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# **ABSTRACT BOOK**

## **Free Papers**

**Date: 2019-12-05**  
**Session: Trauma Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 54714**

**POLYTRAUMA - ARE BINDERS BEING UTILISED APPROPRIATELY?**

Christopher O'DOWD-BOOTH<sup>1</sup>, Thomas GEYTON<sup>2</sup>, Jay WATSON<sup>2</sup>,  
Christopher THORNHILL<sup>2</sup>, Enis GURYEL<sup>2</sup>, David CRONE<sup>2</sup>

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Introduction: Polytrauma is an increasing burden upon modern healthcare, and a current focus for improvement. Pelvic trauma carries a significant morbidity and mortality. The development of pelvic binders and their utilization has reduced this risk by reducing intra-pelvic volume, encourage clot formation and reducing blood loss. However, are these devices being used effectively and is sufficient investigation being performed? Methods: A retrospective review of electronic records from November 2018 – February 2019 was conducted within the major trauma centre, with two independent reviewers. Exclusion criteria included: insufficient imaging and paediatric trauma. Analysis of binder position and post-removal imaging was performed. Results: 177 cases were included for review. Analysis revealed 44% of cases demonstrated inappropriate positioning of pelvic binder. 76% were sited above the optimum level of the mid-trochanteric point. There was a mean distance of 58.8mm from the optimum position, with a range from 22m to 128mm. Of these patients 9% had appropriate complete trauma imaging in the form of whole body trauma CT scanogram, with 3.2% of those without a pelvic fracture undergoing a post-binder removal plain pelvic radiograph. Conclusion: Binder position is essential in effective haemorrhage control. This study demonstrates within the major trauma setter only half are positioned optimally. Further education into correct positioning is essential to reduce morbidity and mortality. Ligamentous injury is easily missed and hence post binder removal imaging is essential, but often forgotten. Further education and research is vital to improving trauma practice and improving patient outcomes in regard to pelvic trauma.

**Date: 2019-12-05**  
**Session: Trauma Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 54797**

**BIOMECHANICAL EVALUATION OF OSSEOUS FIXATION PATHWAYS IN AN ASSOCIATED BOTH COLUMN ACETABULUM FRACTURE**

Samuel HAILU<sup>1</sup>, Richard JENKINSON<sup>2</sup>, Markku NOUSIAINEN<sup>2</sup>, David STEPHEN<sup>2</sup>, Hans KREDER<sup>2</sup>, Stewart MCLACHLIN<sup>2</sup>, Carin WHYNE<sup>2</sup>

<sup>1</sup>Black Lion University Hospital, Addis Ababa (ETHIOPIA), <sup>2</sup>Sunnybrook Health Science Centre, Toronto (CANADA)

Anatomic reduction and stable fixation of acetabulum fractures plays the key role for successful long term outcome. Their fixation is often challenging and poses a large number of possible instrumentation strategies. There is limited biomechanical data that identifies the ideal construct for fixation of associated both column (ABC) acetabulum. This study examined the relative differences between ABC fracture fixation techniques based on acetabulum displacement under simulated weight bearing loads. Six composite right hemi-pelvises, with a fused right sacroiliac joint, were used in this study. Standardized high variety ABC fractures with each column in a single fragment (AO/OTA 62-C1.1) were created. Fractures were initially reduced and stabilized using 3.5mm screws, then 12-hole J-plate was added. This fully-fixed construct was then tested in a single-leg stance model under six cycles of independent axial load tests of 150, 400, and 800N (representing 25, 50, and 100% weight bearing loads). The final cycle for each load was held for 60 seconds to record the acetabular fracture gap displacement. Changes in acetabular stability were then compared between the (1) fully-fixed configuration and following sequential removal of the (2) plate, (3) lateral compression type II (LS) screw, and (4) retro-acetabular screws (RAS). ABC acetabulum fracture pattern was effectively stabilized at the articular fracture site by all fixation configurations tested in quasi-static loading. Fracture stability identified at simulated 100% body weight loads may suggest patients with an inferiority directed supracetabular screw could withstand earlier weight bearing.

**Date: 2019-12-05**  
**Session: Trauma Free Papers 1**  
**Time: 08:00 - 10:00**  
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**Abstract no.: 54727**

**MANAGEMENT OF UNSTABLE PELVIC RING FRACTURES – IS POSTERIOR FIXATION THE SOLUTION? AN ANALYSIS OF 73 CASES**

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**Introduction:** Unstable pelvic ring disruptions result from high-energy trauma and are often associated with multiple concomitant injuries. Internal fixation has become the preferred treatment for unstable posterior pelvic ring injuries. Several methods of fixation of pelvic injuries have been described, including anterior symphysis plating, posterior sacroiliac plating, lumbopelvic fixation and percutaneous fixation with iliosacral screws. **Aim:** The aim of this study was to report on the functional, clinical and radiological results of internal fixation of unstable pelvic injuries in a tertiary care centre. **Materials and methods:** This study involved 73 patients with pelvic injuries who had stabilisation in our centre from JAN 2012 to DEC 2017. 28 patients had Tile B, 38 had Tile C & 7 had Tile A injuries. 62 patients had a posterior fixation in the form of iliosacral screw or plate fixation, 9 patients had anterior & posterior fixation and 4 patients had lumbopelvic fixations. The mean duration of postoperative follow-up was 25.29 (13–48) months. The clinical outcome was assessed with postoperative Majeed's score and the rate of postoperative complications assessed. **Results:** The mean postoperative Majeed score was 76.57. There was a significant improvement in postoperative vertical displacement. 2 patients with lumbopelvic fixation had superficial infection and had implant exit after one year. **Conclusion:** Treatment of unstable pelvic injuries is individualised according to mode of injury. Selective posterior fixation of unstable pelvic fractures with percutaneous iliosacral screws or posterior ilium plating achieves good functional results with minimal soft tissue trauma.

**Date: 2019-12-05**  
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**Abstract no.: 54401**

**DOES TIMING OF SURGERY AFFECT PERIOPERATIVE FACTORS AND SHORT-TERM OUTCOMES AFTER SURGICAL TREATMENT OF ACETABULAR FRACTURES?**

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University of Texas Health Sciences Center, Houston (UNITED STATES)

Introduction: The purpose of this study was to determine whether the timing of open reduction and internal fixation for acetabular fractures has an influence on perioperative factors and short-term medical and surgical outcomes. Materials and Methods: Patients with operatively treated acetabular fractures over a 5-year period were reviewed and stratified based on time to surgery after admission: <2 days versus >2 days, <5 days versus >5 days, <7 days versus >7 days. Patients were then separated based on approach (Kocher-Langenbeck or ilioinguinal) and re-analysed with the time points discussed previously. Outcomes included operative time, estimated intraoperative blood loss, length of stay, and early medical and surgical complications. Results: We identified 204 patients. When comparing blood loss and operative time amongst various timepoints, there were no statistically significant differences. This held true after the cohort was re-assessed based on approach. At every time point analysed, the latter group had a statistically significant increase in hospital stay. This held true after the cohort was re-assessed based on approach as well. There were no statistically significant differences in early surgical or medical complications observed amongst the time points. Discussion: We found that there was no advantage in terms of blood loss or operative time for early versus late fixation of acetabular fractures. However, at every time point analysed, the later cohort had a statistically significant increase in hospital stay. We, therefore, recommend treating these patients as soon as they are medically optimized to limit their hospital stay.

**Date: 2019-12-05**  
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**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 54866**

**FUNCTIONAL OUTCOME OF ACUTE PRIMARY TOTAL HIP REPLACEMENT AFTER COMPLEX ACETABULAR FRACTURES**

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**PURPOSE:** To assess the functional outcome of acute primary total hip replacement in the management of complex acetabular fractures. **MATERIAL AND METHODS:** This prospective observational study was conducted in orthopaedic department of Liaquat National Hospital and Medical College, Karachi. The study was approved by the Ethics review committee of hospital (0190-2016). Patients encountered between January 2010 to January 2016 were entered. 54 patients with acetabular fractures with certain indications (marginal impaction or significant comminution (>3 fragments) of the articular surface of the acetabulum, full-thickness articular injury to the femoral head, an associated femur neck fracture, or pre-existing symptomatic osteoarthritis) were treated with primary total hip replacement. Patients were followed at regular intervals to assess the radiological union of fractures and complications. Functional outcome was evaluated after 2 years by applying Harris Hip Score. All statistical analysis was done by using SPSS version 20. **RESULTS:** All patients achieved radiological union of fractures at an average duration of 21 weeks. During follow up, seven complications were observed. Two patients developed superficial surgical site infection which was treated conservatively. One patient had dislocation which was reduced closely while two patients had acetabular cup loosening which was revised. We also observed 2 cases of Brooker I heterotopic ossification and 1 case of Brooker II. At two year follow up, 78% of patients had an excellent and good functional outcome. **CONCLUSION:** Primary total hip replacement is a valid and reasonable one stage surgical treatment after complex acetabular fractures. However, the complications are not uncommon.

**Date: 2019-12-05**  
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**Abstract no.: 53766**

**RELIABILITY OF RADIOGRAPHIC MATTA GRADING IN THE ASSESSMENT OF QUALITY OF REDUCTION AFTER SURGICAL FIXATION OF ACETABULAR FRACTURE**

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• Introduction: Fractures of the acetabulum are high-energy, potentially life-changing injuries. Surgical treatment of displaced acetabular fractures is the treatment of choice, because it allows anatomical reconstruction of the hip joint. A strong positive correlation has been found between clinical and radiological outcomes. Although Matta grading scale has been commonly used in measuring radiographic displacement in acetabular fracture, this scale has not been tested for its reliability. The purpose of this study was to assess the interobserver/intraobserver reliability of Radiographic Matta Grading. Methods: Plain radiographs (anteroposterior and Judet views) of 35 patients who underwent surgical fixation for acetabular fracture were randomly chosen. Independent reviewers measured articular displacement on plain radiographs utilizing Radiographic Matta Grading on two occasions with at least two weeks between observations. The study involved three groups of orthopaedic surgeons based on their training experience. Intraclass correlation coefficients (ICCs) were used to assess observer agreements. Results: The interobserver reliability was found to be excellent with a mean weighted ICC of 0.93 (0.89 – 0.96). When taken individually for the different groups of observers, the inter-rater reliability for orthopaedic trauma consultants, fellows and residents were 0.78 (0.54 – 0.89), 0.83(0.68 – 0.91), 0.75(0.51 – 0.87). When the two sessions were compared, intraobserver reliability was found to be 0.87 (0.76 – 0.93). Conclusion: Both intra- and inter-observer reliability were excellent. Matta grading scale in our study was shown to be reliable tool for radiological evaluation of acetabular fractures.

**Date: 2019-12-05**

**Session: Trauma Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Auditorium**

**Abstract no.: 52830**

**PARARECTUS VERSUS ILIOINGUINAL APPROACH IN ACETABULAR SURGERY: A RADIOLOGICAL AND CLINICAL OUTCOME ANALYSIS**

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Introduction: Aim of this retrospective database analysis of prospectively collected data was to evaluate radiological and clinical follow-up results after internal fixation of acetabular fractures involving the anterior column using the pararectus approach. Methods: Between 2013 and 2015, 61 patients with an acetabular fracture treated surgically through pararectus and ilioinguinal approach were included. Reduction results were rated according to the modified Matta criteria using a defined measurement protocol in CT scans. Mean operation time, complications, and clinical outcomes median one year postoperatively were compared as well. Results: In the pararectus group (P-group, n=43; mean age: 55 years), reduction was anatomical in 21 out of 40 available patients, imperfect in 11 patients, and poor in 8 patients. The mean joint step reduction was 3.7 mm, and the mean joint gap reduction was 12.1 mm. In the ilioinguinal group (I-group, n=18; mean age: 53 years), reduction was anatomical in 9 out of 18 patients, imperfect in 4 patients, and poor in 5 patients. The mean joint step reduction was 1 mm, and the mean joint gap reduction was 7 mm. Secondary total hip arthroplasty was necessary in 4 patients in the P-group and in 1 patient in the I-group. Operation time was significantly shorter in the P-group ( $p < 0.001$ ). Conclusion: This study indicates that acetabular fracture reduction using the pararectus approach is at least comparable to the ilioinguinal approach independent of patients' age. A relevant advantage of the pararectus approach was seen in a significantly shorter operation time.



**Date: 2019-12-05**  
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**Abstract no.: 53505**

**CLINICAL RESULTS OF FIXATION WITH TRANS-ILIAC ROD AND SCREW FIXATION (TIRF) FOR POSTERIOR PELVIC RING FRACTURES**

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Introduction: Sacral fractures are ordinarily treated with IS screws or posterior plates. But the rate of IS screw misplacement is reported as being up to 12%. Posterior plate fixation is difficult in reducing fracture intra operatively. The stability of fixation with these methods can be inadequate. In 2006, we developed a new fixation technique with spinal instrumentation system, named "Trans-iliac rod and screw fixation: TIRF", and report the clinical results. Operative technique: Incise 5cm just above both sides of post. sup. spine of ilium and make a tunnel under posterior muscles. Then, insert 2 pedicle screws to each side, pass two rods through the tunnel and fix them to the screw heads. Finally, set the transverse connecting devices between the two rods. Method: We indicate this method for type B, C1 and C2 sacral fracture on AO classification. We have treated 34 cases, 19 male and 15 female. Fracture types varied from B for 23 to C for 11 cases. We evaluated complications and clinical results. Results: We experienced one case of surgical site infection, and one case of difficulty in implant removal. On radiological evaluation, we misinserted 6 screws out of 136 screws, but they did not cause any symptomatic problems. We had no cases of nonunion or correction loss. Conclusion: TIRF is an easy and safe procedure, which has high compatibility and stability of fixation. We recommend this method as an effective option in the treatment of sacral fractures.

**Date: 2019-12-05**  
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**Abstract no.: 53087**

**LUMBO-PELVIC FIXATION IN UNSTABLE SACRAL FRACTURES, IS IT A NECESSITY OR A CHANGING TREND?; A CLINICO-RADIOLOGICAL ANALYSIS OF 67 CASES**

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Purpose: Advances in intraoperative imaging and closed reduction techniques have led to a shifting trend towards Lumbopelvic fixation (LPF) in every unstable sacral fracture. The purpose of this study was to evaluate the clinico-radiological outcome of Sacro-iliac (SI) screw and LPF techniques in unstable sacral fractures and thereby, delineate the indications for LPF. Methods: 67 patients with unstable sacral fracture and associated pelvic ring injury were divided into two groups based on surgical technique employed: 1. SI screw group and 2. LPF group. The electronic medical record for each patient was reviewed and recorded for demographic factors and injury details and treatment outcomes were evaluated using follow-up parameters of Pohleman et al. The minimum follow-up period was 2 years. Results: There were 40 patients in SI group (59.7%) and 27 patients in LPF group (40.3%). Among the associated pelvic-ring injuries, APC-2 (47.7%) was the commonest followed by vertical shear (20.9%). There were 33 patients with spino-pelvic dissociation of which 22 were managed by LPF, and remaining 11 with vertical instability had SI screw fixation alone. According to Pohlenmann clinical score, final outcome score showed 39 patients (58.2%) with excellent, 18 patients (26.8%) with good and 10 patients with (14.9%) fair results. Conclusion: Majority of unstable sacral fractures can be effectively managed with percutaneous SI screw including vertically unstable injuries by paying strict attention to pre-operative patient selection in terms of fracture comminution, neurodeficit and closed reduction techniques.

**Date: 2019-12-05**  
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**Room: Auditorium**

**Abstract no.: 53454**

**COMBINED ILIOINGUINAL AND MODIFIED GIBSON APPROACH WITH ANTEROSUPERIOR ILIAC SPINE (ASIS) OSTEOTOMY FOR IMPROVED ACETABULAR EXPOSURE: A CADAVERIC STUDY.**

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Introduction: Combined approaches for severely displaced T-Type or T-type posterior wall acetabular fractures is often necessary for proper reduction and fixation. We introduce a modified Gibson approach combined with ASIS osteotomy for simultaneous reduction and fixation of both acetabular columns. Methods: Twelve acetabula (6 cadavers) were used. In lateral position, a modified Gibson approach with the lateral window of the ilioinguinal approach was used. Incision was carried from the mid-lateral thigh, curving anteriorly to above iliac crest, extending 5 cm posterior to ASIS. After soft tissue dissection, boundaries of the acetabulum exposure were marked. An "L" shaped ASIS osteotomy was performed and retracted medially with the inguinal ligament. The additional anterior column area exposed after osteotomy was labelled. Subsequently, surrounding soft tissue was removed to allow measurement of the marked area before and after osteotomy. The midpoint of a line drawn from ASIS to the SI joint (MP) and pubic symphysis (PS) was used as reference. Surface area photography and computer analysis was used for measurements. Results: ASIS Osteotomy increased anterior column exposure to the level of the iliopectineal eminence: MP to PS was 25.91mm and 60.60 mm before and after osteotomy, respectively. Average anterior column surface area increased by 20%, from 5543 sq.mm to 6617 sq.mm. Conclusion: Modified Gibson approach in combination with lateral ilioinguinal window and ASIS osteotomy provides excellent exposure to the lower part of anterior column. This may allow improved reduction and fixation of T-type and T-type with posterior wall acetabular fractures via a single approach.

**Date: 2019-12-05**  
**Session: Trauma Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 54249**

**MINIMALLY INVASIVE SURGERY FOR CALCANEAL FRACTURES USING, BIORESORBABLE CANNULATED HA/PLLA SCREWS.**

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**Objectives:** The purpose of this report is to present our surgical technique using HA/PLLA screws for calcaneal fractures, and to verify the advantages of this device using postoperative radiographs. **Methods:** Two transverse 2 cm skin incision was made at 1 cm proximal to insertion of the Achilles tendon into the calcaneus and at 2 cm inferior to the lateral malleolus. During the reduction of the posterior facet using the K-wire, 2 cannulated HA/PLLA screws are inserted from lateral to medial through the lateral incision holding the posterior facet to the sustentaculum. Then, additional 2 cannulated HA/PLLA screws were inserted from posterior to anterior just below the fracture fragment through the posterior incision. Nineteen patients were treated using this method. Radiographs were evaluated for fracture healing, radio-opacity of the pins, and radiolucent zones around the pins. The range of motion of the fingers and the postoperative complications were assessed. **Results:** All fractures were united. Shadows of all the screws were observed and there were no radiolucent zones around the pins at the final radiographic follow-up. Postoperative complications were not observed in any of the patients. **Conclusions:** The radio-opacity of HA/PLLA devices is a major advantage of this device. No radiolucent zones were present around the screws, no osteolysis was observed on postoperative radiographs, and there were no postoperative complications. Re-operation for removal was unnecessary. Open reduction and internal fixation using HA/PLLA screws offers several advantages in treating calcaneal fractures.

**Date: 2019-12-05**  
**Session: Trauma Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 54203**

**MRI EVALUATION OF THE POSTERIOR PELVIC BONY AND SOFT-TISSUE INJURIES WITH TILE'S C DISPLACED PELVIC FRACTURES IN YOUNG CHILDREN.**

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Ligamentous disruptions with avulsion of the corresponding growth apophyses is the most common mode of failure of the pelvic ring in young children. Knowledge of the detailed soft tissue and bony patho-anatomy is relevant in case of surgical fixation. We retrospectively reviewed the charts of children with displaced pelvic fractures Tile's C and open triradiate cartilage. Twenty-nine patients were identified with mean age was  $7\pm 3$  years (2 - 14 years). In addition to CT studies, 8 patients had pelvic MRI scans for the assessment of associated posterior pelvic soft-tissue injuries. Iliac apophysis avulsions with displaced sacroiliac joint injuries were seen in 23 patients. The iliac apophysis was attached posteriorly to the quadratus lumborum with the iliolumbar ligament, iliocostalis and the longissimus parts of the erector spinae muscle and latissimus dorsi with the posterior layer of the thoracolumbar fascia TLF. In 2 patients, there was massive soft tissue disruption extending anteriorly with split anterior abdominal wall muscles into 2 layers. The superficial layer was the external oblique and was attached distally to the displaced bony iliac wing, while the deep layer was the internal oblique and transversus abdominis muscles and was attached distally to the avulsed iliac crest apophysis and posteriorly to the middle layer of the TLF. The TLF in particular the middle layer is a key structure, as it is continuous distally with the posterior capsule of the sacroiliac joint and attached to the posterior iliac crest as well as its attachment to the lumbar transverse processes.

**Date: 2019-12-05**  
**Session: Hip Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 55159**

**DIRECT ANTERIOR APPROACH IS SAFE FOR REVISION TOTAL HIP ARTHROPLASTY**

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Introduction: Potential benefits of the hip direct anterior approach (DAA) include inherent stability, a true internervous plane, and improved implant positioning and leg length evaluation with fluoroscopy. Shortcomings of the DAA include a steep learning curve, difficult femoral exposure and its non-extensile nature. Given the paucity of available literature, the purpose of our study is to evaluate the results of the DAA in revision THA. Methods: Retrospective analysis of DAA revision THA cases from 2014-2017 was performed. Chart review identified surgical outcomes, perioperative and postoperative complications, and reoperation. Leg length discrepancy (LLD) and acetabular component positioning were also evaluated. Results: 95 DAA revisions were performed (30 head/liner exchanges, 25 acetabular, 16 femoral, 9 femoral & acetabular revisions, with 6 resection arthroplasties and 9 two-component reimplantations for infections). Average surgical time was 92 minutes, average blood loss was 290mL, and average haemoglobin drop was 2.9g/dl. 16.8% (16) of cases required transfusion postoperatively. One patient sustained a periprosthetic fracture; wound complication and DVT rate were 3.3% (3) and 1.1% (1), respectively. The dislocation rate was 6.6% (6). 13.1% (11) of patients required reoperation. Radiographs demonstrated that 88.4% of acetabular revisions fell within the Lewinnek safe zone (40° +/- 10°), with an average inclination of 44.25°. Mean postoperative LLD was +1.51mm. Discussion: The current study shows that the DAA approach is safe for revision THA with complication rates comparable to those with traditional approaches. Dislocation rates, implant malposition and LLD were at least as low as any previously reported in the literature.

**Date: 2019-12-05**

**Session: Hip Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 53030**

**CLINICAL EVALUATION CONVERSION TOTAL HIP ARTHROPLASTY FROM PEDICLED VASCULARISED ILIAC BONE GRAFT TRANSFER**

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Background: Conversion total hip arthroplasties (THAs) from prior Pedicled Vascularized Iliac Bone Graft Transfer (PVIBGT) are infrequently reported in the literature. We characterized the perioperative outcomes of patients undergoing conversion THA and compared them with those of a matched cohort of patients undergoing primary THA for osteonecrosis of the femoral head .Methods: The institutional database was queried for patients with PVIBGT requiring conversion to THA. This cohort was then matched 1:1 for age, gender, and American Society of Anesthesiologists (ASA) score for patients with ONFHN undergoing primary THA. Medical records were reviewed for intraoperative and postoperative complications, which were then compared between conversion and primary THA patient cohorts. Result: 120 THA patients were included for analysis (60 patients with PVIBGT matched to 60 patients with ONFHN and no prior PVIBGT). The mean perioperative blood loss of the testing group was 480 ml(range , 400-750ml) , and the control group 420ml (range , 350--600ml)(P=0 . 09) ; The mean operation duration of the testing group was 105 min(range , 90-130 min) , and the control group 100 min(range , 90-120 min ; P=0 . 168) ; Complication rate of the testing group was 4.9%(3 cases)and the control group8.6%(5 cases ; P<0.05) ; The mean postoperative HHS of the testing group at the half-year follow-up and the latest follow-up day were 85.8 score(range , 80-92 score) and 96.9 score(rang , 92-100 score) , and the control group 80.5 score (range , 76-90 score)and 92.6 score(range , 86-100 score ; P<0.05) . Conclusion Pedicled Vascularized Iliac Bone Graft Transfer treatment of osteonecrosis of the femoral head did not make THA more difficulty and more peri-operative complication . The recovery of the hips functions are satisfactory .

**Date: 2019-12-05**  
**Session: Hip Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 55138**

**OUTCOMES OF CEMENT IN CEMENT REVISION IN REVISION TOTAL HIP ARTHROPLASTY**

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**OBJECTIVES:** The cement-in-cement femoral revision technique involves removing a femoral component from a well-fixed femoral cement mantle and cementing a new stem into the original mantle. This technique, when carried out for the correct indications, is fast, relatively inexpensive and carries a reduced short-term risk for the patient. **METHODS:** Consecutive series of 66 patients who underwent revision hip arthroplasty with cement in cement fixation of femoral stem at a single unit in a tertiary referral orthopaedic centre were retrospectively analysed for operative time, intra operative complications, post-operative complications, clinical and radiological outcomes. **RESULTS:** Average age of patients was 76 years (49-86). Mean follow up was 16.2 months (6- 41). Most common indication for the surgery was cup loosening in 28 patients (42.4%), followed by dislocation in 14 patients (21.2%) and stem loosening (proximal cement mantle) in 12 patients (18.2%). Average operative time was 184.6 (90-290) minutes. 4 (6.1%) patients required re-revision in the post op period, 2 due to dislocation, and one each due to deep infection and stem fracture. 2 patients (3.03%) suffered intra-operative fractures, and 1 had stem-perforation. 1 patient (1.5%) had radiological loosening at bone-cement interface at the end of 1 year. Common post-op clinical complaints were persistent pain and abductor weakness. Rest of the patients however had a satisfactory outcome. **CONCLUSION:** The cement-in-cement technique for revision of the femoral component was advantageous and gave promising results in terms of being less invasive, reduced intra and post-operative complications like fractures and stem perforation, reduced financial costs and reduced post op morbidity.



**Date: 2019-12-05**

**Session: Hip Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 53041**

**TOTAL HIP ARTHROPLASTY AFTER FAILURE OF ACETABULAR FRACTURES FIXATION**

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Total hip arthroplasty after acetabular fracture is challenging. Patients young age, pelvic deformity, unpredictable bony bone integration and presence of hardware need to be considered before undertaking surgery in these patients. Availability of trabecular metal implants, dual mobility hips have helped in improving our results. During a period from Jan 2009 to Jan 2018 a total of 28 cases were operated for secondary osteoarthritis following acetabular fractures. 20 cases had been managed primarily with ORIF and remaining 8 cases were conservatively managed. We have used trabecular metal implants and dual mobility implants depending on patient factors. In our series there has been one dislocation and 3 superficial skin infection. We have followed these case for an average period of 5.3 years. The Harris hip score improved after surgery. Our results show that proper implant selection and planning of such cases can help in achieving outcomes comparable to primary total hip.

**Date: 2019-12-05**  
**Session: Hip Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 53182**

**MANAGING DISLOCATIONS FOLLOWING HIP ARTHROPLASTY**

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Revisions for hip dislocations have been analysed in this study. 3369 primary and 347 revision THAs were performed between 1st January 2005 and 30th June 2018 in our department. The average follow-up time was 7.4 years (0.5-13) in case of primary, and 7.5 years (0.8-13) in case of revision surgeries. Time to revision, type of revision, and success of the revised cases have been evaluated. 102 hip dislocations have been found in the study period following primary surgeries (3%). Half of these cases (51/102) had multiple dislocations. More than 70% of the dislocations occurred within the first postoperative year. 26 dislocations have been found following revision THAs (7.5%). Also almost half of them (12/26) had multiple dislocations. Approximately 85% of the dislocations occurred within the first year. Revision for dislocation was performed in 18% of the cases (18/102) in the primary group, in the revision surgery group this ratio was 38.5% (10/26). Following this 28 revised cases, no further dislocation was detected in 17 cases, single dislocation was detected in 2 cases, and multiple dislocations in the remaining 9 cases. Re-revision was performed in 5 cases for recurrent dislocation, out of which 3 cases ended up with a Girdlestone procedure. Also Girdlestone procedure was performed in 2 further cases for any other reason. Revisions for hip dislocation gave good results in our practice. These results could be used to inform our patients more precisely about the risk of dislocation following their hip arthroplasties, as well as about possible treatment options.

**Date: 2019-12-05**

**Session: Hip Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 55069**

**DUAL MOBILITY CUPS FOR RECURRENT THA DISLOCATION**

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Introduction: Hip dislocation after total hip arthroplasty remains a challenging problem for the patients and the surgeons. However, among several solutions suggested, it seems that revision THA utilizing dual mobility implant (tripolar prosthesis) may be associated with acceptable outcomes. In current study, we evaluated the midterm outcomes of revision THA using tripolar prostheses in continuation of our previous study. Methods: Between 2005 and 2016, 33 consecutive patients were revised due to recurrent hip dislocation. The patients aged  $64.1 \pm 11.8$  years at the time of the surgery. The inclusion criteria was at least 2 episodes of dislocation after the primary THA. The Patients were followed for  $8.5 \pm 3.8$  years. Results: HHS increased significantly from  $51.3 \pm 11.2$  preoperatively to  $82.7 \pm 9.3$ ,  $p < 0.001$ ). Postoperative dislocation was found in one patient underwent another revision surgery (3%). There was no patient with infection development, symptomatic venous thromboembolism, implant loosening or periprosthetic fracture. Conclusions: Revision THA using dual mobility implants in patients with hip dislocation following the primary THA resulted in compromising functional outcomes without any serious complications. Furthermore, the rate of redislocation was considerably lowered.

**Date: 2019-12-05**  
**Session: Hip Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 53944**

**TOTAL HIP ARTHROPLASTY: EVOLUTION OF THE USE OF DUAL MOBILITY CUPS IN LEBANON**

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Recurrent dislocation, major reason for revision total hip arthroplasty, was found to decrease significantly using dual mobility cup compared to standard cups, in both primary and revision THA. These acetabular implants have gained popularity in different countries besides the country of original concept, France. In Lebanon, the number of DMC implants witnessed a raise but with a lack of quantified reports. Having no national registry, we conducted investigations with each registered company providing THA implants in Lebanon. Data collection was obtained over 5 years, (2013-2017). Data analysis was conducted for each year in terms of rates of implanted THA with DMC and those with SC. Out of the total THA number per year, the percentage of THA-DMC implanted in Lebanon shifted from 34.95% in 2013 to 61.3% in 2017 ( $z = 17.8$ ;  $p = 0.0001$ ), yielding a relative increasing rate of 88% over these 5 years. Additionally, the rate increase has been steady and linear from 2013 to 2017. Lebanese orthopaedic surgeons seem to favour DMC over SC in THA surgeries. While this trend has been noted in France, and in many European countries, no accurate data has been reported on DMC prevalence use from the French literature. When compared to DMC use in the United States, the DMC rate of 61.3% in Lebanon was found to be much higher than the reported 17% from US joint replacement registry. The reported reduced dislocation and mechanical loosening rates following DMC could be the reason behind the observed DMC popularity in Lebanon.

**Date: 2019-12-05**

**Session: Hip Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 53037**

**METALLOSIS DUE TO TITANIUM TAPER WEAR IN 36 CERAMIC-ON-CERAMIC TOTAL HIP ARTHROPLASTY CAUSING EARLY IMPLANT LOOSENING AND REVISION SURGERY**

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Background Metal wear debris are known to cause metallosis and pseudotumors in metal-on-metal hip arthroplasties. This study presents titanium wear in ceramic-on-ceramic THA, which led to loosening and revision surgery. This is not reported in the literature yet. Objectives Eleven cases presenting a rare problem of metallosis in Total Hip Arthroplasty, each with a 36mm ceramic on ceramic (CoC) bearing, a cementless HA-coated titanium stem with a 12/14mm taper, and a cementless titanium press-fit cup. Revision surgery was required due to pain combined with partial aseptic loosening of implants and pseudotumors. During surgery black stained tissues were found in all eleven cases and metallosis was confirmed by histopathology. Methods All eleven THA cases increased titanium blood serum levels were detected. Results: All cases presented with a pseudotumour, black stained synovial tissues, metallosis was confirmed in histopathology. Conclusions Titanium metallosis in 36mm Ceramic-on-ceramic bearings in THA have not been reported yet. The titanium particles caused clinical symptoms and radiographic loosening and originated from the stem taper (trunnion). THA revision to a hard on soft bearing successfully reduced symptoms and titanium serum levels. Further data are needed to comment on the general avoidance of 36mm CoC bearings in THA. Until further data will be available, 36mm CoC bearings should be avoided in THA.

**Date: 2019-12-05**

**Session: Hip Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 53049**

**PSEUDOTUMOURS IN SMALL-HEAD METAL-ON-METAL TOTAL HIP ARTHROPLASTIES AT A MINIMUM FOLLOW-UP OF 20 YEARS. A CONCISE FOLLOW-UP OF A PREVIOUS REPORT.**

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Metal-on-metal (MOM) surfaces in total hip arthroplasty (THA) have been used for young and active patients, due to their reduced risk of wear. Serum cobalt and chromium levels have been used as the standard investigation for follow-up examinations. Magnetic resonance imaging (MRI) with metal-artifact reducing sequences has shown good results in detecting pseudotumors in either symptomatic or asymptomatic patients. The aim of the study was to find out if there is a significant correlation between MRI findings, serum metal levels and pseudotumors and if serum cobalt and chromium levels are useful in detecting patients with pseudotumors. A cross sectional study including 26 patients (29 THAs) of the original 98 patients (105 THAs), included between November 1992 and May 1994 was performed. They were successfully recruited for clinical, radiographic and MRI follow-up examination at a minimum follow-up of 20 years. The mean age at follow up was 72.2 years (range, 51-87 years). Pseudotumors were found in 19 hips. There was no significant correlation between patients with or without pseudotumors regarding serum metal levels, clinical outcome scores, demographic data and cup inclination. The cumulative rate of survival was still at 91.4% in our study cohort at 22.8 years. This study presents the first published data on small-head metal-on-metal hips, comparing the metal ion levels, pseudotumors, clinical and radiological results with a follow-up period of over 20 years. We could show, that MRI is more sensitive for detecting pseudotumors, while serums metal levels alone still lack sensitivity for detecting pseudotumors.

**Date: 2019-12-05**  
**Session: Hip Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 52969**

**OUR EXPERIENCE OF TREATMENT OF BÜRCH-SCHNEIDER ANTI-PROTRUSIO CAGE**

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[Background] This study aimed to evaluate retrospectively the clinical outcomes and complications of structural allografts and Burch-Schneider cage to treat severe acetabular defects in revision total hip arthroplasty. [Objectives] From 2000 to 2015, 10 hips underwent revision THA using structural allografts and Burch-Schneider cages for acetabular reconstruction, including we were able to follow up more than one year. We assessed activity of daily living, postoperative complication, and radiographic examination. [Result]

- Final activity of daily living: Ability to walk with crutch were 5 cases, ability to walk with wheelchair were 5 cases.
- Postoperative complication are that temporary peroneal nerve palsy was 1 case, postoperative dislocation were 2 cases, migration of the APC and screw breakage because of trauma was 1 case, a mild migration of the APC was 1 case, a breakage of the femoral stem was 1 case. 3 cases, excluding 1 case of postoperative dislocation, 1 case of mild migration of Cup and 1 case of temporary peroneal nerve paralysis, performed revision surgery.
- Radiographic examination: The bone graft was incorporated on the basis of the appearance of trabecular remodelling within the graft area in 8 cases, excluding 1 case of a dislocation, 1 case of a bit migration of the APC. The two cases of failure were too high of BMI.

[Discussion] Successful bone grafting for acetabular deficiency has been widely reported but with longer follow-up problems of graft resorption and collapse have also been recognized. But we think that it is necessary to be careful when Paprosky's classification IIIa, IIIb, IV, and BMI are too high when using APC.

**Date: 2019-12-05**  
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**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 55239**

**PERI-PROSTHETIC FRACTURE FOLLOWING CEMENTED COLLARLESS POLISHED TAPER STEM: INCIDENCE AND RISK FACTORS IN OVER 2500 CASES AT MAXIMUM 14 YEARS**

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Background - Peri-prosthetic fractures (PPF) remain a concern and are associated with significant patient morbidity and mortality. Large registry datasets have suggested that the choice of cemented stem may influence the risk of PPF. We investigated all PPF associated with a single cemented stem design used in primary THA and the technical performance. Methods - All patients who received the 12/14 CPT TM stem (Zimmer Biomet) from its introduction at our institution in 2004-2018 were selected. Analysed 2533 cases of which 266 were excluded where the CPT was used in revision THA. Radiographic analysis done considering Barrack cement grade and stem alignment. Results – 27 PPF occurred at a mean interval of 3.0 years (range 1month -11years). Vancouver Classification type B1 = 1, B2 = 14 & C = 12 with an overall incidence 1.19% (95% CI 0.08–1.73). PPF treated by revision THA (13 B2 & 1 C) totalled 0.62% (95%CI 0.37-1.03) at maximum 14 years F/U. The age at time of index surgery in the fracture group was not statistically significant ( $p=0.303$ ). Fisher's exact test demonstrated no significant difference in implant position, cement grade or stem size ( $p=0.678$ ). Conclusions - This study provides benchmarking data regarding the PPF risk for patients receiving a contemporary cemented polished taper stem. The NJR only identifies cases where a stem was revised; in this series the total PPF risk is double that (0.62 vs. 1.19%). Technical performance, implant size does not appear to influence the incidence of PPF with the CPT stem.



**Date: 2019-12-05**

**Session: Hip Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 54121**

**INTERPROSTHETIC FEMORAL SLEEVES IN REVISION ARTHROPLASTY**

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Interprosthetic femoral fractures (IFF) in patients with ipsilateral stemmed total hip arthroplasty (THA) and total knee arthroplasty (TKA) can be technically demanding to treat surgically. Interprosthetic femoral (IF) sleeves have been designed to avoid the disadvantages of fixation of IFF and of total femoral replacement (TFR); and to provide a stable construct. The aim of this study is to present the results with this device from a single centre. We reviewed 26 patients who underwent revision arthroplasty procedures, using custom-made cemented IF sleeves between 1997 and December 2017 in our institution. Two-part sleeves were utilized in 18 patients and one-part sleeves in 8 patients. The most common indication was an IFF (18 patients). Patients were monitored for postoperative complications, implant failure, and re-revision. The minimum follow-up of the survivors with non-revised sleeves was 12 months. Twenty-three patients were included for the final analysis. The mean survivorship of the IF sleeve was 4.6 years. The overall rate of complications was 47.8%. The rate of mechanical failure was 21.7%. Late infections occurred in 3 patients (13%). At the latest follow-up, the mean Harris Hip Score (HHS) was 69.9 points (range 39 to 94), and the mean functional Knee Society Score (KSS) was 42.5 points (range 0 to 90). The IF sleeve is a valid technique for the management of selected patients with IFF, particularly when a stable fracture fixation is not possible. Hip instability is not a concern and functional improvement is achievable. Careful planning is required preoperatively to avoid mechanical failure.

**Date: 2019-12-05**  
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**Room: Grand Ballroom Hall A1**

**Abstract no.: 53059**

**REOPERATION AFTER ELECTIVE TOTAL HIP REPLACEMENT. DO REOPERATIONS INFLUENCE THE RELATIVE SURVIVAL AND IS THE RELATIVE SURVIVAL DIAGNOSIS-SPECIFIC?**

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Introduction: The association between long-term survival and elective primary total hip replacement (THR) has been described extensively. The long-term relative survival following reoperation of THR is less well understood. We studied relative survival of patients with reoperation following elective THR and compared the results for different indications of reoperation. Methods: In this observational cohort study we selected patients who received an elective primary THR during 1999-2017 as recorded in the Swedish Hip Arthroplasty Register. Patients were followed until the end of the study period, censoring or death. We related patient survival after a first or second reoperation to survival of all Swedish inhabitants matched on age, sex and year of birth. Results: There were 9,926 patients with a first-time reoperation. Of these 2,558 underwent further reoperations. Relative survival at 5 years after the first reoperation was 0.94 (95%CI 0.93-0.96) and 0.90 (95%CI 0.87-0.92) after the second reoperation. At 5 years, patients with a first-time reoperation for aseptic loosening had a 4% higher survival compared to the general population of same age, sex and year of birth. Patients with reoperations due to periprosthetic fracture, dislocation and infection had instead 20, 12 and 7% lower survival compared to their respective group from the general population. Discussion/conclusion: The relative survival is influenced negatively by first- and second-time reoperations following elective THR. This effect is strongest after reoperations for infection, dislocation and periprosthetic fractures.

**Date: 2019-12-05**  
**Session: Hip Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 54857**

**MANAGEMENT OF ACETABULAR FRACTURES**

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Introduction: The aim of this study is to explore the diagnosis, treatment, and clinical prognosis of patients with acetabular fractures. Methods: Between January 2013 and December 2018, 64 patients with acetabular fractures were treated. We performed a retrospective study to analyse the factors which may influence a patient's prognosis after surgical treatment of an acetabular fracture. The factors examined included age, femoral head injury, fracture type, dislocation, initial displacement, delay to injury-related surgery (in days), and quality of reduction. Results: Patients included 38 males and 26 females with a mean age of 50.4 (26-71) years. The mean follow-up period was 2.6 (1-5) years. In a univariable regression analysis, quality of reduction, age, and initial displacement were significantly associated with radiological and clinical outcomes. In a multivariable regression analysis, quality of reduction ( $P < 0.001$ ) and initial displacement ( $P = 0.001$ ) were found to be factors predictive of clinical and radiological outcomes. Additionally, the quality of reduction ( $P = 0.005$ ) was found to be predictive of osteoarthritis development. Discussion: Good therapeutic outcomes in patients with acetabular fractures can be achieved via accurate diagnosis, careful pre-operative planning, a well-performed operation, effective reduction and surgical fixation, and appropriate exercise to allow functional rehabilitation. Conclusion: Study results indicated that the quality of reduction was the most important factor influencing the prognosis of patients with acetabular fractures.

**Date: 2019-12-05**  
**Session: Hip Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 54573**

**NECK OF FEMUR FRACTURES: IS OUR CONSENT ADEQUATE?**

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Background: High profile legal cases such as Montgomery versus Lanarkshire Health Board (2015) have prompted a shift in consenting practices across the NHS to a more patient-centred approach to consent. The British Orthopaedic Association has endorsed consent forms for patients sustaining a fractured neck of femur which outlines the risks that should be described when consenting these patients. It is also our hospital's policy to include delirium as a risk on these consent forms. We assessed the adequacy of consenting for these patients in our hospital. Method: All consent forms for dynamic hip screws (DHS) and hip hemiarthroplasties were audited during three time periods. Interventions between cycle 1 and 2 were clinician education and between cycle 2 and 3 were introduction of pre-printed labels to use on consent forms (they included these risks for the two procedures mentioned above). Results: For hemiarthroplasty only 40% of consent forms included all the risks in cycle 1, increasing to 78% in cycle 2 and up to 85% in cycle 3. For DHS these figures were 19%, 64% and 80% respectively. In cycle 1, 75% of risks were documented in hemiarthroplasties, increasing to 83% in cycle 2 and 89% in cycle 3. For DHSs this was 55%, 67% and 75% respectively. Only 44% of hemiarthroplasty and 40% of DHS consent forms were using pre-printed stickers in cycle 3. Conclusion: consenting for these common procedures was initially inadequate, however, introduction of some simple measures vastly improved practice. There is still much scope for improvement.

**Date: 2019-12-05**  
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**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 52895**

**IMPROVING OUTCOMES FOR PROXIMAL FEMORAL FRAGILITY FRACTURES: THE IMPORTANCE OF A MULTIFACTORIAL APPROACH**

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Introduction: Hip fractures present a significant and increasing burden on health services during an era of healthcare austerity. The importance of dedicated hip fracture units (HFU) has been raised in recent years. This study evaluated the effect of implementing a dedicated HFU in a Major Trauma Centre (MTC) on patient outcomes following fragility fractures of the hip. Methods: Data was retrospectively analysed from a prospectively collected database over a 6 year period at a MTC. Data from 2,777 patients sustaining proximal femoral fragility fractures were studied. Of these, 2,117 patients sustained their fracture prior to introduction of the HFU. Time to surgical intervention (TTS), length of hospital stay (LOS) and survival at 30, 120 and 365 days was recorded. Parametric, non-parametric and segmented linear regression techniques were employed to analyse the data. Results: Although median TTS decreased after introducing the HFU, segmented regression detected this change was largely due to the introduction of the best practice tariff, well before the HFU. LOS started decreasing rapidly 6 months following the introduction of the HFU. Mortality at 30 days demonstrated a constant, significant decrease over the study period, unrelated to the HFU (5.47% pre-HFU to 3.13% post-HFU). Mortality at 120 and 365 days also decreased constantly over the entire study period. Discussion: Several improvements were a result of multifactorial interventions over a 6-year period including introduction of the best practice tariff, orthogeriatrician input, implant change and anaesthetic improvements. The HFU appeared to be the sole intervention causing an improvement in LOS.

**Date: 2019-12-05**  
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**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 54018**

**PREDICTION OF THE DELAYED HEALING IN THE BIPHOSPHONATE ATYPICAL FEMUR FRACTURE BY AFPU SCORE**

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Purpose: We calculated the atypical femur fracture problematic union (AFPU) score based on the intra-op x-ray features with the goal to assess if AFPU score can predict the delayed union in this type of fractures. Methods: Patients with the atypical femur fracture treated at our centre from 2006 to date were identified by CPT code, and reviewed with inclusion criteria of ASBMR major feature. AFPU score is calculated by the sum of all intra-op x-ray features exist in a single patient with one unit assigned to each feature. Fracture was considered healed with post-op follow up x-ray with the consolidation of callus in three cortex. Fracture not healed at 6 months is considered as problematic union. Sensitivity and specificity of AFPU score in prediction of the problematic union was calculated. Result: 82 patients were reviewed. Average time to union is 8.9 months. If AFPU score is 1, the sensitivity is 100% and specificity is 50% with negative predictive value of 100% (p=0.001). If AFPU score is 2, the sensitivity falls to 75%,but specificity increases to 92% with positive predictive value of 94% (P=0.0006). If AFPU score is 3, the specific reached to 100% with sensitivity of 55%, Positive predictive value is 100% (p=0.02%). Conclusion: if AFPU score is zero, the fracture likely healed as routine with a drug holiday. If AFPU score is 2 or above, an adjuvant treatment is recommended. If AFPU score is one, an adjuvant treatment should be given only if other comorbidities exist.

**Date: 2019-12-05**

**Session: Hip Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 54896**

**DO CONSERVATIVELY MANAGED HIP FRACTURES HAVE A HIGHER MORTALITY RATE?**

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**Aim:** We aimed to compare the mortality rates of patients with a hip fracture (intracapsular femoral neck fracture and inter-trochanteric fracture) treated conservatively to that of patients managed operatively in this study. **Methods:** Retrospective analysis of records was done of patients who suffered hip fractures between January 2015 and November 2017 in a multidisciplinary Hip Fracture Unit from a single tertiary hospital. Patients were managed non-operatively after discussion with the multidisciplinary unit – Anaesthesia, Geriatric Medicine, Orthopaedic Surgery with risk assessment, as well as patients' family. **Results:** 213 patients were treated conservatively and 780 underwent operative management for hip fractures. Of the conservatively managed patients, 113 had femoral neck fractures, and 100 had intertrochanteric fractures; for those undergoing operative management, 400 had femoral neck fractures and 380 had intertrochanteric fractures. Patients managed non-operatively had a higher inpatient mortality than that of operatively managed patients, 5.16% to 0.90% respectively. 30-day mortality and 1 year mortality rates were also higher for conservatively managed hip fractures. The average number of co-morbidities noted in conservatively managed patients were 6.0 compared to surgically managed patients of 4.6. Most common comorbidities included hypertension, hyperlipidaemia, stroke, anaemia, ischemic heart disease and dementia. Complications such as urinary tract infection, hospital acquired infection, delirium, and myocardial infarctions during hospital stay were noted in 34 conservatively managed patients as compared to 123 surgically managed patients. **Conclusion:** We strongly recommend surgical intervention for all hip fractures, provided comorbidities are also considered.

**Date: 2019-12-05**

**Session: Hip Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 53937**

**MORTALITY RATE AND MID-TERM OUTCOMES OF TOTAL HIP ARTHROPLASTY USING DUAL MOBILITY CUPS FOR THE TREATMENT OF FEMORAL NECK FRACTURES IN A MIDDLE EASTERN POPULATION**

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The dual mobility cups (DMCs) were shown to reduce dislocation rate following total hip arthroplasty for any aetiology, including femoral neck fractures. No reported studies evaluating DMC results for femoral neck fracture in a Middle Eastern population were found in the literature. Methods: This study aims to look for mortality rate, clinical, and functional outcomes in a population having specific rituals involving extreme hip positions as part of their daily activities. Results: Of an initial sample of 174 patients (177 operated hips), 18 (10.3%) patients (20 hips) died after a mean of  $39.6 \pm 13.8$  months (ranging from 2 to 49 months) with only 3 (1.7%) during the first postoperative year. Twelve patients (13 hips) were lost to follow-up and 19 patients (19 hips) had radiological data incomplete. In the final sample of 125 patients (125 hips), no dislocation, aseptic loosening, or infection was encountered. The mean modified Hip Harris Score was of  $94.8 \pm 8.4$ . The mean modified Hip Harris Score of 40 patients who used to practice regularly oriental sitting position or prayers was  $94.1 \pm 3.1$ . After surgery, 36 of these 40 patients (90%) described their hip as "a forgotten hip." Multivariate analyses found correlation only between mortality and cardiovascular co-morbidities. Conclusion: DMC implants showed excellent clinical and functional results. The majority of patients having rituals and customs involving extreme hip positions were able to resume their daily activities. The observed low mortality rate should incite future research to investigate its correlation with the use of DMCs.



**Date: 2019-12-05**

**Session: Hip Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 54125**

**PRIMARY HEMIARTHROPLASTY VERSUS INTERNAL FIXATION USING DYNAMIC HIP SCREW IN UNSTABLE TROCHANTERIC FRACTURES IN AN ELDERLY POPULATION**

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Introduction: Comminuted, unstable intertrochanteric fractures are most common fractures in elderly patients, constituting a major cause of morbidity and mortality. The aim of our study is to compare the efficiency of Bipolar Hemiarthroplasty with Dynamic Hip Screw in terms of short-term survivorship, functional outcome and allowing early mobilization. Methodology: 31 patients (above 55 years old) were divided into 2 groups, DHS and Bipolar Hemiarthroplasty (15 and 16 respectively). Surgical time was calculated from making position to wound closure. Intraoperative blood loss was calculated and time to full weight ambulation was observed. Harris Hip Score was evaluated at the end of 12 and 24 weeks. Results: All 31 patients were followed up till 24 weeks. The mean surgical time for DHS was 97.31 mins vs 86.44 for Hemiarthroplasty. Average blood loss for Hemiarthroplasty was 290.63 ml vs 282 ml in DHS group. DHS group started full weight bearing at average of 43.27 days post op whereas Hemiarthroplasty group started on 2.25 days average. The average Harris Hip Score at 12 weeks in DHS group was 65 vs 77.31 in Hemiarthroplasty group, and at the end of 24 weeks, it was 79.40 vs 90.44. Conclusion: Treatment of intertrochanteric fractures is more effective and less problematic with the Hemiarthroplasty compared to DHS and is better tolerated by patients. It is associated with less surgical time, early full weight ambulation, better functional status and hip joint movement range and early return to daily routine.

**Date: 2019-12-05**  
**Session: Hip Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 55232**

**ARE PATIENTS WITH HIP FRACTURES ON DIRECT ORAL ANTICOAGULANTS AT INCREASED RISK OF MORBIDITY AND MORTALITY?**

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Hip fractures (HFs) are a common injury among older patients. These patients often have coexisting cardiovascular or cerebrovascular diseases, taking anticoagulants. Until recently, antiplatelet inhibitors and Warfarin have been the drug of choice. However, direct oral anticoagulants (DOACs) have emerged as an alternative to warfarin, with the advantage of not requiring routine drug monitoring. However, apart from dabigatran, no specific agent has been available of DOACs and only option for reversal is delay in surgery. Aim of our study was to compare blood loss, wound complications, transfusion, re-operation rate and mortality in neck of femur patients on DOAC, Warfarin, antiplatelets and control group. Methods Retrospective review of all hip fractures admitted to our hospital between January 2016 to July 2018. Blood loss was calculated by formulae described previously. During the study period 868 patients underwent surgical intervention for neck of femur fracture, mean age of 82.3, 74% females. Baseline demographics were comparable between the 4 groups Results Delay to surgery was highest in the Warfarin group. Mean hemoglobin drop, calculated blood loss, wound ooze, transfusion rates, length of stay and mortality were highest in the antiplatelet group. DOACs had highest rate of infection and wound dehiscence 4% and 2% respectively. Subgroup analysis of early vs late surgery for the DOAC group did not show that delaying surgery reduced complications Conclusion Patients on DOACs have higher risk of wound complications but not higher blood loss. Our study did not find any benefit in deliberately delaying surgery for patients taking DOACS.

**Date: 2019-12-05**  
**Session: Hip Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 53209**

**A COMPARISON OF OUTCOMES BETWEEN HEMIARTHROPLASTIES AND TOTAL HIP REPLACEMENTS FOR NECK OF FEMUR FRACTURES MEETING NICE GUIDELINES**

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Background: According to the National Institute of Clinical Excellence (NICE), a Total Hip Replacement (THR) rather than a hemiarthroplasty should be offered to patients who; use no more than 1 stick, are not cognitively impaired and are fit for anaesthesia. In our hospital, the decision regarding choice of implant is made in an MDT between the Surgeon and Geriatric lead depending on the patient's social circumstances. Design & Methods: Data was collected retrospectively, using the National Hip Fracture Database, to include all displaced neck of femur fractures between 02/04/17 to 02/01/18 at Huddersfield Royal Infirmary. Of the 225 patients identified, 75 met the guidelines for a THR but only 29 THRs were performed. The remaining 46 patients underwent a hemiarthroplasty. The Oxford Hip Score was used to compare outcomes between these two groups. Results: In the THR group the age range was 47-85 years, median age was 71 and the average ASA was 2.07 compared with 66-97, 83 and 2.63 respectively in the hemiarthroplasty group. The average Oxford Hip Score for patients in the THR group was 43.4 compared with 36.9 in the Hemiarthroplasty group. Conclusion: Our study shows that THR gives better outcomes when compared to Hemiarthroplasties. The cost of a THR is substantially higher compared to hemiarthroplasty and requires greater surgical expertise as not all surgeons perform THR routinely; hence this group of patients invariably miss the 36-hour target. Neither of these however, should be contributing factors given the outcomes.

**Date: 2019-12-05**

**Session: Hip Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 55136**

**DYNAMIC HIP SCREW VS CANCELLOUS SCREWS FOR INTRACAPSULAR NECK OF FEMUR (NOF) FRACTURES IN YOUNG PATIENTS**

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Background: Proximal femur fractures account for 3.6% of all fractures and almost about 53% of all fractures occurring in the hip region. There are a number of surgical modalities available for the treatment of neck of femur fractures but till date, a clear consensus regarding the optimal management modality has not been reached. Objective: To compare clinical and radiological outcomes of young patients presenting with intracapsular NOF fractures treated with either the Dynamic Hip Screw (DHS) or Multiple Cannulated Screws (MCS). Methods: This is a retrospective comparative analysis between 2 matched cohorts treated with either DHS or MCS. Our study group consisted of a consecutive series of 94 patients aged < 60 years admitted to the hospital with intracapsular NOF fractures. All patients were analysed for their clinical function, pain, radiological union at the fracture site, complications following fixation and re-operation rates. Results: Out of the total 94 patients, 45 were operated with DHS and 49 with MCS. The average age of the study group was 51.53 years. The average follow-up time for the study group was 2.6 years. The MCS group experienced a significantly higher overall complication rate (37% compared to 22% in DHS group) and a higher rate of re-operations (24% as compared to 8% in DHS group). Conclusion: DHS and MCS are both very effective means of treatment of NOF fractures. Although the DHS may have a larger incision and increased soft tissue dissection, it is associated with significantly less rates of post-operative fixation failures, overall complications and re-operations.

**Date: 2019-12-05**

**Session: Hip Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 54721**

**IMPACT OF RESIDENT TRAINING LEVEL ON RADIATION EXPOSURE DURING FIXATION OF PROXIMAL FEMUR FRACTURES**

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Introduction: Exposure to ionizing radiation has been linked to multiple adverse health effects and is an accepted occupational risk in the healthcare industry, especially among orthopaedic surgeons and trainees. We sought to identify if residents are at greater risk for radiation exposure earlier in their training and during more complex procedures. Methods: We analysed 866 cases of extra-capsular proximal femur fracture fixation at one academic institution. We compared fluoroscopy times for these cases by the different levels of resident training, as well as type of fracture and type of implant used. Attending only cases were used as a control group. One-way and two-way ANOVA tests were used for the statistical analysis. Results: Fluoroscopy times during fixation of subtrochanteric fractures (207.70 seconds) were longer than intertrochanteric (113.55 secs) and basicervical fractures (86.08 secs) ( $p < 0.001$ ). Long nail (152.39 secs) fluoroscopy times were longer than short (100.12 secs) and intermediate (80.31 secs) nails ( $p < .001$  each). Cases involving PGY-4 residents (133.3 secs) were the longest on average, while cases with no residents were the shortest (94.91 secs). The no resident cases used significantly less fluoroscopy than those with PGY-2, PGY-4, and junior and senior resident combinations ( $p < 0.001$ ). Conclusion: This study demonstrates that orthopaedic surgery residents and attending physicians need to remain aware of radiation exposure during use of intra-operative fluoroscopy. Appropriate personal protective equipment should be worn, and attending or more experienced residents should take a more active role in the more complex cases to decrease exposure risk.

**Date: 2019-12-05**

**Session: Paediatrics Free Papers 1**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54726**

**MINIMALLY DISPLACED LATERAL HUMERAL CONDYLE FRACTURES -  
OPTIMISING FOLLOW-UP AND MINIMISING COST**

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Introduction: Lateral Humerus Condyle (LHC) fractures are common seen in young people (<18 years). The treatment depends of displacement. Non-surgical treatment require periodic visit and x-ray control. If displacement increase, surgical treatment is required. The aims were to evaluate the risk of displacement in non-operatively treated minimally displaced LHC fractures and to try optimizing the follow-up visits and radiographs. Methods: An IRB approved retrospective review was performed. Patients with displaced (less than 2mm) LHC fractures was involved. From 2009-2015 at one institution. Patients treated at the onset operatively were exclude. The number of visits and radiographs were calculated the first 4 weeks. Variation amongst the various (>10) treating surgeons. Children with subsequent displacement needing operative fixation was measured. Results: 159 children with non-displaced LHC fractures. 2 excluded (inadequate radiographs). 96 male and 61 female. The average age: 5.3 years. Only one required surgery after 9 days post injury (closed pinning – fracture 2.5 mm gap). The first 4 weeks, the average of visits was 2.7 and 10.3 for radiographs. Conclusion: Minimally displaced LHC fractures can be treated non-operatively. We found an extremely low risk (0.63%) of increased displacement in appropriately selected patients with minimally displaced LHC fractures. The optimal follow up in cast is not well defined. There is variability in follow up patterns between surgeons. Optimizing and standardizing the follow up at about 10 days and another at around the 4-6 week with radiographs at these visits would result in appropriate identification of displacement and unnecessary office visits.

**Date: 2019-12-05**

**Session: Paediatrics Free Papers 1**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54509**

**SUPRACONDYLAR HUMERUS FRACTURES IN LOW AND LOWER MIDDLE-INCOME COUNTRIES: A REVIEW OF THE CURRENT EPIDEMIOLOGY, TREATMENT MODALITIES AND OUTCOMES**

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**Background:** The purpose of this scoping review is to identify research trends in paediatric supracondylar humerus (SCH) fractures in low and lower-middle income countries (LICs) and assess the nature and quality of that research. **Methods:** We categorized studies of SCH fractures in LICs by geographic region, and the Gardner classification of included patients. We evaluated each study's methodology and conclusions. **Results:** We analysed 105 studies, most of which included Type III fractures only (66%). Many were conducted in South Asia (58%) and assessed treatment outcomes (78%). Most of the studies had level IV evidence (67%). Common research limitations were limited sample size (48%) and follow-up (24%). Epidemiological studies concluded that SCH fractures are more common among male children, usually secondary to falls and rarely present with nerve injuries. Most therapeutic studies reported outcomes of surgery (91%). Thirteen studies concluded that all-lateral versus cross-pinning techniques have similar outcomes. Seven studies reported preference for closed reduction (4) over open reduction, unless imaging was unavailable (3). Most common outcome measures were Flynn criteria (61) and range of motion (42). None of the papers looked at treatment costs. **Conclusions:** Our data show a paucity of high quality research from LICs. Many studies examined similar controversies as the HIC literature - surgical technique - rather than issues specific to low-resource settings. Few studies examined non-operative treatment, which remains the only treatment available for those patients without access to surgical care. Further investigation of feasible treatment and outcomes for SCH fractures in LICs is needed.

**Date: 2019-12-05**

**Session: Paediatrics Free Papers 1**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54759**

**THE IMPACT OF A VIRTUAL ORTHOPAEDIC TRIAGE CLINIC MODEL IN NORTHERN IRELAND**

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Purpose: To assess the impact of a 4 year, prospectively managed virtual orthopaedic triage clinic model in Northern Ireland. Methods/Results: Within Northern Ireland, delivery of the regional Paediatric Orthopaedic service was unsustainable. 2600 outpatient referrals for 1900 new patient appointments in 2013. Virtual clinic was established with funding for a consultant led service (2PA's) with secretarial support. Clinicians access regional electronic data and triage referrals weekly onto database. Between July 2014 and November 2018, 9624 referrals received for 8571 patients. 77% generated from primary practice with bimodal pattern in month/age; referral peaks in June/September, majority aged 1-2 and 12-14 years of age. Other sources included paediatricians, A&E and physiotherapists. 64% required outpatient appointment, 16% received advice letter and the remainder redirected to other pathways. 2259 suitable for physiotherapy assessment. Pre-appointment investigations requested for 207 patients, 2 admitted acutely and 20 assigned to fracture clinics for rapid assessment. Cost savings estimated £60k per year. Commonly, gait variants, flat feet in infants, 'hearsay' referrals and radiological reports review managed by advice. Conclusion: The virtual clinic has streamlined our service bringing it closer to capacity, and could be adapted for use in other institutions. It provides better needs rationing and a safety net for urgent referrals. Referrers/patients receive timely feedback with enhanced waiting list management. There are few unknowns on the waiting list and reduced repeat referrals. Service needs are now more clearly understood and unnecessary clinic appointments are significantly reduced. Referring clinicians better informed by letter and it led to the development of physiotherapy assessment clinics.



**Date: 2019-12-05**

**Session: Paediatrics Free Papers 1**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54722**

**CORRECTION OF LOWER EXTREMITY ANGULAR DEFORMITIES IN SKELETAL DYSPLASIA WITH HEMIEPIPHYSIODESIS**

Mihir THACKER, William MACKENZIE, Amit NEMADE, Kenneth ROGERS, Carlos PARGAS, Colleen DITRO

Alfred I. duPont Hospital for Children, Wilmington (UNITED STATES)

Introduction: Lower extremity deformities are common in skeletal dysplasia (SKD). Growth modulation using a tension band plate (TBP) to fix angular deformities is a common method but there is little data in SKD population. This study aimed to describe the patient characteristics at time of surgery and last visit, with recurrence and overcorrection rate post TBP use. Methods: A retrospective review of patient who had at least 6 months follow post TBP surgery from 2005 to 2017. Mechanical tibio-femoral angle (mTFA), Mechanical Axis Deviation (MAD), Mechanical Lateral Distal Femoral Angle (mLDFA) and Mechanical Medial Proximal Tibial Angle (mPTA) measured. Results: 74 patients had TBP. Average age at surgery 9.3 years. Gender: female (39, 53%) and male (35, 47%). Most common SKD were Morquio (32) and Spondyloepiphyseal dysplasia (16). Femoral/tibial angulation: valgus (77/58), varus (25/29). Implant removal: femoral valgus/varus (60/15). Tibial valgus/varus (43/21). Average days to removal: femoral valgus/varus (604/607), tibial valgus/varus (819/734). mLDFA change in femoral implant removal: valgus/varus (80.3-90.2/113.2-94.5). Without implant removal: valgus/varus (80-86/107-102). Femoral varus without removal implant only measure not less than  $P < 0.05$ . mPTA change with tibial implant removal: valgus/varus (99.4-92.0/ 78.9-87.8). Without implant removal: valgus/varus (101-98/77-87). Tibial valgus without implant removal only measure not less than  $P < 0.05$ . Femoral/tibial complications: no correction (5/6), over correction (10/8), recurrence (26/19). More surgeries for TBP: femur/tibial (33/7). Conclusion: Tension band plate (TBP) for correction of angular deformities has a 54% complication rate for the femur and 51% for tibia. Patients need to be advised to have appropriate follow-up after surgery.

**Date: 2019-12-05**

**Session: Paediatrics Free Papers 1**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54911**

**NEONATAL BIRTH FRACTURES: A TERTIARY MATERNITY HOSPITAL EXPERIENCE.**

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Introduction: To identify the incidence and types of neonatal birth fractures in a tertiary maternity unit in the United Kingdom (UK) and find possible associated factors. Method: Identification of all live births born in our institution between 2000 and 2016. Review of hospital records and imaging of all neonates who had any imaging done up to the age of 12 months to identify birth fractures. Data were analysed with RStudio. Results: We identified 87461 consecutive live births. Sixtysix sustained a fracture during delivery: 46 clavicle-, 13 humerus-, 4 skull-, 1 femoral-, 1 rib- and 1 tibial fracture. Five neonates who suffered a clavicle or humerus fracture also had an Erb's palsy. Fracture patients' mean/median birth weights were 3690/3830 grams (population 3368/3415) and gestation mean/median were 39.3/40 (population 39.1/39). The modes of delivery in the fracture group were: spontaneous (28), emergency caesarean (6), elective caesarean (4), forceps (18) and Ventouse (10). Sixty-five fractures were in singletons. The dependent variable "Fracture" was linked with the independent variables birthweight, sex, gestation, delivery day, delivery time, number of deliveries per day, delivery mode and breech. Logistic regression analysis showed a significant association between "Fracture" and "Birthweight", "Forceps & Ventouse Delivery" and "Gestation". Conclusion: Our data are the first data on neonatal birth fractures from a maternity unit in the UK. We found a low fracture incidence of 0.075%. We recommend including data on birth fractures as part of a range of clinical safety markers for delivery units.

**Date: 2019-12-05**

**Session: Paediatrics Free Papers 1**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 55791**

**OUTPATIENT AMBULATORY MANAGEMENT OF ACUTE PAEDIATRIC FRACTURES IS SAFE, SAVES INPATIENT HOSPITAL ADMISSIONS AND HAS HIGH LEVELS OF PARENT SATISFACTION**

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Introduction and Objective Paediatric patients with fractures requiring operative intervention are commonly admitted and given clinical priority for surgery on the next available trauma list. This may affect treatment of other high priority cases. The aim of this study was to establish the safety and patient satisfaction of our institutional management protocol, which is to treat appropriate patients on an ambulatory semi-elective basis. Materials and Methods All consecutive acute paediatric fractures requiring surgical intervention managed on an ambulatory basis were identified over a six-month period. Outcome measures: time to surgery, incidence of complications, number of hospital inpatient nights saved. Parent satisfaction was assessed using a questionnaire focused on pain management, adverse events and outcome. Results 53.1% (76/143) of operatively treated acute paediatric fractures were managed on an outpatient ambulatory basis: upper limb fractures 65.4% (70/107), lower limb fractures 16.7% (6/36). Mean time to surgery: 2.4 days (SD 1.6). There was one complication resulting in early admission to hospital. 182 hospital inpatient nights were saved. 89.5% (68/76) questionnaire completion: mean overall satisfaction score of 4.47 (scale: 1 - very poor, 5 - excellent, SD 0.8), 86.7% had adequate pain control. Conclusions Outpatient ambulatory management of acute paediatric fractures is safe with low rates of complications, saves unnecessary hospital inpatient stays and has high levels of parent satisfaction.

**Date: 2019-12-05**

**Session: Paediatrics Free Papers 1**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54720**

**THE DIAGNOSTIC UTILITY OF MUSCLE BIOPSY FOR SUSPECTED MYOPATHY: A PRIMER FOR ORTHOPAEDISTS**

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Introduction: Muscle biopsy is requested to assist in diagnosing the cause of motor delay such as muscular dystrophy, congenital or metabolic myopathy. Our purpose was to review the results of muscle biopsies performed at our institution in order to determine the diagnostic yield and hence the utility of performing the procedure. Methods: An IRB approved retrospective review. Patients with muscle biopsy between 2000-2013 was compiled. Biopsies performed to diagnose a process other than myopathy were excluded. Preoperative and postoperative diagnoses codes were compared to see if the biopsy results either confirmed or changed the suspected diagnosis. Results: 225 diagnosis codes were available. Biopsies performed starting in the year 2000. Of this subset, 84 of the biopsies were diagnostic (yield of 37%), 48 of which confirmed the preoperative diagnosis. Thus, when the biopsy was diagnostic, the preoperative diagnosis was correct 57 % of the time. The three most common diagnoses were inherited or muscular dystrophy (12%) Non-myopathy/neurogenic (11%) Metabolic or toxic myopathy (8.9%) Conclusion: Orthopaedic surgeons are consulted to take a muscle biopsy when suspect myopathy. The likelihood of making a diagnosis from the biopsy procedure is 37 %. In the instance when the biopsy is diagnostic, it confirms the preoperative diagnosis over half (57%) of the time. A muscle biopsy may not always yield a definitive diagnosis even when there is a high index of suspicion for a clinical diagnosis of myopathy. Investigation of a child with suspected neuromuscular disorder is challenging, and muscle biopsy represents an important diagnostic tool.

**Date: 2019-12-05**

**Session: Paediatrics Free Papers 1**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 53530**

**LEGG-CALVE-PERTHES DISEASE CAN LEAD TO ACETABULAR RETROVERSION**

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Introduction: Legg-Calve-Perthes-Disease (LCPD) typically leads to deformation of femoral head and sometimes the acetabulum too. We observed acetabular retroversion after LCPD and asked: How often acetabular retroversion occurs in LCPD; if retroversion depends on the stage of disease and if acetabular version of the contralateral side is affected as well? Methods: We retrospectively studied 94 patients (101 hips) diagnosed with LCPD between 2004-2017. We excluded 14 patients, due to previous hip surgery or bilateral LCPD. The final study group included 80 patients (80 hips), mean age  $6 \pm 2$  (2 – 12) years at diagnosis. Mean radiographic followup was  $7 \pm 4$  (2 – 23) years. Disease staging was performed using the Waldenström classification (I – IV). Since the radiographic anatomy of the non-ossified acetabulum cannot be directly evaluated, an established, indirect parameter for acetabular version (pelvic width index [PWI]) was assessed for each disease stage for affected and unaffected hip. Retroversion was defined by a  $PWI < 45\%$ . Results: After LCPD, 35% of patients showed acetabular retroversion. Over the course of the disease the prevalence of acetabular retroversion changes: initial stage 47% (12% contralateral hip;  $p < 0.05$ ), fragmentation stage 66% (6% contralateral;  $p < 0.05$ ) and after complete healing 35% (10% contralateral;  $p < 0.05$ ). The unaffected hips showed no significant change in acetabular version. Conclusion: After LCPD, acetabular retroversion was present in over one third of the patients. As acetabular retroversion from LCPD can aggravate the intra-articular impingement conflict caused by the deformed femoral head, it should be diagnosed and addressed when performing surgery.

**Date: 2019-12-05**

**Session: Paediatrics Free Papers 1**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54840**

**VALIDATION OF THE PATIENT REPORTED OUTCOMES MEASUREMENT INFORMATION SYSTEM (PROMIS) PAIN MEASURES IN PAEDIATRIC PATIENTS WITH CEREBRAL PALSY**

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Background: Pain is highly prevalent among paediatric patients with cerebral palsy (CP), however, often inadequately evaluated and treated. The objective of this study is to validate pain domains in the Patient Reported Outcomes Measurement Information System (PROMIS) questionnaire and investigate associations between patient characteristics and self-reported pain. Methods: This is a retrospective cohort study on paediatric patients with CP treated at the orthopaedics and rehabilitation medicine departments of a single institution from 2006 to 2018. Patients were administered PROMIS sub-domains including four pain domains (Pain Interference, Pain Intensity, Pain Behavior, Pain Quality). Construct validity including convergent, discriminant and known group validities were determined. Results: 43 paediatric patients ( $13 \pm 2.9$ y, 31%F, 69%M) were included in this study. Patients with more anxiety, higher fatigue, and lower mobility had higher pain (convergent validity). Patients with a GMFCS IV-V had significantly higher pain than patients with a GMFCS of I-III (known group validity). Peer relationships had no to weak associations with pain domains (discriminant validity). Among paediatric patients, there was no association between age or gender and pain scores. Conclusion: This study demonstrated that the PROMIS pain domains have adequate validity, demonstrating that PROMIS has the potential to serve as a patient reported outcome tool to assess pain in paediatric patients with CP. Patients with GMFCS I-III reported experiencing lower pain as compared with patients with GMFCS IV-V. However, as patients age they report more pain indicating the possible impact of changes in mass, tone and frailty as well as aging on pain.

**Date: 2019-12-05**

**Session: Paediatrics Free Papers 1**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 53521**

**APPLICATION OF ANTIFIBROTIC SUBSTANCES ON PES EQUINOVARUS DERIVED CELLS**

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Idiopathic pes equinovarus (clubfoot) is a common congenital deformity of the foot. There is a mass of fibrotic and contracted tissue localized in the medial side of an affected leg(s) between medial malleolus, os naviculare and sustentaculum tali. We isolated fibroblast-like cells from this fibrotic tissue, which was excised during the surgery of relapsed clubfeet. The aim of our study is to test several antifibrotic substances on these fibrotic tissue derived cells. The main criteria of the testing are the inhibitory effect on extracellular matrix production, namely on collagen synthesis and deposition, and inhibition of cell contractility. The cell behaviour and extracellular matrix production is investigated in static cell culture as well as dynamic conditions of mechanical loading. A comparison of the effect of different antifibrotic substances on the cells will be presented first in static conditions. Application of antifibrotic substances directly into the fibrotic extracellular matrix of the clubfoot deformity could decrease the contraction and improve the outcomes of casting corrections, especially in relapsed patients. Supported by the Ministry of Health of the Czech Republic (AZV 17 31564A) and Charles University GA UK No. 336218.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 54389**

**ROLE OF TIBIAL PLATEAU SLOPE IN ANTERIOR CRUCIATE LIGAMENT INJURIES: A STUDY IN AN INDIAN POPULATION**

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**Introduction:** The geometry of the tibial plateau has been largely ignored as a source of possible risk factors for anterior cruciate ligament injury. Discovering the anterior cruciate ligament injury risk factors associated with the tibial plateau may lead to delineation of the existing sex-based disparity in anterior cruciate ligament injuries and help develop strategies for the prevention of anterior cruciate ligament injuries regardless of gender. **Methods:** The medial and lateral tibial plateau slopes as well as the medial tibial depth of concavity in 20 uninjured controls (10 women and 10 men) and 20 anterior cruciate ligament-injured cases (3 women and 17 men) were measured using radiographs and CT scans. Probability of anterior cruciate ligament injury was measured in an individual based on the measured values. **Results:** The female anterior cruciate ligament-injured cases had increased lateral tibial slope and shallower medial tibial depth compared with the uninjured controls, while male cases had increased lateral and medial tibial slope and shallower medial tibial depth compared with controls. The medial tibial depth is an important risk factor followed by lateral tibial slope in all participants. The medial tibial slope was a risk factor only in men. **Conclusion:** A combination of increased posterior-directed tibial plateau slope and shallow medial tibial plateau depth could be a major risk factor in anterior cruciate ligament injury susceptibility regardless of gender.



**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53758**

**IS DVT PROPHYLAXIS INDICATED AFTER ACL RECONSTRUCTION SURGERY?**

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Introduction: Knee Arthroscopy has been considered a benign procedure, and routine prophylaxis is not the standard of care in many institutions; however, prospective studies have suggested that, in the absence of thromboprophylaxis, the incidence of venographically detected DVT in patients undergoing knee arthroscopy can be as high as 18%. Method: We conducted a cohort study on the incidence of symptomatic DVT and pulmonary emboli following arthroscopic ACL reconstruction. In a period of 11 years, 2265 cases of ACL reconstructions were performed by a single surgeon. In the first 1222 cases no prophylaxis was used and in the following 1043 cases, either LMWH or Aspirin was prescribed. In the post-operative period, patients with abnormal calf and/or thigh pain, swelling of the limb and pulmonary symptoms were investigated for DVT using colour Doppler sonography. Results: A total of 11 cases (0.48%) of symptomatic DVT including 4 cases of pulmonary emboli (PE) were detected. Two patients had massive PE requiring ICU admission. The incidence of symptomatic DVT after arthroscopic surgery was quite low regardless of receiving prophylaxis (4 of 1043) or not (7 of 1222). Despite not being statistically significant ( $P>0.05$ ), there was a slight decrease in DVT incidence in the prophylaxis group. No major bleeding complication related to thromboprophylaxis was recorded. Conclusion: In spite of the low incidence of DVT/PE after ACL reconstruction, we recommend the use of appropriate prophylaxis according to the local and national guidelines to prevent severe consequences including mortality.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53508**

**PROBABILITY OF ANTERIOR CRUCIATE LIGAMENT TEAR IN THE CONTRALATERAL KNEE AND IN SIBLINGS**

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Background: Several genetic factors can cause an individual's susceptibility to ACL rupture. The aim of the present study was to evaluate certain underlying factors that increase the risk of ACL rupture. Methods: 836 patients with ACL rupture who underwent ACL reconstructive surgery were enrolled. The collected variables included sex, age, height, weight, exercise level, time interval between ACL rupture in the first knee and contralateral ACL rupture, dominant leg, side of the involved knee and sibling history of ACL rupture. Results: The mean length of follow-up of patients was 6.9 years. Eighty-three patients (9.9%) had a contralateral ACL rupture, and 155 patients (18.54%) had siblings with a history of ACL rupture. Contralateral ACL rupture was three times higher in women than in men and in patients with siblings with a history of ACL rupture than in those without this history. In addition, the risk of contralateral ACL rupture was higher in those younger than 30 years of age, with a BMI of 20-25 kg/m<sup>2</sup> and who participated in a regular sports activity. Our results indicated that 83.13% of contralateral ACL ruptures occurred during the first two years after the primary operation. Conclusion: Based on our findings in a 5 to 8-year follow-up, of every 10 patients, one patient had a contralateral ACL rupture, and two patients had siblings with a history of ACL rupture. It also seems that a sibling history of ACL rupture and being female are important risk factors for ACL rupture in the contralateral knee.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53283**

**IS SAPHENOUS NERVE AT RISK FOLLOWING HAMSTRING GRAFT HARVEST IN ARTHROSCOPIC ACL RECONSTRUCTION SURGERY?**

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Arthroscopic anterior cruciate ligament (ACL) reconstruction is a widely-accepted procedure for restoring knee stability following ACL injuries. The use of the 4-strand Hamstring autograft is agreed as the safe and effective graft Source. However iatrogenic nerve injury of the saphenous nerve branches as a common sequel. Damage to the infrapatellar branch of saphenous nerve (IPBSN) is well described in the Literature. The rate of IPBSN was described as being statistically higher with the vertical incision in some studies with respect to an oblique incision. A controversy still exists regarding the most appropriate incision for hamstring graft harvest. The purpose of this study is to compare incidence, extent of sensory loss and the natural course of recovery of the sensory nerve injury between oblique and vertical incision. A randomized prospective study was carried out on 84 patients, divided into two groups, all of them underwent arthroscopic ACL reconstruction using hamstring tendon graft with two incisions; a vertical incision used in 43 patients, and an oblique incision in 41 patients. The location and area of sensory loss were evaluated during follow-up as well as the degree of improvement and patient satisfaction. This study revealed the high incidence of nerve injury particularly the IPBSN during hamstring graft harvest, but did not prove a difference between oblique and vertical incisions. It was clear that harvesting the semitendinosus alone is not a factor that can diminish nerve injury.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53097**

**OUR EXPERIENCE WITH EXTRA-ARTICULAR AUGMENTATION OF ACL RECONSTRUCTION**

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Background: A residual pivot shift in up to 25% of Anatomic Single Bundle (ASB) ACL reconstructions, coupled with studies failing to show superiority of Double bundle reconstructions over ASB; led to Extra-articular procedures being re-introduced in addition to intra-articular reconstruction in a select group of patients. Cadaveric studies compared ALL and Ilio-tibial band (ITB), there was no consensus as to which structure is most important for rotational stability. Patients and methods: from January 2014 until July 2016 a randomized controlled trial on 200 patients who required ACL reconstruction with an added extra-articular procedure. We included patients with grade 3 knee jerk, high demand athletes and revision cases. In all cases ASB technique was used for ACL reconstruction. Patients were allocated to 2 groups, 100 patients underwent ACL plus ALL reconstruction (group A) and another 100 patients were treated with ACL reconstruction plus ilio-tibial band (ITB) tenodesis (group B), which was sub-grouped according to method of fixation. Results there was no statistically significant difference between both groups regarding Taegner activity score, Lysholm score, returning to the pre-activity level. Conclusion: No clinically significant superior results were demonstrated using one extra-articular procedure over the other. This study relied on pivot shift test to assess stability. However, objective analysis of rotational knee kinematics is required to determine the superiority of one technique over the other in conferring rotational stability

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 52847**

**THE ACL AND ANTEROLATERAL LIGAMENT (ALL) RECONSTRUCTION  
– ROTATIONAL STABILITY AFTER TWO YEARS**

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Introduction: Purpose of the study was to evaluate rotational stability after ACL and ALL reconstruction. Methods: 40 patients selected prospectively at random into two groups were evaluated. The mean follow-up after the surgery was 26 months (range, 24 to 33 months). The navigation system was used. Measurements were done by the blinded investigator. Patients were asked to perform (in 30° weight-bearing flexion) the maximal external trunk rotation to develop the reverse rotation of the tibia against the femur. All measurements were taken on both the reconstructed and healthy knees. Cincinnati, Lysholm, and IKDC scores were used to evaluate clinical results. The nonparametric Wilcoxon test was used to evaluate results. Results: After the ACL+ALL reconstruction, the mean IR of the tibia was 8,1°. In the contralateral healthy knee joint, IR was 8,6° at average. We did not find any statistically significant difference in IR stability between reconstructed and healthy knees ( $p > 0.05$ ). After the simple ACL reconstruction, the mean IR was 9,9°. In the contralateral healthy knee joint, IR was 8,7° at average. We found the statistically significant difference in IR stability between reconstructed and healthy knees ( $p < 0,05$ ). In terms of clinical results (Cincinnati, Lysholm, IKDC), knees after ACL+ALL reconstruction behaved better but without any statistically significant difference between both groups. Conclusion: The ACL+ALL reconstruction restores the rotational stability of the knee joint without any significant difference in comparison to the contralateral healthy knee. We cannot state the same for the simple ACL reconstruction.

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**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53621**

**COMPARISON OF FUNCTIONAL OUTCOME OF TRANSTIBIAL  
ENDOSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION  
BY BONE- PATELLAR TENDON- BONE GRAFT WITH AND WITHOUT  
AUGMENTATION**

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Introduction: Reconstruction of Anterior Cruciate Ligament (ACL) injury by Bone- Patellar Tendon –Bone (BPTB) graft and augmentation may provide rigid fixation. Methods: Retrospective review done on the records of 60 consecutive patients (Age 21-40 years) with at least 3 years follow up of reconstruction of complete ACL deficient knees with BPTB graft from January 2012 to December 2018. Thirty Five cases were augmented (Group-A) and 25 cases were not (Group-B). Functional assessment was done by Lysholm Knee Score (LKS), Knee injury and Osteoarthritis Outcome Score (KOOS) and clinical tests for stability. Chi-squared test and paired-t test were used for statistical analysis using SPSS. Results: There was significant improvement ( $p < 0.05$ ) of all knee function assessment components and stability in both groups but no significant difference between the groups ( $p > 0.05$ ). Although the complications were insignificant, persistent knee instability and patella-femoral pain were more in group-B [ $n=3(12\%)$ ]. Conclusion: Augmentation did not provide significant functional advantage in Transtibial endoscopic reconstruction of ACL by BPTB grafts.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53597**

**FEMORAL HEAD-NECK OFFSET AND THE HIP RANGE OF MOTION IN PATIENTS WITH ACL INJURY**

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Introduction: Femoroacetabular impingement (FAI) can cause restriction in hip range of motion especially internal rotation and may change biomechanics of hip-knee-ankle chain. Recent studies have shown the interaction between hip biomechanics changes and knee injury and some relationship between hip pathology and increase in ACL injury. We hypothesis that increased alpha angle as an indicator of FAI , may restricted hip range of motion and increases in stresses applied to the ACL, thereby increasing the risk of ACL injuries. Methods: In a retrospective study, 140 consecutive patients with non-contact ACL ruptures and 100 patients with non-ACL injury were enrolled. Hip range of motion measured. FAI assessed by 45° Dunn radiograph and calculating hip alpha angle. Result: There is any difference in age, gender distribution, height, weight and BMI between groups. Hip range of motion except external rotation were significantly decreased in ACL-injured patients comparing with control subjects. ACL-injured group had higher alpha angle in compare with control individuals. (P<0.001) as cut point of 60° for alpha angle, 31% (n=39) of the ACL-injured group had alpha angle over 60°, compared to 11.1% (n=10) of control individuals. (P=0.001) Discussion: This study suggest that the patients with ACL injuries had higher hip alpha angles compared to control group. They also had a decrease in hip range of motion parameters such as internal rotation, abduction and adduction. So we suggest that decreased femoral head-neck offset may have a possible role in ACL injury.

**Date: 2019-12-05**

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**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53444**

**ARTHROSCOPIC ACL RECONSTRUCTION THROUGH TRANS - TIBIAL TUNNEL USING BONE – PATELLAR TENDON – BONE GRAFT**

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Background: The anterior cruciate ligament reconstruction is done to improve stability and function of the knee. In spite of all the controversy, bone- patellar tendon- bone (B-PT-B) graft is still the author's choice being inserted through transtibial tunnel and fixing it by interference screws. The aim of this article is to describe the surgical technique and also to discuss the results. Material & Method: 98 Patients of ACL injuries from April 2013 to March 2018 underwent Arthroscopic assisted ACL reconstruction by different method out of which the procedure of "Arthroscopic ACL reconstruction through trans tibial tunnel using bone – patellar tendon – bone graft" was done in 26 cases. The inclusion criteria for this procedure were isolated complete tear ACL (Grade III injury) in young active patients. ACL injuries associated with other injuries (PCL, LCL, MCL or meniscal injuries) were excluded and were reconstructed by other method. Results: The follow-up study of 1-4 years (average 2.5 years) revealed excellent results. 87% of 26 patients had negative pivot shift examination with remaining 13% having grade 1 ligament laxity. Tegner activity levels were similar to preinjury levels, Lysholm score was 91. No patients exhibited any long term patellar tendinitis however low incidence of patellar pain (17%) was noted. Conclusions: Most endoscopic technique reveals no superior differences in final outcome when compared with our technique. In conclusion, arthroscopic ACL reconstruction through trans - tibial tunnel using bone – patellar tendon – bone graft is easy and reliable method with good outcome.



**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53381**

**A COMPARATIVE EVALUATION OF THE RESULTS OF ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION WITH QUADRUPLED HAMSTRING GRAFT USING CROSSPINNING (TRANSFIX) OR ENDOBUTTON AS FEMORAL TUNNEL GRAFT FIXATION METHODS**

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Introduction: Tear of anterior cruciate ligament (ACL) is the most common ligamentous injury and the approach to ACL tear has undergone several changes during last four decades. Aims and Objectives: Evaluation of quadrupled hamstring graft as ACL substitute and comparison of the two common modalities of graft fixation namely- Crosspinning technique and Endobutton technique. Study design: Retrospective study Materials and Methods: A total of 30 ACL deficient knees (age between 20yrs -50yrs) were included in the study conducted at Lok Nayak Hospital, New Delhi. Standard arthroscopic ACL reconstruction technique and ipsilateral quadrupled hamstring tendon graft was used. 15 cases each after randomisation underwent ACL reconstruction by Crosspinning (Transfix) and Endobutton fixation on femoral side. Standard ACL rehabilitation protocol was followed. Clinical evaluation was done pre-operatively, post-operatively at 2wks, 8wks, 14wks and 6months. CT evaluation of femoral and tibial tunnel diameter was done at 2wks, 3months and 6months. Final grades based on IKDC subjective knee evaluation score and modified Lysholm's knee score was given at 6 months and the results were compared with pre-operative data statistically. Results and Discussion: There was no significant difference in knee stability and functional ability between the Endobutton and Transfix groups. The femoral tunnel widening between the two groups were comparable up to 14th week but after that in the Endobutton group widening was more than in the Transfix group particularly at the midway and at the aperture, which may be attributed to the windscreen wiper mechanism.

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**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 52890**

**CLINICAL AND FUNCTIONAL OUTCOMES FOR ALL INSIDE TIGHTROPER VERSUS PLLA-HA INTERFERENCE SCREW FIXATION IN ARTHROSCOPIC ACLR**

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**INTRODUCTION:** Arthroscopic ACL reconstruction is common procedure in young-middle aged physically active people and athletes. We compare clinical and functional outcomes after double bundle ACLR in Arthroscopic All Inside TightRopeR versus PLLA-HA Interference screw fixation. **MATERIALS & METHODS:** Prospective multicenter study from July 2015- October 2016. 104 patients undergoing arthroscopic ACLR were randomized to receive Tight RopeR (All Inside group) or PLLA-HA screws. Patients evaluated using KSS, WOMAC, Friedmann-Wyman score, VAS, 30s chair and Anterior Drawer Test. **RESULTS:** In 104 patients, 84.61% men and 15.39% women. Baseline Drawer 3+ and 30s chair test 4 in both groups. Mean VAS, KSS and WOMAC was 6, 38.4, 24.9 in PLLA-HA group and 6, 37.5, 24.4 in TightRope Group. Significant improvements ( $p < 0.01$ ) for VAS, KSS, WOMAC and Friedmann-Wyman scores in PLLA-HA group on 14th, 60th, 180 days. **DISCUSSIONS:** PLLA-HA Group patients more confident while walking on Day 2 and 14. PLLA HA group patients early to reach 90 degrees flexion on Day 2. Tight feeling throughout and Anterior Drawer 1+ at Day 60 in TightRope Group. **CONCLUSION:** PLLA-HA Interference Screw Fixation is economical and more stable fixation in immediate, early and late post-operative period. Patients are confident and bear weight early.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53025**

**COMPARISON OF FUNCTIONAL OUTCOME BETWEEN  
“TRANSPORTAL” AND “OUTSIDE IN” TECHNIQUE IN ARTHROSCOPIC  
ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION**

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Introduction: Anatomical placement of the femoral tunnel is critical to the success and clinical outcome of Anterior Cruciate Ligament (ACL) reconstruction. Image analysis has shown that Outside-in technique is associated with different femoral tunnel geometry than the Transportal technique in Anterior Cruciate Ligament reconstruction, but the results of clinical studies did not show statistical difference in functional outcome between the two techniques. Materials and Methods: From June 2016 to June 2018, 60 patients were enrolled in this study and were randomly assigned to either Transportal group (30 patients) or Outside In group (30 patients), and ACL reconstruction were performed in all. Patients were followed minimum up to 6 months and were evaluated for functional outcome with clinical scores (LYSHOLM, TEGNER and IKDC). Results: Pre operatively, all patients had instability of knee in form of giving way which was evaluated by Lachman test, anterior drawer test, pivot shift test and confirmed by Magnetic Resonance Imaging. No significant differences in functional outcome was found between the two groups in terms of IKDC, LYSHOLM and TEGNER score. Medial meniscus rupture was the commonest associated injury. Road traffic accident was major cause of ACL injury in our study. Conclusion: Patient's functional abilities determined by clinical scores did not differ significantly between the Outside In and Transportal techniques for anatomic ACL reconstruction, although the femoral tunnel geometries differed significantly between the two techniques.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 52907**

**ACL RECONSTRUCTION, WHEN IS BEST TO INTERVENE**

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There is no consensus in the literature regarding the optimal timing of surgical reconstruction of the ruptured anterior cruciate ligament (ACL). The objective of this study was to evaluate the early function and complications in patients with in either acute (0-1 week, group I), subacute (1-6 weeks, group II) or early delayed/late (6 weeks- , group III) anterior cruciate ligament reconstructions. Methods: 130 consecutive patients with a mean age of  $29 \pm 10,2$  years were operated and followed-up by the senior surgeon (DJ). The patients were divided into three groups. There were 42 patients were in the acute (Group I, 32,3%), 40 patients in the subacute (Group II, 30,8%) and 48 patients in the delayed/chronic (Group III, 36,92%) period. The patients in all three groups ( $n = 130, 36,9$ ) were comparable in terms of gender, age, preinjury activity level. Follow up was for a minimum of 6 months. Preoperative evaluation consisted of physical examination, subjective evaluation, IKDC scoring. Analysis of intraoperative associate meniscal and chondral injuries and postoperative complications was performed. Results: There was no statistical difference between the three groups. Associated meniscal or chondral surgery was performed in 15 (35,7%) of the patients in group I, 15 (25%) in group II and in 28 (58,3%) of the patients in group III ( $P < 0.01$ ). A total of 7 manipulations under anaesthesia were required. Conclusion: ACL injured patients who underwent reconstruction in the acute or subacute stage post ACL injury had a higher early postoperative complication rate.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 54854**

**NO ADDITIONAL BENEFIT AND HIGHER COMPLICATIONS RATE WITH SYNTHETIC GRAFT AUGMENTATION IN ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION: A SYSTEMATIC REVIEW**

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**Introduction:** The use of synthetic material in the management of anterior cruciate ligament (ACL) rupture remains controversial. Synthetic graft augmentation has been proposed as a back-up option when the prepared tissue graft is too small. The present systematic review evaluated the long-term clinical outcomes associated with this technique. **Methods:** A systematic review of the electronic databases Medline, Embase, and The Cochrane Library was conducted to extract all comparative studies pertinent to the research question. The principal variables assessed were objective and subjective knee outcomes and rate of complications. **Results:** A total of 196 publications after exclusion of duplicates and spanning the period from 1985 to 2019 were identified. Studies included consisted of five randomised trials, eight comparative series and one prospective cohort study. The overall population included 1108 patients; 616 ACL autologous tissue reconstruction, 370 ACL reconstruction with tissue and additional synthetic augmentation, and 77 ACL repair with additional synthetic augmentation. There was significant heterogeneity in the reported outcomes. Nevertheless, an overall 66% of outcomes favoured standard non-synthetic ACL reconstruction. The use of synthetic material was also associated with higher rates of complications. **Conclusions:** No benefit in clinical outcomes when comparing standard autologous tissue ACL reconstruction to synthetic material graft augmentation ACL reconstruction. There is a trend towards a higher rate of post-operative complications in the augmentation groups. In terms of long-term clinical outcomes, augmentation of primary repair were superior to repair alone but inferior to standard reconstruction.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 54379**

**BIOCOMPOSITE SCREWS FIXATION IN SOFT-TISSUE ACL RECONSTRUCTION – RETRIEVAL ANALYSIS AFTER TIBIAL CYST: A CASE SERIES**

Rodica MARINESCU<sup>1</sup>, Iozefina BOTEZATU<sup>2</sup>, Andrei BUNEA<sup>2</sup>, Dan LAPTOIU<sup>2</sup>

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Introduction. Increasing trend in soft tissue grafts for ACL replacement includes interference screw fixation on tibial site; complications related to interference fixation are documented. Biocomposite screws =alternative solution. We present a series of complications related to biocomposite screws fixation. Methods: We prospectively follow our series of 457 ACL reconstructions with soft tissue grafts performed with interference fixation with biocomposite screws. Ten cases presented different forms of cystic reactions (intervals range from 9 to 31 months). All cases were documented: clinical and laboratory exams, MRI, arthroscopy; infection ruled out. Surgery consisted in retrieval of the implant, local debridement and curettage of bone tunnel; histological examination of the explanted tissues and surface analysis by electron microscopy of the screws remnants. Results: At one-year follow-up all patients were symptom free and resumed previous activities. Patients mean age: 30 years (range 16 - 43). No significant correlations between the clinical aspects and implant type found. Anatomic-pathological aspect: polymorph inflammatory tissue (lymphocytes, monocytes, neutrophil); 5 out of 10 cases (all 75PLLA/25HA) had gigantic polynuclear cells and birefringent material debris. The implants showed marked resorption signs but still present (at 20 months postop). Conclusions: Retrieval analysis protocol can be useful in cases with complications related to biocomposite screw fixation. The possibility for late complications should be kept in mind and long-time surveillance should be done in patients who received biocomposite screw fixation.

**Date: 2019-12-05**

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**Room: Grand Ballroom Hall A3**

**Abstract no.: 53558**

**A LATERAL EXTRA-TENODESIS OF THE ILIOTIBIAL BAND**

Amr OMR

Menofia University Hospital, Shibin El-Kom (EGYPT)

Although this great progress in ACL reconstruction techniques, abnormal knee kinematics is still reported that will proceed to arthritic changes, there has been more interest in the anterolateral structures, and the contribution of each component to rotatory knee stability. The concept of combining a lateral extra-articular augmentation with an intra-articular reconstruction for the treatment of ACL injury emerged with the objective of decreasing the failure rate of either technique carried out in isolation. Inclusion criteria in our study 1- Revision ACL reconstruction 2-Primary ACL reconstruction in the following situations (Athletes practicing contact sports, Obese patients, Patients with grade III or IV pivot). Method: A width strip of the iliotibial band is dissected keeping its distal attachment to Gerdy tubercle. The strip is separated proximally and dissected from underlying soft tissue. The LCL is next identified. Two vertical incisions are performed, one anterior and the other behind the LCL. A Kelly clamp is then passed from one incision to the other forming a tunnel deep to the LCL. At the femoral attachment site the vastus lateralis muscle is elevated, keeping the foot externally rotated and the knee in 30 degree flexion as well as the ACL graft tensioned, the strip is passed deep to the periosteal flap and fixed by a staple. Conclusion: A lateral tenodesis of the ITB is an effective surgical method that not only restores but also reinforces anterolateral stability and allows for sufficient rotational stability in the setting of an ACL reconstruction in selected cases.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53408**

**MRI EVALUATION OF ANTEROLATERAL LIGAMENT TEARS IN KNEE INJURY WITH ANTERIOR CRUCIATE LIGAMENT RUPTURE**

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**Objective:** To evaluate the incidence of Anterolateral Ligament (ALL) tear in acute knee injury and its association with Anterior Cruciate Ligament tear (ACL). **Materials and methods:** Forty patients with isolated early ACL tears were prospectively reviewed under 3T-MRI evaluation to identify ALL tears. This was correlated with trauma mechanisms and degree of knee instability. Patients less than 18, or more than 50 years of age, and those with posterolateral corner injury or LCL instability were excluded, which left 31 patients (30 males; mean age:28.6 years) for the final evaluation. **Results:** The ALL was visualized completely on the MRI in all 31 patients. ALL had mid substance tear in 19 knees (61.3%), proximal femoral attachment in eight knees (25.8%), at the tibial end in 6 knees (19.3%) and was seen torn at both proximal and distal ends in five knees (16.1%). Clinical correlation revealed higher number of giving way episodes, more functional loss of activities and higher grades of pivot shift test in cases with ALL tear along with ACL tear as compared with patients who had ACL deficiency without concomitant ALL tear ( $p$  value  $<0.05$ ). **Conclusions:** The ALL can be identified in all cases with 3T-MRI. Tears are clearly seen and may be classified according to location. We found no correlation of ALL tears with injury mechanism; however ACL deficient knees with concomitant ALL tear on MRI had more functional impairment and instability. **Level of Evidence:** 2b. **Keywords:** Anterolateral Ligament (ALL); knee injury; ACL deficient knee; 3T MRI; Knee Instability.



**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53246**

**PREDICTION OF THE GRAFT SIZE OF 5-STRANDED SEMITENDINOSUS AND GRACILIS TENDONS FOR ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION. RETROSPECTIVE COHORT STUDY.**

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Hamad Medical Corporation, Doha (QATAR)

Size of Hamstring tendon graft is of paramount importance to predict ACL reconstruction failure since a graft diameter of 8mm or less has significant risk of failure. 5 strands hamstring graft technique is gaining popularity and to ensure having larger graft diameter, this study was aimed to find whether anthropometric measurements can predict 5 strands graft diameter. 427 patients who were operated in 2016/17 were reviewed retrospectively and found 214 patients who had 5 strands graft reconstruction. Height, weight, age and BMI were collected from the chart while body surface area and lean body mass were calculated using equations. 98% of patients had graft diameter equal or more than 8 mm diameter, Height was the only anthropometric measure that was significantly associated with graft diameter and was the only factor that could weakly predict the graft size on stepwise regression analysis. Subgroups analysis based on patients age shows that only in the age group 20 - 24 yr, graft diameter is significantly associated with height, weight, body surface area and lean body mass, however only height can significantly be used to predict the graft size while other associated factors were excluded using stepwise regression analysis. In other age groups analysis anthropometric measurements were not significantly associated with graft diameter. Conclusion: patient's height in the age group 20-24 is the only anthropometric measurement that can be used to predict the size of 5-stranded hamstring graft. Using 5-stranded hamstring graft technique would mostly ensure graft diameter equal or more than 8mm.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 54399**

**RELATION OF TIBIAL POSTERIOR SLOPE TO TIBIAL TUNNEL WIDENING AFTER PRIMARY ACL RECONSTRUCTION IN INDIAN POPULATION**

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Introduction: The femoral and tibial bone morphology could influence the amount of femoral and tibial tunnel widening after primary anatomic ACL reconstruction. It was hypothesized that tibial and femoral bone morphology would be significantly correlated with tunnel widening after anatomic ACL reconstruction. Methods: 25 consecutive patients who underwent primary single-bundle anatomic ACL reconstruction with hamstring or peroneus longus autograft were enrolled. Bone morphology of tibia and femur including, medial and lateral tibial posterior slope, medial and lateral tibial plateau width, medial and lateral femoral condyle width and femoral notch width on preoperative magnetic resonance imaging (MRI) scans and radiographs. Tibial and femoral tunnel width at three points (aperture, mid-section, and exit) were measured on standard anteroposterior radiograph and CT scans from 1 week and 1 year postoperatively. Multivariable linear regression was used to analyse correlations between bone morphology and tunnel widening. Result: Increase in lateral tibial posterior slope was the only independent bony morphology that was significantly correlated with an increased tibial tunnel exit widening. Conclusion: Increased lateral tibial posterior slope is an important preoperative anatomic factor that may predict tunnel widening at the tibial tunnel exit. In regard to clinical relevance, the results of this study suggest that lateral tibial posterior slope be measured preoperatively. In patients with increased lateral tibial posterior slope, more rigid graft fixation and a more conservative physical therapy regiment may be preferred.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 52924**

**ARTHROSCOPIC PRIMARY ACL SUTURE IN PHYSICALLY ACTIVE PATIENTS**

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Introduction: Injury of anterior cruciate ligament (ACL) often leads to instability of the knee which excludes from physical activity. Current, recommended treatment consisted of extensive surgery as ACL reconstruction, using mostly autogenous transplants, associated with tissue damage at a donor site. What is more, ACL reconstruction surgery is not always successful, leading to patient's dissatisfaction. The purpose of this study was to determine if primary suture of ACL allows to restore knee joint stability which correlated with patient satisfaction. Materials and methods: This prospective study was conducted on 71 patients within the age group of 21-43 yo. who had acute knee injury with ACL instability based on clinical examination, MRI and arthroscopic Sherman classification. Finally, 41 of them underwent primary suture of the ACL. Outcomes were measured according to MRI scan performed at 6 and 12 months post-surgery and clinical assessment at the same time using KOOS scale. Results: The time of an early patients follow up was from 1 to 3 years. In 4 patients there was secondary instability of the operated knee (9,7%). Those patients returned to regular activity after 3-4 months and had another twisting injury of the knee. In 3 patients (7,3%) there were instability of the operated knee after 12 months without any injury. 34 patients (83%) have good knee stability and they returned to professionally and physically activity. Conclusions: In acute proximal ACL tear primary suture repair should be consider in professionally and physically active patients.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 52913**

**DOES HAMSTRING TENDON GRAFT DIAMETER AFFECT THE OUTCOME OF ANTERIOR CRUCIATE LIGAMENT SURGERY?**

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Background: To identify effect of quadrupled Semitendinosus Gracilis (STG) graft diameter on knee stability, functional outcome and re-injury risk after primary ACL reconstruction (ACLR). Methodology: Patients were recruited according to inclusion and exclusion criteria. Study had 2 limbs- retrospective and prospective. Retrospectively, 11 patients were recruited who underwent revision ACLR between years 2010-2015 and were compared for graft rupture risk. Prospectively, 103 patients, who underwent primary ACLR were included and divided into group A & B, depending upon their quadrupled STG graft diameter of < 8mm & ≥8 mm respectively and compared for knee stability, graft rupture risk and functional outcome. Binary logistic regression was used to measure the relative association between the measured variables and hamstring graft diameter. Results: Mean age of patients was 24.68±3.00 years. In retrospective limb of study, 10/11 patients who underwent revision ACLR had graft diameter <8mm and 1 had graft diameter ≥8 mm. In prospective limb of study, 2 patients in group A, presented with graft rupture and none in group B suffered from graft rupture. KT difference at 1 year follow-up after primary ACLR was more in group A with 2.57±1.67mm (p-value=0.03). Return to sports (RTS) was significantly higher in group B (p-value=0.01). Lysholm score and WOMAC score were comparable in both the groups at 6 months and 12 months (p-value >0.05). Conclusion: Graft size of <8 mm is a risk factor for ACL graft re-injury. Graft size of ≥8mm provides better knee stability and higher RTS.

**Date: 2019-12-05**

**Session: Sports Medicine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53608**

**ANATOMIC STUDY AND REANALYSIS OF THE NOMENCLATURE OF THE ANTEROLATERAL COMPLEX OF THE KNEE FOCUSING ON THE DISTAL ILIOTIBIAL BAND. IDENTIFICATION AND DESCRIPTION OF THE CONDYLAR STRAP**

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**Purpose:** To characterise the macroscopic anatomy of the anterolateral complex of the knee, in particular the femoral condylar attachment of the distal ITB. **Methods:** Sixteen fresh-frozen human cadaveric knees were used to study the anterolateral complex of the knee. Standardized dissections were performed that included qualitative and quantitative assessments of the anatomy through both anterior (n 1/4 5) and posterior (n 1/4 11) approaches. **Results:** A distinct anatomic structure, hereafter termed the "condylar strap" (CS), was identified between the femur and the lateral gastrocnemius on one side and the deep surface of the ITB on the other, in all posteriorly dissected specimens. The structure had a mean thickness of 0.88 mm, and its femoral insertion was located between the distal Kaplan fibres and the epicondyle. The proximal femoral attachment of the structure had a mean width of 15.82 mm, and the width of the distal insertion of the structure on the ITB was 13.27 mm. The qualitative evaluation of behaviour in internal rotation revealed that this anatomic structure became tensioned and created a tenodesis effect on the ITB. **Conclusion:** There is a consistent structure that attaches to the deep ITB and the femoral epicondylar area. The orientation of fibres suggests that it may have a role in anterolateral knee stability. **Clinical Relevance:** This new anatomic description may help surgeons to optimize technical aspects of lateral extra-articular procedures in cases of anterolateral knee laxity.

**Date: 2019-12-05**

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**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53347**

**ESTABLISHING THE FIRST REGISTRY ON POSTERIOR CRUCIATE LIGAMENT IN OUR REGION: THE TEHRAN POSTERIOR CRUCIATE LIGAMENT REGISTRY (TPCLR) STUDY DESIGN AND PRIMARY RESULTS**

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**Objective:** We established a registry on Posterior Cruciate Ligament (PCL) injuries. **Methods:** Objectives of the registry were to determine overall characteristics of PCL injuries, to define aetiology of PCL injuries specific to our region, to determine prognostic factors in PCL surgery, to determine and compare treatment approaches in PCL injuries, to improve treatment outcomes using surgeon and patient feedback to hospital, to compare clinical outcome between isolated PCL injuries and complex PCL injuries and to evaluate best surgical interventions for those with isolated PCL and complex PCL injuries. **Results:** To date, 55 individuals have been registered. Majority of patients were men (87.25%). Mean age of patients was 28.12±8.53 years old. Average follow-up period was 28.83±20.62 months for each person. Mean time between trauma and surgery was 27.8±38.0 months. Most common cause of PCL injury was traffic accidents (70.9%) followed by sports injuries (5.5%). Most common chief complaint was joint instability (85.5%). Only 23.6% of patient presented with isolated PCL injuries. Regarding type of PCL surgery, majority of patients underwent single tibial-double femoral tunnel surgery (56.4%), followed by single tibial-single femoral tunnel (34.5%). Allografting was used in 60% of patient. Average Cincinnati knee rating scale (CKRC) was 35.87±11.4, which improved significantly after PCL surgery (79.45±11.90, p<0.001). Full range of motion only existed in 29.1% of patient prior to surgery, which improved to include 92.7% of patients (p<0.001) after surgery. **Conclusion:** The registry provides invaluable information regarding PCL injury characteristics and will be the basis for future studies focused on PCL injuries.

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**Session: Sports Medicine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 54959**

**A DOUBLE BLIND RANDOMIZED COMPARATIVE STUDY OF TWO AUTOGRAFTS IN ARTHROSCOPIC ACL RECONSTRUCTION**

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Introduction: Autografts are preferred choice for Arthroscopic ACL Reconstruction There is paucity of single centre randomised comparative studies of Q-tendon auto graft and quadrupled H-grafts Material: 62 men in 20 -40 year age were randomized into two groups, A, B. by a Sports medicine specialist who is not part of surgical team. All the patients were thoroughly evaluated clinically, radiographically and by MRI and had symptomatic complete ACL ruptures. Method: Group A and B patients all underwent Arthroscopic ACL reconstruction by single surgeon. In group A autologous Quadriceps tendon was used and in Group B autologous Hamstring tendons were used.as single bundle using far anterior portal and fixation was done by Bioresorbable wedge on femoral side and Beta Tricalcium phosphate fenestrated PLLA IFS as aperture fixation. All patients were administered same post ACLR Rehabilitation protocol of exercises and followed up at 3 weeks, 6 weeks, 12 weeks, 6months, 9months, one year and five years and at each visit evaluation was done using IKDC, KOOS, Laxometry and single leg stance balance time in seconds and Podogram Results: in group A quadriceps weakness was found in first 3 weeks after surgery which improved by 9 weeks and they had no Hamstring weakness. Stiffness was found and Q-lag in 18percent of group A patients. In group BV patients Hamstring weakness was found for first three weeks after surgery which improved by 9 weeks. Final conclusion: at last follow up no statistically significant difference was found between group A and B.  $p = < 0.05$

**Date: 2019-12-05**  
**Session: Hand Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 54753**

**RECONSTRUCTION OF UPPER LIMB BONE DEFECTS BY FREE VASCULARIZED FIBULAR GRAFT (VFG)**

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Introduction; Upper limb bony defects is yet a debatable dilemma. Limb shortening, amputation, biological reconstruction and prosthetic replacement are all options. Patients and Methods; Between 2-2003 and 1-2015, 45 cases with bone defects of the upper limb were reconstructed by free VFG at H&ULRM unit, Assiut University. Defects were > 6 cm, following trauma or tumour resection. Minimum FU was 12 months. Tumour group, 24 patients. (14 males, 10 females). Average age 19.8 years (5 to 35). The tumour involved humerus, (18), radius, (6). Post-traumatic group, 21 patients, 16 males and 5 females. The average age was 33 years (3 to 64). The average defect was 10 cm (6 to 14.5). The humerus in 7 patients, the humerus & the proximal radius and ulna in 2 patients, the humerus & the proximal ulna in 1 patient, the radius alone in 11 patients and distal radial epiphysis, carpals, and ulnar 4 metacarpals in 1 patient. Results; The graft union in group-I (tumour) was 83.3% after the primary procedure and 16.7% after a secondary procedure. In group-II (post-traumatic) was 95.2% after the primary procedure and 4.8% after a secondary procedure. The overall incidence of hypertrophy was 22.2% (10 out of 45 patients in both groups). Conclusion; Biological reconstruction of upper limb bony defects (exceeding 6 cm), using VFG is considered a successful reconstructive way with good long lasting results.



**Date: 2019-12-05**  
**Session: Hand Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 54709**

**THE OBSERVATION OF TWO DIFFERENT REVERSE DIGITAL ARTERY ISLAND FLAPS IN REPAIRING FINGERTIP SOFT-TISSUE DEFECT**

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**Objective:** To report the clinical outcomes of two different surgical procedures in repairing fingertip soft tissue defect: the reverse dorsal digital island flap with nerve anastomosis of cutaneous branches of proper digital nerve and reverse digital artery island flap without nerve anastomosis. **Methods:** We selected patients of fingertip soft tissue defect in nearly ten years, excluding thumb and multi-finger repair, a total 45 cases {45 fingers}. 20 fingers were treated using reverse dorsal digital island flap with cutaneous branches of proper digital nerve, 25 fingers were treated with another reverse digital artery island flap. If the flap survived in both groups after operation, the presence and absence of complications and other conditions were observed and compared. **Results:** Twenty patients with anastomosis of nerve flap were followed up for 12 to 19 months (mean 15.5 months). All patients achieved good sensory recovery (S3-S4). The two-point discrimination of the flap was 5.2- 8.0 mm (mean 5.9 mm); 25 patients with non-anastomosis of nerve flap repair were followed up for 21 to 120 months (mean 43.3 months) also achieved better sensory recovery (S3-S4), but only 20 patients achieved The two-point discrimination of the flap, which was 4.8 to 15.0 mm (average 9.1 mm), and 5 patients did not achieved two points discrimination of the flap. **Conclusion:** The reverse dorsal digital island flap with cutaneous branches of proper digital nerve has a good effect in the recovery of two-point discrimination. It is an excellent method to repair fingertip soft tissue defect.

**Date: 2019-12-05**  
**Session: Hand Free Papers 1**  
**Time: 08:00 - 10:00**  
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**Abstract no.: 54023**

**ARTHROPLASTY USING OSTEOCHONDRAL GRAFTS FROM THE KNEE FOR POST-TRAUMATIC OR DEGENERATIVE HAND JOINT DISORDERS.**

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(Objective) To describe the operative procedure and report the clinical outcomes of arthroplasty for various hand joint disorders using autologous osteochondral grafts from the knee. (Methods) Fourteen patients underwent articular surface reconstruction for hand joint disorders with autologous osteochondral grafts from the patellofemoral joint. Mean patient age was 37 years (range 15-57y). The patients were followed for an average of 48 months (range 18- 97m). Metacarpophalangeal joint arthroplasty was performed in 5 cases, and proximal interphalangeal joint in 9 cases. The patients' clinical outcomes were evaluated with joint range of motion, visual analogue scale (0-10 points), and Disabilities of the Arm, Shoulder, and Hand (DASH) score. Histological examination was performed in 4 cases after surgery. (Results) Graft union was confirmed in all cases without radiographic evidence of resorption or necrosis. Follow-up radiographic examinations showed good remodelling of the joints. The finger flexion-extension arc improved significantly from an average of 19° to 63°. The mean visual analogue scale also improved significantly from 7.0 to 1.5. The mean total active motion showed a significant improvement from 147° preoperatively to 210° postoperatively, and the mean DASH score improved significantly from 33 to 12. There were no significant differences for the arc of finger motion and DASH score between metacarpophalangeal and proximal interphalangeal joint disorders or between hemi and total joint arthroplasty. Histological examination revealed viable chondrocytes in the implanted cartilage. (Conclusion) Autologous osteochondral grafting from the knee provided satisfactory outcomes and may be a useful option for arthroplasty of hand joint disorders.

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**Room: Grand Ballroom Hall C1**

**Abstract no.: 53399**

**CLINICAL RESULTS OF PERCUTANEOUS RELEASE OF TRIGGER FINGERS USING AN 18-GAUGE NEEDLE.**

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Introduction: Trigger finger is one of the most common disorders of the hand. It affects the quality of life and represents one of the most common causes of hand pain and disability. Purpose: study the results and clinical outcome of percutaneous release of trigger finger. Methods A total of 60 trigger fingers in 46 patients with persistent symptoms after at least one previous corticosteroid injection underwent percutaneous release of A1 pulley using an 18-gauge needle. Results the follow up period ranged from 28 months to 48 months with an average of 34 months. Clinical release with the relief of active triggering immediately after percutaneous release was noted in all patients. No complications nor recurrences were reported. Conclusion: the percutaneous needle release of trigger finger is a simple, safe, and reliable method with results equal to the open surgical release. It requires no special equipment, but only a syringe needle for the release,

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**Abstract no.: 53470**

**COMPARATIVE EVALUATION OF OUTCOME OF FLEXOR TENDON REPAIR WITH OR WITHOUT AMNIOTIC MEMBRANE WRAP**

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**Introduction:** It is not difficult to suture tendons and prepare the ground for sound union: the real problem is to obtain a freely sliding tendon capable of restoring hand function (Pulveraft). It has been suggested that amniotic tissue has the ability to minimise the peritendinous fibrotic response following repair. **Aim:** To compare the fibrotic response and outcome in patients with and without Amniotic membrane wrap at tendon repair site. **Methodology:** 10 patients with flexor tendon injuries were subjected to surgical repair. The repair site was wrapped with allogenic Human Amniotic Membrane (HAM) in 5 cases. Remaining 5 served as controls as no HAM wrap was used. The fibrotic response was assessed Functionally (Total active motion, Adjusted Strickland, Buck Gramcko scoring), Radiologically (High Frequency Ultrasound) and Biochemically (serum TGF-beta1, Interleukin-6 levels). Outcome measures studied included evidence of infection, VAS score, Pinch/Grip strength, were recorded at pre-defined intervals. **Results:** HAM wrap cases were functionally better than the controls and recorded better tendon glide on ultrasonography at follow up (6-18 months). TGF-beta1 and Interleukin-6 serum levels decreased in majority of HAM cases whereas they increased in controls at 2 - 6 weeks postoperatively. No infection/immune rejection phenomenon was observed in HAM wrap cases. **Discussion:** HAM wrap at tendon repair site seems to have reduced the serum proinflammatory mediators leading to suppression of fibrotic response and improved tendon gliding. Being immune privileged, the HAM did not invite rejection. **Conclusion:** HAM wrap reduces fibrotic response following tendon repair thereby improving tendon glide and hand function.

**Date: 2019-12-05**

**Session: Hand Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 55249**

**INTRODUCTION OF AN INNOVATIVE REPAIR TECHNIQUE IN TYPE IV FDP TENDON AVULSIONS**

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Introduction: The purpose of this study was to determine strength and failure characteristics of an innovative repair technique based on a tension banding principle using a suture anchor compared to two commonly used surgical repair techniques in type IV avulsions of the flexor digitorum profundus tendon. Material and Methods: Bony avulsion and a subsequent FDP tendon avulsion of the flexor digitorum profundus tendon was simulated in 45 fresh frozen distal phalanges from human cadavers. Allocating 15 specimens into three groups, repair was performed with a screw-anchor combination, transosseous sutures and the new technique using a suture anchor. All specimens were loaded cyclically from 2 to 15 N at 5 N/s for a total of 500 cycles. Samples were tested to failure at the completion of 500 cycles. Load at failure, load at first noteworthy displacement (>2mm), elongation of the system, gap formation at the fragment-phalanx interface, and the mechanism of failure were assessed. Results: The new techniques' biomechanical superiority in load to failure, load at first noteworthy displacement, and gap formation the fragment-phalanx interface was statistically significant. A decrease in elongation of the tendon-repair complex implies a rigidity of the repair. No implant extrusion or suture rupture were recorded during cyclic loading when using the new technique. Conclusion: This innovative repair technique is superior biomechanically to other commonly used surgical repair techniques, particularly in consideration of an early passive mobilization protocol. Due to its subcutaneous position, reduction of complications may be achieved.

**Date: 2019-12-05**

**Session: Hand Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 54582**

**ROLE OF ADDITION OF DEXAMETHASONE AND KETOROLAC TO LIGNOCAINE INTRAVENOUS REGIONAL ANAESTHESIA (BIER'S BLOCK) TO IMPROVE TOURNIQUET TOLERANCE AND POSTOPERATIVE ANALGESIA IN HAND AND FOREARM SURGERY**

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**Objective:** To compare tourniquet tolerance and postoperative analgesia using lignocaine intravenous regional analgesia alone or with addition of dexamethasone and ketorolac. **Methods:** The randomised, prospective study was conducted at Mayo Hospital, Lahore, from June 2013 to June 2014. Patients were divided into three groups: group I received lignocaine; group II received lignocaine and 30mg ketorolac; and group III received lignocaine, 30mg ketorolac and 08mg dexamethasone for intravenous regional anaesthesia. A total of 40ml solution was made by diluting it with normal saline. Motor and sensory block and recovery times were noted. Visual analogue scale was used to assess the severity of surgical and tourniquet pain, and total number of analgesic tablets taken in the first 24 hours after surgery were also recorded. **Results:** The 180 patients in the study were divided into three equal groups of 60(33.3%) each, with each group having 30(50%) male and 30(50%) female subjects. In all the three groups, the sensory and motor onset and recovery time was the same ( $P>0.05$ ). Lower pain scores were reported in groups II and III compared to group I ( $p<0.001$ ). Patients of group II and III also required fewer analgesic tablets postoperatively and had longer postop time during which no analgesia was given compared to group I ( $p<0.05$ ). **Conclusion:** Bier block using lignocaine, dexamethasone and ketorolac provides better tourniquet tolerance in patients undergoing hand and forearm surgeries when compared to use of lignocaine alone and lignocaine and ketorolac. **Keywords:** Bier's block, Ketorolac, Dexamethasone, Lignocaine.

**Date: 2019-12-05**

**Session: Hand Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 53871**

**SAFE ROUTE FOR PLACEMENT OF K-WIRE IN PROXIMAL PHALANX  
BY AVOIDING INJURY TO EXTENSOR APPARATUS.**

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The aim of the study was to quantify the amount of Extensor tendon excursion experienced following K-wire fixation of Proximal Phalanx. Three Cadaver specimens were utilized to examine extensor tendon excursion. K-wire is inserted into proximal phalanx of all fingers including thumb with Dorsal anterograde route i.e. from base to head in one hand and Dorsal retrograde route i.e. from head to base in the other hand of each cadaver. Measurements were performed during ten different passive and active simulated motions. Active motion in Retrograde route resulted in higher tendon excursion than antegrade route. This knowledge may help optimise the management of the route of choice in K wire fixation in Proximal phalanx fracture.

**Date: 2019-12-05**  
**Session: Hand Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 55171**

**RISING PRESSURES AND DEMANDS ON HAND CLINICS: COULD PHYSIOTHERAPY LED CLINICS BE A SOLUTION?**

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Introduction: Advanced physiotherapy-led services have previously been implemented to address the increasing demands on musculoskeletal clinics. At our centre currently, all patients undergoing hand surgery have a subsequent consultant/registrar outpatient follow-up. Aim: Investigate the efficacy of a pilot study in which a trial of physiotherapy-led clinics was implemented to follow up selected patients post hand surgery. Method: The records of patients awaiting outpatient follow-up post hand surgery were reviewed retrospectively. The nature of the procedure and condition was used to determine if patients would be suitable for physiotherapy-led, consultant-led or telephone follow-up. Two physiotherapy-led clinics were carried out to coincide with consultant-led hand clinics, to facilitate the availability of a consultant review if required. Results: Of the 205 notes reviewed, 60% (n=122) were deemed appropriate for non-consultant follow up, with 43% (n=88) suitable for physiotherapy follow-up, and 16% for telephone follow-up by physiotherapy-assistant. From the two piloted physiotherapy-led clinics, 90% were independently discharged by the physiotherapist. Consultant input was only required in 10%. Conclusions: This study highlights potential alternatives to the traditional methods of patient follow-up, providing evidence to support physiotherapy-led follow-up clinics to relieve the burden on consultant hand clinics. This also has the potential for improving the collection of patient outcomes.



**Date: 2019-12-05**  
**Session: Hand Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 54324**

**COMPARISON OF LOCAL STEROID INJECTION AND SURGICAL DECOMPRESSION IN TREATMENT OF CARPAL TUNNEL SYNDROME**

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**Objective:** To compare the efficacy of local steroid injection versus surgical decompression in treatment of carpal tunnel syndrome in terms of frequency of pain. **Study Design & Methods:** This Randomized Controlled Study was carried out in the Orthopaedic Department for duration of 02 years from 3rd January 2013 to 2nd January 2015. The study included 130 patients with carpal tunnel syndrome who had moderate (Grade 2) and severe (Grade 3) pain. Patients were graded according to severity of pain based upon Visual Analog Pain Scale (VAS). Lottery method was used to allocate the patients randomly into two groups. Group A contained 65 patients who were subjected to surgical decompression and 65 patients were in Group B who were injected with local steroid injection. All the surgical decompressions through mini incision technique. **Results:** Out of 130 patients, 63.1%(82/130) were males and 36.9%(48/130) were females. The mean age of the patients was  $45.20 \pm 7.42$  years. Efficacy (at least one grade improvement in pain at one month) was observed to be significantly high in group B patients who were treated with local steroid injection (87.8%) as compared to group A patients who underwent surgical decompression for carpal tunnel syndrome (72.3%). **Conclusion:** Steroid injections were found to be superior to the surgical management when follow up was done after 1 month of treatment after both steroid injection and mini incision technique of open surgery. Thus its administration as a routine treatment in all patients with Carpal tunnel syndrome is suggested.

**Date: 2019-12-05**  
**Session: Hand Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 53162**

**COMPARATIVE STUDY OF DOUBLE IV CANNULA AND SINGLE NEEDLE TECHNIQUE OF ASPIRATION AND METHYLPREDNISOLONE INJECTION IN THE TREATMENT OF WRIST GANGLION**

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Abstract: Ganglion is the one of the common soft tissue swellings in the hand and wrist. Treatment options include reassurance, aspiration with or without steroid, hyaluronidase and surgical and arthroscopic excision. All current treatment options are suboptimal. Objective: The aim of the study was to compare the outcome and recurrence rate after treatment of wrist ganglion by aspiration and methylprednisolone injection by double IV cannula versus single needle technique. Methodology: A prospective comparative clinical study was done at Central Institute of Orthopaedics, Safdarjung hospital with a total of 72 patients. 36 patients in Group 1 were treated with double IV cannula technique and 36 patients in Group 2 were treated with single needle technique. All the patients were followed up for 6 months to look for recurrence and any complication. The patient's age, sex and various characteristics of the ganglion cyst like side, site, size, etc were recorded. Results: In group 1, recurrence was seen in 6 patients (15.7%) while in group 2, recurrence was seen in 14(38.8%) patients. There was statistical significant difference between the two groups with p value of 0.04. No complication was seen in both groups due to methylprednisolone injection. Conclusion: Inspired by the results we advise to use aspiration and methylprednisolone injection by double IV cannula technique in the treatment of wrist ganglion before any surgical intervention. It is safe, simple, cost effective method and is less invasive and less time consuming with recurrence rate comparable to surgical and arthroscopic interventions.

**Date: 2019-12-05**  
**Session: Hand Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 52864**

**ASYMPTOMATIC ELECTROPHYSIOLOGICAL CARPAL TUNNEL SYNDROME**

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Introduction: Asymptomatic Electrophysiological Carpal Tunnel Syndrome (AECTS) demonstrates electrodiagnostic evidence of CTS but does not have clinical symptoms of CTS. Materials: Thirty-seven hands of 36 patients who met the following three criteria were included: 1) consulted to our hospital without having symptoms; 2) had a minimum score of 1.0 on the Boston CTS Questionnaire or had the scores exceeding 1.0 were due to diseases except CTS; 3) had latencies of abductor pollicis brevis-compound muscle action potentials (APB-CMAP)  $\geq 4.5$  ms for three consecutive times with more than one month intervals between measurements. Twelve patients were men, 24 were women. The mean age was 59.7 years. Methods: The following outcome parameters were determined: 1) Two-point discrimination (2PD) values of the three radial digits were averaged; 2) Grades of the Semmes-Weinstein test (SWT) of the three radial digits were averaged; 3) Phalen's test (positive or negative); 4) Carpal compression test (positive or negative); 5) Tinel's sign (positive or negative). Results: The 2PD values in Group A, B and C were 5.05, 6.67 and 10.03 mm, respectively. There was a significant difference between Group A and B. SWT grades for Group A, B and C were 0.96, 1.57 and 2.92, respectively. There was a significant difference between Group A and B, and Group B and C. Conclusions: This means that AECTS actually has sensory disturbance while the rates of positive symptom-inducing tests are low, indicating that AECTS patients do not have symptoms during daily activity.

**Date: 2019-12-05**  
**Session: Hand Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 54070**

**A PEDICLE OR FREE FLAP FOR RECONSTRUCTION OF UPPER EXTREMITY**

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Introduction: The best strategy of upper extremity reconstruction with a pedicle or free flap is controversial. We report the functional outcomes after reconstructive surgeries for soft tissue and/or bone defects in upper extremities. Methods: We treated 26 patients, who had a mean age of 41 years. The pedicle or free flap was applied to reconstruct the upper extremity in such as tumour wide resection, infection, pseudarthrosis, congenital radioulnar synostosis, and musculocutaneous nerve palsy. Patients were followed to evaluate their functional recoveries, treatment modalities, type of flap utilized, and postoperative donor/recipient site complications. The functional assessment was performed using range of motion (ROM), manual muscle test, and DASH score. Results: All patients achieved bone and soft tissue union. Two donor-site hematomas in latissimus dorsi flaps and 1 claw toe in vascularized fibula graft were complicated. The mean of elbow arc was 95 degrees whereas that of pronation/supination arc of the forearm was 82 degrees. The mean of DASH score was 13.2 points improved. Conclusion: A free flap is generally performed in upper arm bone defect because of insufficient bone harvest in case of a pedicle flap. On the other hand, the pedicle flaps such as latissimus dorsi, lateral upper arm, and radial forearm are enough to cover soft tissue defects. A fibula bone grafting is useful for large bone defects to reconstruct. A latissimus dorsi muscle flap can be an effective surgical option for both wide soft tissue coverage and functional muscle reconstruction.

**Date: 2019-12-05**  
**Session: Hand Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 53567**

**RESULTS OF SINGLE STAGE FREE TENDON GRAFT IN NEGLECTED FLEXOR TENDON INJURY ZONE II IN ADULTS USING FDS TENDON OF THE INJURED DIGIT**

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Objective: evaluate of using FDS tendon of the same injured digit as a graft for neglected FDS & FDP tendons injury zone II in adults in one stage done at Hand and Reconstruction Microsurgery Unit at Assuit University Hospital. Methods: prospective evaluation of 13 patients with neglected FDS & FDP tendons injury zone II underwent tendon graft using the FDS tendon of the same injured digit as a graft. Average age was 21 years and average time interval was eight weeks. All patients were Boyes' grade 1 according to Boyes' pre-operation classification system in flexor tendon injuries. Early range of motion protocol was used as a rehabilitation program. Patient compliance to the rehabilitation program was assessed by a five point score. Results were assessed by IFSSH and Strickland's adjusted classification systems. The final assessment was obtained at fourth month post-operative. The Results according to Strickland's adjusted classification system: 15.4% of the cases showed excellent results, 69.2% showed good results, 15.4% showed fair result, no poor result was showed and according to IFSSH classification system: 46.2% showed excellent results, 46.2% showed good results , no fair results, 7.7% showed poor results. Conclusion: FDS tendon of the same injured digit is considered a good donor to reconstruct neglected FDS and FDP tendons injury in zone two in adults and restoration of finger normal function.

**Date: 2019-12-05**  
**Session: Hand Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 53543**

**WHAT IS THE PREVALENCE OF PRIMARY OSTEOARTHRITIS OF THE DISTAL RADIOULNAR JOINT ON PLAIN X-RAYS AND HOW MANY PATIENTS HAVE ULNAR WRIST PAIN?**

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Ghent University Hospital, Gent (BELGIUM)

Introduction: Not much information is available about the prevalence of degenerative changes of the distal radioulnar joint and it is not known how many patients are asymptomatic. Methods: Both X-rays of 1013 skeletally mature patients who visited the orthopaedic department in our hospital between 2013 and 2017 were examined for signs of degenerative arthritis. The severity of the arthritis was divided into three grades: mild, moderate and severe. In the medical files was noted if patients complained of ulnar wrist pain at the time the X-rays were taken. Patients with secondary osteoarthritis were excluded (posttraumatic arthritis, rheumatoid arthritis, gout, haemochromatosis, chondrocalcinosis). Results: Primary osteoarthritis of the distal radioulnar joint was found in 71 patients (7%). Mean age was 60 years and 55% were male. In 30 patients both wrists were affected. Mild signs of osteoarthritis were present in 54 (5.3%), moderate in 13 (1.3%) and severe in 3 (0.3%) patients. Ulnar wrist pain was reported in 11.1% with mild, in 38.5% with moderate and in 66.6% of patients with severe osteoarthritis. Conclusion: Primary osteoarthritis of the distal radioulnar joint was uncommon and it was asymptomatic in about half of the patients with moderate or severe involvement.

**Date: 2019-12-05**

**Session: Hand Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 53857**

**CAPITATE SHORTENING IN KIENBÖCK'S DISEASE IN 10 CASES. CLINICAL AND RADIOLOGICAL RESULTS MORE THAN FIVE YEARS OF FOLLOW-UP.**

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Kienböck's disease is a form of osteonecrosis affecting the lunate, which progresses through several stages if not treated. Usual surgical procedures unload the lunate. Radial shortening is the common procedure in negative ulnar variance. For wrists with neutral or positive ulnar variance, this procedure could produce a distal radio-ulnar discrepancy and an ulnocarpal impingement. We perform, in these cases; a capitate shortening. Our objective was to assess the long-term clinical and radiological outcome of capitate shortening for patients with neutral or positive ulnar variance at stage II and IIIA of disease. Between 2010 and 2016, 10 patients (07 male, 03 female) were operated. Their average age was 38 years (28 to 49). Four Lichtman's stage II and six stage III A with neutral or positive ulnar variance. The surgical procedure consisted in a dorsal approach and a 2 mm shortening osteotomy in the capitate's waist. Fixation was carried out by two memory staples. The mean follow-up was 05 years (29-84 months). Clinically all patients had improved wrist pain, wrist range of movement, and grip strength after the surgery. Radiographic disease progression occurred only in 3 wrists (one stage II to stage IIIA and two stage IIIA to IV), at 5 years follow-up without a bad clinical outcome. Lunate revascularization improved in all other cases. Any intracarpal complication or capitate non-union occurred. The capitate shortening is a simple and low aggressive procedure. Wrist's functional outcome has good results. We recommend this procedure for symptomatic patients in early Kienböck's disease with neutral or positive ulnar variance.

**Date: 2019-12-05**  
**Session: Hand Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 53870**

**MANAGEMENT OF FLEXION CONTRACTURES OF THE WRIST BY DIFFERENTIAL DISTRACTION**

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Introduction: Flexion contractures of the wrist are a dreaded complication of VIC, post infective/post traumatic destruction of wrist or Tuberculosis of the wrist joint. Most of the times the patient is advised an amputation with prosthetic replacement as the treated limb also is like a dud limb. To avoid it a simple alternative is to use the principle of controlled differential fractional distraction histogenesis. JESS distractors allow gradual distraction of contracted soft tissues and align all the joints of the hand so as to bring corrections of all aspects of hand and wrist deformity simultaneously. This study was done with the aim to analyse the role of differential distraction in correcting cases of flexion contractures of the wrist in terms of cosmetic, functional and anatomical outcome. Methods: Total of 6 flexion contractures of the wrist and hand underwent Differential fractional distraction. Patients were assessed preoperatively for morphology, functionality and radiology. Period of correction varied from 5-8 weeks. Once correction was obtained then apparatus for differential distraction (Joshi type external stabilisation system) is locked in that position for same period and later converted to cast for maintenance and followed up regularly... Results: Excellent to Good results were obtained in all the cases as assessed with patient focussed wrist outcome score (2003). There were only minor complications in patients. Conclusion: Differential Distraction by JESS frame is a simple, versatile and cheap method suited for correcting flexion contractures of the wrist and hand which were neglected, resistant and recurrent.



**Date: 2019-12-05**  
**Session: Hand Free Papers 2**  
**Time: 16:00 - 17:30**  
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**Abstract no.: 54648**

**FUNCTIONAL AND RADIOLOGICAL OUTCOMES FOLLOWING SURGICALLY MANAGED PERILUNATE DISLOCATIONS**

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Perilunate dislocations (PLDs) are uncommon high-energy injuries that may result in significant morbidity if inadequately treated. We report the midterm outcomes following surgical intervention and the validity of the Patient Rated Wrist Evaluation (PRWE) score as an assessment tool post injury. Methods: We prospectively present outcomes in 21 patients with perilunate injuries. Definitive surgical management comprised fixation of all fractures and anatomical reconstruction of ruptured ligaments where possible. All patients completed the DASH and PRWE, for which internal consistency and construct validity were assessed. Results: At 24 months, the mean grip strength was 79% of the uninjured side (range 61%-95%) and the mean range of flexion was 71% and extension was 58%. 85% of patients returned to work within 6 months. The PRWE score was 36.2 (range 14.5-77.3) and DASH 25.2 (range 7.5-91.7). The mean visual analogue scale (VAS) satisfaction score was 7.9 (range 0-10), VAS pain at rest 1.9 (range 0-6) and on activity 3.3 (range 1-6). DASH and PRWE demonstrated similar internal consistencies with Cronbach alphas of .98 and .91, respectively, and a strongly positive correlation coefficient of  $r = +.7$  ( $P < .05$ ). Conclusions: Surgical treatment of PLDs can provide good clinical outcomes allowing patients to return to normal activities in a reasonable timescale when delays to surgery are kept to a minimum. The PRWE demonstrated high internal consistency and was found to be a valid questionnaire with advantages over the DASH for use following severe carpal injuries.

**Date: 2019-12-05**  
**Session: Hand Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 54316**

**SYSTEMATIC REVIEW OF DIAGNOSIS FOR CLINICALLY SUSPECTED SCAPHOID FRACTURES: WHICH IS BEST?**

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Background: Scaphoid fracture accounts for approximately 15% of acute wrist fractures. Clinical examination and plain x-rays are commonly used to diagnose the fracture, but this approach may miss up to 16% of fractures in the absence of lucent lines on plain radiographs. As such, additional imaging may be required. It is not clear which imaging modality is best. To summarize the current literature on scaphoid fractures to evaluate the sensitivity, specificity and accuracy of four different imaging modalities. Case description: A systematic-review and meta-analysis was performed. The search term 'scaphoid fracture' was used and all prospective articles investigating MRI, CT, bone scintigraphy and ultrasound were included. In total, 2,808 abstracts were reviewed. Of these, 42 articles investigating 51 different diagnostic tools in 2,507 patients were included. Literature review: The mean age was 34.1±5.7years and the incidence of fractures was 21.8% for occult scaphoid fractures. MRI has the highest sensitivity and specificity, which are 94.2% and 97.7%, respectively, followed by CT scan with a sensitivity and specificity at 81.5% and 96.0%. Ultrasound's sensitivity and specificity are between 81.5% and 77.4%, respectively. Significant differences between MRI, bone scintigraphy, CT and ultrasound were identified. Clinical relevance: MRI has higher sensitivity and specificity than CT scan or bone scintigraphy.

**Date: 2019-12-05**

**Session: Hand Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 53776**

**THE CRITICAL SIZE OF A ULNAR STYLOID FRACTURE AND THE BIOMECHANICAL EFFECTS OF THE REMNANTS SOFT TISSUES AND OF THE SURGICAL REPAIR ON THE DRUJ-STABILITY**

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Background: Ulnar styloid fractures (USF) may cause distal radioulnar joint (DRUJ) instability depending on the fracture size. The critical fragment size is unknown. The remaining soft tissues may provide sufficient residual stability even following basal USF. However, 10% are addressed surgically but no biomechanical studies have compared the different techniques. Our study aims to access the critical USF size and the best surgical treatment for restoring the DRUJ-stability. Methods: Seventeen forearm specimens were tested in a custom jig. Soft tissue was removed preserving the interosseous membrane, ECU and TFCC. The positional change of the DRUJ was measured with a MicroScribe. Pronosupination was measured and Translation was quantified in neutral, pronation and supination applying load. Specimens were sequentially tested intact, after different USF, after surgical fixation with 4 repair techniques and after transection of the remaining portions of the DRUL. Results: The pronosupination increased significantly and gradually with all 3 tested fractures. DP-translation significantly increased after the fovea fracture. Both pronosupination and DP-translation significantly increased after transection of the remaining soft tissues after a basal USF including the fovea. The DP-translation was reduced significantly with all 4 surgical techniques (2 K-wire, tension band wiring (TBW), headless compression screw, suture anchor). Only the K-wire fixation and the TBW restored the rotation to the intact condition. Conclusions: All tested fracture sizes of the ulnar styloid led to rotational instability of the DRUJ; however, the DRUJ remained stable in DP-translation unless the USF involved the fovea. There are still soft tissues attached to the ulnar head, giving residual stability to the DRUJ after a foveal USF, the dorsal portion have a more important role in the DP-stability. All four USF repair techniques restored some DRUJ-stability, however TBW is biomechanically superior to the other techniques.

**Date: 2019-12-05**  
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**Abstract no.: 53474**

**GCT OF SCAPHOID TREATED WITH EXCISION AND FOUR CORNER FUSION**

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We present a rare case of GCT of scaphoid bone. A 28 years old male presented to us with complaints of pain, swelling and restricted motion of right wrist for 4 months. Radiographs revealed an expansile, osteolytic lesion in the scaphoid with thinned out cortex. CT and MRI scans revealed osteolytic, expansile, contained lesion in the scaphoid with no breach in the cortex and no involvement of other carpal bones. Differential diagnosis of aneurysmal bone cyst (ABC), GCT, simple bone cyst and enchondroma were considered. Fine Needle Aspiration cytology revealed GCT of scaphoid. Surgical excision and four corner fusion of the wrist was planned. Procedure was performed with Brunner's zig zag incision over the dorsum of wrist. Intraoperatively scaphoid was found to be expansile, thinned out and bluish in colour and there was no extraosseous spill of the tumour. The wrist was immobilized in a plaster splint for a period of six weeks, following which range of motion exercises were started. Postoperatively, the Histopathological analysis confirmed the diagnosis of Giant Cell Tumour and margins were free of tumour. Follow up was done for a period of 24 months and there was no evidence of recurrence. GCT of the carpal bones is a very rare entity, only few case reports have been described. No long-term study is available for choosing appropriate method of treatment. Early diagnosis and aggressive management are the key to successful management of GCT.

**Date: 2019-12-05**

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**Abstract no.: 53814**

**THE COMPARISON BETWEEN STRUT BONE AND CHIP BONE ALLOGRAFT FOLLOWING VOLAR LOCKING PLATING IN THE TREATMENT OF THE DISTAL RADIUS FRACTURE: A RETROSPECTIVE COHORT STUDY**

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Introduction: Distal radius fracture is the most common fracture with several methods provided augmentation to fracture healing, such as locking compression system, artificial or allogeneic bone grafting. However, rare study has investigated the outcome between chip and strut allografting. The purpose of this study is to gain an understanding of the differences between these two allografting methods. Materials and Methods: From February 2005 to January 2018, 32 patients with radiographic instability were indicating open reduction and internal fixation with allogeneic bone graft. The first group had chip allografting, while the second group had strut allografting. Indications for surgery, the technique with volar locking plating fixation, and postoperative rehabilitation were the same in both groups. The radiological outcomes included the changes in radiological parameters at just postoperation, postoperative 1, 3, 6 and 12 months. The radiological parameters including loss of volar tilt, radial length, radial inclination, cortical thickness, and present of articular stepoff. Results: There were 22 patients in group 1 and 10 patients in group 2. The average follow-up time was 53.7 weeks. Radiological outcomes were similar in both groups and there were no significant differences in clinical outcomes between both groups. Multivariable linear regression analysis showed older age was associated with intention of chip allografting, while strut allografting was associated with more correction of volar tilt and radial length. Conclusions: Outcome and time to union revealed no significant differences between chip and strut allografting, clinically or statistically. The decision may differ with comorbidity or fracture pattern of patients.

**Date: 2019-12-05**  
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**Time: 16:00 - 17:30**  
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**Abstract no.: 53822**

**A RETROSPECTIVE COHORT STUDY OF VOLAR LOCKED PLATING FIXATION FOLLOWING CORRECTIVE OSTEOTOMY IN MALUNION OF DISTAL RADIUS FRACTURE**

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Introduction: Malunion of distal radius fracture after conservative treatment majorly correlates to residual symptoms. Multiple methods of corrective osteotomy have been reported for radiography improvement. Volar locked plating (VLP) brings a new vision by maintaining construct better but with rare discussion on the relationship to corrective osteotomy. The purpose of this study is investigating the radiological and clinical outcomes after VLP fixation following corrective osteotomy in malunion of distal radius fracture. Methods: From 2005 to 2019, all malunion of distal radius fracture under through corrective osteotomy and VLP fixation were enrolled while revision cases were excluded. The correction extent was measured by radiological parameters, such as volar tilt, ulnar variance, radial inclination, and elevation of articular stepoff. Moreover, the long-term outcome was assessed by the radiological parameters on postoperative 1, 3, 6 and 12 months. Results: 25 patients with a mean age of 52 (27–71) were enrolled. The average follow-up time was 53.8 weeks. The mean dorsal angulation was 17.98 ° (29.4 °-38.2 °); the mean ulnar variance was plus 2.4 mm (0–9.2 mm) and the mean radial inclination was 19.28 ° (8.8 °–30.2 °). All the patients received closed reduction and below-elbow casting as primary treatment. All the osteotomies healed radiographically at the last follow-up. No major complications of non-union or infection occurred, but only 3 cases of transient median neuropraxia. Conclusions: Corrective osteotomy and VLP fixation, either with or without bone grafting, proved an effective method for malunion of distal radius fracture after conservative treatment in vain

**Date: 2019-12-05**  
**Session: Hand Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 53549**

**FIXATION OF DISTAL RADIUS FRACTURES USING WIDE AWAKE ANAESTHESIA WITH NO TOURNIQUET TECHNIQUE: A COST EFFECTIVE AND RESOURCE FRIENDLY ALTERNATIVE IN LOWER INCOME AND MIDDLE INCOME COUNTRIES**

Muhammad TAHIR<sup>1</sup>, Ghulam MAHBOOB<sup>2</sup>, Mark PHILLIPS<sup>3</sup>, Allah Rakhio JAMALI<sup>1</sup>

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The purpose was to perform surgical fixations of distal radius fractures (DR) using wide awake local anaesthesia with no tourniquet (WALANT) using a cost-effective approach. From March 2017 until December 2018 40 patients having a closed DR were presented within 10 days of initial injury. Anxious, non-cooperative patients or those requiring general or spinal anaesthesia for other injuries or having peripheral arterial disease were excluded. Orthopaedic Trauma Association (OTA) system classification was used. A hematoma block was given in the emergency. Afterwards, 10-15 ml of 1% lidocaine with adrenaline was used in 1:100,000 concentration for WALANT. Volar approach was used in all cases, 5ml anaesthetic was administered below the Pronator Quadratus (PQ) for drilling and screw fixation. Fluoroscope was used to check the fixation and patient was asked to move the wrist for impingement. Postop VAS was recorded. Functional outcome was measured by using the qDASH and, Mayo's wrist score, grip strength, flexion and extension at the wrist, at fracture union. The mean age was 45.23 years, and most common fracture pattern was A2 13 (32.5%) followed by A3 11 (27.5%) and C1(15.0%). Time to union was 15.20 weeks (SD 2.43). qDASH score was 13.33 (SD 4.16) and Mayo's wrist score of 81.62 (SD 7.01). Flexion and extension at the wrist were 64.00 (SD 5.08) and 53.12 (SD 5.39) degrees, with an average grip strength of 72.88% (SD 8.07%) of the contralateral side. WALANT is a cost-effective and safe method which can be used in patients unfit for general anaesthesia.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 53191**

**SUBTALAR ARTHROREISIS IN PAEDIATRIC FLEXIBLE FLATFOOT**

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Flatfoot is a common problem in childhood, composed of hindfoot valgus, flattening of the medial arch, forefoot abduction and Achilles tendon tightening. Most cases will recover spontaneously or remain asymptomatic. Non-operative measures include supportive footwear and physical therapy. Surgical options include tendon transfer, tarsal arthrodesis, calcaneal osteotomies, and subtalar joint motion blocking procedures (Arthroreisis). In our study we are including 50 patients with symptomatic flexible paediatric flatfeet that failed non-operative measures and underwent subtalar arthroreisis (+/- Achilles lengthening) in Hamad General Hospital between Jan 2012 - March 2019. Our age group from 8 years till puberty. Cases of non-flexible and spastic flatfoot, adults, and cases that underwent other surgical interventions will be excluded. Cases will be re-evaluated in terms of pain (using VAS pain score), function (AOFAS score), radiology (using Mearey's and Calcaneal pitch angle), and Complications (as Sinus Tarsi pain, infection and implant migration) in comparison to preoperative assessment.



**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 53430**

**SUPRAMALLEOLAR OSTEOTOMY AND AMIC CARTILAGE RECONSTRUCTION IN SEVERE CARTILAGE LESION**

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HKF - International Center for Hip, Knee and Foot Surgery, ATOS Clinic, Heidelberg (GERMANY)

**Introduction:** This paper shows in a case series, exceptional cartilage lesions with pathological changes. The indications, strategies for osteotomies and the treatment strategies in malaligned bipolar, cystic and gross cartilage lesions is explained. **Material & Technique:** 35 patients with severe circumscribed varus/valgus arthritis have been operated by supramalleolar osteotomy (SMOT). 70 patients presented bipolar (tibial & talar "kissing") lesions with correct hindfoot axis. 18 patients had a gross cystic lesion and were additionally treated with filling of the cysts. Follow-up consisted of a clinical evaluation with assessment of the Foot and Ankle Outcome Score (FAOS) and the VAS Score for pain, function and satisfaction. **Results:** The overall mean time from initial surgery to follow-up was 29.4 ± 5.7 months. The subscales of the FAOS Score for symptoms, pain, function in daily living, function in sport and recreation and quality of life improved from 25.7±4.0, 39.6±3.3, 46.5±4.4, 20.8±3.4 and 13.2±2.9 preoperatively to postoperative 71.8±5.5, 72.2±4.3, 74.8±5.7, 25.9±2.8 and 50.8±4.5 respectively in patients with kissing lesions. All improvements with significance ( $p<0.05$ ) excepting in in sports and recreation. The VAS scores improved significantly ( $p<0.05$ ) in pain from 8.2±3.9 to 3.4±2.8, in function from 2.1±1.8 to 6.4±4.1 and in satisfaction from 2.7±1.9 to 7.1±3.5. In patients with SMOT and in cystic lesions, improvements were observed in all scores, but not all with significance. **Conclusions:** This cases series have shown the possibilities for a successful managing of this severe cartilage lesions and offers also its limit in the overall.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 52886**

**TOTAL TALAR REPLACEMENT WITH A NOVEL 3D PRINTED MODULAR PROSTHESIS FOR TUMOURS**

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**Purpose:** Widely accepted surgical reconstruction for tumours of the talus is arthrodesis, which may associate with poor limb functions. The aim of this study was to present a novel reconstruction with ankle function preserved after en bloc talus tumour resection. **Method:** A 43-year-old female with mesenchymal sarcoma of the talus was admitted in our centre. Total talar replacement with 3D-printed modular total talar prosthesis was prepared for reconstruction. The 3D-printed modular total talar prosthesis was designed exactly as the mirror image of the contralateral talus with complete filling of the sinus tarsi and subtalar joint space. The upper modular component of prosthesis was made of high molecular weight polyethylene (UHMWPE), and the lower component, titanium alloy. Pre-drilled holes in three directions were prepared for screw fixation of the subtalar joint. **Result:** The patient underwent en bloc talus resection through anterior approach, followed by reconstruction with the 3D-printed prosthesis. The whole procedure took 2 h, and intra-operative blood loss was 50 ml. At the last follow-up our patient was disease free, and she could walk almost normally without any aid or pain. The Musculoskeletal Tumor Society (MSTS) score was 26/30. The American Orthopedic Foot and Ankle Society (AOFAS) score was 91/100. The range of motion for dorsiflexion and plantar flexion was 40 degrees. And no abnormalities were observed in the roentgenograph. **Conclusion:** Total talar replacement with a 3D-printed modular prosthesis may be an effective procedure for patients with tumours of the talus as it could maintain ankle function.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 53875**

**A PROSPECTIVE STUDY TO EVALUATE THE RESULTS OF  
ENDOSCOPIC MANAGEMENT FOR HAGLUND'S SYNDROME USING 3  
PORTAL TECHNIQUE**

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Introduction: This is a prospective study to evaluate the new three portal endoscopic calcaneoplasty technique for providing access to the retrocalcaneal space, allowing adequate endoscopic resection of Haglund's deformity, excision of retrocalcaneal bursa and Achilles tendon debridement. Materials & Methods: Total 18 patients (23Heels) were included who failed conservative treatment for 6 months. First a visualizing portal, 5 cm proximal to the insertion and just lateral to Achilles tendon, was established to access the retrocalcaneal space. Next two distal portals: medial and lateral were made under vision at superior aspect of calcaneum adjacent to insertion of Achilles tendon as working portals. The inflamed retrocalcaneal bursa was shaved, posterosuperior calcaneus deformity was resected and degenerated Achilles tendon was debrided. The outcome was assessed by Ogilvie Harris Score, Maryland Foot Score and Ankle and Hindfoot Scale (AOFAS) at 6weeks, 12weeks and 24weeksResults:2 patients lost in follow up and 21 heels were assessed. According to Ogilvie-Harris score 6(28.5%) had good while 15(71.4%) showed excellent results at end of 24weeks. AOFAS score improved significantly from 56.42±8.60 to 91.67±4.40. Maryland Foot score improved significantly from 54.17±5.84 to 94.50±3.23 at end of 24 weeks. The repeated measured Anova test in postoperative follow-up at 6, 12 and 24 weeks showed significant difference. Paraesthesia on medial aspect ankle in 3 patients and portal scar site hyperaesthesia in 4 patients. Conclusion: Endoscopic management offers good results in patients of Haglund's syndrome with failed conservative treatment.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 53961**

**RESTORATION OF STANDING AND WALKING FUNCTIONS IN CRAWLING, CROUCHING, HOPPING LIMPING AND SQUATTING PATIENTS- ANALYSIS OF SURGICAL TREATMENT OF 255 CASES**

**Mofakhkharul BARI**

**Bari-Ilizarov Orthopaedic Centre, Dhaka (BANGLADESH)**

Restoration of standing and walking functions in crawling, crouching, hopping, limping and squatting patients is very difficult for the Orthopaedic and Reconstructive surgeons. Ilizarov surgery for anthropometric corrections is very interesting and praiseworthy. Ilizarov is the most natural way of treating all difficult bone and joint problems. During my long period of Ilizarov surgery, I faced lot of problems with very interesting and complex cases. Today I would like to share my long experiences with those crawling, crouching, hopping, limping and squatting patients.

**Date: 2019-12-05**  
**Session: Foot & Ankle Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C2**

**Abstract no.: 53661**

**WEBER-TRANSFORMATION-SURGERY -ANKLE CONSTRUCTION IN FIBULAR HEMIMELIA**

Michael WEBER

Prof. Weber's Institute of Orthopaedic Excellence BR Medical Suites / NMC / DHCC / Dubai / UAE, Dubai (UNITED ARAB EMIRATES)

Introduction: The instability/luxation of the upper ankle joint in fibular hemimelia represent a serious problem in severe forms especially when complex lengthening of the affected limbs are performed. I present a unique technique for construction of a "talo-fibular" joint substitute by the construction of a lateral malleolus externus plasty that solves these problems. Patients: 22 Patients with fibular hemimelia are presented with an average age of 6y 6m (1y 5m – 13y 7m). 50% of the patients showed type 2 (Coventry) and 50% type 3 (Coventry). All cases showed unilateral affection. 60 % / 40% affection of right / left foot. Amount of foot rays: 60% = 4 rays, 30% = 3 rays and 10% = 5 rays. 40% of the ankle joints were luxated, 30% subluxated and 30% showed severe instability. 70% showed talo-calcaneal fusion. Accompanied malformations: 40% femoral hypoplasia, 20% PFFD, 10% FFU-complex and 30% showed no additional malformations. Methods: The surgical procedure by use of Iliac crest transplant is demonstrated Results: All malleolus externus plasty healed primary. The average growth of the transplant by the apophysis was 2y 7m (9m – 5y 9m). 95 % of the ROM of the ankle joint could be improved. Conclusions: Using this technique an individually adapted lateral malleolus plasty with growth potential is realized that stabilize long lasting the ankle joints and resists soft tissue stress caused by the lengthening and or natural growing of the lower leg.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54282**

**FUNCTIONAL AND RADIOLOGICAL OUTCOME OF  
TIBIOTALCALCANEAL ARTHRODESIS IN CHARCOT  
NEUROARTHROPATHY USING A RETROGRADE HIND FOOT NAIL**

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INSTITUTE OF MEDICAL SCIENCES, KOCHI (INDIA)

Introduction: Tibiotalcalcaneal arthrodesis is a good salvage technique for complex unstable deformed hind-foot in Charcot neuroarthropathy. We aim to study the functional & radiological outcome of TTC arthrodesis in such patients. Materials & Methods: We prospectively studied a series of 20 hind-foot fusions in tertiary level teaching hospital between Jan-2008 to Jan-2018. The mean age was 61(32-76years). 15 cases had diabetes-mellitus, 1 with spinal-cord injury & 4 had sensory neuropathy due to an unknown cause. Amputation was advised for 9 cases with ulcers. Each patient had neurovascular status assessed by vibration perception threshold (VPT), transcutaneous PO<sub>2</sub> (TcPO<sub>2</sub>), and Ankle-Brachial-index (ABI) to determine salvageability. All patients had TTC-fusion by nail performed through standard technique by a senior surgeon & managed peri-operatively by a multidisciplinary team. The outcome was measured using AOFAS scoring system. Results: At mean follow up of 38 months (23-65) we achieved 100% limb-salvage and 75% fusion rate. The mean AOFAS score was 74 (pain-score=32, functional-score=42). We found that 7 patients (35%) out of 20 had excellent results, 9 cases (45%) had good and 4(20%) showed fair results. In total 5 patients had stable fibrous ankylosis with good to fair outcome. There were 2 complications in the form of infection and peri-implant fracture managed successfully conservatively. Conclusion: Tibiotalcalcaneal arthrodesis by retrograde hind-foot nail is a good fusion technique to salvage the deformed unstable hindfoot in Charcot arthropathy. VPT, TcPO<sub>2</sub>, and ABI are good indicators of prognosis & salvageability. These patients need meticulous care by multidisciplinary approach due to associated serious comorbidities.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 53385**

**FEATURES OF THE FIRST METATARSOPHALANGEAL JOINT CHONDROPLASTY BY AUTOLOGOUS MATRIX-INDUCED CHONDROGENESIS (AMIC) IN TREATMENT OF PATIENTS WITH FIRST METATARSOPHALANGEAL JOINT OSTEOARTHRITIS**

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Introduction: there are a lot of surgical methods of treatment of patients with first metatarsophalangeal joint (1 MTPJ) osteoarthritis (OA). All of these methods have both advantages and disadvantages, so there is no ideal method and there is no general approach to the choice of surgical treatment of these patients. This fact urged us to offer one more type of joint salvage operation – the 1 MTPJ chondroplasty by autologous matrix-induced chondrogenesis (AMIC). The aim of the study: to offer the 1 MTPJ chondroplasty as a variant of surgical treatment of 1 MTPJ OA and to analyse the immediate and medium-term results. Materials: the results of the surgical treatment of patients with 1 MTPJ OA using the AMIC technique with two-layered collagen matrix were evaluated within 3, 6 and 12 months after the operation. Methods: clinical – visual analogue scale for pain (VAS pain), American Orthopedic Foot & Ankle Society (AOFAS) scale; instrumental – feet radiography and MRI. Results: patients noted a significant decrease in the level of pain according to VAS score (on average, by 60 mm), while the AOFAS score increased on average by 30 points. One patient had the relapse of the disease. Conclusion: the 1 MTPJ chondroplasty is going to be an effective method of the joint salvage surgery for 1 MTPJ OA. Key words: osteoarthritis, first metatarsophalangeal joint, chondroplasty, AMIC.

**Date: 2019-12-05**  
**Session: Foot & Ankle Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C2**

**Abstract no.: 55128**

**FUNCTIONAL BRACING IS COST EFFECTIVE AND SAFER IN  
MANAGEMENT OF STABLE WEBER B ANKLE FRACTURES;  
MULTICENTRE STUDY**

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**Aims:** Despite the current recommendations and strong evidence that stable Weber B ankle fractures can be treated with functional bracing and weightbearing as tolerated, some reluctance still exists among trauma surgeons to follow these recommendations. This study examines how the difference in weight-bearing status and method of immobilisation can increase the workload and cost in fracture clinics, without any clinical benefit. **Methods:** We identified 116 patients over the period of 6 months between two major institutions in South Wales who had isolated trans-syndesmotic distal fibula Weber B stable ankle fractures. Mean age was 51 years (18-92) and 61 patients (52%) were female. Eleven patients were diabetic. Patients were followed up for a minimum of 6 months to detect complications. **Results:** 50% of the patients (58) were treated in plaster while the others were treated with a weight-bearing boot. 83 patients (71%) were allowed to weight-bear at the first fracture clinic appointment. All fractures healed irrespective of weight-bearing status or method of immobilisation. The protocol of functional bracing and weight bearing was associated with fewer outpatient appointments (2.5 vs 3.6;  $p=0.0001$ ) and fewer radiographs obtained (2.3 vs 3.3;  $p=0.0001$ ). Patient demographics and the diagnosis of diabetes did not impact the outcome. **Conclusion:** Isolated trans-syndesmotic Weber B ankle fractures, that are clinically and radiologically stable, can be safely treated with functional bracing in a boot and weightbearing as tolerated starting at the first appointment in the fracture clinic. We question the rationale behind the clinical and radiographic weekly review for such injuries.



**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54754**

**INTERMEDIATE TO LONG-TERM FOLLOW-UP OF HINTEGRA TOTAL ANKLE REPLACEMENTS**

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Introduction: New generation total ankle replacements (TARs) in appropriate patients, have reported 10 year survival rates up to 89% from design centres. We report multicentre, intermediate to long-term outcomes, of the Hintegra TAR. Methods: This study utilised a prospective, nonrandomised observational approach to assess survival and revision rates, in all Hintegra TARs, performed in Musgrave Park and Altnagelvin Hospitals from 2004-2013. All procedures performed, by two fellowship trained foot and ankle consultants. Review clinics established in 2018 to update patient history, clinical examination, radiographs, AOFAS hindfoot scores and Charlson Comorbidity Index (CCI). Radiographs reviewed for evidence of loosening, by two authors blinded to clinical outcomes. Results: Between 30/03/2004-18/01/2013 62 primary TARs were performed on 58 patients. Excluding the deceased (n=9) and those lost to follow up (n=1) our mean follow up was 12 years 3 months, average AOFAS score 78. During the first 4 years 11/23(48%) required additional surgery; reduced following a modification of the surgical technique. Our 5 and 10 year survival rates are 84% (52/62) and 71% (27/38) respectively. Risk factors for revision include BMI>30 (Chi-squared P=0.006), smoking history (Chi-Squared P=0.027) and lower ASA scores (One-way ANOVA P=0.034). No association between CCI and revision. Asymptomatic osteophyte formation and polyethylene wear noted after 8-10 years. 6.4% deep infection rate. Conclusion: The Hintegra TAR is a good alternative in the management of ankle arthritis, providing good function and sustained pain relief in the intermediate to long term. We would however stress the steep learning curve and the importance of achieving correct alignment to maximise longevity.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54671**

**SUBLUXATION OF THE MIDDLE FACET OF THE SUBTALAR JOINT AS A MARKER OF ADULT ACQUIRED FLATFOOT DEFORMITY PERITALAR SUBLUXATION: A CASE-CONTROL STUDY**

Cesar DE CESAR NETTO<sup>1</sup>, Alexandre Leme GODOY-SANTOS<sup>2</sup>, Guilherme Honda SAITO<sup>3</sup>, Francois LINTZ<sup>4</sup>, Sorin SIEGLER<sup>5</sup>, Martin O'MALLEY<sup>3</sup>, Jonathan DELAND<sup>3</sup>, Scott J ELLIS<sup>3</sup>

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**Introduction:** In this case-control study, we investigated the use of the middle facet (MF) as an indicator of peritalar subluxation (PTS) in adult acquired flatfoot deformity (AAFD) patients, using weightbearing computed tomography (WBCT). **Methods:** We included 30 patients with stage II AAFD (20 females/10 males), 57.4 (range, 24 to 78) years, and 30 matched-pair controls (20 females/10 males), with a mean age 51.8 (range, 19 to 81) years, that underwent WBCT. Two independent and blinded fellowship-trained foot and ankle surgeons measured the amount of subluxation (percentage of uncoverage) and the incongruence angle of the MF at the midpoint of its longitudinal length, using coronal WB CBCT images. **Results:** Substantial to almost perfect intra- and interobserver reliability was observed for both measurements. We found the MF to significantly demonstrate increased PTS in patients with AAFD, with a mean value for joint uncoverage of 45.3% (95% CI, 40.5% to 50.1%), when compared to 4.8% (95% CI, 0% to 9.6%) in controls ( $p < 0.0001$ ). Significant differences were also found for incongruence angle, with a mean value of 17.3 degrees (95% CI, 15.5 to 19.1) in AAFD patients and 0.3 degrees (95% CI, -1.5 to 2.1) in controls ( $p < 0.0001$ ). A joint incongruence angle of more than 8.4 degrees was found to be diagnostic for symptomatic stage II AAFD. **Conclusion:** We described the use of the SJ MF as a marker for PTS in patients with AAFD. Significant differences in the percentage of joint uncoverage and incongruence were found when compared to controls.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54270**

**ARTHRODESIS OF THE FIRST METATARSOPHALANGEAL JOINT  
REDUCES THE HINDFOOT GROUND PRESSURE DURING WALKING**

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Introduction: The most common location of a degenerative disease within the foot is the first metatarsophalangeal joint (MTP I). Arthrodesis of the first metatarsophalangeal joint, which is considered the so-called "Golden standard" in the case of proceedings in the final stage of the rigid arch. The aim of the work was to assess the impact of MTP I arthrodesis on the distribution of pressure within the foot during gait. Methods: Twenty six patients after MTP I arthrodesis who met inclusion criteria were reviewed, analysed and compared with 23 patients in matched control group. The study was conducted on the Zebris treadmill FDM-THQ with built-in baroresistive sensors, as well as WinFDM software. Three measurements of dynamic recording were made for each subject, consisting of a computer record of a thirty-second walk on the treadmill. The forefoot, midfoot, and hindfoot segments were analysed for the average of maximum force AMF [N] and average maximum pressure AMP [N / cm<sup>2</sup>] in each phase of the gait cycle. Results: AMF within the forefoot was statistically lower the during the rebound phase in the operated foot comparing to the control group. AMF and AMP were statistically lower in the hind foot during heel strike phase in the operated foot comparing to the control group. Conclusions: The MTP I arthrodesis has an impact on the patient's lower force generation within the forefoot in the rebound phase during gait. Arthrodesis of the first metatarsophalangeal joint significantly reduces the hind foot ground pressure during heel strike phase of walking.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54230**

**COMPARATIVE STUDY ASSESSING SPORTING ABILITY AFTER ARTHRODESIS AND CARTIVA HEMIARTHROPLASTY FOR TREATMENT OF HALLUX RIGIDUS**

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Background: Arthrodesis and Cartiva synthetic cartilage implant (SCI) are accepted treatments for hallux rigidus. Although good functional outcomes have been reported for both procedures, there is little data available on post-operative sporting ability for these patients. As of now, there are no independent comparative series for treatment of hallux rigidus utilising polyvinyl alcohol implants. Objectives: To compare sporting ability after Arthrodesis and Cartiva SCI hemiarthroplasty of the first metatarsophalangeal joint. Study Design & Methods: Patients at a single centre with symptomatic hallux rigidus who underwent Arthrodesis or Cartiva SCI hemiarthroplasty were identified. Sporting ability was assessed at a minimum of 12 months post-operative utilising the patient reported outcome measure, Foot & Ankle Ability Measure (FAAM) sports questionnaire. First metatarsophalangeal joint arthritis was radiographically graded according to the Hattrup and Johnson (HJ) classification. Results: 42 Arthrodesis and 26 Cartiva patients were included in this study. Mean ages for this cohort were 64 and 58 respectively with a follow-up time of 19 and 18 months respectively. Arthrodesis patients consisted of 6.8% HJ1, 40.9% HJ2 and 52.3% HJ3 and Cartiva SCI patients 31% HJ2 and 69% HJ3 with no HJ1 patients. Mean post-operative FAAM scores were 80.9% for Arthrodesis and 78.9% for Cartiva SCI. Conclusions: Our results suggest that both Arthrodesis and Cartiva SCI result in similar post-operative sporting ability. Cartiva SCI results in a faster return to activities and preserves joint flexibility with adequate pain reduction. Initial results of Cartiva SCI are favourable and comparable to arthrodesis.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54669**

**THE INFLUENCE OF CALCANEAL AND FIRST RAY OSTEOTOMIES ON THE CONTACT PRESSURES OF THE ANKLE JOINT**

Cesar DE CESAR NETTO<sup>1</sup>, Danilo RYUKO NISHIKAWA<sup>2</sup>, Niall SMYTH<sup>3</sup>, Nicholas CASSCELLS<sup>3</sup>, Stuart MICHNICK<sup>3</sup>, Tao XU<sup>3</sup>, Pooyan ABASSI<sup>3</sup>, Brent PARKS<sup>3</sup>, Stuart MILLER<sup>3</sup>

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Introduction: Medial displacement calcaneal osteotomies (MDCO) and first ray plantarflexion osteotomies are frequently used realignment procedures for hindfoot and ankle joint valgus malalignment. In this cadaveric study we compared their influence on the contact pressures of the ankle joint (CPAJ). Methods: Fifteen cadaveric specimens were used. Flexor and peroneal tendons were loaded. Ankles were tested in an intact position, after isolated MDCO (6, 8, 10 and 12mm), isolated Cotton osteotomies (4, 8 and 12mm) as well as combined osteotomies (10mm and 12mm, respectively). Specimens were then cyclically load from 100N-700N at a rate of 0.5Hz for 30 cycles. Average and maximum pressure data were extracted as well as the centre of pressure (CoP) movement in the AP and ML directions. Results: There was a significant ( $p < 0.05$ ) and progressive decrease in respective maximum and average contact pressures of the ankle joint when comparing intact ankle (1608 and 1312kPa), calcaneal osteotomy (1291 and 1034 kPa), Cotton osteotomy (1165 and 962 kPa) and combined osteotomies (1134 and 903 kPa). Cotton osteotomy and combined osteotomies showed similar contact pressures. Regarding CoP measurements of the ankle joint, native ankle and MDCO demonstrated similar positionings in the sagittal and coronal planes. Cotton and combined osteotomies caused a significant shift of the CoP anteriorly and laterally. Conclusion: Cotton osteotomy has a greater effect on the CPAJ when compared to MDCO. There is an overall decrease in the maximum and average pressures and a deviation of the CoP toward the anterior and lateral aspect of the joint.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54314**

**HIGH INCIDENCE OF SPRING LIGAMENT FAILURE IN ANKLE FRACTURES WITH COMPLETE DELTOID RUPTURES: A PREVIOUSLY MISSED ENTITY LEADING TO RAPID DESTABILISATION OF THE FIRST RAY AND SYMPTOMATIC ADULT FLAT FOOT.**

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Injury to the deltoid ligament complex is an easy to diagnose and an accepted frequent consequence following ankle fractures involving the medial foot. Injury to the spring ligament however is not easily diagnosed and the incidence following ankle fractures with deltoid ligament rupture is unknown. We present a series of 15 patients who were followed up at 28.5 (+/-14) months post ankle fracture involving deltoid ligament rupture as diagnosed on radiographs. We found that 100% of patients had spring ligament rupture as diagnosed with a lateral translation score of >20mm (p< 0.001). These patients were also found to have tarsometatarsal (TMT) instability, an established complication of spring ligament rupture, implicated in the development of adult acquired pes planus (p< 0.001). We found that the degree of spring ligament strain correlated with the degree of TMT instability (correlation coefficient +0.62). This study demonstrates an unrecognised phenomenon in the literature. The rupture of the spring ligament at the time of injury is not recognised and, as we demonstrate with TMT instability, leads to rapid failure of the first ray. This finding would indicate that a new facet of treatment must be recognised and implemented in the long term management of ankle fractures as this medial column instability must be recognised.

**Date: 2019-12-05**

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**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54498**

**THE MEARYS ANGLE: CAN IT BE USED TO DETERMINE THE TYPE OF SURGERY FOR HALLUX VALGUS, A COMPARISON BETWEEN LAPIDUS TECHNIQUE AND SCARF OSTEOTOMY IN PATIENTS WITH A HIGH MEARYS ANGLE**

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**INTRODUCTION:** Hallux valgus is a common pathological condition which in its early stages affects the 1st Metatarsophalangeal joint of the foot. Scarf Osteotomy is a common and successful procedure for correction of this deformity. But recurrence of deformity is reported as 5-8% .A study by Mann and Coughlin 2010, shows that hallux valgus tends to progress rapidly in patients with pes planus because the foot is unable to withstand the deforming pressures exerted on it by either shoes or weight bearing. Thus, the role of Mearys angle which is used to describe the severity of flat foot becomes significant when analysing hallux valgus deformities. Our study aims to look into the recurrence rates in hallux valgus patients with a high Mearys line among those operated with a Lapidus procedure vs Scarf osteotomy. **METHODS:** At a minimum follow up of 3 months we retrospectively analysed the radiographs, theatre and clinical notes of patients with hallux valgus having a high Mearys angle. Of a total of 60 patients, 30 patients had a Lapidus procedure while the other 30 had a scarf osteotomy. **RESULTS:** Our results demonstrate a high rate of statistically significant recurrence of the deformity in patients with high Mearys angle who had a scarf osteotomy done. **CONCLUSION:** In this study we associate a disrupted Mearys line with an increased risk of recurrence of the deformity. The Lapidus procedure used in this study shows a very low risk of recurrence of deformity in patients with a high Mearys line compared to those who had a scarf osteotomy done.

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**Session: Foot & Ankle Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54342**

**TOPICAL REVIEW: FIBULAR NAIL FIXATION**

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Background: Intramedullary implants have been used historically in long bone fractures with success. In recent years a variety of intramedullary implants for the treatment of fibular fractures have been investigated. These various implants have not been assessed together in a cohesive manner. In this review we assess implants used for intramedullary fixation of fibular fractures with respect to implant design and clinical results. Methods: A comprehensive literature review for intramedullary implants in fibular fractures was performed. All publications that assessed intramedullary fibular implants were reviewed. In total, 11 different intramedullary nails were found. Any clinical results obtained from these studies were reviewed. Results: The intramedullary implants generally fell into one of three categories: an unlocked longitudinal strut, an implant roughly equivalent to a large screw, or a more traditionally locked intramedullary nail. Clinical results are generally good, although inconsistent outcome reporting greatly limits comparison between studies. Complication rates varied with the implants, although they were generally low. Conclusion: Intramedullary implants for fibular fracture stabilization have changed over the years to improve stability. Although clinical results are limited, data suggests that these implants are safe and can potentially approximate more traditional implants.



**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 52970**

**USE OF AN INFLATABLE INTRA-MEDULLARY NAIL FOR FIXATION OF UNSTABLE ANKLE FRACTURES IN FRAIL ELDERLY PATIENTS**

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**Introduction** Unstable ankle fractures in the frail elderly population are challenging to manage due to multiple comorbidities, compromised soft tissues and poor bone density. We present a management option using a non-interlocked, expandable intramedullary hindfoot nail (Fexion) to treat this patient cohort. **Methods** A retrospective cohort study was conducted, identifying 15 patients in total who had undergone this procedure over the previous 10 years. Inclusion criterion involved all patients aged over 65 years who had sustained an ankle fracture fixed with a hindfoot fixation nail. **Results** Average age of patients included in the study was 83 years. No significant difference was observed between comorbid clinical presentation (7.07 Carlson Comorbid index) or ankle fracture configuration. All patients had a median duration of surgery of 64 minutes and were discharged with a median inpatient stay of 21 days. One patient had experienced a superficial wound infection overlying the incision and was given oral antibiotics. Two patients had their fixation nail removed at a later date due to ongoing pain related to the implant. **Conclusion** In elderly patients with multiple co-morbidities, surgical fixation with an intramedullary fixation nail is a viable treatment option. It utilises a reduced operative time, a single incision on the heel pad thus sparing the compromised skin over the malleoli and facilitates a rapid return to full weight bearing status with limited post-operative complications. The advantages advocate this unique surgical approach as an alternative to close contact casting and conventional fixation methods.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54294**

**ACHILLES TENDON ELONGATION AFTER FUNCTIONAL MANAGEMENT OF ACUTE RUPTURES**

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Achilles tendon elongation after treatment of acute ruptures has been linked to sub-optimal clinical outcomes. The magnitude of elongation has also been suggested to be adversely correlated with clinical outcomes. Although there are variable treatment protocols for management of acute ruptures, no study has investigated Achilles tendon elongation after functional management. Between August 2014 and June 2018, 150 consecutive patients with acute Achilles tendon ruptures were included. They were treated non-operatively according to a functional management protocol. Achilles tendon lengths were measured indirectly using the difference in the Maximal Ankle Dorsiflexion Angles between injured and non-injured sides at 6 months. Previous studies have shown that a 12° increase in maximal ankle dorsiflexion angle correlates with a 10 mm increase in Achilles tendon length. The Achilles Tendon Total Rupture Score (ATRS), EQ5D and heel-rise height were also recorded. Among the study cohort, only 14 (9.3%) patients develop Achilles tendon elongation (>5 degrees). The elongation was significant (>10mm) in only 3 patients. There was no significant difference in the ATRS and EQ5D scores between patients who develop elongation (ATRS 67.5; EQ5D 69) compared with patients with elongation less than 5mm (ATRS 69.9; EQ5D 73). All 3 patients with elongation > 10mm had a significant limitation in their heel-rise ability. In conclusion, although functional management protocols of acute Achilles tendon ruptures are proving to be safe and effective; these protocols should be optimized to avoid excessive elongation which can be associated with poor clinical outcome.

**Date: 2019-12-05**

**Session: Foot & Ankle Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54719**

**OUTCOME OF TALOCALCANEAL COALITION RESECTION ASSISTED WITH INTRA-OPERATIVE NAVIGATION**

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Background: Tarsal coalition is a fusion between two or more bones of the foot due to failed segmentation of the primitive mesenchyme. This can produce a painful and stiff foot. Prevalence is 1 to 3%. Lack of surgical precision can result in pain, instability, or re-ossification. The purpose is report the outcomes after talo-calcaneal resection using intra-operative navigation (ION). Methods: An IRB approved retrospective review was performed. Paediatric patients who had resection of talo-calcaneal coalition assisted with ION from 2008-2018. Results: 42 patients with talo-calcaneal coalition between 2008 and 2018. Eleven (26.1%) underwent resection using ION (26.19%) with fat interposition. Mean age was 11.51±1.46 years. Predominant population Caucasian-female (9, 81.8%). Coalition side: bilateral (3, 27%), left (6, 55%), and right (2, 18%). Symptoms were pain, stiffness, and limitation of activities. Clinical signs: decreased range of subtalar motion. Surgical resection: right side (4) and left side in (8). Reconstruction of flat foot performed on 6 feet (50%) due to deformities. Follow up average 8 months. Post-operative pain in 2 patients. Improvement in range of motion, specifically subtalar motion. All had complete resections. One re-ossification diagnosed by CT scan (9%). No other reported complications. Conclusion: The ION could improve the completeness of resection; help avoid taking excess amount of bone and creating iatrogenic instability. This study population had a 91% success rate of no re-ossification after the use of this ION. This technique requires more training, time of surgery, and radiation use. Longer-term follow-up is need to determine survivorship of technique.

**Date: 2019-12-05**

**Session: Research Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 52856**

**COLLAGEN ISOFORM EXPRESSION IN POST-TRAUMATIC STIFF ELBOW ANTERIOR CAPSULES**

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Background: Posttraumatic elbow joint (EJ) contracture produces severe functional limitations on the performance of daily living after elbow injury, such as fractures and/or dislocation. However, despite the critical role it plays in the pathogenesis of EJ contracture, very little is known about the structural properties of the EJ contracture capsule. Hypothesis: We hypothesized that several collagens are expressed in response to capsular injury, in addition to the well documented collagens I and III. Methods: We surgically excised the anterior capsules of seven post-traumatically injured and stiff patients' elbow joints, recalcitrant to conservative management, in order to improve their range of motion. These excised capsules were immediately preserved in dry ice and underwent basic histological and more detailed western blot analysis for collagen sub-type analysis. Results: The results indicated that type-I and type-III collagen levels, as well as lesser collagens II, V, VI and X, were detected at differing levels in all patients. The amalgamated data of all the specimens showed a maximum expression between 3 and 7 months from the traumatic event. After 4 months post-trauma, the levels of collagen type II, V and X were consistently less than collagen VI in the contracture specimens. Collagen VI showed consistent expression throughout the trauma duration from 1 to 18 months. The results demonstrate a relative down-regulation of collagen II, V and X, which progresses with higher time of contracture formation. Conclusions: The data documents that there is a complex time dependent up-regulation and down-regulation of collagens, from the time of injury, and varies according to the collagen sub-type. Clinical Relevance: The expression of collagen types in capsular injury was not documented well. Defining the relationship between lesser subtypes of collagen and contracture time may improve the understanding of joint capsule healing following an injury.

**Date: 2019-12-05**

**Session: Research Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 54633**

**TOTAL JOINT REPLACEMENT IMPROVES PAIN, FUNCTIONAL QUALITY OF LIFE AND HEALTH UTILITIES IN PATIENTS WITH LATE-STAGE KNEE AND HIP OSTEOARTHRITIS FOR UP TO FIVE YEARS**

Audrey NEUPREZ<sup>1</sup>, Arnaud NEUPREZ<sup>2</sup>, Jean-François KAUX<sup>3</sup>, William KURTH<sup>3</sup>, Christophe DANIEL<sup>3</sup>, Thierry THIRION<sup>3</sup>, Jean-Pierre HUSKIN<sup>3</sup>, Philippe GILLET<sup>3</sup>, Olivier BRUYÈRE<sup>2</sup>, Jean-Yves REGINSTER<sup>2</sup>

<sup>1</sup>University of Liege, LIEGE (BELGIUM), <sup>2</sup>University of Liege, Liege (BELGIUM), <sup>3</sup>CHU Liège, Liege (BELGIUM)

Our objective was to determine whether the symptomatic improvement that was previously recorded during the first year after joint arthroplasty in patients with osteoarthritis of the lower limb was maintained after 5 years. 626 osteoarthritic patients from a University Hospital were followed in a prospective study. Validated specific (WOMAC) and generic (SF-36 and EQ) instruments assessing quality of life were used prior to surgery and yearly during the follow-up. We use the concept of good outcome defined as a clinically relevant improvement in WOMAC greater than or equal to the minimally important difference. Regressions were performed to evaluate the relationship between preoperative, perioperative and postoperative measures and the evolution of WOMAC scores after 5 years (percent change). We also examined any predictors of good outcomes and compared the results. The beneficial effect on quality of life observed during the first year was maintained for up to five years. More than 3/4 of the patients experienced a good outcome. Both good outcome and the change in 5-year WOMAC can be predicted by various preoperative (i.e., radiological severity, comorbidities, disability and level of education), perioperative (i.e., length of hospital stay and place of discharge) and postoperative (i.e., complications) variables. Joint arthroplasty is a highly valuable therapeutic strategy for patients with hip or knee OA who do not respond to pharmacological management. These results represent a step towards the collection of robust, scientifically sound data that will pave the way for the completion of health economic analyses in the field of OA.

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**Abstract no.: 52857**

**ELBOW CONTRACTURE CAPSULE - HISTOLOGY EXAMINATION**

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**INTRODUCTION:** Stiffness is common sequelae of bony or soft tissue trauma to the elbow joint. Currently, there is little data on the degree of histological disorganization observed in these capsules. In this study, we use a semi-quantitative grading system, previously validated in tendinopathies, to grade this disorganization and correlate this with elbow motion loss. **METHODS:** Twenty-three whole anterior elbow capsules were collected via open elbow release and were stored in 10% formalin. Measurements of each specimen's length, width and thickness were recorded. Each specimen was divided into four portions, two from the lateral side and two from the medial side. The medial and lateral portions were oriented at 90 degrees to each other, embedded in paraffin, sectioned and H&E stained. The tissue sections were graded using the modified Movin scale. Range of motion data was collected at three time points: pre-operative, immediately post-operatively and at the final follow-up appointment. **RESULTS:** Each specimen was assigned a Movin score equal to the average of the medial and lateral scores as there was no significant difference between them (12.9, 13.1,  $p=0.69$ ). All capsules scored either moderately or markedly abnormal. The average thickness (5.2cm) was comparable to previously published work (4.0 cm,  $p=0.47$ ), and this was significantly greater than cadaveric controls (0.6 cm,  $p=0.01$ ). Average follow up was 6.9 months. Patients showed significantly increased extension at both post-operative measurements compared to preoperatively ( $p=0.001$  and  $p=0.00002$ ). **CONCLUSIONS:** The thickness of our samples is comparable to previously published work and all of our samples are significantly thicker than cadaveric controls. Assessment of joint capsules from contracted elbows with a validated scoring system found that all samples scored either moderately or markedly abnormal. Our data also suggests there is

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**Abstract no.: 55141**

**THE RISK OF VENOUS THROMBOEMBOLISM AFTER LUMBAR SPINE SURGERY: A POPULATION-BASED COHORT STUDY**

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Introduction: Venous thromboembolism (VTE) including deep vein thrombosis (DVT) and pulmonary embolism (PE) are never the least rare complication after spine operation, but currently, no study has yet investigated the risks of these fatal consequences following lumbar spine surgery (LSS). Material and methods: After excluding those who have received any kind of arthroplasty and spine surgery in previous 6 months, 8697 patients over the age of 20 years old under through LSS between 2000 and 2013 were identified from the Taiwan National Health Insurance claims data. Each patients was randomly selected and frequency-matched with 4 individuals not receiving LSS by age, sex and index year. Results: The incidence rates of VTE in LSS group and the control group were 1.84 and 0.69 per 1,000 person-years, respectively. The LSS group had a higher risk of VTE [Adjusted HR = 2.13, 95%CI= 1.41-3.21], DVT [Adjusted subHR = 2.20, 95%CI= 1.40-3.46], and PE [aSHR = 1.60, 95%CI= 0.68-3.78]. The other correlated risk factors included older age, [50-64 y/o : aSHR = 2.16, 95%CI= 1.14-4.09, >65 y/o: aSHR = 3.18, 95%CI= 1.65-6.13], cancer history [aSHR = 2.96, 95%CI= 1.58-5.54], heart failure [aSHR = 2.19, 95%CI= 1.27-3.78], chronic kidney disease [aSHR = 1.83, 95%CI= 1.18-2.83], and admission longer than 9 days [aSHR = 1.92, 95%CI= 1.22-3.04].Conclusions: The overall risk of venous thromboembolism following lumbar spine surgery is less than 2% but correlated with curtain risk factors. The spine physician should be aware of the prophylactic prevention according to the heterogeneity with higher risks.

**Date: 2019-12-05**  
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**Time: 08:00 - 10:00**  
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**Abstract no.: 54301**

**SARCOPENIA IN PATIENTS WITH CHRONIC LOW BACK ACHE - A CASE CONTROL STUDY**

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Introduction: The lifetime prevalence of chronic low back ache (CLBA) is approximately 84%. LBA has multiple causative factors. There is paucity of literature on LBA and its association with sarcopenia. Methods: This case control study was conducted from 2017 to 2018 including 150 Patients with LBA of >3 months, 125 controls without Low back Ache (NLBA) and were subjected to Muscle mass, muscle strength, gait speed and fat ratio analysis. Sarcopenia was defined according to Asian Working Group for Sarcopenia as low handgrip strength (<26 kg in men and <18 kg in women) and/or a lower walking speed (<0.8 m/s) with a low muscle mass (<7.0 kg/m<sup>2</sup> in men and 5.4 kg/m<sup>2</sup> in women). The cutoff value for body fat ratio was 28% body fat for men and 40% for women. Based on the presence of sarcopenia and obesity, groups were classified into sarcopenic obesity, non-sarcopenic obesity, sarcopenic non-obesity, and non-sarcopenic non-obesity. Results: There was no significant difference between the groups in terms of age, sex, and BMD. VAS and ODI scores were significantly different between the groups ( $p < 0.05$ ). In CLBA group 38% had sarcopenia whereas only 26% in NCLBA had sarcopenia. Body fat ratio was high in CLBA group (81.3%) as compared to NCLBA group (67%). Sarcopenic obesity was significantly higher in CLBP group ( $p < 0.05$ ). Conclusion: Evaluation for sarcopenia is grossly neglected during routine evaluation for LBA. This study shows the significant association of sarcopenia in CLBA patients and sarcopenia assessment should be included in routine LBA study panel.



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**Abstract no.: 52949**

**EVALUATING THE EFFECTIVENESS OF LEARNING AND QUALITY IMPROVEMENT IN ORTHOPAEDICS**

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Learning and change are key elements of clinical governance and are responsible for the progression of our specialty. Although Orthopaedics has been slow to embrace quality improvement, recent years have seen global developments in surgical education, quality improvement and patient outcomes research. We reviewed recent advances in the evaluation of learning and change and identified the most important research questions that remain unanswered. Research into proxies of learning is improving but more work is required to identify the best proxy for a given procedure. Learning curves are becoming commonplace but are poorly integrated into postgraduate training curricula. With various organisations promoting centralisation of care, learning curve analysis is more important than ever before. Patient outcomes research is rapidly changing, with an increased focus on quality-of-life measures. These are key to patients and their care. Cost-utility analysis is increasingly seen in orthopaedic manuscripts and this needs to continue to improve evidence-based care. Large-scale international, multi-centre randomised trials are gaining popularity and updated guidance on sample size estimation needs to become widespread. A global lack of surgeon equipoise will need to be addressed. Quality improvement projects frequently employ interrupted time-series analysis to evaluate change. This technique's limitations must be acknowledged, and more work is needed to allow for the evaluation of change in a dynamic healthcare environment where multiple interventions often occur. Advances in the evaluation of learning and change are needed to drive improved international surgical education and increase the reliability, validity and importance of the conclusions drawn from orthopaedic research.

**Date: 2019-12-05**  
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**Abstract no.: 55176**

**DEFINING VALUE IN ORTHOPAEDIC SURGERY: A SCOPING REVIEW**

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Background: Value-based care has recently emerged as a way to contain health-care expenses while delivering quality care. The objective of this scoping review was to examine the range of definitions for “value” in the orthopaedic literature, and how it has been measured. Methods: This scoping review included research assessing patients with musculoskeletal pathology and reporting on value. This includes economic analyses related to bone and joint disease. We excluded basic-science, non-human studies, opinion articles, editorials, commentaries and non-systematic reviews. Search: We searched MEDLINE, EMBASE, CINAHL, and Web of Science databases. Results: Our search captured 45,863 titles, and included 162 original studies. Of the articles that explicitly defined value, they defined it as quality over cost. Two of these articles additionally identify quality, safety, effectiveness, patient centeredness, timeliness, efficiency, cost-containment, equity and access as key domains of value-based care. Most articles reporting a value-based outcome reported cost over health outcomes, typically using traditional economic evaluation methods (>90%) focusing on 4 out of 8 domains (quality, safety, effectiveness, cost-containment). Frameworks have emerged recently that expand to include additional value domains such as patient-centeredness, timeliness, efficiency, equity and access; most commonly Multiple Criteria Decision Analysis (MCDA, reported by six studies). Conclusions: This synthesis underscores the complexity of defining value-based care. Most commonly reported as outcomes over cost using traditional economic evaluations, these describe only part of what goes into value-based care. Future frameworks in value-based research should facilitate multiple perspectives, and align the variation in outcome priorities that may be put forth.

**Date: 2019-12-05**

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**Abstract no.: 53497**

**RELIABILITY OF THE EOS IMAGING SYSTEM FOR ASSESSMENT OF THE SPINAL AND PELVIC ALIGNMENT IN THE SAGITTAL PLANE**

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Introduction: The sagittal alignment of the spine, pelvis is not only closely related to the overall posture of the body but also to the evaluation and treatment of spine disease. In the last few years, the EOS imaging system, a new low-dose radiation X-ray device, became available for sagittal alignment assessment. However, there has been little research on the reliability of EOS. The purpose of this study was to evaluate the intrarater and interrater reliability of EOS for the sagittal alignment assessment of the spine and pelvis. Methods: Records of 46 patients were selected from the EOS recording system between November 2016 and April 2017. The exclusion criteria were congenital spinal anomaly, deformity, previous history of spine and pelvis operation. Sagittal parameters of the spine and pelvis were measured by three examiners three times each using both manual and EOS methods. Means comparison t -test, Pearson bivariate correlation analysis, and reliability analysis by intraclass correlation coefficients (ICCs) for intrarater and interrater reliability were performed using R package "irr." Results: We found excellent intrarater and interrater reliability of EOS measurements. For intrarater reliability, the ICC ranged from 0.898 to 0.982. For interrater reliability, the ICC ranged from 0.794 to 0.837. We used a paired t -test to compare the values measured by manual and EOS methods: there was no statistically significant difference between the two methods. Correlation analysis also showed a statistically significant positive correlation. Conclusions: EOS showed excellent reliability for assessment of the sagittal alignment of the spine and pelvis.

**Date: 2019-12-05**

**Session: Research Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 53103**

**THE SYMPTOM AND FREQUENCY OF THE PATIENTS WITH MULTIPLE MYELOMA IN OSTEOPOROTIC VERTEBRAL BODY FRACTURE IN THE ELDERLY**

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Background: In an aging society, osteoporotic vertebral body fracture (OVF) will continue to rise, on the other hand, undiagnosed multiple myeloma (MM) will also increase. We investigated the symptom and frequency of the patients with MM included in OVF. Methods: Between April 2016 and March 2017, 145 patients was diagnosed OVF with using MRI in our hospital. Among these, we chose the 108 patients over 75 years of age, and excluded the patients having infection, Parkinson's disease and another malignancy disease. In the 108 patients, we examined Bence Jones proteins in urine, monoclonal protein on serum. Results: 6.5% patients (7/108) was diagnosed with symptomatic MM, in the patients between 75 to 84 age was 5.1%(3/59), over the 85 age was 8.2%(4/49). In the 7 patients, the mean age was 85 age, hemoglobin was 7.8g/dL and albumin- globulin ratio was 0.83, that was low in all 7 patients. Discussion: Generally, the patients with MM is occupied by over 65 age, and have parts of diseased bone in 80%. In elderly, they have often anaemia, renal dysfunction and hypoalbuminemia, so it is difficult to judge whether each symptoms resulting from MM or not. But, the patients with MM quite often visit an orthopaedic surgery, so when we meet the patients having multiple vertebral body fracture and refracture in short term, severe anaemia, low albumin- globulin ratio in case of OVF, we should positively consider the involvement of MM, and inspection of monoclonal protein is recommended.

**Date: 2019-12-05**  
**Session: Research Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C3**

**Abstract no.: 53719**

**TARGETING MUTANT TP53 AS A POTENTIAL THERAPEUTIC STRATEGY FOR THE TREATMENT OF OSTEOSARCOMA**

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Mutant TP53 is a promising therapeutic target in cancers. Considering the current challenges facing the clinical treatment of cancer, as well as the urgent need to identify novel therapeutic targets in osteosarcomas, we aimed to evaluate the clinical significance of mutant TP53 in osteosarcoma patients and to explore the therapeutic effect of targeting mutant TP53 in osteosarcomas. We performed a meta-analysis to investigate the relationship between mutant TP53 and the overall survival of patients with osteosarcoma. A CRISPR-Cas9 system and a TP53 inhibitor, NSC59984, were also used to specifically knock-out and inhibit mutant TP53 in the human osteosarcoma cell lines, KHOS and KHOSR2. The meta-analysis demonstrated that mutations in the TP53 gene could be used to predict a poor 2-year survival in osteosarcoma patients. We also demonstrated that the expression of mutant TP53 in human osteosarcoma cell lines can be efficiently knocked-out using CRISPR-Cas9, and this decreased the proliferation, migration, and tumour formation activity of these osteosarcoma cells. Moreover, drug sensitivity to doxorubicin was increased in these TP53 knock-out osteosarcoma cells. NSC59984 also showed similar anti-tumour effects as CRISPR-Cas9 targeted TP53 in the osteosarcoma cells in vitro. We have also demonstrated that the knock-out or inhibition of mutant TP53 decreased the expression of the oncogene IGF-1R, anti-apoptotic proteins Bcl-2 and Survivin in osteosarcoma cells. Collectively, these results suggest that mutant TP53 is a promising therapeutic target in osteosarcomas. Therefore, further studies exploring novel strategies to target mutant TP53 may help improve the treatment outcomes of osteosarcoma patients in the clinic.

**Date: 2019-12-05**

**Session: Research Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 52888**

**IN VITRO STRESS EFFECT ON DEGRADATION AND DRUG RELEASE BEHAVIOURS OF BASIC FIBROBLAST GROWTH FACTOR--POLY(LACTIC-CO-GLYCOLIC-ACID) MICROSPHERE.**

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To study the degradation and basic fibroblast growth factor (bFGF) release activity of bFGF - poly(lactic-co-glycolic-acid) microsphere (bFGF-PLGA MS) under stress in vitro, including the static pressure and shearing force-simulating mechanical environment of the joint cavity. bFGF-PLGA MSs were loaded into self-made static pressure and shearing force loading instruments to study microsphere degradation and drug release experiments. Microsphere morphology, quality, and weight-average molecular weight of polymer were also analysed. In the static pressure loading experiment, bFGF-PLGA MSs at different pressure were stable initially. The trend of molecular weight change, quality loss, and bFGF release was consistent. Meanwhile, microsphere degradation and bFGF release rates in the 4.0 MPa pressure loading group were faster than those in the normal and 0.35 MPa pressure loading groups. It was the fastest in the shaking flask group, showing a statistically significant difference ( $P < 0.0001$ ). In the shearing force loading experiment, there were no distinctive differences in the rates of microsphere degradation and bFGF release between experimental and control group. Meanwhile, microsphere degradation and bFGF release rates by shaking flask oscillation were obviously faster than those by shearing force only ( $P < 0.0001$ ). There are significant bFGF-PLGA MS degradation and bFGF release due to interaction between extraction stress and time. Static pressure has a conspicuous influence on bFGF-PLGA MS degradation and release, especially at 4.0 MPa. The shearing force has a slight effect on bFGF-PLGA MS degradation and drug release. Shaking flask oscillation has a significantly distinctive effect.

**Date: 2019-12-05**

**Session: Research Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 53410**

**ROLE OF TERIPARATIDE IN MANAGEMENT OF OSTEOPOROTIC  
INTERTROCHANTRIC FEMUR FRACTURES - A PROSPECTIVE  
RANDOMISED CONTROLLED TRIAL**

Aman HOODA

PGIMER, CHANDIGARH, Panchkula (INDIA)

**Background:** The osteoporotic fractures are very commonly encountered by the surgeons and concepts of treatment have been evolving to improve the patient's clinical outcome. Teriparatide, a recombinant form of human parathyroid hormone, hasten fracture healing and bone union. Its usage in healing of osteoporotic fractures is evolving and the present study was done to determine its role in intertrochanteric fractures in osteoporotic bones. **Methods:** It was a prospective randomized control trial done at our tertiary care hospital. Two groups were formed, one of which received subcutaneous Teriparatide post surgery and the other did not. The improvement in bone marrow density, union rates, various collapse and migration of spiral blade were compared. **Results:** The results of 15 patients who underwent Proximal Femur Nailing were compared to 15 patients who received additional Teriparatide therapy. A significant reduction in fracture union time was seen in Teriparatide group as compared to the control group. The rate of migration of the helical blade did not show any significant difference but the maintenance of reduction and functional outcome were significantly better in the Teriparatide group at the end of 6 months. The complications like superficial wound infection and bed sore were seen higher in the Teriparatide group but their association with the therapy cannot be established with certainty. **Conclusion:** Overall Teriparatide treatment improves the union and functional outcome in osteoporotic intertrochanteric femur fractures that could definitely reduce the morbidity and mortality in elderly patients in long term. **KEYWORDS:** Osteoporotic fractures; proximal femur fractures; intertrochanteric; Teriparatide; Outcome

**Date: 2019-12-05**

**Session: Research Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 55005**

**RADIOMORPHOLOGICAL MANIFESTATIONS OF THE FEMORAL AND TIBIAL CORTICAL BONE AT DIFFERENT STAGES OF LIMB LENGTHENING**

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Background. There has been a lot of research done on the Ilizarov limb lengthening, however, very few publications focus on quantitative assessment of the distractional regenerate bone in tibia and femur lengthening. Data regarding quality of the bone after lengthening are needed to consider the time of frame removal and develop a rehabilitation program. Methods. Computed tomography assessment of a parent bone was performed for 136 patients with limb length discrepancy and bone deformity of various aetiologies before and after lengthening. Transosseous osteosynthesis technique with the Ilizarov external fixation was used for limb lengthening and deformity correction in all the cases. Results. Cortical density of the femur and tibia in patients with limb length discrepancy and bone deformity of various aetiologies was shown to have differences as compared to the contralateral limb. The lengthening process was accompanied by decreased cortical density of the segment being lengthened, and the density decrease was greater in the areas adjacent to the distractional regenerate bone. Osteonal density of the cortical bone was higher in the norm and at long-term follow-up as compared to the density of external and internal plates. Conclusion. Cortical bone demonstrated heterogenic structures with resorption areas of various magnitude and density, with minimal values at the boundary with regenerate bone during distraction and fixation with frame on, and at short-term follow-up. Complete organotypical restructuring of the bone was shown to occur at a one-to-three-year follow-up depending on aetiology of the disease and amount of lengthening performed.



**Date: 2019-12-05**

**Session: Research Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 54100**

**ROLE OF GANGA HOSPITAL OPEN INJURY SEVERITY SCORE (GHOISS) IN PROGNOSTICATING THE FUNCTIONAL OUTCOMES IN OPEN TIBIAL FRACTURES – A PROSPECTIVE STUDY OF 108 CASES**

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Introduction: Management of open fractures of tibia is a major challenge. It is difficult to predict the functional outcome. Aim is to assess the ability of Ganga hospital open injury severity score (GHOISS) in predicting the functional and radiological outcome in patients who underwent limb salvage and reconstruction. Material and methods: Between May 2015 and May 2016, 108 patients with open tibial fractures were categorized based on GHOISS as: Group 1 – Score < 10 (81 patients), Group 2 – Score 11-12(17 patients) and Group 3 – Score 13-14(10 patients). They were assessed based on time to fracture union, length of hospital stay, average no of surgical procedures, infection rate and the results were compared among groups. The mean duration of follow up was 18 months. Functional outcome was analysed using Lower extremity functional scale (LEFS) and SF -12. Results: Group 1 patients had a lesser days of hospital stay, lesser number of surgical procedures when compared with other two groups which was found to be statistically significant ( p value <0.005). Similarly group 1 patients had a better functional outcome when compared with other two groups which was found to be statistically significant (p value <0.005). The functional outcome of group 2 and group 3 was found to be similar. There was no statistical significance while comparing infection rate in three groups (p value >0.005). Conclusion: Ganga hospital open injury severity score (GHOISS) successfully prognosticates the functional and radiological outcome in open injuries with a score less than 10.

**Date: 2019-12-05**

**Session: Research Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 54798**

**INCIDENCE AND RISK FACTORS ASSOCIATED WITH POST-OPERATIVE ACUTE KIDNEY INJURY (AKI) IN ELECTIVE HIP & KNEE JOINT REPLACEMENTS**

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**Aims:** To quantify the incidence of AKI in elective lower limb arthroplasty patients and identify the risk factors for developing post-operative AKI. **Methods:** A retrospective observational study of 100 consecutive elective joint replacement patients. Study period was from December 2018 to January 2019. Retrospective case notes review undertaken. Data was collected on: 1) pre- and post-operative creatinine levels and percentage drop in eGFR (estimated glomerular filtration rate) 2) potential risks for developing AKI (i.e. types of joint replacement, pre-operative nephrotoxic medications, post-operative fluids and NSAIDs (nonsteroidal anti-inflammatory drug) prescriptions. The KDIGO (Kidney Disease, Improving Global Outcomes) diagnostic criteria were used to calculate the incidence of AKI in the cohort. **Results:** The incidence of AKI in the total cohort was 7.9% (n=8). It was identified that the high risk group consisted of elderly male patients between 70-79 years old (50%; n=4). Patients undergoing hip joint arthroplasty were also found to have a higher AKI incidence (75%; n=6) as compared to knee (25%; n=2). Pre-operative nephrotoxic medications (100%; n=8) and post-operative NSAIDs (50%; n=4) were strongly linked to the development of AKI. **Conclusion:** Our review shows that pre-operative nephrotoxic medications and hip arthroplasty are strong indicators for developing post-operative AKI. Our recommendations include routinely prescribing 2 litres of fluid post-operatively (excluding patients with significant congestive heart failure), to encourage patients to drink clear fluids up to 2 hours before the operation and avoid post-operative NSAIDs treatment.

**Date: 2019-12-05**

**Session: Research Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 53105**

**POSTERIOR CRUCIATE LIGAMENT RESECTION IN TOTAL KNEE ARTHROPLASTY: EFFECT ON FLEXION-EXTENSION GAPS, MEDIOLATERAL LAXITY, AND FIXED FLEXION DEFORMITY**

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**Introduction:** The objective of this study was to assess the effect of posterior cruciate ligament (PCL) resection on flexion-extension gaps, mediolateral soft tissue laxity, and fixed flexion deformity (FFD) during posterior-stabilised total knee arthroplasty (TKA). **Methods:** This prospective study included 110 patients with symptomatic knee osteoarthritis undergoing primary robotic-arm assisted posterior-stabilised TKA. Optical motion capture technology with fixed femoral and tibial registration pins was used to assess gaps pre- and post-PCL resection in knee extension and 90 degrees knee flexion. Mean preoperative hip-knee-ankle deformity was  $4.1 \pm 3.4$  degrees varus. **Results:** PCL resection increased the flexion gap more than the extension gap in the medial ( $2.4 \pm 1.5$ mm vs  $1.3 \pm 1.0$ mm respectively,  $p < 0.001$ ) and lateral ( $3.3 \pm 1.6$ mm vs  $1.2 \pm 0.9$ mm respectively,  $p < 0.01$ ) compartments. The gap differences following PCL resection created mediolateral laxity in flexion (gap difference:  $1.1 \pm 2.5$ mm,  $p < 0.001$ ) but not in extension (gap difference:  $0.1 \pm 2.1$ mm,  $p = 0.51$ ). PCL resection improved overall FFD ( $6.3 \pm 4.4$  preoperatively vs  $3.1 \pm 1.5$  postoperatively,  $p < 0.001$ ). There was a strong positive correlation between preoperative FFD and change in FFD following PCL resection (Pearson correlation coefficient=0.81,  $p < 0.001$ ). **Conclusion:** PCL resection creates flexion-extension mismatch by increasing the flexion gap proportionally more than the extension gap. The increase in the lateral flexion gap is greater than the increase in the medial flexion gap, which creates mediolateral laxity in flexion. Improvements in FFD following PCL resection are dependent on the degree of deformity prior to PCL resection.

**Date: 2019-12-05**

**Session: Research Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 53709**

**WHICH TIBIAL NAILS ARE STIFFER? REGIONAL (INDIA) VERSUS INTERNATIONAL. A BIOMECHANICAL STUDY**

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Introduction-Despite the advancements in fixation methods for tibial shaft fractures using intramedullary nails (IM), implant failure continues to be a major cause for reoperation. Biomechanical properties of tibial nails from global manufacturers have been exhaustively studied and reported. Regionally manufactured nails from India lacks any biomechanical data from independent researcher's and surgeons. In this study, we analysed the biomechanical properties of four commonly used regional nails in comparison to three market available and adjusted international nails. Materials and Methods- A total of seven IM nails (Five titanium and one stainless steel) from six manufacturers (four regional; R1, R2, R3, R4 and three international; G1 G2, G3) were procured and subjected to axial loading and four-point bending test according to the American society for testing materials (ASTM) F1264 guidelines. Results: The load required for plastic deformation for regional nails were 2520 Newtons for R1, 2760 Newtons for R2, 2760 Newtons for R3, 2150 Newtons for R4; and for international nails, it was 3070 Newtons for G1, 2930 Newtons for G2, 2220 Newtons for G3. The comparative data suggest that the international nails were much stiffer than the regional nails. On further skimming of the data a few outliers were noted, (i)one of the international nail G3(Titanium international nail) had a load to plastic deformation much lower than the regional nails;(ii) and R4(stainless steel regional nail) failed earlier than all of the titanium nails. Conclusion: The study provides a reference to the orthopaedic community about the standards of existing intramedullary nails.

**Date: 2019-12-05**

**Session: Research Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 53259**

**REGULATION OF WNT SIGNALLING EXPRESSION BY MICRORNAS IN PATIENTS WITH CERVICAL OSSIFICATION OF THE POSTERIOR LONGITUDINAL LIGAMENT**

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Background: Ossification of the posterior longitudinal ligament (OPLL) is a pathological process that results in ectopic bone formation around the spinal region. This process is one of the manifestations of diffuse idiopathic skeletal hyperostosis and causes serious neurological complications. Cell differentiation at the ossification front is known to be important during this pathological condition, although the factors regulating its initiation and progression are still unclear. Methods: Ligamentous tissue was isolated from 28 patients who underwent decompressive surgery for cervical OPLL. Tissue sections were used for in vitro culture to obtain primary cells through migration methods. Using microRNA array, the factors associated with OPLL were identified and compared with control ligamentous samples harvested from patients with cervical spondylosis without ossification. The ligamentous sections were also examined by immunohistochemistry for the expression of candidate microRNA target genes. Results and Conclusion: The microRNA array identified 177 factors; 12 of which were expressed at significantly different levels in patients with OPLL compared to those in control patients. Hsa-miR-487b-3p was particularly down-regulated in patients with OPLL, satisfying a false discovery rate of <0.05. This microRNA was predicted to regulate the expression of genes involved in Wnt signalling. Immunohistochemical analysis of Wnt signalling proteins, including Wnt3a, LRP5/6, and beta-catenin, revealed elevated expression in mesenchymal cells and/or premature chondrocytes at the ossification front. These results reveal that the down-regulation of miR-487b-3p could play an important role in the initiation of Wnt signalling during the ossification process in OPLL.

**Date: 2019-12-05**

**Session: Research Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 53251**

**ROLE OF CK-MM IN MANGLED EXTREMITY AS TISSUE MARKER**

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Various studies have shown the increased expression and the significance of Serum CK-MM in muscle injury. But the expression of CK-MM and its significance in skeletal muscle tissue, particularly in event of high velocity trauma, is yet to be explored and implicated further. A pilot study was planned with the aim to observe the pattern of expression of CK-MM in muscle tissue and to further explore its implication, in patient with mangled extremity who underwent surgery. Methods: This is a prospective pilot study, including 30 patients with mangled lower limb. Amputation was done for patients with MESS score  $\geq 7$  whereas limb salvage for MESS score  $<7$ . Intraoperative muscle tissue samples were obtained from different zones in either group and H&E staining was done followed by IHC staining with CK-MM antibody. The results were evaluated with help of special grading system. Results: On H&E examination, statistically significant increase was noted in viable muscle tissue with concomitant decrease of necrotic tissue from Zone A to C in group I, and from pre to post debridement samples in group II. These microscopic findings were correlated with increase CK-MM staining in corresponding zones of group I & II. Conclusion: IHC stain of CK-MM is highly sensitive in detecting the viable muscle tissue. Variable expression of CK-MM was observed in different zones of injury. CK-MM is a definite marker of muscle integrity; henceforth a good indicator to identify the muscle non-viability, which is not obvious in HE stained sections.

**Date: 2019-12-05**

**Session: Research Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 53100**

**POLYPEPTIDE CO-PHOTO-CROSSLINKED GELATIN HYDROGEL FOR BONE REGENERATION**

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Introduction: Polypeptides have been widely applied. However, the easily inactivation and burst release of the peptides limit their in vivo application. Therefore, the construction of a stable and durable delivery system for polypeptide for bone repair and regeneration is challenging but highly demanded. Methods: We constructed photo-crosslinkable osteogenic growth peptides (OGP) by solid-state synthesis, and then co-crosslinked them with photo-crosslinked gelatin (GelMA) by ultraviolet (UV) radiation to create a novel osteogenic polypeptide hydrogel (GelMA-c-OGP). The osteogenicity of GelMA-c-OGP hydrogels were checked by osteogenic precursor cells MC3T3-E1 cells. In vivo, the GelMA-c-OGP hydrogel was injected into the distal defect of the femur in the SD rats. The implanted sites were scanned imageologically and performed histological staining post the surgery. Results: The GelMA-c-OGP hydrogel displayed good mechanical properties and accelerated MC3T3-E1 osteogenesis. In vivo, the traumatic callus of the GelMA-c-OGP hydrogel-injected rat was visible after 8 weeks, and the defect site was filled with new bone, meanwhile the cortical bone was continuous. More collagen fibres and connected cortical bones were observed histologically in the GelMA-c-OGP implanted rats. Conclusion: We synthesised polypeptide co-photo-crosslinked Gelatin Hydrogel for bone regeneration. It can be injectable and solidified in situ by co-crosslinking OGP and GelMA under UV light. This scaffold retained the properties of the hydrogel, provided sustained release of OGP and promote osteogenesis. Therefore, the GelMA-c-OGP hydrogel provides a potential carrier for the clinical application of orthopaedics.

**Date: 2019-12-05**

**Session: Research Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 52908**

**EXPERIMENTAL STUDY OF THE IMPACTS OF BFGF ON DECREASING THE EXPRESSION OF EXTRACELLULAR INFLAMMATORY FACTORS TO PROMOTE THE PROLIFERATION AND DIFFERENTIATION OF CHONDROCYTES**

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Objective: Observed the effect of basic fibroblast growth factor (bFGF) and inflammatory cytokines on growth characteristics and differentiation potential of rat articular chondrocytes cultured in vitro. Methods: Divided the second generation chondrocytes of rat into four groups— A control group (chondrocytes were cultured individually), B negative control group (chondrocytes were cultured with TNF-, IL-1and IL-6), C positive control group (chondrocytes were cultured with bFGF) and D experimental group (chondrocytes were cultured with bFGF, TNF-, IL-1and IL-6)—and observed the four groups after 3 days, 5days'and 7days' culturing, respectively. The state of chondrocyte activity were detected by CCK8 method, the content of inflammatory cytokines were determined by ELISA method, protein level of COL2A1 as well as ACAN were identified by immunofluorescence assay (IFA) and the expression of gene COL2A1 and ACAN were assessed by real time PCR. Results: The optical density (OD) of chondrocytes in four groups detected by CCK8 showed that C group > D group > A group > B group, ELISA method indicated that compared to A group, the expressions of IL-1, IL-6 and TNF- significantly increased in B group. In addition, IFA showed that protein expression of COL2A1 as well as ACAN in C group were up-regulated obviously than other three groups. In comparison with A group, mRNA expressions of COL2A1 together with ACAN in C group had a similar trend ( $p < 0.05$ ), and B group had a significant decrease. Conclusion: Applying bFGF to rat articular chondrocytes cultured in vitro reasonably could maintain the phenotype of chondrocytes effectively.



**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 53630**

**COMPARISON OF FUNCTIONAL OUTCOME OF MEDIAL PIVOT TOTAL KNEE ARTHROPLASTY WITH POSTERIOR STABILISING (PS) TOTAL KNEE ARTHROPLASTY - A RANDOMISED TRIAL**

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Background: Despite the wide acceptance of PS Total knee arthroplasty design as an answer to advance osteoarthritis of knee joint, still there are many shortcomings especially in terms of reproducing normal kinematics of the knee joint. Therefore, Medial Pivot TKA system is gaining popularity as it reproduces nearly a normal knee kinematics by pivoting medial condyle of femoral component with a concave medial part of tibial polyethylene insert like ball and socket mechanism. Materials and Methods: A total of 70 patients were included in this study, half of whom underwent Medial Pivot TKR and the other half was managed by PS total knee design. Data was collected preoperatively and postoperatively at 6 months, 1 year and 2 years; from August 2016 till October 2018. Functional outcome was assessed in terms of Knee society score KSS, ROM and Forgotten Joint Score-12 FJS-12. Results: In our study, male to female ratio was 13:22 and 11:24 in group-A (MP-TKA) and group-B (PS-TKA) respectively. The mean knee flexion at the end of our study was 119.40 +/- 3.16 in group-A and 113.40 +/- 2.47 in group-B. Similarly, FJS-12 was considerably better in group-A (60.08 +/- 16.72) with p-value <0.001 as compared to group-B. Knee society score was comparable in both groups with p-value of 0.180. Conclusion: We have found better results in the group treated with Medial Pivot TKR in terms of Knee society score KSS, ROM and Forgotten Joint Score-12 FJS-12. Key words: Total knee arthroplasty, Medial pivot design, Knee society score.

**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 53460**

**WALK THE LINE - ORIENTATING THE TIBIAL COMPONENT ALONG THE ANATOMICAL TIBIAL AXIS MAY RESULT IN PATELLOFEMORAL PROBLEMS FOLLOWING TOTAL KNEE REPLACEMENT.**

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Ysbyty Gwynedd, Bangor, North Wales, Bangor (UNITED KINGDOM)

Introduction: Optimal rotational alignment of the tibial component is important for good functional outcome following TKR. Internal rotation of the tibial component has been associated with patella-femoral problems. A commonly used rotational reference is a line drawn from the deepest point of the posterior tibial sulcus to a point dividing the tibial tuberosity into its medial 1/3 and lateral 2/3 (MTA). Another commonly used axis is the Anatomical Tibial Axis (ATA); a line connecting tibial condylar centres is transected by a line through the tibial tuberosity. Aim: To analyse the degree of variability in inter-axis angular relationships between the ATA and MTA. Methods: MRI imaging from 350 knees obtained for the purpose of patient specific instrumented TKRs were analysed. The MTA and ATA were identified as described above and the angular relationship between them was measured. Results: The median angular difference was 6.41 degrees. The minimum value was -11.950 and the maximum value was 17.690 with an overall range of 29.640. Coronal alignment angles ranged from 13.350 valgus to 16.360 varus and 16.740 valgus to 14.770 varus for females and males respectively, Conclusion: There is considerable variability in the angular relationships between the two axes of rotation of the proximal tibia. If rotation of the tibial component is based on the ATA, significant internal rotation of the tibial component will occur in some patients with resultant patellofemoral problems. In those patients with large variation between the two axes, tibiofemoral incongruence may occur if more constrained tibial inserts are used.

**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 55153**

**COMPARING RADIOGRAPHIC OUTCOMES OF ROBOTIC TOTAL KNEE REPLACEMENT TO MANUAL INSTRUMENTATION**

Zachary POST<sup>1</sup>, Andres DUQUE<sup>1</sup>, Luis GRAU<sup>1</sup>, Alvin ONG<sup>1</sup>, David LE<sup>2</sup>, Sean GRIFFITHS<sup>2</sup>, Lauryn BIANCO<sup>3</sup>, Danielle PONZIO<sup>1</sup>, Fabio OROZCO<sup>1</sup>

<sup>1</sup>Rothman Orthopaedics, Egg Harbor Township (UNITED STATES), <sup>2</sup>Inspira Health Network, Vineland (UNITED STATES), <sup>3</sup>Pennsylvania College of Osteopathic Medicine, Philadelphia (UNITED STATES)

Introduction: Robotic arm assisted total knee arthroplasty (RTKA) has many potential benefits including advanced CT based implant sizing, improved restoration of mechanical alignment and implant rotation, and increased accuracy of bony resection. The purpose of this study was to compare radiographic outcomes between robotic arm assisted total knee replacement (TKA) and TKA with manual instruments. Methods: 50 consecutive robotic arm assisted and manual TKAs were identified. Radiographic knee society scores were calculated to determine implant position and patellofemoral tracking. Accuracy of femoral sizing was evaluated as was pre and post-operative posterior condylar offset. Results: There were 27% of manual TKA patients who were outliers in regards to tibia and femur varus/valgus and tibia slope as compared to 10% in the RTKA group. There was an 11% average deviation in the post-op posterior condylar offset in the manual group as compared to 1% deviation in the RTKA group. 33% of manual TKAs were found to be oversized ML with 0% in the RTKA group. 83% of manual TKA patients were outliers in regards to either patellar component tilt, patellar tilt or patellar displacement as compared to 10% in the RTKA group. Discussion: While we are just starting to see the clinical benefits of robotic arm assisted TKA reported in the literature and further work still needs to be done, this study demonstrates that RTKA leads to more consistent implant position, improved patellofemoral tracking and more consistent implant sizing and restoration of posterior condylar offset as compared to manual instruments.

**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 54839**

**METAL ALLERGY AND TOTAL KNEE ARTHROPLASTY: A CALL FOR GLOBAL CONSENSUS**

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Background: Despite an unclear immunological mechanism, so-called hypoallergenic components are actively marketed and continue to be used in total knee arthroplasty (TKA). Recent literature proposes that known metal hypersensitivity has no impact on arthroplasty outcomes. Methods: A cross-sectional observational analysis of patients implanted with a hypoallergenic-coated TKA was conducted. The methodology followed the Reporting of studies Conducted using Observational Routinely collected health Data (RECORD) statement. Results: A database spanning the period between 2011 and 2018 was created. A total of 45 cases received Titanium and Niobium/Vanadium coated TKA implants for primary osteoarthritis. All but one case were female patients, with mean age of 64 years (range 43-83). 93% of cases reported a history of dermatitis in contact with Nickel containing metals. Pre-operative British Contact Dermatitis Society (BCDS) standard patch series was only conducted among 31% of cases. Despite the use of Nickel-Free components skin closure was performed with Nickel containing skin clips in 62% of cases. There were no reports of hypersensitivity reactions in the latter group. The clinical and radiological outcomes remained satisfactory across all cases. Nevertheless, the estimated implant-cost of equivalent number of cases was increased by 2 to 3 fold. Conclusions: The present study demonstrates no correlation between patient reported metal sensitivity, epicutaneous testing and Nickel containing skin clips. Predominance in female patients might in-fact represent dermal reaction to oxidised metal particles from contact with jewellery but not true hypersensitivity. There is therefore a need for paradigm shift and the authors call for a consensus.

**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 54674**

**ALL TYPES OF COMPONENT MALROTATION AFFECT THE EARLY PATIENT-REPORTED OUTCOME MEASURES AFTER TOTAL KNEE ARTHROPLASTY**

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Introduction: Results following total knee arthroplasty (TKA) whether clinical, radiological or survival analysis have been well studied. Still, there are some concerns regarding patient satisfaction with the outcome of the surgery and factors that might contribute to a suboptimal result. This study aims to determine if there is a correlation between primary TKA malalignment and early patient reported outcome measures (PROMs). Material and methods: Sixty patients, who had their primary TKA with minimum two years follow up, were recruited for a detailed clinical and radiological examination. Knee alignment in coronal, sagittal and axial planes was measured. In all knees, the normal and the outliers were defined and their clinical results (PROMs) compared to see if there was a statistically significant difference. Results: There was non-significant correlation between postoperative limb malalignment in the coronal and the sagittal planes and PROMs. Conversely, there was a significant negative correlation between all types of malrotation and PROMs. Conclusion: Although malalignment has been linked to inferior outcome and implant survival, our results showed that coronal and sagittal limb malalignment has no significant effect on early PROMs. However, all types of component rotational malalignment significantly worsen PROMs.

**Date: 2019-12-05**

**Session: Knee Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Junior Ballroom A**

**Abstract no.: 54512**

**ANTERIOR VERSUS POSTERIOR REFERENCING IN THE MEASUREMENT OF POSTERIOR CONDYLE OFFSET RATIO FOR TOTAL KNEE ARTHROPLASTY**

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Background: Preservation of the joint anatomy is of special importance in providing a successful and long lasting Total knee replacement. A comparison of the Posterior Condylar Offset Ratio (PCOR) pre and post operatively, can be used to assess preservation of normal parameters. PCOR is the maximal thickness of the posterior condyle projecting posteriorly to the tangent of the posterior cortex of the femoral shaft, divided by the maximal thickness of the posterior condyle projecting posterior to the straight line drawn as the extension of the anterior femoral cortex on a true lateral radiograph. Objective: To determine if there is a statistical difference in maintaining normal condylar anatomy using the PCOR formula when employing either anterior or posterior referencing techniques in total knee arthroplasty. Methods and Results: Out of the 180 patients included in the study, anterior referencing was used in 84 patients and posterior referencing was utilised in the remaining 96 patients. Patients were matched based on age, sex and side of limb in the surgery. Preoperative and post-operative lateral radiographs were compared. The preoperative PCOR similar in both study groups (0.43) and the post-operative PCOR did not show any statistical difference between the two groups (0.47). It was also comparable to that of Johal et al which reinforces the external validity of the study. Increase in PCOR was observed following surgery in both the groups and no difference was noted when compared between both the groups. Conclusion: There is no difference in PCOR with anterior and posterior referencing Total Knee Arthroplasty.

**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 53612**

**KINEMATICALLY ALIGNED CRUCIATE-RETAINING TOTAL KNEE ARTHROPLASTY: COMPARISON OF TWO TYPES OF PROSTHESIS DESIGN**

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**Introduction:** Recently, kinematically aligned total knee arthroplasties (TKAs) have gained interest for achieving good clinical outcomes compared with mechanically aligned TKAs. However, the influence of prosthesis design on patellar tracking in kinematically aligned TKA is not unclear. Therefore, the purpose of the present study was to compare intraoperative and postoperative patellar tracking and clinical outcomes in kinematically aligned TKAs between two different types of prostheses. **Patients and Methods:** Sixty kinematically aligned cruciate-retaining TKAs (30 multi-radius, fixed-bearing insert (group A) and 30 single-radius, mobile-bearing insert (group B)) were performed for varus-type osteoarthritis using a navigation system. Intraoperative and postoperative patellar tracking were compared between the two groups. The range of motion and 2011 Knee Society Scores (KSS) were also compared between the two groups one year after surgery. **Results:** Although there was no difference in patellar mal-tracking including patellar lateral shift and tilt between the two groups, the ratio of intraoperative lateral retinacular release for adjusting patellar tracking was significantly higher in the group A than B. There was no significant difference in postoperative flexion angles and 2011 KSS between the two groups. **Conclusions:** In the comparison of the two types of prosthesis design in kinematically aligned TKAs, although the proportion of cases performing lateral retinacular release was significantly high in the group A, no difference was found in the postoperative clinical course.

**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 55147**

**CLINICAL AND RADIOGRAPHIC OUTCOMES: NOVEL CEMENTLESS METAL BACKED PATELLA DESIGN**

Zachary POST<sup>1</sup>, Andres DUQUE<sup>1</sup>, Luis GRAU<sup>1</sup>, Fabio OROZCO<sup>1</sup>, David LE<sup>2</sup>, Sean GRIFFITHS<sup>2</sup>, Lauryn BIANCO<sup>3</sup>, Danielle PONZIO<sup>1</sup>, Alvin ONG<sup>1</sup>

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Introduction: High early failure rate in previously designed press-fit has limited its wide spread use. In 2013, a new 3d printed porous titanium metal backed patella design was released to increase bone ingrowth and used a unique compression moulding technique to create a stronger interlock layer between the polyethylene and metal backing. We sought to determine the survivorship, radiographic and clinical outcomes of the Stryker Triathlon Tritanium cementless metal backed patella. Methods: A retrospective review of prospectively collected data on 323 cementless metal backed patellae at two-year follow up was performed. Knee Society radiographic scores were obtained at latest follow up to evaluate for lucency. KOOS and VR6 scores were compared. Loosening noted on radiographs and/or reoperation for any reason were the end points used to determine survivorship. Results: Overall survivorship was 99.0% (314 cases). When considering aseptic loosening as the mode of failure, survivorship was 100%. The average pre-operative KOOS score increased from 34.73 pre-operatively to 59.61 (6 months) and 53.91 (2 years). The average pre-operative VR/SF-12 PH score increased from 31.11 pre-operatively to 47.32 (6 months) and 44.89 (2 years). The average pre-operative VR/SF-12 MH score increased from 39.00 pre-operatively to 52.59 (6 months) and 53.13 (2 years). 3.9% (10) of patients had an asymptomatic radiographic lucency. 100% (254) of patients had radiographic osseous integration of the patellar component. Conclusion: We found that the redesigned Stryker Triathlon Tritanium cementless metal backed patella showed excellent survivorship, osseous integration, and clinical outcomes at minimum two-year follow up.



**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 55066**

**PIE-CRUSTING OF PROXIMAL MEDIAL COLLATERAL LIGAMENT FOR VARUS DEFORMITY IN KNEE ARTHROPLASTY**

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<sup>1</sup>AIIMS Rishikesh, Dehradun (INDIA), <sup>2</sup>AIIMS Rishikesh, Rishikesh (INDIA)

Introduction: Pie-crusting technique has been commonly used in valgus knees but there is a fear of over-release of medial collateral ligament (MCL) in varus knees. We propose that multiple needle puncturing technique of MCL release is a safe and less invasive approach for medial release. Methods: Prospective case-control study. Sixty patients were identified during total knee arthroplasty who had medial tightness after initial varus release. They were divided into two groups- 30 patients undergoing extensive medial release (Group 1), and 30 patients undergoing pie-crusting of MCL (Group 2). Initial medial release involved excision of overhanging osteophytes, release of deep MCL, posterior oblique ligament, posteromedial capsule, semimembranosus and pes anserinus. If medial gap is tighter pie-crusting of the superficial MCL was carried out, 1.5 cm from its femoral insertion, using a sixteen gauge needle in group 1. Subperiosteal release of superficial MCL was carried out in group 2. Results: There was no difference in mean age, sex-ratio, body mass index, preoperative range of motion, Knee Society Scores and WOMAC scores between the two groups. Mean thickness of polyethylene insert used was  $10.7 \pm 1.3$  mm (range 10-14 mm). None of the patients in either group had symptoms of knee instability at follow-up. There was no cases of over-release intraoperatively or failures at follow up (>3mm of medial laxity). There was no difference in functional outcome scores at one year. Conclusion: Pie-crusting of superficial MCL is safe and effective in correction of moderate to severe varus deformities in knee arthroplasty

**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 55013**

**EARLY OUTCOMES OF THE ATTUNE TOTAL KNEE ARTHROPLASTY IN A NON-DESIGNER SERIES OF 436 KNEES**

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<sup>1</sup>Wrightington Hospital, Mumbai (INDIA), <sup>2</sup>Wrightington Hospital, Lancashire (UNITED KINGDOM)

Introduction: Recent literature has raised concerns regarding an increased incidence of early aseptic loosening of the tibial component in novel total knee system. Our study investigates early radiographic and clinical outcomes of this new design knee implant. Methods: 436 consecutive cemented new total knee arthroplasties performed in a single centre between June 2014 and October 2017 were analysed for their clinical and radiological outcomes. Results: Component revision occurred in 0.9% of patients (2 for deep infection & 2 for peri-prosthetic fractures) at 1-year mean follow-up. 1.8% patients had reoperations (3 polyethylene exchange for instability, 3 secondary resurfacing of the patella and 2 washouts). There were no cases of revision for aseptic loosening or debonding of the components at the cement implant or cement bone interface. The incidence of radiolucency under the tibial tray (8%) was much lower than other existing knee systems (18-96%) and did not correlate with clinical outcome or revision rate. The incidence of unexplained pain (5%) was lower than other reported rates of 12-18% with other knee systems. Conclusions: The early results of this new implant are promising in terms of the incidence of post-operative unexplained knee pain and subsequent patient dissatisfaction. There were no revisions due to tibial component debonding/aseptic loosening or early mechanical implant failure as described in other reported literature. To our knowledge, this is first and largest non-designer series of this new system. In our opinion, a meticulous cementation technique is the key to obtain good results with any knee system.

**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 53157**

**NAVIGATION IMPROVES THE SURVIVAL RATE OF MOBILE BEARING TOTAL KNEE ARTHROPLASTY IN SEVERE PRE-OPERATIVE CORONAL DEFORMITY**

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<sup>1</sup>CHU Grenoble, Strasbourg (FRANCE), <sup>2</sup>CHU Grenoble-Alpes, Tuttlingen (GERMANY), <sup>3</sup>CHU of Strasbourg, Strasbourg (FRANCE)

Introduction: The restoration of physiological coronal alignment of the lower limb is considered a critical point for the long-term survival of a TKA. The aim of this study was to measure the impact of the use of navigation on the survival over 10 years, and to detect the potential influence of the severity of the initial coronal deformation on this survival. Methods: A national, multicentric, retrospective study was performed. All patients operated between January 2001 and December 2004 in the participating centres for TKA implantation were consecutively included, without exclusion criteria. The initial coronal deformation was measured and angles greater than or equal to 10° were considered to be a large deformation. Cases with post-operative coronal deformity less than or equal to 3° were considered corrected. All patients were contacted after 10 years or more to determine the survival of the TKA. Results: 1604 TKAs were implanted during the study period. 943 cases (58.8%) were operated with a conventional technique (control group) and 661 (41.2%) with a navigated technique (study group). 422 cases (26.3%) had a large deformity (control group: 186 cases – 19.7%, study group: 240 cases – 36.3%). There was a significant difference between the 13-year survival rates in the control group (93.4%) and in the study group (99.4%) for cases with large initial deformity (p=0.04). Conclusion: TKAs implanted with a navigation system had a 13-year survival rate higher than that of prostheses implanted with a conventional technique when the initial frontal deformation was greater than 10°.

**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 55150**

**CLINICAL AND RADIOGRAPHIC OUTCOMES OF MODERN CEMENTLESS TOTAL KNEE DESIGN**

Zachary POST<sup>1</sup>, Andres DUQUE<sup>1</sup>, Luis GRAU<sup>1</sup>, Fabio OROZCO<sup>1</sup>, David LE<sup>2</sup>, Sean GRIFFITHS<sup>2</sup>, Lauryn BIANCO<sup>3</sup>, Danielle PONZIO<sup>1</sup>, Alvin ONG<sup>1</sup>

<sup>1</sup>Rothman Orthopaedics, Egg Harbor Township (UNITED STATES), <sup>2</sup>Inspira Health Network, Vineland (UNITED STATES), <sup>3</sup>Pennsylvania College of Osteopathic Medicine, Philadelphia (UNITED STATES)

Introduction: Previous press fit tibial components have shown high early failure rates secondary to aseptic loosening. In 2013 a new 3D printed, pressed fit tibia was designed to increase bone ingrowth, improve initial fixation while ingrowth occurs, and used in conjunction with a beaded cementless femoral component. We sought to determine the survivorship, radiographic and clinical outcomes of the Stryker Triathlon Tritanium tibial and femoral components in patients with minimum two-year follow up. Methods: A retrospective review of prospectively collected registry data of 329 cementless total knees with a minimum of two-year follow up was undertaken. Knee Society radiographic scores were obtained at latest follow-up visit to evaluate for lucency and osseous integration. KOOS and VR6 scores were assessed. Loosening noted on radiographs and/or reoperation for any reason were the end points used to determine survivorship. Results: Overall survivorship was 99.1% (327 cases). When considering aseptic loosening as the mode of failure, survivorship was 100%. The average pre-operative KOOS score increased from 34.96 pre-operatively to 52.58. The average pre-operative VR/SF-12 PH score increased from 31.13 pre-operatively to 44.90. The average pre-operative VR/SF-12 MH score increased from 38.94 pre-operatively to 52.78. 3.82% (11), 10.77% (32), and 2.43% (7), of patients had an asymptomatic radiographic lucency of the femoral, tibial or both components, respectively. 100% (297) of patients had radiographic osseous integration of both components. Conclusion: We found that the redesigned Stryker Triathlon Tritanium cementless total knee showed excellent survivorship, osseous integration, and clinical outcomes at minimum two-year follow up.

**Date: 2019-12-05**

**Session: Knee Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Junior Ballroom A**

**Abstract no.: 53683**

**INFLUENCE OF POSTERIOR TIBIAL SLOPE ON FUNCTIONAL OUTCOME AFTER CRUCIATE RETAINING TOTAL KNEE ARTHROPLASTY**

Romit AGRAWAL, Vijay SINGH, Ayush SHARMA, Nilesh MANGALE, Jeet SAVLA, Priyank DEEPAK, Shorabh SINHA, Ajay JAISWAL

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Introduction: Posterior tibial slope (PTS) plays a significant role in maintaining the flexion gap and knee stability following total knee arthroplasty (TKA). The aim of this study is to evaluate the role of posterior tibial slope on functional outcome after Cruciate Retaining TKAs. Methods: Sixty three cases with grade 4 osteoarthritis of knee (54 patients: 37 females and 17 males) that were operated with Cruciate Retaining TKA were included in this study. Preoperative & postoperative range of motion and posterior tibial slope were recorded for each case. According to the change in slope that was calculated by subtracting the preoperative from the postoperative PTS, Posterior tibial slopes were divided into 2 groups: group 1  $\geq 30$ ; group 2  $< 30$ . Functional evaluation was done using WOMAC and KSS score. Results: Mean WOMAC score has been improved significantly from preoperative to postoperative knees in both groups. KSS objective & functional score also followed the similar pattern. As observed, postoperatively mean objective score were noted from 37.36 to 79.4 ( $p=0.800$ ) in group1 & 36.3 to 90.6 ( $p<0.001$ ) in group 2 and mean functional score were noted from 26 to 79.1 ( $p<0.001$ ) in group 1 to 28.5 to 85.5 ( $p<0.001$ ) in group 2. Conclusion: The posterior tibial slope angle is the critical factor that influences the functional outcome in Cruciate Retaining TKA, as a group having minimum deviation of slope postoperatively showed significant improvement compared to the other group. Therefore the surgeon should be careful in choosing the PTS in Cruciate Retaining TKAs.

**Date: 2019-12-05**  
**Session: Knee Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 53864**

**SEVERE FIXED VALGUS DEFORMITY IN TKR. IS IT POSSIBLE TO SAVE THE LIGAMENTS? SURGICAL TECHNIQUE AND VIDEO RESULTS**

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Raffaele IORIO<sup>3</sup>, Daniele MAZZA<sup>3</sup>, Andrea FERRETTI<sup>4</sup>

<sup>1</sup>Rome University, Rome (ITALY), <sup>2</sup>Rome University, Rome (ITALY),

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Fixed valgus deformity is a challenge in TKR when the leg alignment reaches severe deformity. Axial alignment, equal space in flexion extension gap and balanced rotation are often impossible to obtain without a very important release with the consequence of creating an excessive space between femur and tibia, especially in flexion. Is it possible to save the ligaments and obtain a balanced knee? The External Condyle Sliding technique permits to save the ligaments that should be sacrificed in the lateral aspect of the joint. To demonstrate the optimal balancing of the knee we used a mobile bearing surface in all cases except one. When technique is well performed a stable result could be obtained. In long term results are stable as shown in the video with complete recovery to daily life activity. In one case we reported a luxation of the polyethylene.

**Date: 2019-12-05**  
**Session: Knee Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom A**

**Abstract no.: 54096**

**WHAT ARE THE RISK FACTORS FOR FAILURE AFTER ONE-STAGE EXCHANGE FOR PERIPROSTHETIC JOINT INFECTION OF THE KNEE?**

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Helios ENDO-Klinik Hamburg, Hamburg (GERMANY)

There is a lack of studies analysing the risk factors for failure after infected total knee arthroplasty (TKA). This study was performed to detect health- and procedure-related risk factors for failure following one-stage septic knee exchange. Ninety-one patients who failed following one-stage septic exchange TKA, between January 2008 and December 2017, were included for final analysis. In the same time interval, we randomly selected control group without subsequent revision surgery. More than 45 pre-, intra- and postoperative factors were investigated to identify risk factors for failure. Bivariate analysis yielded 10 predictors (variables with significance at  $p < 0.05$ ) for failure involving re-revision for any reason and 11 predictors for failure involving re-revision for reinfection. The binary logistic regression model revealed the following risk factors for re-revision for any reason: history of a 1-stage exchange for infection (odds ratio [OR], 26.706 [95% confidence interval (CI), 5.770 to 123.606];  $p < 0.001$ ), history of a 2-stage exchange (OR, 3.948 [95% CI, 1.869 to 8.339];  $p < 0.001$ ), and isolation of enterococci (OR, 16.925 [95% CI, 2.033 to 140.872];  $p = 0.009$ ). The risk factors for reinfection in the binary logistic regression analysis were history of 1-stage or 2-stage exchange arthroplasty, isolation of enterococci, and isolation of streptococci (OR, 6.025 [95% CI, 1.470 to 24.701];  $p = 0.013$ ). Most of identified risk factors were not related to the patient's comorbidities. Among them, the isolation of Enterococcus species, polymicrobial PJI and a previous one-stage exchange TKA, increased the risk of failure significantly.

**Date: 2019-12-05**

**Session: Knee Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Junior Ballroom A**

**Abstract no.: 55144**

**CLINICAL AND RADIOGRAPHIC OUTCOMES OF NOVEL HIGHLY POROUS CONE DESIGN**

Zachary POST<sup>1</sup>, Andres DUQUE<sup>1</sup>, Luis GRAU<sup>1</sup>, Fabio OROZCO<sup>1</sup>, David LE<sup>2</sup>, Sean GRIFFITHS<sup>2</sup>, Lauryn BIANCO<sup>3</sup>, Danielle PONZIO<sup>1</sup>, Alvin ONG<sup>1</sup>

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Background: Revision total knee replacements are projected to grow by 601%. A new 3D printed cone design offers biologic fixation to improve constructs stability in an efficient ream to fill system for revision arthroplasty. We sought to determine survivorship and clinical radiographic outcomes of the Stryker Tritanium cone augments for both femoral and tibial bone defects used in the setting of revision total knee arthroplasty with stemmed implants. Methods: A retrospective review of prospectively collected registry data on 61 patients who underwent revision total knee arthroplasty from 2015-2018 and were eligible for two-year follow-up. Knee Society radiographic scores were obtained at follow-up to evaluate for lucency, osseous integration, and alignment. KOOS and VR6 scores were assessed. Loosening noted on radiographs and/or reoperation for any reason were used to determine survivorship. Results: 50 cones (33 tibial and 17 femoral) were included in our study. Overall survivorship at latest follow-up was 98% with one patient requiring revision of the tibial component for septic loosening. When considering only aseptic loosening, survivorship was 100%. 12% of tibial cones and 17% of femoral cones were found to have asymptomatic lucencies. 4% of patients had cortical hypertrophy around the stem. Stable osseous integration was noted in 98% of femoral and tibial cones. Conclusion: We found that the Stryker Tritanium femoral and tibial cone augment system showed excellent survivorship and clinical and radiographic outcomes in the setting of revision total knee arthroplasty at midterm follow-up.



**Date: 2019-12-05**  
**Session: Knee Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom A**

**Abstract no.: 54500**

**COMPLICATIONS RELATED TO THE USE OF SPACERS IN REVISION KNEE ARTHROPLASTY: A SINGLE CENTRE RETROSPECTIVE STUDY**

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Prosthetic knee joint infection is a devastating complication and a two-stage procedure involving cement spacers is the gold standard for revision surgery. This study was primarily undertaken to highlight the complications encountered with the use of spacers for revision knee surgery at our centre. 65 patients underwent revision total knee replacements at our centre from September 2014 to September 2017. The type of spacer used, complications encountered and final outcome following their usage were identified. The mean age group of our study population was 64.63. The mean time interval of the spacer in-vivo was 5.62 months. 18 patients had an articulating spacer (A) while the rest had a static spacer (S) implanted. The overall complication rate was 21% with comparable rates in both articulating and static spacers. 10 patients (15.38%) continued to have persistent infection (A: 2, S: 8), 3 (4.6%) patients sustained a fracture and 1 (1.5%) patient had a cracked femoral spacer. Two patients underwent amputations, four patients died due to unrelated events before they could undergo their second stage fixation and two patients had an arthroscopic synovial biopsy to rule out infection prior to a definitive second stage fixation. Bone loss due to spacers stood at 44% in the static group while it was 20% in the articulating group. Conclusion: Both articulating and static spacers are comparable in terms of their complications. Although bone loss is much lower in the articulating group, the role of static spacers cannot be ignored as it is the implant of choice in re-revision surgeries.

**Date: 2019-12-05**  
**Session: Knee Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom A**

**Abstract no.: 54228**

**ROTATING HINGE KNEE VERSUS CONSTRAINED CONDYLAR KNEE IN REVISION TOTAL KNEE ARTHROPLASTY: A META-ANALYSIS**

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The purpose of this meta-analysis is to compare the survivorship and clinical outcomes of RHK and CCK prostheses. We evaluated pain and function scores, range of motion (ROM), complications, and survival rates in patients treated with RHK or CCK with short-term (<5 years) or midterm (5-10 years) follow-up. 12 studies (one randomised study and 11 non-randomised studies) met the inclusion criteria and were analysed in detail. The proportion of the knees in which short-term (<5 years) survival rates (RHK, 83/95; CCK, 111/148; odds ratio [OR] 0.52; P = 0.09) and midterm (5-10 years) survival rates (RHK, 104/128; CCK, 196/234; OR 1.05; P = 0.88) did not differ significantly between two prostheses. In addition, there were no significant differences in ROM (P = 0.07) and complication rates (P = 0.46). In contrast, CCK groups reported significantly better pain score (95% CI: 0.50 to 2.73; P = 0.005) and function score (95% CI: 0.01 to 2.00; P = 0.05) than RHK groups. This meta-analysis revealed that 87.4% of RHK and 75.0% of CCK prostheses survive at short-term (<5 years), while 81.3% of RHK and 83.8% of CCK prostheses survive at midterm (5-10 years). The differences in standardized mean pain and function scores we detected were likely to be imperceptible to patients and almost certainly below the minimum clinically important level, despite a significant difference in both groups. Based on the findings of the current meta-analysis, RHK prostheses continue to be an option in complex RTKA with reasonable midterm survivorship.

**Date: 2019-12-05**  
**Session: Knee Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom A**

**Abstract no.: 53299**

**THE ROLE OF PRE-OPERATIVE INFLAMMATORY MARKERS IN PREDICTING POSTOPERATIVE INFECTION IN PATIENTS UNDERGOING TOTAL KNEE ARTHROPLASTY**

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Background: CRP) and ESR are frequently used to aid the diagnosis of postoperative peri-prosthetic infections (PPIs) following TKA. The role of using these inflammatory markers preoperatively to predict the risk of postoperative PPIs in patients undergoing TKAs has not been well documented to date. Objective: To evaluate the role and cost-effectiveness of preoperative ESR and CRP in predicting postoperative PPIs in patients undergoing elective primary TKA. Design: A Prospective Study. Method: All patients who underwent primary or simultaneous bilateral TKA from 1 September 2014 to 31 December 2016 were included in the study. Patients who had uncontrolled diabetes, previous surgery or septic arthritis on the same knee, or lost for follow-up were excluded. Inflammatory markers were documented 1-2 days preoperatively. Patients were followed up over a period of 12 months postoperatively. All necessary data were collected prospectively and documented. The data were analysed using SPSS 20. Results: 139 patients were included in this study. 142 primary TKAs were performed during the study period, three patients underwent simultaneous bilateral TKA. Eighty-seven (62.59%) patients were females and 52 (37.41%) were males. The mean age was 64 years. Ninety-five (68.34%) patients had one or more preoperative comorbidities. High preoperative levels of CRP and/or ESR were found in thirty-seven (26.62%) patients. Two (1.44%) patients developed postoperative infection and were treated successfully. No other complications were recorded. Conclusion: We found no significant link between elevated preoperative inflammatory markers and the presence of PPI. Therefore, we do not support the routine use of preoperative inflammatory markers.

**Date: 2019-12-05**  
**Session: Knee Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom A**

**Abstract no.: 54279**

**EARLY RESULTS OF USING OF INDIVIDUAL TITANIUM AUGMENTS FOR REVISION KNEE ARTHROPLASTY.**

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Introduction: one of the most challenging tasks of a revision knee arthroplasty is the completion of bone defects. Picture of bone deficiency is individual in each case. We proposed the using of individual 3D printed titanium augments for completion of bone defects. Methods: we performed CT-scans of both lower limbs on the 640-slice CT scanner. After 3D reconstruction, we planned the position of the revision implant and calculated bone defects. We planned level of bone resection and created a digital model of augment. In cases of AORI F3 or T3 defects, it were cones. All surfaces for contact with host bone were porous. Augments were printed from Rematitan® powder on Concept Laser M2 Cusing printer. We used individual augments for revision knee arthroplasty since October 2017 in 14 patients (11 women and 4 men), mean age 65,3 yrs. (from 50 to 82 yrs.), mean Oxford Knee Score was 5,7 (from 1 to 20). We installed 5 individual augments on the femoral side (1 for AORI F2A, 2 for AORI F2B and 2 for AORI F3 defects) and 9 individual augments on the tibial side (4 for AORI T2A, 3 for AORI T2B and 2 for AORI T3 defects). Between augments and components, we used bone cement. Results: Planned and printed individual augments matched intraoperatively and were installed in all cases. Among these patients, there were no cases of component's loosening, periprosthetic infection or re-revision surgeries. Mean Oxford Knee Score one year after surgery was 43,5 (from 27 to 47).

**Date: 2019-12-05**  
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**Room: Junior Ballroom A**

**Abstract no.: 54140**

**CONTINUED PAIN FOLLOWING TOTAL KNEE ARTHROPLASTY:  
DIAGNOSTIC ALGORITHM AND MANAGEMENT OPTIONS**

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Despite recent advances in total knee arthroplasty (TKA) and improvements in clinical outcomes, somewhere about 20% of patients still complain of continued pain after this procedure. Origin of this persistent pain can be multifactorial and just as pain is the common presentation for many complications after TKA, pinpointing the exact cause can be challenging. The evaluation of these patients relies on a thorough understanding of the individual patient characteristics, web of differential diagnosis of painful TKA, and an adoption of a multidisciplinary holistic approach to effectively resolve their pain. This review summarizes evidence-based findings within the last decade on various causes of continued pain after TKA. Registry data on painful TKA were analysed together with literature findings to present a diagnostic algorithm and a rational guide to management of continued pain following TKA. Keywords: Total Knee Arthroplasty, Continued Pain, Diagnostic algorithm, Management

**Date: 2019-12-05**

**Session: Knee Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Junior Ballroom A**

**Abstract no.: 54975**

**OUTCOMES OF REVISION KNEE REPLACEMENT USING TOTAL STABILISING PROSTHESIS**

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Introduction: A frequently encountered difficulty in revision knee surgery is to address tibio-femoral bone loss. Aim: is to assess functional outcomes in revised TKR using Triathlon® TS TKR with augments and/or metaphyseal cones to reconstruct bony defects. Patients and methods: Retrospective study included 19 patients who underwent revision TKR using Triathlon® TS TKR with augments or metaphyseal cones. All patients were assessed regarding their age, BMI and reasons of failure. Anderson's classification was used to assess degree of bone loss. Pre and postoperative oxford knee scores (OKS) were collected for all patients. Joint line was determined measuring from superior prominence of the fibular head to the most distal aspect of the femoral component. Posterior femoral offset was also measured. Results: Nineteen patients were included in this study. Twelve were males. Average BMI was 29.7. Average time between primary and revision surgery was 4.75 years. Reason of failure was infection in 9 patients and loosening in the rest. According to Anderson's classification, 2 knees were grade IIa, 8 were grade IIb and 9 were grade III. For femoral defects, 16 patients needed augments and 4 needed metaphyseal cones, while, for tibial sided defects, 9 required cones and one needed an augment. Average 12.84mm of joint line and 31.41mm of posterior femoral offset were restored. We achieved average of 18.47 points improvement on OKS with patient average satisfaction 8.625/10. Conclusion: Total stabilising (TS) TKR using cones and or augments is a good versatile option for revision surgeries with achievable good outcomes.

**Date: 2019-12-05**  
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**Time: 16:00 - 17:30**  
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**Abstract no.: 52899**

**KNEE FLEXION DEFORMITY AFTER TOTAL KNEE ARTHROPLASTY: A SURGICAL APPROACH, INDICATION AND RESULTS**

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Purpose: A flexion deformity of the knee is the inability to fully straighten the knee, also known as flexion contracture. It may develop as a result of adhesences in the popliteal fossa after surgery like TKA. Materials and Methods: the authors describe a surgical technique in case of for failed rehabilitation in obtaining full extension and ROM after TKA. The incision is located at the medial side of the knee at the level of the distal medial femur. It reaches the posterior side of the distal femur close to the posterior aspect of the bone and advances on the distal posterior femur towards the medial condyle, the intercondylar notch and towards the lateral femoral condyle debriding and detaching the formal adhesences causing the flexion contracture. Rehabilitation with extension posture allows for FWB gait (sometimes supported by an extension brace). Results: a limited series of patients is reported with adequate results. Revision arthroplasty could be avoided in this series. Conclusions: in case of postoperative fixed flexion contracture with gait limitation and pain a posterior release of fixed adhesences through a medio posterior approach can easily obtain full extension without flexion loss.

**Date: 2019-12-05**  
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**Room: Junior Ballroom A**

**Abstract no.: 52898**

**DEBRIDEMENT, ANTIBIOTICS AND IMPLANT RETENTION; ARE THERE ANY PREDICTIVE CLINICAL MARKERS FOR IMPLANT RETENTION SUCCESS?**

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Introduction: Prosthetic joint infections result in significant patient morbidity, a recognised mortality and a substantial cost. Currently there are no validated stratification systems available which accurately predict the success of surgical debridement, antibiotic provision and implant retention (DAIR) in patients with infected total knee replacements (TKRs). We performed a retrospective review, looking specifically for any correlation between several readily available markers of infection and the subsequent success of DAIR. Materials and Methods: We retrospectively reviewed patients with microbiology confirmed infected TKRs that underwent a DAIR procedure between 2013-2018 at our institution. Patients' demographics, temperature, C-reactive protein, white cell count (at time of presentation) and the presence or absence of frank pus within the knee joint was determined using a combination of IT systems. SPSS was used to correlate each of these characteristics with the subsequent success of DAIR. Results: Twenty two patients (12 females, 10 males) with a mean age of 71.6 (54-88) and minimal follow up of 6 months. The overall success rate for DAIR in this group was 55%. CRP was significantly higher in those patients in which DAIR failed (241 vs 88,  $P=0.05$ ) and every patient which underwent a failed DAIR had pus in their joint at surgery ( $P=0.027$ ). Discussion: Our data suggests the presence of pus and a CRP of  $>200$  should steer the surgeon towards a formal revision rather than DAIR. Further work ideally in the form of a multicentre analysis is required to produce a formal tool to stratify patients with infected TKRs.



**Date: 2019-12-05**  
**Session: Knee Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom A**

**Abstract no.: 54985**

**REVISION KNEE SURGERY FOR ASEPTIC LOOSENING AND CONTINUED PAIN: IS METAL HYPERSENSITIVITY REAL?**

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Introduction: Despite 5-20 % of dissatisfaction reported in the literature, knee arthroplasty is a rewarding operation for patients suffering from arthritis who have failed non operative treatment. The mystery prevails when the implants fit anatomically and are well balanced. Metal hypersensitivity is the last investigation in line when others causes are ruled out. Material and Methods: We discuss two cases who presented at different times after standard primary knee arthroplasty with continued symptoms. A fifty-seven-year-old lady underwent a complex knee arthroplasty for post traumatic arthritis and was revised to nickel free implants after 11 months of index surgery for continued pain and skin reaction. Another sixty-six-year-old male underwent third revision surgery for aseptic loosening with implants free of nickel and zirconium, three years after the index surgery. Results: Both patients reported improvement in function and greater satisfaction at a minimum of 2 years of follow up (range 18 - 36 months). They resumed their activities of daily living by 3 months after the revision surgery (range 3-4 months). There were no immediate complications or implant related complication at the last follow up. Conclusion: Our cases demonstrate the metal hypersensitivity was the most likely cause of dissatisfaction and failure of primary arthroplasty. We discuss an algorithm to plan surgery for such patients and avoid comorbidities, multiple surgeries and reduce the cost /resources for patients and health system.

**Date: 2019-12-05**  
**Session: Knee Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom A**

**Abstract no.: 53085**

**THE DAIRV (DEBRIDEMENT, ANTIBIOTIC BEADS AND VAC DRESSING) WITH RETENTION OF IMPLANT AND IV ANTIBIOTIC FOR INFECTED TKR**

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Prosthetic joint infection (PJI) is a devastating complication in total knee (TKA) and third most common cause of revision of TKA with arthroplasty debridement and implant D significant morbidity and surgical challenges been has management, which one option in is retention (DAIR depending on many factors reported to have variable success rates are reporting our own experience in. We infection duration especially debridement and implant D with) criteria fit the patients managing PJI of 3-antibiotic beads (Tobramycin and Vanco placement of) (DAIR retention of removal debridement and for 3 weeks a mycin) and VAC drain with total of 6 weeks of IV antibiotics after 3 weeks antibiotic beads patients, the surgical and After complete of 2 years follow up. Result: functional outcomes are very good with no e/o of infection relapse and biochemically as well as acceptable mobility and pain relief. Clinically beads, and placement of antibiotic with procedure. The DAIR Conclusion be a successful can antibiotic and 6 weeks of intravenous VAC drainy eradicate infection, treatment option for PJI in TKA. It can effective resulting in improved functional outcome and a reduction in the need of may be associated with far greater surgery, which more extensive morbidity.

**Date: 2019-12-05**  
**Session: Spine Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 54835**

**SURGICAL SITE INFECTIONS IN PAEDIATRIC SPINAL SURGERY OVER A DECADE OF SERIAL AND ITERATIVE EFFORTS TO ERADICATE INFECTION: TIMING MATTERS**

David Price ROYE JR.<sup>1</sup>, Bradley HAMMOOR<sup>2</sup>, Hiroko MATSUMOTO<sup>2</sup>, Gerard MARCIANO<sup>2</sup>, Lucas DZIESINSKI<sup>2</sup>, Benjamin ROYE<sup>2</sup>, Michael VITALE<sup>2</sup>

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**Purpose:** In response to increased incidence of SSI at our institution a multi-disciplinary anti-infection effort was instituted: Comprehensive Unit Based Safety Program (CUSP) and Solutions for Patient Safety (SPS). The purpose of this study was to examine the effect these two programs had on the incidence of SSI. **Methods:** Patients aged 0-21 who had undergone instrumentation, lengthening, revision, or definitive fusion procedure were included. Procedures were divided into a pre-program implementation cohort (1/1/06 to 6/12/15), and a post-program implementation cohort, 6/13/15 to 3/31/18). The CDC definition of SSI was utilized (deep SSIs within 90 days and superficial SSIs within 30 days). **Results:** 1200 patients undergoing 2082 procedures were examined. Program implementation reduced SSI incidence in congenital scoliosis (3.6% to 1.0%), neuromuscular scoliosis (7.8% to 7.2%), and syndromic scoliosis (4.1% to 3.5%) but had no effect on idiopathic scoliosis (1.2% to 1.2%). SSI incidence was markedly reduced following instrumentation (4.7% to 2.6%) and revision (10.9% to 6.7%) procedures. However, lengthening procedures and definitive fusion procedures saw an increase from 1.8% to 2.2% and 3.2% to 3.9%, respectively. **Conclusion:** Implementation of both a qualitative and protocol driven anti-infective program reduces SSI incidence. Time-series data suggests that the impact of these programs may have a recency effect, with decreased SSI incidence immediately following program implementation but resurging when program lessons and adherence have been forgotten. This is further suggested by the re-emergence of SSI following implementation of iterative interventions in the past decade.

**Date: 2019-12-05**  
**Session: Spine Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 54143**

**DOES PREVENTIVE CARE BUNDLE HAVE AN IMPACT ON SURGICAL SITE INFECTIONS FOLLOWING SPINE SURGERY? AN ANALYSIS OF 9607 PATIENTS**

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**Introduction:** Postoperative surgical site infections (SSI) pose significant health burden. The purpose was to analyse the effect of care bundle protocol on SSI in our institution. **Material and Methods:** Retrospective analysis of 9607 consecutive patients undergoing spine procedures from 2014 to 2018 was performed. Preventive care bundle was implemented from January 2017 consisting of (a) Preoperative bundle- glycaemic control, chlorhexidine gluconate (CHG) bath, (b) Intraoperative bundle- time specified antibiotic prophylaxis, CHG+alcohol-based skin preparation (c) Postoperative bundle- 5 moments of hand hygiene, early mobilization and bundle auditing. Patients operated from January 2017 were included in post-implementation cohort and remaining formed the Pre-implementation cohort. Database were drawn from weekly and yearly spine audits, Hospital infection Committee software. Infection data was collected based on CDC criteria, further sub classification was done based on procedure, spinal disorders and spine level. Variables were analysed and level of significance set as <0.05. **Results:** A total of 7333 patients met the criteria. The overall SSI rate decreased from 3.42%(131/3829) in pre-implementation cohort to 1.22%(43/3504, p=0.000) in post-implementation cohort (RR=2.73, OR=2.79). Statistically significant reduction was seen in all the groups (a) Superficial and Deep, (b) Early and Late and (c) Instrumented and Uninstrumented groups but was more pronounced in early(p=0.000), superficial(p=0.000) and instrumented groups(p=0.000). On subgroup analysis based on spine level and spinal disorder significant reduction was seen in Lumbar (p=0.000) and Degenerative group (p=0.000). **Conclusions:** Our study revealed significant reduction of SSI secondary to strict bundle adherence and monitored compliance compared to patients who did not receive these interventions.

**Date: 2019-12-05**  
**Session: Spine Free Papers 1**  
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**Room: Junior Ballroom B**

**Abstract no.: 53311**

**THE EFFECT OF INTRADISCAL VANCOMYCIN POWDER IN THE PREVENTION OF POSTOPERATIVE DISCITIS RCT STUDY**

Reda Ali SHETA

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Post discectomy discitis, although relatively uncommon (4%), is regarded as the most disabling cause of failed back surgery. This is a prospective, randomized, comparative, multicentric study of 407 patients in which microscopic or open discectomy was planned, either due to the failure of conservative treatment or due to the presence of a neurological deficit at the time of presentation. The patients were divided randomly, by simple randomization, into two groups. Group (A) included 206 cases, while group (B) included 205 cases. In the first group, a local Vancomycin powder was inserted into the disc space after finishing discectomy, and in the second group, nothing was inserted. The follow up was done clinically after the first week, with additional follow-ups the second week, the sixth week and at a three-month visit. In the case of any clinical findings suspicious of discitis during follow up, a laboratory and MRI study were requested. There were 10 cases (4.95%) of postoperative discitis, all in the second group. The cases were four men and six women, ranging in age between 24 and 53. Three were diabetics. Seven cases were in L4-5-disc space, and three cases in L5-S1. While in the first group (the Vancomycin group), there were three cases (1.46%), one male and two females, all at the level of L4-5. We concluded that the intra-operative prophylaxis, with Vancomycin intradiscally, is effective in decreasing the incidence of postoperative discitis.

**Date: 2019-12-05**  
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**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 55034**

**STRATEGIES FOR REDUCTION OF SURGICAL SITE INFECTION (SSI) IN LOW RISK ADOLESCENT IDIOPATHIC SCOLIOSIS SURGERY. EXPERIENCE FROM TERTIARY LEVEL PAEDIATRIC CENTRE**

Sandeshkumar LAKKOL<sup>1</sup>, Athar SIDDIQUI<sup>2</sup>, Ramesh NADARAJAH<sup>2</sup>, Broomfield EDEL<sup>2</sup>, Stewart TUCKER<sup>2</sup>, Tom EMBER<sup>2</sup>, Mark HARRIS<sup>2</sup>

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Introduction Reported rate of postoperative infection in Adolescent Idiopathic Surgery (AIS) ranges from 0.9% to 3% in literature. In our institution due to a higher rate of infection (annual rate of 1-2%) we developed a comprehensive infection control guideline in in 2014. This study reports the importance of practicing strict infection prevention guidelines and reduction of SSI in low risk AIS patients. Methods: All patients had who underwent PSF for AIS at tertiary level teaching hospital from January 2015 to September 2018 were included. Prospectively collected data from surgical site infection surveillance were reviewed for detection of SSI. Minimum 90 days infection rates among PSF patients who had surgery after introduction of newer guidelines were reported. Results : A novel best practice infection prevention guideline for spinal surgery was developed using an MDT approach ; which included MRSA screening , antibiotics covering gram positive and negative, temp optimisation, adhesive antiseptic dressing, betadine soaked swabs for wound edges, betadine wash, pulse lavage, vancomycin with bone graft ,post-op antibiotic prophylaxis and minimising dressing changes. Total of 152 patients (14 males and 136 females) had PSF between January 2015 to December 2018. Average age at the time of PSF was 14.1 years. There was no SSI reported at time of final follow up (3 – 48 months) among these cohorts. Conclusion: This study results emphasises the need for development of standardised guidelines either locally or nationally to prevent development of SSI in low risk scoliosis surgery.

**Date: 2019-12-05**  
**Session: Spine Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 54036**

**OUTCOME ANALYSIS OF ANTERIOR RECONSTRUCTION WITH RIB GRAFTS IN TUBERCULOSIS OF THE THORACIC SPINE**

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Introduction: Reconstruction of anterior column is a key step in the surgical treatment of tuberculosis of thoracic spine with significant vertebral body destruction and localised kyphosis. The use of iliac crest tricortical autografts is well known for significant morbidity in the donor area. A transthoracic approach to the thoracic spine via thoracotomy allows for good reconstruction of anterior column by an easily available autograft – the rib. We describe here 52 cases of thoracic spine tuberculosis where anterior column reconstruction was done using isolated rib grafts supplemented with posterior hartschill and sublaminar wire fixation via the “versatile approach”. Methods: Between January 2004 and December 2016, 52 patients with thoracic spine tuberculosis had anterior column reconstructed with multiple rib grafts by a single surgeon. Preoperatively standing anteroposterior (AP) and lateral views of the thoracolumbar spine were obtained or supine radiographs in patients with no ambulatory power in their lower limbs and imminent paralysis. Preoperative magnetic resonance imaging (MRI) was performed for all patients. Indications for surgery in these patients were presence of neurologic deficit (49 patients) and vertebral column instability (3 patients). Repeat radiographs were performed postoperatively for assessment of anterior fusion. Computed tomography was performed postoperatively in patients in whom fusion could not be assessed on X-ray. Results: All patients underwent a minimum follow-up of 18 months and were evaluated clinico-radiologically. Good bony fusion with neurological recovery was achieved in all cases. There was one case of graft buckling and reappearance of localised kyphosis which was treated conservatively.

**Date: 2019-12-05**  
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**Room: Junior Ballroom B**

**Abstract no.: 55095**

**CLINICAL EFFICACY AND FEASIBILITY OF ONE-STAGE COMBINED POSTEROLATERAL AND ANTEROLATERAL DECOMPRESSION, FOR THORACO-LUMBAR TUBERCULOSIS USING PEDICLE SCREW INSTRUMENTATION AND GLOBAL FUSION VIA A POSTERIOR-ONLY APPROACH**

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a) Background: With an increase in drug-resistant tuberculosis cases, the incidence of spinal tuberculosis has increased. The current study was conducted with an objective to study the benefits of spinal instrumentation in active disease. Material and Methods: The study, comprised of 40 adult (>18yrs) patients with thoracic or lumbar tuberculosis, was conducted in a tertiary care institute. Patients with Neural deficit (grade III, IV) as per Tuli and Kumar classification, pan vertebral disease, kyphotic deformity greater than 30°, multiple contiguous vertebral involvement (>2 vertebra involvement) were included in the study. Past history of ATT intake, proven MDR TB patients, the presence of systemic disease, and pregnant and lactating females were excluded. All patients underwent combined posterolateral and anterolateral decompression, using pedicle screw instrumentation and global fusion via a posterior-only approach. The average follow-up was 23.5 months. Results: Mean age of patients was 42.8 yrs with the majority being males (26/40) and L1 was most common vertebra involved (13/25). Mean duration of surgery was 3 hours and 40 minutes (ranges 2 hr 50 mins – 6 hours). The average blood loss was 850 ml {range 700 – 1300 ml}. Mean kyphotic angle improved from 26° preoperatively to 6.6° in the immediate postoperative period and was 13.2° at final follow up. All the patients except one had postoperative improvement in Tuli and Kumar's grading. Conclusion: One-stage combined posterolateral and anterolateral decompression, posterior instrumentation and combined interbody and posterior fusion via a posterior-only approach is an effective and feasible treatment method for thoraco-lumbar spinal tuberculosis.



**Date: 2019-12-05**  
**Session: Spine Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 54037**

**CLASSIFICATION AND MANAGEMENT ALGORITHM FOR POST –  
OPERATIVE INFECTIONS FOLLOWING TRANSFORAMINAL LUMBAR  
INTERBODY FUSION**

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Introduction: Post-operative infections can involve different tissue zones (sub-cutaneous, sub-fascial etc). Our objective was to classify post-operative wound complications after TLIF which would help in decision-making. Methods: Among 1279 patients(1520 segments) who underwent TLIF with average 1 year follow-up, 62(4.8%) had wound complications, which were classified anatomically into 5 groups; 1.Marginal necrosis(MN) 2. Wound-dehiscence (WD) 3. Pus around implants (PS) 4. Bone-marrow oedema (BME) and 5. Pus in disc-space (PD). Management details were recorded. Results: There were 7 in group 1, 35 in group 2, 10 in group 3, 4 in group 4 and 6 in group 5. 87% patients presented in early post-operative period. In Group 1, five patients were managed with re-suturing and two managed conservatively. In Group 2, all patients had wound gaping and managed by debridement. Group 3 presented with severe back pain and fever, with demonstrable pus around screw site. Debridement with screw revision was done in one and remaining were managed by debridement with implant retention. Group 4 presented with increasing back ache and MRI showing bone marrow oedema within vertebral end plates without any collection. Debridement was performed followed by long-term antibiotics. Group 5 presented with severe back pain and fever, and demonstrable pus in disc space. Early infections were treated by cage removal and long term antibiotics while later presentations had pan - implant removal. Conclusion: The new anatomical classification of surgical site infections helps in grading severity of infection and provides appropriate treatment guidelines which would result in better infection clearance and patient outcomes.

**Date: 2019-12-05**  
**Session: Spine Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 52939**

**EVALUATION OF HEALING OF LESION IN TUBERCULOSIS (TB) SPINE BY CONTRAST MRI AND 18-FDG PET/CT SCAN**

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Introduction: The end point of treatment in TB spine is unresolved. The present study was conducted to evaluate healing of lesion in TB spine by Contrast MRI and 18-FDG PET/CT scan. METHODS: 44 TB spine patients on ATT (24 drug resistance, 15 for neurological deficit) were enrolled and evaluated haematologically and radiologically. The Contrast MRI and PET/CT was performed at 9,12,18,24 months. ATT was stopped on Contrast MRI based healing/ absence of FDG uptake on PET scan. ATT was continued in active/resolving lesion. RESULTS: 26 cases; 21 fresh and 5 drug resistance cases achieved healed status. Of the fresh lesions, 1 achieved healed status on Contrast MRI, 6 on PET/CT (no preceding MRI), 6 on both Contrast MRI and PET/CT, 6 cases were MRI active but PET/CT healed, 2 cases were MRI healed but PET/CT active. 6,5,5,4,3,3,1 cases showed healing at mean duration of 9, 12, 18, 24, 30, 36 months respectively. Of 5 with drug resistance cases, 1 showed healing on Contrast MRI and PET/CT, 3 were MRI active PET/CT healed, 1 case was MRI healed, PET/CT active. The duration of ATT was 12, 30, 36 months in 1, 1, 3 respectively. Contrast MRI showed healing lesion in 9/15 active cases (60 %) and 2/5 drug resistant cases (40%). While PET/CT in 18/20 active cases (90%) and 3/5 in drug resistance (60%). CONCLUSION: PET/CT is better imaging modality than Contrast MRI to determine the end point of healing in TB spine. It is unscientific to stop ATT by fixed time frame.

**Date: 2019-12-05**  
**Session: Spine Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 54008**

**SPINAL INFECTIONS: EXPERIENCE AT A SPINAL UNIT**

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Introduction: Infection of the spine is becoming relatively more common with variability in the clinical presentation. Although an MRI scan will confirm the location, definitive diagnosis is made by needle aspiration. Our aim was to identify common causative organisms and sensitivities for spinal infections in our spinal unit. Methods: A retrospective study was conducted looking at all the patients that presented over a 1-year period at our regional spinal centre. Location of their infection as well as their blood, tissue, pus, and urine cultures were analysed. The treatment management and choice of antibiotics were also noted. Subsequently, with the help of our microbiologist, we introduced new antimicrobial guidelines for spinal infections including first and second-line treatment and their durations. Results: A total of 18 patients were treated with an average age of 62 years (range 26-83). There were 14 males and 4 females. The average length of hospital admission was 31 days (range 7-72). There were 4 patients with infection over the cervical, 3 over thoracic and 6 over the lumbar spine. Five patients had an infection at multiple sites. Findings showed that 44% of patients were operated on (n=8). We also discovered that Staphylococcus aureus was the most cultured organism, whereas Flucloxacillin was the most used antibiotic. Conclusion: Patients with spinal infection may not grow any organism when looking at microscopic results initially; however, it is vital to await culture reports. Our antibiotic guideline may help treatment of spinal infections at your centre.

**Date: 2019-12-05**  
**Session: Spine Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 55103**

**TO EVALUATE ROLE OF IMPRINT CYTOLOGY AS AN EARLY  
DIAGNOSTIC MODALITY COMPARED TO HISTOPATHOLOGY IN  
VERTEBRAL LESIONS**

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Background: Vertebral lesions can be infective or neoplastic. They have a high chance of progression, leading to compression of cord. Thus rapid diagnosis of these lesions is important. Frozen section and fine needle aspiration cytology technique are less useful in hard bony tumours. Imprint cytology is a recent technique which has been successfully used in the diagnosis of soft tissue and bony lesions. Methods: Hospital ethics board approval was taken. 38 patients, suspected of vertebral lesions underwent transpedicular biopsy under appropriate anaesthesia with Jamshedi needle. Core tissue was taken. Minimum two imprint cytology slides were obtained. Slides were stained by May-Grunwald-Giemsa method. For histopathological evaluation, core biopsy specimen was fixed with 10% formalin and decalcified with EDTA. Paraffin-embedded blocks were prepared. Reporting was done as per standard protocol. All slides of imprint cytology were reviewed by a single cytopathologist (single-blinded) and final diagnosis was given. Results: Sensitivity of imprint cytology compared with histopathology was 68.6%. Specificity, positive and negative predictive value, overall accuracy of the imprint cytology compared with histopathology, were 100%, 100%, 21.4%, 71% respectively. Mean duration of time taken for reporting imprint cytology was 36 minutes while that for histopathological diagnosis was 15 days. Conclusion: Imprint cytology is a rapid, simple, acceptable, reliable and cost effective method for diagnosis of vertebral lesions. It correlates modestly with the ability to identify positive results and forms a good diagnostic tool in confirming cases that are actually free from the disease process. Its efficacy as a diagnostic test is very high.

**Date: 2019-12-05**  
**Session: Spine Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 55245**

**THE TREATMENT OF DURAL TEARS IN THE LITERATURE: DROWNING  
IN INFORMATION BUT THIRSTY FOR A CLEAR MESSAGE**

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Introduction: The reported treatment of dural tears in degenerative spinal surgery has varied significantly in the literature and therefore the aim was to review the reported methods and compare their outcome. Method a systemic literature search was conduct on PubMed database using specific mesh words. Articles reporting on the treatment and outcome of dural tears were selected reviewed based on specific inclusion and exclusion criteria Results: All the identified studies were level 4 evidence; retrospective case series or case control studies. The ported methods of Dural tear repair varied significantly amongst studies and many used combination of surgical techniques. The failure rate of Dural repair(regardless of the treatment) ranged from 0%- to 38.1%, given and unadjusted pooled failure rate of 7.9% (95%CI4.1 – 11.7%). The failure rate varied significantly among the surgical techniques with no clear pattern and no association to the complexity of the repair. Conclusion: The outcome of dural tears more likely to be determined by the complexity of the original tear rather than the technique employed in repairing the Dura. The significant variation in the reported treatments makes it imperative to classify these tears and standardise the treatment approach in order to facilitate future comparisons studies.

**Date: 2019-12-05**  
**Session: Spine Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 55253**

**FUNCTIONAL AND RADIOLOGICAL OUTCOME OF EARLY MOBILISATION IN UNSTABLE AO TYPE A THORACOLUMBAR FRACTURES WITHOUT NEUROLOGICAL DEFICIT**

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**INTRODUCTION:** The aim of this study was to see the functional and radiological outcome of early mobilisation with Taylor's brace in unstable AO type A thoracolumbar fractures without neurological deficit managed non-operatively. **MATERIALS AND METHODS:** The study included 20 patients. Patients were mobilized with Taylor's brace as soon as acute pain subsided (< 2 wks) and reviewed till at least 2 years with standing radiographs. **RESULTS:** The mean progression of kyphosis over 2 years duration was 7.9 degrees. The mean vertebral height loss also progressed from a mean of 51.9% at presentation to 60.4% at 2 year follow-up, a mean progression of 8.5%. At 2 year follow up, the mean ODI was 10.1% and mean VAS score was 0.7. No patient developed neurological deficit. **CONCLUSION:** Even though there is some deterioration in radiological parameters, there is constant improvement in functional parameters. For these fractures, non-operative management using brace and early mobilization promises comparable results without the cost and risk of surgery.

**Date: 2019-12-05**  
**Session: Spine Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 54919**

**MANAGEMENT PROTOCOL AND OUTCOME OF ACUTE CERVICAL DISLOCATIONS.**

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Introduction: In this study, we aim to evaluate and put forward a systematic management protocol for treating acute traumatic sub-axial cervical spine dislocation. Methodology: A retrospective study was conducted on 44 patients with traumatic sub-axial cervical dislocations between 2012-2017 for a period of 5 years. Operative intervention was done as per protocol described in this study. Closed reduction was not attempted for those showing prolapsed disc on MRI .Results: Out of 44 patients, C5-6 was the most commonly affected level with 26 patients followed by C6-7 with 14 cases. No patient deteriorated neurologically following surgery. 25 patients required anterior cervical discectomy and fusion (ACDF), 14 patients needed posterior interspinous wiring followed by ACDF. 5 patients required anterior discectomy followed by posterior wiring and then anterior plating (APA approach). 7 patients had prolapsed disc of which 2 were treated by ACDF and 5 patients needed APA approach. 20 patients had locked facets. Fusion was seen in all cases at 1year followup. Conclusion: Although different surgical approaches have been described for patients with traumatic subaxial cervical spine dislocation, how to choose a treatment strategy following an algorithm is still not very clear. The treatment algorithm described in our study gives a step by step assessment of the patient with special emphasis on pre-op radiological evaluation to rule out traumatic disc herniation; which patient to undergo attempt of closed reduction; selection of appropriate reduction approach and indication of selective stabilization and fusion for long lasting results.

**Date: 2019-12-05**  
**Session: Spine Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 54239**

**UNSTABLE HANGMAN'S FRACTURE – DO ANTERIOR SURGERIES OFFER BETTER OUTCOMES?**

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Background: Literature on surgical management of unstable hangman's fracture has conflicting results when comparing anterior versus posterior approaches. The purpose of this study was to assess the outcomes in surgically managed unstable Hangman's fractures. Methods: A single centre prospective analysis of retrospectively collected 31 patients who underwent surgery from June 2010 to January 2017. Data obtained from medical records, PACS and clinical follow ups were analysed. Results: Mean age was 45.19 + 13.35 years (M:27,F:4). There were 16 type II, 13 type IIA and 2 type III fractures (Levine-Edward's classification. 15 patients underwent C2-3 anterior cervical discectomy and fusion with anterior cervical plating using Southwick-Robinson approach and 16 had undergone posterior surgery (9 pars repair,6 C1-C3 fusion,1 Occipitocervical fusion). Minimum follow- up of 1 year. Significant decrease in mean translation (pre-op 3.65mm to post-op 1.78mm, p=0.006) and mean angulation (pre-op 9.87° to post-op 4.27°, p=0.02) was found post-operatively in anterior group, whereas in posterior group it was not significant (translation p=0.09, angulation p=0.055). Loss of reduction from post-op to final follow-up was found to more in posterior group (p=0.12) when compared to anterior group (p=0.33). Residual deformity with anterior surgery was found in one patient compared to nine patients in posterior. While both anterior and posterior group had improvements in NDI scores from pre-op to post-op and follow-up the improvement was better in anterior group(p=0.032). Conclusion: We found that while both anterior and posterior group had good functional outcomes, anterior group were marginally better.



**Date: 2019-12-05**

**Session: Spine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Junior Ballroom B**

**Abstract no.: 55223**

**FUNCTIONAL OUTCOME AND SAFETY OF EXPANSION DUROPLASTY  
IN ACUTE TRAUMATIC SPINAL CORD INJURY**

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Expansion Duroplasty(ED) effectively improves physiological parameters in Traumatic Spinal Cord Injury. Here we are presenting functional outcome and safety of ED in Acute Traumatic Spinal Cord Injury(ATSCI).This prospective case series was conducted at Orthopedic Spine Institute, Doctors Hospital&Medical Centre, Lahore from 1st Jan 2017 to 31 Dec 2017.Sample size of 10 Consecutive patients presented in our hospital with ASIA A after ATSCI recruited in the study and followed prospectively. All patients had ASIA scoring, x-ray screening, CT-SCAN and MRI. Facia lata graft was used for ED. All patients kept flat for 5days after surgery. The results were evaluated using ASIA scoring system preoperatively, in immediate post-operative period and in followup visits. Patients were followed up at 3weeks, 6 weeks, 12 weeks, 6 months and 12 months post-operatively. Mean age was 25years & Male to Female ratio was 2:1. The mean follow up was 12months.Patients with ASIA score B, C, D, E were excluded from study. All patients were operated within 36hours after presentation in hospital. There was no evidence of worsening of neurology after surgery. There were six patients with Thoracolumbar trauma while four patients had cervical spine injury. Two patients with cervical spine injury recovered and regained motor and sensory of upper limbs while other two cervical spine injuries remain unchanged. All patients with thoracolumbar trauma were independent mobilizer by the end of one year. Average operation time was 4hours for Thoracolumbar and 6hours for cervical spine. One patient had superficial wound infection while there was no deep infection, meningitis or dural leakage. So it is concluded that ED is not associated with neurological injury and effectively improves neurology. However further studies are warranted. Key words: Acute Traumatic Spinal Cord Injury (ATSCI), Expansion Duroplasty (ED)

**Date: 2019-12-05**  
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**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 53910**

**UNSTABLE THORACOLUMBAR BURST FRACTURES: SHORT SEGMENT INCLUDING FRACTURE VERTEBRAE VERSUS LONG SEGMENT FIXATION**

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Now-a-days short-segment including fracture vertebrae stabilization is one of the modalities of treatment. In order to compare short segment including fractured vertebrae with long segment fixation, we studied ninety-one patients suffered from unstable thoracolumbar burst fractures from July 2015 to July 2018. Forty-six of them were managed with short-segment including fracture vertebrae fixation and forty-five with long-segment fixation. The mean follow up period was 12 months. Pre and post-operative radiological parameters Cobb angle, kyphotic deformation and loss of Cobb angle correction were evaluated. Clinical outcome was evaluated by ASIA impairment scale and Modified Mcnab criteria. According to ASIA impairment scale 1 grade of improvement was 63% and 2 grade of improvement was 34.8% in short segment group and 60% and 40% in long segment group, respectively. In short-segment and long-segment group, 37.3.1% and 77.7% cases showed excellent to good outcomes in Modified Mcnab criteria. The mean Cobb's angle and kyphotic deformation correction at final follow up was  $22.09 \pm 3.62$  to  $12.78^\circ \pm 2.32^\circ$  and  $24.24 \pm 3.71$  to  $11.00^\circ \pm 2.03^\circ$  in short-segment and  $21.29 \pm 8.20$  to  $12.98^\circ \pm 4.69^\circ$  and  $21.96 \pm 6.03$  to  $10.76^\circ \pm 2.13^\circ$  in long-segment group, respectively. The average loss of Cobb's angle correction was  $6.02^\circ \pm 2.02^\circ$  in short segment group and  $4.69^\circ \pm 2.30^\circ$  in long-segment group. There was no statistically significant difference in above clinical and radiological outcomes between two groups ( $p > 0.05$ ). In conclusion, short segment posterior transpedicular fixation including fracture vertebrae might be as effective as long segment pedicle screw fixation for treatment of unstable thoracolumbar burst fracture.

**Date: 2019-12-05**

**Session: Spine Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Junior Ballroom B**

**Abstract no.: 54052**

**DOES FUSION MANDATORY FOR THORACOLUMBAR BURST FRACTURE TREATED WITH POSTERIOR SPINAL INSTRUMENTATION?**

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Introduction: Thoracolumbar fractures account for 90% of spinal fractures, with the burst subtype corresponding to 20% of this total. But there is always a controversy regarding the best treatment for this condition. Although spinal fusion has been a touchstone of spinal fixation, non-fusion technique has become raising its popularity recently. Some studies suggested that non-fusion had several advantages over fusion. Objectives: The aim of prospective study was to compare short segment posterior instrumentation with fusion versus short segment posterior instrumentation without fusion. Methods: For this purpose, 34 consecutive patients were assigned to two groups from July 2014 to June 2018. Group 1 included 17 patients treated by short segment instrumentation with fusion where group 2 included 17 patients treated by short segment instrumentation without fusion. Results: No statistically significant difference was identified between the two groups regarding radiological outcome, functional outcome, neurologic improvement, and implant failure rate. However, non-fusion group had less operative time & blood loss, elimination of donor site morbidity and saving more motion segments. Conclusion: Spinal fusion is not necessary or need not be a routine procedure for surgically treated thoracolumbar burst fractures

**Date: 2019-12-05**  
**Session: Spine Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 53432**

**THE IMPACT OF THE DOCTOR-HELICOPTER TRANSPORTATION AND CLOSED REDUCTION TECHNIQUE FOR IMMEDIATE REDUCTION OF CERVICAL SPINE DISLOCATION**

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**Introduction:** When a wide area is covered by a few hospitals and doctors, early time reduction of the cervical spine dislocation may be difficult only by ambulance transportation and open-surgery. This study aimed to analyse the effect of doctor-helicopter transportation for injuries that occurs far-away, and closed reduction with craniocervical traction using Halo-ring. **Methods:** Twenty-two cervical spine dislocation patients were treated at our institution between 2012 to 2018. The success rate of closed reduction, the time from injury to reduction, and the functional prognosis were analysed retrospectively. **Results:** Thirteen patients were transported by doctor-helicopter (group H), seven were by ambulance (group A), and two by themselves. The AIS grade was A in nine patients, C in three, D in five, E in three, and two were cardiopulmonary arrest. Immediate closed reduction was performed for nineteen patients. The success rate of the reduction was 94.7%, and the rate of reduction in six hours after trauma in group H was 90.0 % and 83.3% in group A. The average duration of the reduction including Halo-ring connection was 30.0 minutes, and the average traction weight were 15.6 kg. The duration and traction weight didn't correlate with the body weight and the height of the patients. All of the patients with AIS grade C and D, and three of nine with grade A improved their grade six months after injury. **Conclusion:** The doctor-helicopter transportation and craniocervical traction technique were effective to achieve immediate reduction of cervical dislocation in medical under-staffed areas.

**Date: 2019-12-05**  
**Session: Spine Free Papers 2**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 53270**

**THE IMPACT OF SURGICAL CORRECTION ON FUNCTIONAL OUTCOME IN THORACOLUMBAR BURST FRACTURES. A SYSTEMATIC REVIEW AND META-ANALYSIS**

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**Introduction:** The pedicle screw–rod construct is a popular method in posterior instrumentation and fusion to treat unstable thoracolumbar fractures. This construct can be secured percutaneously using the minimally invasive technique (MIS) or by open technique. This study aims to detect the impact of surgical correction on the outcomes. **Methods:** A systematic review and Meta-analysis was performed to pool data for the comparison of surgical correction and loss of correction. Variables of interest were Local Kyphotic Angle (LKA), Vertebral Body Height (VBH), and their correlation with functional outcome (VAS, ODI). **Results:** Of the 82 articles identified, 8 studies were eligible, with a total of 451 fractures treated surgically (209 with open surgery versus 238 with MIS). The surgical correction of vertebral body height was better in MIS group compared to conventional group [P <0.001]), whereas no difference in surgical correction of local kyphotic angle between two groups [P 0.940]). No difference in the loss of correction between two groups in vertebral body height and local kyphotic angle [P 0.407]) and [P 0.520]) respectively. The short term functional outcome and pain score was better in MIS group compared to conventional group at 3 months follow up (SDM: 1.799, 95% CI: [0.787, 2.812], [P <0.001]), whereas no difference was found in final follow up [P 0.804]). **Conclusion:** MIS is superior to open surgery in short term for surgical correction and functional outcomes. No statistically significant difference between MIS and conventional surgery in surgical loss of correction and long-term functional outcome.

**Date: 2019-12-05**  
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**Abstract no.: 53326**

**OBLIQUE LUMBAR INTERBODY FUSION COMBINED WITH MINIMALLY INVASIVE PERCUTANEOUS POSTERIOR INSTRUMENTATION FOR ADULT SPINAL DEFORMITY**

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Minimally invasive surgery (MIS) of adult spinal deformity (ASD) is a surgical method aim to minimize perioperative and postoperative complications. The authors present early experience about circumferential MIS(cMIS) which involves oblique lumbar inter body fusion (OLIF) with percutaneous pedicle screw(PPS) fixation for ASD. 53 thoracolumbar ASD cases who underwent surgical correction from lower thoracic spine were conducted. Preoperative and postoperative spinopelvic parameters were measured. Surgery was performed over 2 stages. During the first stage, OLIF was performed from L1/2 or Th12/L1 to L4/5. After 4 to 7days, the second stage surgery was performed with L5/S1 posterior lumbar interbody fusion (PLIF) and percutaneous instrumentation from lower thoracic spine to pelvis. Radiological deformity correction at 4 weeks and perioperative complications were evaluated. Scatter plots were created for comparison of pre- and postoperative sagittal spinopelvic parameters (SVA, PT, PI-LL, TPA). The patient's mean age was 75 years old (male 20, female 33). The mean operative time was 480(361-770) min, and the blood loss was 844(245-2220)ml. Significant improvement of spinopelvic parameters were found from preoperative in SVA (108 to 30.6mm), LL (17.7° to 49.8°), PT (33.8° to 19.0°), and TPA (35.8° to 15.2°). The change pre-post sagittal spinopelvic parameters (SVA, PI-LL, PT , TPA) were strongly correlated with preoperative values. As cMIS had improvement of spinopelvic parameters and none of major complications, this technique could provide a safe and effective strategy to the management of ASD even if severe sagittal imbalance.

**Date: 2019-12-05**  
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**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 54321**

**SPINOPELVIC DISSOCIATION IN PATIENTS SUFFERING INJURIES FROM AIRBORNE SPORTS**

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Background: Spinopelvic dissociation is an infrequent injury that results mainly from high energy accidents which results in an osseous dissociation of the upper central segment of the sacrum and the entire spine from the lower sacral segments. The purpose was to investigate the incidence of spinopelvic fractures in general as well as among airborne injuries. Methods: Using our electronic patient records from the emergency department database, we retrospectively investigated all sacral and pelvic fractures related to airborne sports between 2010 and 2017. All injuries were classified according to the shape (H-, T-, U- or L-type fracture) Roy-Camille, Denis, AOSpine and the Tile classification system. Results: During the period of interest, 44 patients (18.7%) were admitted with sacral fractures after accidents obtained from airborne sports, including 16 spinopelvic dissociations (36.4%). Most commonly H- (n=4), T- (n=3), U- (n=2) and L-type (n=2) fractures were observed. However, no such fracture pattern could be identified in 5 patients. The majority of these injuries were obtained from paragliding (75.0%), followed by BASE-jumping (21.4%) and parachuting (4%). The mean ISS in the spinopelvic dissociation group was significantly higher compared to other sacral fracture group (38.1 versus 20.4; p<0.001). Six-lambda-type, 4-T-type, 4 H-type and 2 U-type injuries were identified. In total, 4 patients (25%) were found to have neurological impairment. For treatment, 87.5% of patients underwent subsequent surgical stabilization. Conclusion: Airborne sports have high potential for serious, life-threatening injuries with a high incidence of spinopelvic dissociation. It is important to identify the potential injuries promptly for the further treatment.

**Date: 2019-12-06**  
**Session: Trauma Free Papers 2**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 54533**

**REGIONAL BLOOD FLOW CHANGES IN VARIOUS BODY REGIONS ASSOCIATED WITH REPERFUSION INJURY IN A STANDARDISED ANIMAL MODEL**

Sascha HALVACHIZADEH, Michel TEUBEN, Yannik KALBAS, Hans-Christoph PAPE, Roman PFEIFER

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Purpose: The specific circulatory changes on various regional blood flow situations during and after haemorrhage has not been evaluated in a standardized fashion, due to a lack of technical options. This study aims to analyse and compare alterations of the local microcirculation of various body regions known to be relevant for the development for SIRS and sepsis (intestine, extremities). Methods: In a well-established porcine multiple trauma model (standardized femoral shaft fracture, liver laceration, blunt thoracic trauma, liver laceration, and haemorrhagic shock (group PT)) local microcirculation was measured within the gastrointestinal tract and the extremity. Timepoints: Baseline, shock phase (1 hour), Resuscitation, 2, 4, and 6 hours after trauma. Parameters: local oxygenation: Oxygen 2 C device (O2C, Lea Germany), Vital parameters, blood gas analysis. Results: Following injury induction, significant changes occurred in BP, HR, lactate, as indicated in table I. Along with sustained acid-base changes during haemorrhage, there were significant alterations in regional circulation (Table I). While the changes of the upper GI-tract normalized rapidly after shock, these changes are altered in the other body regions (Colon, liver, extremities). Conclusion: The delayed improvement of microcirculation in the liver, colon, and extremities may represent a trigger for systemic hyperinflammation and subsequently SIRS and sepsis.



**Date: 2019-12-06**  
**Session: Trauma Free Papers 2**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 54536**

**A STUDY ON LIFE SAVING EMERGENCY INTERVENTIONS IN MULTIPLY INJURED PATIENTS – HOW ARE THEY DISTRIBUTED?**

Sascha HALVACHIZADEH, Kai-Oliver JENSEN, Basil HATZ, Ladislav MICA, Hans-Christoph PAPE, Kai SPRENGEL

University Hospital Zurich, Department of Trauma, Zurich (SWITZERLAND)

There still is a disagreement on whether the orthopaedic trained trauma surgeon or the general trauma should take the lead in the treatment of severely injured patients. In order to approach this topic, this study aims to summarize the most common injuries among multiple injured patients. Analysis of data base from a level 1 trauma centre. Inclusion: severely injured patients according to berlin classification and complete data set (type of emergency intervention within 24 hours, outcome parameter). Stratification of injury severity of body region according to MAIS. Outcome parameter include type of emergency intervention, pneumonia, sepsis, multiple organ failure, and mortality. Non-orthopaedic interventions were defined as interventions at the thorax, abdomen, or the head. 751 severely injured patients (mean ISS 38.4 ±12.7). 94.7% had emergency surgery. The most commonly performed intervention were: insertion of intracranial pressure monitoring device (ICP, 31.1%), laparotomy (26.4%), insertion of a chest tube (23.8%), and external fixation of fractures (23.5%). Patients who underwent non-orthopaedic interventions had significantly higher ISS ( $p < 0.0001$ ). There is strong evidence that most lifesaving interventions are non-orthopaedic. These patients had higher rates of complications (Odds ratio pneumonia: 1.5, sepsis: 1.7, in-hospital mortality 1.4). Our Data show, that the most common emergency surgeries performed within 24 hours are non-orthopaedic interventions. Those patients have higher risk of mortality or developing complications indicating the more severe injury distribution. Since lifesaving interventions of multiple injured patients include abdominal and thoracic procedures, these patients should be treated by specialized trauma surgeons with a background in general surgery.

**Date: 2019-12-06**  
**Session: Trauma Free Papers 2**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 53787**

**INFECTED DEFECTED NON UNION- CLASSIFICATION, STRATEGY TREATMENT ACCORDING SABIC (FIX AS) FOLLOW-UP 25 YEARS**

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Introduction: Treatment of bone defect in orthopaedics caused removing pathological processes (mostly tumours), then in traumatology of defect caused by primary trauma, war injuries and finally after radical debriding or complications-non union followed by infections, has always been of interest to surgeons and a challenge for methods and science in general. Methods: This work presents possibilities of compression – distraction method by Fix-AS, for solving large bone defects (up to of the bone corps) with distraction callus, and without spongious bone transplantation, with consolidation in natural ways. 1ST GROUP: fixation with shortening of extremities and achieving the length after cover the soft tissue defect. • by lengthening in the area of non union, • by lengthening after proximal or distal corticotomy. 2nd GROUP: fixation of the non union with the full length of the extremity and levelling with the nearby joint areas and treatment of the defect, either by • internal transport, • VE successfully treated 445 non-union, of which 250 infected ones, 195 with bone defect, 51 over 5 cm , which is especially emphasized in this work. This work analyses and presents infection – defect non-union, after war injuries and failed treatment by others methods. Conclusion: This way, extremity is saved even in heaviest cases, unlike other methods (bone grafting, external transport. Results: Followed by ways at solving contractures, deformations achieving full length of extremity with simultaneous infection sanitation and non-union consolidation in natural ways. For the last 25 years were flap), often ended by an amputation.

**Date: 2019-12-06**  
**Session: Trauma Free Papers 2**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 54532**

**OCAL VERSUS SYSTEMIC INFLAMMATION IN A STANDARDIZED PORCINE TRAUMA MODEL: IS THERE A DISCERNIBLE EFFECT OF THE MAGNITUDE OF INJURIES?**

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Severe injury leads to inflammatory changes known to be associated with systemic complications. Aim of this study: to analyse acute response after single versus multiple injuries associated with severe haemorrhage. Standardised pig model: haemorrhagic shock, liver laceration, femoral shaft fracture, blunt thoracic trauma. Control animals were submitted to isolated trauma. Fracture stabilization by nailing. Observation period: 6 hrs. Time points: baseline, trauma, completion of resuscitation, 2, 4 and 6 hours after nailing. The systemic inflammation was measured with ELISA. Soft tissue analysis were performed with PCR of muscle and fatty tissue harvested from the fracture site at baseline and at termination. Results: PT n= 27, group MT n= 25. PT showed a significant increase in systemic IL-10 after one hour after resuscitation until the end of observational period ( $p < 0.02$ ). Our data show significant differences in systemic IL-6 values when comparing group PT to group MT ( $p < 0.008$ ). The local circulation was decreased at the fractured site in PT compared to MT ( $p < 0.03$ ). The local increase in IL-6 and IL-10 of fatty tissue is comparable in MT and PT. The local microcirculation in the extremities differ in MT and PT ( $p < 0.05$ ) In the acute phase of inflammation after severe injury, the significance changes observed in systemic inflammation does not translate into local tissue reaction. Our data reveal that local vascularity is lower in polytraumatized animals, which might explain the lack of this response. Further studies are needed to reveal whether this is associated with a delayed reperfusion damage.

**Date: 2019-12-06**  
**Session: Trauma Free Papers 2**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 53368**

**ANALYSIS OF PREVENTABILITY OF PRECLINICAL TRAUMA DEATHS**

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Introduction: Preclinical mortality of severely injured patients is still high. This patient group is poorly described and no databases are available. After performing a systematic review of literature, we tried to understand, whether preclinical trauma death are preventable. Methods: This systematic review was performed with a main focus on publications including data on preclinical preventability. Inclusion criteria: published between 01.01.1990 and 01.10.2018 in peer-reviewed journals. Following parameters were documented: country, number of patients, preventable death rate (PP=potentially preventable and DP=definitely preventable), definition of preventability, type of trauma (blunt versus penetrating) and causes for preventability mentioned within the study. Results: In total, 19 papers met the inclusion criteria of the present literature review. Autopsies in combination with an expert panel were used in majority of studies (12/19) to assess the preventability of polytraumatised patients. A preventable death rates from 14.6 % to 47.6 % was described, whereas, 4.9 % to 11.3 % were definitely preventable and 25.8 % to 42.7% were potentially preventable. Delay of treatment (27-58%), management errors (40-60%) and treatment errors (50-76.6%) were identified as causes for preventability in studies reviewed. Conclusion: Our systematic review revealed that in high number of patients mortality could be preventable or avoidable due to improvements in preclinical treatment and strategies. Preclinical management should be re-evaluated in order to identify options to reduce mortality.

**Date: 2019-12-06**

**Session: Trauma Free Papers 2**

**Time: 08:00 - 10:00**

**Room: Auditorium**

**Abstract no.: 54368**

**RETROGRADE FEMORAL NAILS FOR EMERGENCY STABILISATION IN MULTIPLY INJURED PATIENTS WITH HAEMODYNAMIC INSTABILITY**

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Abstract Background: Closed reduction and stabilization with external fixator is the current standard of care as part of damage control orthopaedics (DCO). However, external fixators may not achieve full fracture stability and are associated with increased risks of stiffness and infection. Additionally, conversion to internal fixation is a major procedure with associated risks. We conducted a retrospective study of all patients with femoral shaft fractures with multiple injuries and hemodynamic instability who were treated with retrograde intramedullary femoral nail (RIMFN) at our institution on emergency basis as part of damage control orthopaedics to evaluate the immediate effect of RIMFN fixation technique on patient's hemodynamic status as documented by vital signs (Blood pressure and pulse) intraoperatively. Methods: Patients with multiple injuries with hemodynamic instability with femoral shaft fractures treated in tertiary referral university hospital. Closed reduction and retrograde femoral nailing without proximal locking was performed to achieve immediate skeletal and haemodynamic stability. Pulse rate and BP measurements were noted for all patients starting from the time patient would enter the operating room till the patient was shifted back to the recovery ward. Results: Statistically significant improvement in pulse rate and blood pressure was noted following femoral fracture fixation with intramedullary nail. No cases of infection or symptomatic fat or pulmonary embolism were encountered. Conclusions: RIMFN can be an effective alternative to external fixator as damage control device and is associated with immediate improvement in vital signs (Pulse and blood pressure) intra operatively.

**Date: 2019-12-06**

**Session: Trauma Free Papers 2**

**Time: 08:00 - 10:00**

**Room: Auditorium**

**Abstract no.: 53061**

**RIB FRACTURE FIXATION IMPROVES CHEST WALL FUNCTION - MAJOR TRAUMA CENTRE EXPERIENCE**

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Rib fracture fixation has shown improvement in mortality, morbidity and length of hospital stay in patients with chest wall injury. Purpose of this study was to assess outcomes and complications of rib fracture fixation in our major trauma centre from 2014 to 2018. Retrospective analysis of all rib fractures treated with open reduction and internal fixation from March 2014 to April 2018 was performed. Outcome measures included length of hospital/ intensive care stay, mechanism of injury, length of procedure, inspiratory spirometer volume (ISV), and mortality and morbidity. 158 patients (103 male, 55 female, mean 61 years) underwent rib fracture fixation. 51 patients (32.2%) suffered rib fractures due to road traffic accidents while 103 patients (67.8%) due to fall or crush injury. 99 patients (62.6%) had flail segment while 109 (68.9%) had pneumothorax. Mean procedure length was 93.5 minutes. Mean drop in Hb% was 10.24. 59 patients (37.3%) had concurrent additional procedures. Mean length of stay was 13 days, ITU stay was 8.2 days. Mean time to surgery was 2.3 days, postoperative stay was 10.7 days. Chest wall inspiratory function was measured objectively using inspiratory spirometer volume, mean 1241mL preoperatively and 2013mL postoperatively ( $p < 0.0005$ ). Chest infection was common, affecting 46 patients (29.11%). 21 patients (13.2%) died during follow up, of which 4 died within 30 days, 8 within 90 days. The study further confirms the existing evidence of improved outcome in chest wall inspiratory function and reduction in length of stay. Early fixation has shown satisfactory outcome.

**Date: 2019-12-06**  
**Session: Trauma Free Papers 2**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 52941**

**DCO CONCEPT FOR GUNSHOT INJURIES: RESULTS FOR EARLY  
CONVERSION FROM EXTERNAL TO INTERNAL FIXATION**

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Damage control orthopaedic (DCO) is a relatively new concept. The method was created and adapted from the armed forces model of temporary repairs to gain control of an unstable situation until definitive intervention could be undertaken as soon as possible. Materials and methods: It is a descriptive retrospective study of seven years from 2011 to 2017. We included open fracture limb. Exclusion criteria are: - Closed limb trauma. - mine explosion wounded. - rupture of unstable pelvic ring. Results: A retrospective study was conducted in twenty three Tunisian male soldiers of mean age 34 years old (range: 20 to 46 years) injured during combat operations. Injury mechanism was gunshot wound in all patients. All Injuries were caused by armoured projectiles 16 wounded had associated lesions of whom nine were polytrauma patients. The lower extremity was involved in 18 cases and the upper limb in 5 cases. Open fractures were classified as type IIIC (88.88%) and 11,11% type II according to Gustilo classification. Conversion to internal fixation was performed in patient with following criteria: Hemoglobin > 10g/dl; Rate of prothrombine > 50%; blood protein level > 60g/l; C - reactive protein < 3mg/l. Mean period was 9.66 days after trauma (D+4 to D+19). At the mean of 30 months follow up (5 months to 72 months) clinical outcome was satisfactory with functional autonomy and no local infection; while the radiological results showed bone healing in 17 cases; other case does not succeed in achieving proper bone healing treated by another rigid internal fixation associated with bone grafting.

**Date: 2019-12-06**

**Session: Trauma Free Papers 2**

**Time: 08:00 - 10:00**

**Room: Auditorium**

**Abstract no.: 54487**

**THE INFLUENCE OF THE NUTRITIONAL STATUS ON THE OUTCOME OF POLYTRAUMATISED PATIENTS: BMI VS FAT DISTRIBUTION**

Silja SEINEN<sup>1</sup>, Orkun ÖZKURTUL<sup>1</sup>, Jörg BÖHME<sup>2</sup>, Philipp PIEROH<sup>3</sup>, Christoph JOSTEN<sup>3</sup>, Johannes FAKLER<sup>3</sup>

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The nutritional status is a major factor in developing coronary heart disease or arterial hypertension and can be an outcome predictor in trauma patients. However, fat distribution has not yet been considered as an independent factor. The aim of our study was to investigate the influence of fat distribution compared to the BMI on the outcome of polytraumatised patients. Methods: We analysed severely injured patients retrospectively in a two year period (01/2011-12/2012). Data was collected from the patients' medical records and the data contributed to the German Trauma Registry (TraumaNetzwerk DGU®). Fat distribution was determined by segmentation of whole body-CT-scans by using the image processing software Mimics® (Materialise NV, Belgium). Results: 184 patients were included. Age was between 16 and 91 years ( $48.77 \pm 21.633$  years). Mean BMI was  $25.67 \pm 4.12$  kg/m<sup>2</sup>. The mean subcutaneous adipose area was  $200.95 \pm 106.74$  cm<sup>2</sup>, the mean visceral adipose area was  $110.32 \pm 82.04$  cm<sup>2</sup>. The mean subcutaneous adipose tissue (SAT) was  $2151.51 \pm 1330.61$  cm<sup>3</sup>, the mean visceral adipose tissue was  $1413.14 \pm 1102.82$  cm<sup>3</sup>. The BMI did not significantly correlate with mortality. SAT and total fat volume influenced the mortality significantly ( $p < 0.004$  and  $p < 0.028$ ). A protecting effect of the SAT was found (OR: 0.998, CI95%: 0.996, 0.999). Conclusion: Fat distribution can be determined easily by semi-automatic segmentation of whole-body CT-scans. In our study, fat distribution significantly correlated with the patients' outcome rather than BMI. That can be an important tool for risk stratification for trauma surgeons in polytraumatised patients.



**Date: 2019-12-06**  
**Session: Trauma Free Papers 2**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 54451**

**CLINICAL OUTCOME OF PATIENTS AFTER ON SCENE RESUSCITATION UNDERGOING TRAUMATIC CARDIAC ARREST – YES, IT IS WORTH IT.**

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Introduction: There are still controversial debates about the role of resuscitation efforts after traumatic cardiac arrest. In recent years, studies have shown that traumatic resuscitation does not necessarily have a catastrophic outcome. The aim of our study was to evaluate patients who primarily survived a traumatic cardiovascular arrest with special focus on neurological outcome. Methods: A retrospective evaluation of our institutional prospective data set of the DGU® trauma register was performed for the years 2010 to 2015. Included were polytrauma patients with an ISS $\geq$  16, an age of  $\geq$  16 years, and cardiopulmonary resuscitation efforts in the prehospital setting. A poor outcome was defined as a Glasgow Outcome Scale (GOS) of 1-3 points. Statistical evaluation was performed by univariate analysis and significance testing for subgroup analyses by t-test. Results: From 1200 patients in our database, a total of 45 (4%) patients (37 male) who met the inclusion criteria were included in our study. The mean age was 46 $\pm$ 8.5 years (range, 16 to 84), the main trauma mechanism was blunt trauma. Of 45 patients, 10 survived (22%), 8 (18%) had a good outcome and 2 (4%) a poor neurological outcome. Thirty-five patients (78%) died. The mean ISS was 42 $\pm$ 6.8. Conclusion: Based on registry data of our trauma centre, this study showed that resuscitation after traumatic cardiac arrest can result in survival and a good neurological outcome in almost every fifth patient. Hence, maximum resuscitation efforts must be considered even in case of cardiac arrest after blunt trauma.

**Date: 2019-12-06**  
**Session: Trauma Free Papers 2**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 53314**

**PREVALENCE AND INFLUENCE OF COMORBIDITIES IN POLYTRAUMA PATIENTS ON SURVIVAL RATES. EXPERIENCES OF A LEVEL 1 TRAUMA CENTRE**

Valerie WEIHS<sup>1</sup>, Viola HABERMAYER<sup>1</sup>, Michel DEDEYAN<sup>1</sup>, Nikolaus LANG<sup>1</sup>, Stephan FRENZEL<sup>1</sup>, Martin FROSSARD<sup>1</sup>, Thomas HEINZ<sup>1</sup>, Stefan HAJDU<sup>2</sup>

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Background: Red blood cell distribution width (RDW) has been shown to predict mortality in patients with multiple different medical conditions and in trauma patients. This study tested whether the underlying comorbidities and RDW levels are prognosticators in polytrauma patients. Methods: Retrospective data analysis on 173 polytraumatised patients. Age, comorbidities and red cell distribution width were analysed in relation to mortality. Results: Mean level of RDW was 13.52 mg/dl and mean Charlson Comorbidity Index (CCI) was 1.278 in all polytrauma patients. More than half of all patients had one or more comorbidity. RDW level and CCI significantly increased with age. Patients with comorbidities showed higher RDW levels. No influence of the underlying comorbidities could be detected on the survival of patients, although patients who died secondarily showed significantly higher CCI. RDW level beyond 13.75 mg/dl and age beyond 55 years of age showed a statistically significant negative influence on the secondary survival of polytrauma patients. After multivariate regression analysis age remained as independent prognosticator on the survival of polytrauma patients. Conclusion: Comorbidities in polytrauma patients seem to have no influence on the survival, at least following the results of our analysis. In contrast to that age and RDW are independent prognostic indicators for the survival of polytrauma patients. RDW might show underlying health conditions and might be used for clinical risk adjustment in polytrauma patients.

**Date: 2019-12-06**  
**Session: Trauma Free Papers 2**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 53313**

**GERIATRIC POLYTRAUMA PATIENTS. EXPERIENCES FROM A LEVEL 1 TRAUMA CENTRE**

Thomas HEINZ<sup>1</sup>, Valerie WEIHS<sup>1</sup>, Viola HABERMAYER<sup>1</sup>, Michel DEDEYAN<sup>1</sup>, Nikolaus LANG<sup>1</sup>, Stephan FRENZEL<sup>1</sup>, Stefan HAJDU<sup>2</sup>

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Background: The percentage of geriatric polytrauma patients (>65 years of age) is increasing. The aim of this study was to show clinical characteristics and potential prognosticators for geriatric polytrauma patients compared to younger ones. Methods: Retrospective data analysis on 173 polytraumatised patients. Age, trauma mechanism, injury severity and types of injury were analysed in relation to mortality. Results: About 16.2% of all polytrauma patients were geriatric patients with a mean ISS of 31 and an overall mortality rate of 39.2%. Younger polytrauma patients had significantly lower mortality rates (22.1%). Geriatric polytrauma patients met significantly more often the criteria for the polytrauma classification of the New Berlin Definition, although the mean ISS levels were nearly equivalent in both groups. The main trauma mechanism did not differ. A severe traumatic brain injury was present in about 71.4% of all geriatric patients compared to 51% in the younger group. Younger patients tend to die more often primarily, whereas 32.1% of the geriatric patients died secondarily. The main cause of death in the elderly was traumatic brain injury in 45.5% compared to 25.0% in younger ones. Geriatric patients showed significantly higher mean Charlson Comorbidity Indices. An age > 55 years of age showed independent statistically significant negative influence on the secondary survival of all patients. Conclusion: Age remains a significant risk factor and predictor of increased mortality in polytrauma patients. Geriatric polytrauma patients show significantly higher rates in severe traumatic brain injury and higher rates in pathophysiological conditions demanding early and rapid treatment.

**Date: 2019-12-06**  
**Session: Trauma Free Papers 2**  
**Time: 08:00 - 10:00**  
**Room: Auditorium**

**Abstract no.: 53172**

**A DATA BASED ASSESSMENT OF FOUR GRADING SCORES OF POLYTRAUMATISED PATIENTS**

Sascha HALVACHIZADEH, Larissa BARADARAN, Paolo CINELLI, Roman PFEIFER, Hans-Christoph PAPE

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The crucial early assessment of the clinical status leads the decision of surgical treatment strategy in multiple injured patients. None of the classification systems, ranging from expert opinion to data base development, were externally validated. In order to compare four different scoring systems (EAC, mCGS, CGS, PTGS) we used a data base from one level 1 trauma centre. Inclusion criteria: ISS eq/higher 16, complete data set to classify patients according to scoring system. Outcome: Mortality, pneumonia, sepsis, haemorrhagic shock, multiple organ failure. This study included 3668 patients with an overall mortality rate of 26.8%, pneumonia rate 19%, sepsis 14.9%, and MOF 1.9%. Our data show distinct different results in the complication rate, or mortality within all scores. The mCGS shifts patients towards more stable condition. The EAC is more predictive for death from haemorrhage but has little predictive value for pneumonia or sepsis. Here, the PTGS has the best predictive value for late complication (PLR pneumonia: 8.4, sepsis: 3.2, MOF: 16.1). Each scoring system shows a different focus on specific physiologic organ system (coagulation, haemorrhage, acid-base). Inclusion of values indicative for different physiologic organ systems (such as CGS or PTGS) leads to higher predictability of outcomes.

**Date: 2019-12-06**

**Session: Trauma Free Papers 2**

**Time: 08:00 - 10:00**

**Room: Auditorium**

**Abstract no.: 52984**

**CHANGES IN TRAUMA MANAGEMENT FOLLOWING THE IMPLEMENTATION OF THE WHOLE-BODY COMPUTED TOMOGRAPHY: A RETROSPECTIVE MULTICENTRE STUDY BASED ON THE TRAUMA REGISTRY OF THE GERMAN TRAUMA SOCIETY (TRAUMA REGISTER DGU ®)**

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Introduction: Whole-body computed tomography (WBCT) plays an increasingly important role in the diagnostic assessment of trauma room patients. It is still unclear whether its use has led to changes of trauma room procedures and patient outcomes. Methods: In a retrospective multi-centric study based on the trauma registry of the German Trauma Society (TraumaRegister DGU ®), we analysed patients with an ISS  $\geq$  9 between 2002 and 2013. Two periods of time, i.e. up to 3 years preceding (pre-WBCT) and up to 3 years following the introduction of the WBCT (WBCT-group), were assessed separately for every hospital (TR-DGU Project ID 2014-020). Results: 19,838 patients underwent treatment in 77 hospitals. Of these, 5621 were assigned to the pre-WBCT group and 11,307 to the WBCT group. Basic data did not differ relevantly. The time spent in the trauma room decreased from 77.9 min (pre-WBCT) to 63.3 min (WBCT). Following the introduction of the trauma scan, the number of diagnoses per patient increased from 4.6 to 5.1. The percentage of patients who underwent surgery immediately after the completion of trauma room procedures decreased from 44.5 to 39.1%. There was an increase in mortality from 15.7 to 15.9%. Conclusions: Routine use of WBCT is not superior to a combination of conventional radiography, ultrasound and focused CT in terms of mortality. The entire process involving the introduction of the trauma scan and the further development of algorithms has caused changes that can be observed in the trauma room setting.

**Date: 2019-12-06**  
**Session: Trauma Free Papers 3**  
**Time: 16:00 - 17:30**  
**Room: Auditorium**

**Abstract no.: 54377**

**IMPROVED TERROR PREPAREDNESS BY EDUCATION OF IN-HOSPITAL  
DECISION MAKERS WITH A TABLE - TOP - EXERCISE: THE TERROR  
AND DISASTER SURGICAL CARE (TDSC®) - COURSE**

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Introduction: The incidence of terror attacks is increasing worldwide, so that we have to estimate such scenarios at any time. Caused by the use of weapons and bombs these scenarios result in a large number of injured patients in the sense of a mass casualty incident (TerrorMASCAL). This is not only a challenge for the pre-hospital setting, but also in the immediate aftermath for the hospitals and the inner-clinical setting. For the management of these scenarios in the hospital special educated staff and especially responsible decision makers are required. Methods: The German Trauma Society developed in cooperation with the Medical Service of the German Armed Forces a new course: the Terror and Disaster Surgical Care - Course (TDSC)®. Main objective was to educate and familiarise surgeons with the special injury patterns and as well as train them for decision making and managing such scenarios. For that a special and complex table-top-exercise as one part of the course was developed. Results: Within two years and with more than 20 TDSC® - Courses it was possible to train more than 420 participants. With a detailed evaluation we could show that the familiarity to topics like resource depending surgical concepts for caring about the special injury patterns could be improved and decision making was trained in a very well manner. Conclusion: The care for patients in TerrorMASCAL situations requires a rethinking and adapted behaviour, for that we could show and want present that the new TDSC® - Course is a sufficient option.

**Date: 2019-12-06**  
**Session: Trauma Free Papers 3**  
**Time: 16:00 - 17:30**  
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**Abstract no.: 54144**

**LIPID PROFILE CHANGES IN PATIENTS WITH PLANTAR FASCIITIS: A CASE CONTROL STUDY**

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**Introduction:** Plantar heel pain is one of the most common conditions seen by the orthopaedic surgeon. Approximately 1 in 10 people will develop heel pain during their lifetime, and 1% of all visits to orthopaedic surgeons are thought to be for heel pain. An increased risk of plantar fasciitis has been associated with decreased ankle dorsiflexion. **Methods & Materials:** we recruited 39 plantar fasciitis patients and 117 healthy controls into this cross-sectional. The inclusion criteria were a history of characteristics heel pain, less than 3 month of pain duration, Age between 18 and 60 years old. Exclusion criteria were systemic rheumatologic disorders, History of trauma to the heel and radiculopathy. Cholesterol, LDL, HDL, Triglyceride (TG) and FBS and BMI were measured. Functional assessment was performed using Manchester Oxford Foot and Ankle (MOXFQ) questionnaire. **Discussion:** In a systematic review on 17 articles and 2612 patients, it has been showed that there is a correlation between higher level TG, LDL, CHOL and tendon disorders. But lipid profile changes have not studied in plantar fasciitis. In this study we showed there is significant relationship between increased level of TG and LDL and plantar fasciitis. Drugs used for hyperlipidaemia may have role in treatment of plantar fasciitis. **Results:** TG, cholesterol and LDL level were significantly higher in patients compare to healthy controls. ( $P < 0.05$ ). The relationship between gender and lipid profile were also investigated and we found no significant relation between these two variables. However, HDL and FBS were not significantly different between the two groups. **Keywords:** lipid profile, heel, triglyceride.

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**Abstract no.: 54971**

**THE OUTCOME OF PRIMARY INTRAMEDULLARY NAILING OF OPEN TIBIAL AND FEMORAL FRACTURES IN AN AUSTERE ENVIRONMENT**

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Open fractures are unique in the urgency they impart to the injury and the therapeutic challenge they pose. Non union and infection are among the major concerns. Open tibial and femoral shaft fractures are among the commonest orthopaedic urgencies. Primary IM nailing requires a skillset and knowledge of the principles of open fracture management and also a well-equipped operating room with the necessary implants and instruments. In a low resource setting, one or more of these prerequisites may not be met, and the outcome may thus be affected similarly. We performed primary IM nailing of open tibial and femoral fractures, all in sub-ideal conditions, in a simple non modular operating room, with no laminar flow. There was no image intensifier available. There were 106 fractures in 104 patients: 93 tibial and 13 femora. The mean time from injury to surgical debridement was 19.6hrs. Mean duration of antibiotics therapy was 4.3d, and the mean duration of hospital stay was 4.1d. All patients were followed up to union. Mean time to radiographic union was 6.1 months for the tibia and 5.7 months for the femur. Non union was seen in 4 tibial and 1 femoral fractures. There were 3 superficial infections but no deep infection. The outcomes were comparable to, and in some cases better than those found in existing literature. To summarise, although open long bone fractures are serious injuries, and have traditionally been met with hesitancy to nail primarily especially in austere environments, the same can be carried out with successfully, in expert hands if the principles are religiously followed.



**Date: 2019-12-06**  
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**Abstract no.: 53562**

**THE CURRENT SITUATION AND FUTURE CHALLENGES OF THE TRAUMA SYSTEM IN SRI LANKA**

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Introduction: A trauma system is a coordinated and determined attempt in a defined location that delivers the full range of care to all patients who are injured and is linked with the local public health system. The aim of the trauma system is to prevent injuries while making sure that the right patient goes to the right hospital within the shortest duration while receiving appropriate care. Current Situation: Sri Lanka lacks qualified Emergency medical physicians. An initiation of a training program was done by the Post Graduate Institute of Medicine, University of Colombo Sri Lanka. They developed a comprehensive 6-year training curriculum which started in 2012 with the advice and assistance from members of the Australasian College of Emergency Physicians. The Trauma secretariat are working on developing a Primary Trauma care program. They are also working on expanding the training programme for nurses on Mass Casualty and Trauma care. Future Challenges: The country needs a centralized communication centre with well-trained dispatchers. It is vital that public awareness campaigns for EMS access are conducted nationally with the use of mass media. It is also important to establish a nationwide paramedic profession with training and qualification in addition to training doctors in pre-hospital care. Conclusion: An introduction of a private-public partnership will definitely help as the services that cannot be provided by the government can be taken over by the private sector. Sri Lanka is a developing country hence needs financial support from the international community to make these efforts successful.

**Date: 2019-12-06**  
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**Abstract no.: 53280**

**MANAGEMENT OF GUNSHOT FRACTURES OF LONG BONES**

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Author shares his experiences with gunshot trauma which he got from missions to countries affected by the war (Libya, Syria, Ukraine, Iraq) and also from study stays in hospitals in cities with high criminal rate - Johannesburg (Soweto) in South Africa, Cuiabá in Brazil. He explains ballistic effects of different shotguns and follows the injury from the beginning with the first aid in battlefield condition, through initial treatment in emergency room in the hospital, to final revision in operation theatre and physiotherapy. Author mentions the advantages and disadvantages of using Damage Control Surgery (Orthopaedic) in comparison to Early Total Care. Author focuses how to care about soft tissue injury and what signs are crucial for the prognosis and should not be overlooked. At the final part he gives information about the biomechanics of external fixators and methods of their application in gunshot fractures.

**Date: 2019-12-06**  
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**Abstract no.: 54502**

**OUTCOME OF SIMULTANEOUS TREATMENT OF MULTIPLE SEVERELY INJURED TRAUMA PATIENTS – AN ANALYSIS OF THE GERMAN TRAUMA REGISTRY**

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**INTRODUCTION** Simultaneous treatment of multiple trauma patients exposes health care professionals to increased quantity, severity and diversity of injuries. In Western Europe these situations are becoming more frequent, however are still rare. We hypothesized that simultaneous treatment of several trauma patients is associated with worsened outcome. **METHODS** The Trauma register DGU was utilised. Patients admitted between 2002 and 2015 with an ISS>8 were included. Scenarios were divided based on the presence or absence of simultaneous admission of multiple trauma patients. Group 1 included regular admitted individuals, whereas patients admitted simultaneously were selected for group 2. We compared baseline characteristics as well as outcome between groups. **RESULTS** A total of 132,382 admissions were identified and 4,462 simultaneous admission-scenarios were included. An injury severity score (mean) of 21.2 was encountered, and ISS did not differ between groups. Thorax injuries were more frequently diagnosed in group 2 (49% vs. 45%, p<0.001) than in individually admitted patients. Furthermore, trauma bay diagnostics took slightly longer (64.7 vs. 65.9 min) in simultaneous admissions compared to individual admissions. Transfusion requirements and mortality rates did not differ between groups (12.1% in regular admissions and 10.8% in MCI-cases). **CONCLUSION** This multicentre study underlines the rarity of simultaneous admission of severely injured trauma patients. It further shows that diagnostics in simultaneously admitted trauma patients took slightly longer. However, management and outcome do not differ between simultaneous and individual admissions.

**Date: 2019-12-06**  
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**Abstract no.: 53278**

**TRIAGE IN MASS CASUALTIES INCIDENTS**

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Introduction: With increasing amount of Mass Casualty Trauma Incidents (traffic accidents, natural disasters, war injuries including terrorist attacks) in the world is convenient to find proper strategy and learn from history. Methods: Survey of Mass Casualty Incidents in history and comparing with authors own experiences from humanitarian missions with Medevac in Libya, Syria, Iraq, Ukraine, Senegal and Nepal. Results: Authors focus on crucial point in dealing with Mass Casualty Incidents - triage. Authors divide triage into first aid, prehospital, logistical, hospital and describe characteristics and importance of each one according their experiences from the humanitarian missions abroad and also from the training simulations home. Conclusions: None can prevent the Mass Casualty Incident, but we can improve our preparedness by learning from our mistakes in history and by practicing real simulations.

**Date: 2019-12-06**  
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**Abstract no.: 53272**

**VIOLENCE AGAINST HEALTH PERSONNEL AND FACILITIES IN LIBYA.**

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Introduction; Violence in Libya continues to have a devastating impact on health care in the country, with hospitals and other medical facilities bombed, shelled and looted; medical personnel targeted, attacked and even taken hostage or arbitrarily detained; and patients at times denied prompt life-saving care or attacked while getting treatment. Method; collection of data from home office, Armed groups, including those formally integrated into military and militia, have assaulted, threatened and even unlawfully deprived healthcare workers of liberty. Doctors and other hospital staff face insults, intimidation and beatings by fighters seeking preferential treatment for injured members of their armed groups and their relatives, example; Between 1 May 2017 and 1 May 2018, It has been recorded 36 attacks on medical facilities, personnel or patients, although the actual number is likely to be significantly higher. Discussion; What should we do for this problem?

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**Abstract no.: 52933**

**KERMANSHAH EARTHQUAKE: A REPORT OF MUSCULOSKELETAL INJURIES AND ORTHOPAEDIC MANAGEMENT IN TALEQANI HOSPITAL, THE TRAUMA CENTER OF KERMANSHAH, WEST IRAN**

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A 7.3-magnitude earthquake recently shook Ezgeleh district, located about 143 km from Kermanshah city (12/11/2017), in the western part of the country. Due to the severity of the earthquakes and the infrastructure of the nearby cities and villages, a large number of victims needed medical treatment. Since earthquake is one of the natural disasters, the state of unpreparedness of the health care systems against natural disasters is unusual. So the aim of this paper showing our acting about the critical situation and criticize our duty and review the same article for better acting with Unpredictable events.

**Date: 2019-12-06**  
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**Abstract no.: 53026**

**IATROGENIC MEDIAN NERVE INJURY AS A RESULT OF VENOUS CUT DOWN PROCEDURE: A RARE CASE REPORT**

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Venous cut down is an emergency procedure done to get vascular access in trauma patients when peripheral cannulation is difficult or in patients requiring chronic indwelling catheter for parenteral nutrition. It is a relatively safe and minor surgical procedure with a low rate of complications. We present a rare case of iatrogenic injury of the right median nerve which occurred during basilic vein cut down at our institution. The injury came to notice when the patient presented with complaints of paraesthesia, inability to make a fist, difficulty in writing and weakness in right hand for the past 6 weeks. Upon exploration it was noted that the median nerve was tightly tied circumferentially with a suture forming a constriction band which was released and neurolysis was done. At 4 months of follow up, patient showed complete recovery in the function of flexor digitorum superficialis and lateral half of flexor digitorum profundus and had no complaint of paraesthesia and was able to write and get back to work. With good anatomical knowledge and high caution during the procedure, such a complication could have been avoided.

**Date: 2019-12-06**  
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**Abstract no.: 54129**

**FUNCTIONAL AND RADIOLOGICAL OUTCOME OF SCHATZKER TYPE V & VI TIBIAL PLATEAU FRACTURES TREATED WITH DUAL PLATING**

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<sup>1</sup>Ganga hospital, Coimbatore, Tamil Nadu (INDIA), <sup>2</sup>Ganga Hospital, Coimbatore (INDIA)

Introduction: Treatment of bicondylar tibial plateau fractures is a challenge. Restoring the articular congruity with axial alignment and low incidence of complications is very important for good functional outcome. Materials and Methods: In a 4 year period, 96 Schatzker type V and VI tibial plateau fractures were treated with dual plating through two incisions. Mean age was 45 yrs (21 to 66 yrs) with 87 men and 9 women. The average waiting period to definitive surgery was 7 days (1 to 23 days). Sixteen patients (17 %) underwent temporary knee spanning external fixation. All fractures were operated with medial and lateral plating. Results: Outcome of 96 patients with an average follow up of 24 months was assessed with Rassmussen's anatomical and functional grading system. Excellent to good radiological outcome was achieved in 93 patients (96.8 %). Functional outcome was excellent to good in 94.6 % of our patients. Outcome was fair in 5 patients. Varus collapse was seen in 3 patients. Three patients (3.1 %) developed deep infection which is significantly low compared to other studies. A significant positive correlation was found between the functional and radiological scores. Patients who developed infection had fewer waiting days to surgery as compared to those who didn't have infection (p = 0.07). Conclusion: Dual plating helps in achieving good outcome in Schatzker Type V and VI tibial plateau fractures. Waiting adequately for definitive fixation until the swelling has subsided completely and until the skin condition has improved will reduce the rate of infection.



**Date: 2019-12-06**  
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**Abstract no.: 53354**

**CEMENT AUGMENTATION IN OSTEOPOROTIC INTERTROCHANTERIC FRACTURES – A SIMPLE YET EFFECTIVE TECHNIQUE**

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Despite reliable results of osteosynthesis for stable intertrochanteric fracture patterns, complications of inadequate bone anchorage occur frequently in elderly osteoporotic patients with comminuted intertrochanteric fracture. Notwithstanding many favourable reports in literature about use of polymethylmethacrylate (PMMA) bone cement to prevent these complications in fresh intertrochanteric fractures, the techniques described in literature are quite expensive and complicated. We present a simple technique of PMMA augmentation using a custom-made cement gun designed by the presenting author. Using this technique, a prospective study was conducted in 100 osteoporotic patients with an average age of 70 years, (range 60-94 years) and a T score < -2.5 on DEXA scan, having intertrochanteric fractures (AO type 31-A2 in 56 and 31-A3 in 44). PMMA augmentation of DHS was performed by injecting a very small amount (3-5 ml) of conventional bone cement precisely into the femoral head. All patients had bony union at an average of 13 weeks (range 12-16 weeks). There was no incidence of varus collapse or superior screw cut out despite weight bearing from early postoperative period. None of the patients had joint penetration by cement or thermal necrosis around lag screw. Most of the patients were able to regain their pre fracture mobility status with a mean hip pain score of 8.6 at the final follow up (average 21 months). Using this technique, cement augmentation appears to be an effective method of preventing osteoporosis related complications in intertrochanteric fractures without any apparent limitations.

**Date: 2019-12-06**  
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**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 55055**

**TOTAL HIP ARTHROPLASTY IN ASSOCIATION WITH DIGASTRIC TROCHANTERIC OSTEOTOMY AND PROXIMAL SHORTENING: A SOLUTION FOR OLD HIP DYSPLASIA**

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Introduction: Untreated hip dysplasia can be associated with several clinical, functional and psychosocial problems for the patients. Although the treatment of the patients with old hip dysplasia remains controversial, however, there are promising outcomes regarding THA in these patients. In the current study, the outcomes of cementless THA combined with digastric trochanteric osteotomy and proximal shortening in patients with hip dysplasia Crowe type IV were investigated. Patients and Methods: There were 102 patients investigated in the current prospective study. There were ninety two females and 10 males aged  $33.17 \pm 7.12$  years. All of the patients were evaluated clinically and radiologically with serial follow-ups. Any complication development was recorded. Results: The mean modified Harris hip score improved significantly from  $44 \pm 12.8$  preoperatively to  $80 \pm 8.3$  at the final follow-up ( $P < 0.0001$ ). At the last follow up, none of the patients complained about pain. On the x-rays, osteolytic lesion, lucencies, trochanteric non-union, and change in inclination were not found. There were 7 (6.9%) patients with intraoperative or postoperative complications included 3 sciatic nerve palsies, 2 dislocations after falling, one intra-operative femoral fracture and one intra-pelvic cup migration. Conclusions: Cementless THA using the digastric trochanteric osteotomy and proximal shortening was associated with excellent short- to midterm outcomes in patients with severe hip dysplasia. The procedure was safe and recommended for these patient population.

**Date: 2019-12-06**  
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**Abstract no.: 55220**

**LOW FRICTION ARTHROPLASTY AND DUAL MOBILITY CUP: A NEW GOLD STANDARD.**

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**Introduction** Low friction arthroplasty (LFA) introduced by Sir John Charnley was the gold standard for many years. Dislocation and infection are the first causes for early revision. Late failures are Polyethylene (PE) wear and loosening. Due to dislocation risk we slowly switched to use Dual Mobility Cups (DMC). Purposes are 1) to assess whether our changes have improved outcomes, 2) what is the new gold standard? **Material and methods** We selected on an observational registry 1091 cases of hybrid Charnley Total Hip Arthroplasty (THA). Acetabular component was either DMC in 455 cases or Fixed Cup (FC) in 636 cases. **Results** Three dislocations (0.6%) occurred in DMC group (none revised). In FC group 54 dislocated (8.49%) and 20 were recurrent and underwent revision (revision rate 3.14%). In DMC group 5 acetabular and 3 femoral revisions were performed (revision rate for loosening 1.7%). In FC group 19 cases underwent acetabular revision, 5 cases had femoral component revised (revision rate for loosening 3.7%). **Discussion** Charnley's LFA has proven over 50 years excellent survivorship. To decrease dislocation risk, one suggested to increase femoral head diameter. Gilles Bousquet proposed another way: DMC concept. Dislocation is no longer a critical issue with DMC as demonstrated in our series and main series. DMC in primary THA is still a subject of debate. Mid-term results do not demonstrate a higher rate of wear than LFA. What is the current gold standard? LFA was and is our current gold standard in association with a DMC.

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**Abstract no.: 54563**

**LONG-TERM SURVIVAL OF A CEMENTLESS STRAIGHT STEM WITH A COLLAR: A CONTINUE AND MULTICENTRIC SERIES OF 369 THA AT A MINIMUM FOLLOW-UP (FU) OF 15 YEARS**

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Introduction: the cementless stem results in THA at long term FU are excellent today, but to use a stem with collar is always discussed. The aim of these study is to show that the results at long term of a collared cementless stem are also excellent but with some advantages. Methods: We analysed a continuous and multicentre series of 351 patients (369 primary THA) with a mean age of 70 years and a minimum FU of 15 years. These patients have been operated on by 3 seniors surgeons with a collared cementless straight stem (CCSS) and a bilayer coating (titane-HA). This study has benefited of a statistic analysis. Results: 55.5% was female, 85% of osteoarthritis, 6.7% of necrosis, 3,5% of dysplasia, are the main aetiologies. 132 patients were dead (35.7%) and 42 (11.3%) lost to FU. 2 periprosthetic fractures, 2 infections and 5 neck fractures secondary to metallurgic problem was the main complications. The survival curve for failures all types was 96.9% and for revision for stem loosening 100% at 16 years FU. The mean Harris hip score at the last FU was 95 vs 41.7 preop. The radiologic study doesn't show subsidence, stress shielding and loosening. Discussion: the literature analysis shows that our results are in the same order than collarless cementless stem with a greater significant primary stability, with less fractures and always a smaller stem size. Conclusion: This CCSS provides us a very satisfactory and reliable results at more than 15 years.

**Date: 2019-12-06**  
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**Abstract no.: 52903**

**BONE REMODELLING WITH THE C-STEM POLISHED TRIPLE-TAPERED IMPLANT: A 13 TO 18-YEAR FOLLOW-UP STUDY.**

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Introduction: The C-stem polished triple-tapered implant was designed to load proximally at the calcar, reducing negative bone remodelling, maintaining bone stock and minimising loosening. Methods: Data was collected prospectively on a series of 500 consecutive C-stems (455 patients) performed between March 2000 and December 2005. A posterior approach, cemented acetabulum, canal restrictors, stem centralisers and Palacos-R cement, containing Gentamicin, were used, with a third generation cementing technique. Results: There were 282 females (62%), age at surgery averaged 69.3yrs (23-92), and follow-up of the remaining 189 implants averaged 183 months (156-225). Cement mantle was Grade A in 67%, B in 31% and D in 2%, femoral offset averaged 44mm (35-54) and subsidence averaged 1.53mm (0-4.5). Seven periprosthetic fractures and 13 dislocations occurred. 31 acetabular components loosened, 16 were revised and all were associated with rapid wear. Calcar rounding was present in 16% at 10yrs. Loss of calcar height occurred in 5% and localised lysis in 9%, both associated with rapid wear. Distal femoral cortical hypertrophy (DFCH) occurred in only 6 cases (1.2%), none associated with loosening. Seven femoral implants loosened (1.4%), three were revised. All were associated with rapid wear and calcar changes at 10 years. Summary: The C-stem performed well, with low complication and re-operation rates. DFCH occurred in 1.2% and was not associated with loosening. Aseptic femoral loosening occurred in 1.4% and negative calcar changes in 13.6%. Implant failure on the femoral and acetabular sides, and negative bone remodelling in the calcar region are related to high wear rates.

**Date: 2019-12-06**  
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**Abstract no.: 55243**

**MEDIUM-TERM OUTCOME OF LARGE HEAD CERAMIC-ON-METAL  
PRIMARY TOTAL HIP ARTHROPLASTY: A NON-COMPARATIVE  
PROSPECTIVE STUDY**

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Background: Femoral head sizes greater than 32 mm offer several advantages in physical function and activity levels of patients by improving hip stability, decreasing dislocation rate and increasing range of motion. We present the first study in English literature on use of large head ceramic-on-metal (CoM) THR. Methods: 20 patients with OA of hip were recruited and CoM THR was performed between Jan 2010 and Feb 2011. Pre-op analysis included measurement of Cobalt (Co) and Chromium (Cr) levels in whole blood, Harris hip score (HHS) and oxford hip score (OHS). Following CoM THR, patients were followed up at 3, 6,12,24,36 months and at 5, 8 years. Analysis at follow up included X-ray, and calculation of CoCr levels, HHS and OHS. Result: Average follow-up was 7.12years, Head size used ranged from 42 – 54 mm (average of 47.58 mm). Average pre-op Co and Cr levels were 0.50ppm and 4.26ppm respectively. Average post op Co and Cr levels were 1.22 and 1.32 respectively. HHS increased from an average of 51.62 to 91.64. OHS increased from an average of 23 to 44.77. None of the patients had complications following surgery. Conclusion: The Co levels rose by an average of 0.7ppm at 8 years post op, surprisingly a paradoxical drop in Cr levels was observed post-op. All patients had good-excellent hip function at 8 years based on HHS and OHS and no adverse features observed. The medium term outcomes are encouraging however further research is warranted.

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**Abstract no.: 54202**

**COMPARATIVE ANALYSIS OF SHORTENING OSTEOTOMIES TYPES  
OUTCOMES IN TOTAL HIP REPLACEMENT IN PATIENTS WITH  
CONGENITAL HIP DISLOCATION**

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Total hip replacement is effective treatment of patients with congenital hip dislocation. We analysed results of THR in 156 patients with dysplastic coxarthrosis Crowe IV who were treated between 2011 and 2016. The average age was  $40.1 \pm 4.7$  years. Gender distribution: 129 women and 27 men. Cup was placed in true acetabulum position. Shortening femoral osteotomy was performed in the subtrochanteric zone and stem was placed. All patients were divided into 3 groups depending on the type of shortening femoral osteotomy. Group 1 included 75 patients with chevron osteotomy, group 2 - 45 patients with linear osteotomy, group 3 - 36 patients with an oblique osteotomy. Results were evaluated by HHS after 3, 6 and 12 months. According to HHS, average postoperative result after 12 months was  $86,5 \pm 2,6$  in 1st group, in 2nd group -  $81,1 \pm 1,8$ , in 3rd group -  $83,2 \pm 2,2$ . Difference of lower limb post-operatively in 1st group was  $0,7 \pm 0,4$  cm, in 2nd group -  $0,8 \pm 0,3$  cm, in 3rd group -  $0,8 \pm 0,2$  cm. Full healing of femur occurred after  $2,1 \pm 0,3$  months in 1st group, in 2nd group -  $4,0 \pm 0,5$  months, in 3rd group -  $3,5 \pm 0,4$  months. In 2nd group in 2 cases and in 3rd group in 1 case there were nonunions of femur. Aseptic stem loosening occurred in 1 hip in 1st group, in 3 hips in 2nd group and in 2 hips in 3rd group. Chevron femoral osteotomy in patients with congenital hip dislocation is characterized by a high functional results and rapid healing of the osteotomy zone.

**Date: 2019-12-06**  
**Session: Hip Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 54838**

**CLINICAL AND RADIOLOGICAL OUTCOMES OF TOTAL HIP ARTHROPLASTY USING A MONOBLOCK STEM AND FEMORAL OSTEOTOMY IN CROWE TYPE-IV HIP DYSPLASIA**

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**PURPOSE:** To report the clinical and radiological outcomes of total hip arthroplasty (THA) utilizing a monoblock HA-coated stem combined with subtrochanteric femoral shortening osteotomy in patients with Crowe type-IV developmental hip dysplasia. **METHODS:** Thirty-four hips in 31 patients with Crowe type-IV developmental hip dysplasia who underwent THA using cementless monoblock fully HA-coated tapered stem combined with subtrochanteric transverse femoral shortening osteotomy were included. The clinical (Harris Hip Score) and radiological evaluations were performed pre-and post-operatively. **RESULTS:** The mean age was 35 years (range, 27-46); all females. The minimum follow-up was 2 years (range, 2-11). None of the patients was to follow-up. The average HHS increased from 42 (range, 16-77) pre-operatively to 91 (range, 65-100) at the most recent follow-up ( $p < 0.001$ ). All the stems were well-ingrown at last follow-up; no stem related complications. Early dislocation was observed in one patient (2.9 %) and was treated conservatively; one patient (2.9 %) developed a transient femoral nerve neuropraxia and one patient (2.9 %) had non-union at osteotomy site which was successfully treated with extracorporeal shock wave therapy. **CONCLUSIONS:** THA utilizing monoblock HA-coated stem and subtrochanteric transverse osteotomy provided good clinical and radiological outcomes; comparable to modular S-ROM stem. It is safe; simple and reasonable treatment option to be considered in patients with Crowe-IV developmental hip dysplasia.



**Date: 2019-12-06**  
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**Abstract no.: 53348**

**LIFETIME RISK OF RE-OPERATION FOR CERAMIC-ON-POLYETHYLENE VERSUS CERAMIC-ON-CERAMIC BEARINGS: STUDY OF 8489 PRIMARY HIPS ON A 30-YEAR FOLLOW-UP PERIOD**

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Introduction: Evaluation of the lifetime risk of re-operation (and not only implant revision) with two different bearings. Material and Methods: 8,489 ceramic heads (32 mm) implanted (age 68 years, range 18 to 85) from 1978 to 1998; 6,346 with conventional PE and 2,143 with ceramic bearing. Re-operation defined as hip procedure performed for any reason in operating room regardless of the type of anaesthesia or skin incision. We reviewed the medical records for 1019 reoperations (C/C= 150 ;7% and C/PE= 869; 14%) performed at 21 years  $\pm$  15 years, with 821 "living hips" available at the last follow-up of 30 years (range 20 to 40), the others hips followed until death or revision. Results: The cumulative risk of re-operation was 12% (95% confidence interval; 12% to 15%), using death or re-operation as a competing risk. Patients aged under 50 years at surgery had a 31% (28% to 42%) risk of re-operation with C/PE bearing and 15% (12% to 18%) risk with C/C bearing ( $p < 0.0001$ ); patients 50 to 59 years old had a 18% risk (16% to 24%) with C/PE bearing and 10% risk (6% to 12%) with C/C bearing ( $p < 0.0001$ ); patients aged 60 to 69 years whatever bearings had the same 9% risk of re-operation; and patients older than 70 years had a same 4% risk during their lifetime. Conclusions: The benefit of C/C bearing to decrease the risk of re-operation appeared real only when the patient was younger than 60 years.

**Date: 2019-12-06**  
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**Time: 08:00 - 10:00**  
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**Abstract no.: 54632**

**IMPROVED PATIENT-REPORTED OUTCOMES AFTER TOTAL HIP REPLACEMENT IN SWEDEN**

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(THR) have improved over the last decades. In Sweden, there has been a focus on early mobilization, shorter length-of-stay and improved perioperative management over the last decade. We investigated changes over time in patient-reported outcomes measures (PROMs) following THR in Sweden. Methods: Preoperative and one-year postoperative data collected through the routine follow-up program of the Swedish Hip Arthroplasty Register between 2008 and 2015 were used for the analyses. The PROMs questionnaire comprises the EQ-5D, a visual analogue scale (VAS) on hip pain, and at follow-ups a VAS addressing satisfaction with the outcome of the THR. Multiple linear and logistic regression analyses were used to investigate the impact of year of surgery. Results: There were 78,073 entries with complete pre- and one-year postoperative PROMs data during this period. There were positive trends for all PROMs. The odds for improving in EQ-5D was higher during 2014-2015 compared to 2008-2009 (OR 1.07, 95% CI 1.02-1.13). The estimated effect of years of surgery (2014-2015) was 2 units (on a 0-100 scale) for both for hip pain and satisfaction compared to 2008-2009 ( $p < 0.001$ ). Discussion: Decisions about how to best deliver health-care should be based on what adds value to the patient. Sweden's tradition of quality registers has been proposed to be an effective path to stimulate clinical improvement work, to implement best clinical practice, and to adhere to evidence-based methods. This study demonstrates a significant trend of improvement in patient-reported outcomes in Sweden.

**Date: 2019-12-06**  
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**Abstract no.: 53528**

**THE USE OF POLARSTEM HIP STEM AND R3 ACETABULAR COMPONENT FOR TOTAL HIP ARTHROPLASTY IS ASSOCIATED WITH HIGHER GAINS IN PATIENT-REPORTED OUTCOME MEASURES COMPARED TO THE CLASS AVERAGE FOR CEMENTLESS IMPLANTS**

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The combination of POLARSTEM™ hip stem and R3™ acetabular currently has the lowest revision rate of any total hip arthroplasty construct combination at 7 years within the United Kingdom's National Joint Registry 2018 Annual Report; however, patient-reported outcome measures (PROMs) associated with this combination are less well understood. Bespoke implant reports were requested for the POLARSTEM/R3 combination with OXINIUM™ heads and highly cross-linked polyethylene (XLPE) bearing. Reports used data from the National Health Service PROMs programme, which collected the Oxford Hip Score (OHS), EQ-5D and EQ-VAS. Health gain scores, calculated as differences between preoperative and six month post-operative scores, were adjusted to account for any differences in patient demographics between comparative groups. The mean OHS adjusted health gain score for the construct combination was 22.8 (95% confidence interval [CI]: 22.4 – 23.1; n=1799 patients) compared to 21.2 (95% CI: 21.2 – 21.3; n=111,055). For EQ-5D, the scores were 0.462 (95% CI: 0.451 – 0.473; n=1685) for the construct and 0.434 (95% CI: 0.433 – 0.436; n=102,448) for the class average. For EQ-VAS, the construct had adjusted scores of 14.2 (95% CI: 13.4 – 14.9; n=1605) compared to the class average of 11.4 (95% CI: 11.3 – 11.5; n=98,610). There were also more patients who rated their satisfaction as 'excellent' in the specific construct group. Comparisons were statistically significant in all cases ( $p < 0.001$ ). In conclusion, in addition to excellent mid-term survivorship, this construct combination has demonstrated superior PROMs which may improve patient outcomes.

**Date: 2019-12-06**

**Session: Hip Free Papers 3**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 55006**

**EFFECTS OF ROTATIONAL TORQUE ON THE GEOMETRY OF UNSTABLE INTER-TROCHANTERIC FRACTURE FIXATION – A COMPARATIVE STUDY ON RIGHT AND LEFT HIP FRACTURES**

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In this study we have taken special precautions to avoid spinning of femoral head during fixation in an unstable intertrochanteric fracture. Total 81 inter-trochanteric fractures (37 right, 44 left) in 77 patients (27 males, 50 females) with mean age of 83.34 years (range 58 to 100), having bilateral hip fractures in 4 patients, were treated surgically with internal fixations. Intertrochanteric fractures were classified on the anteroposterior view as per Tronzo classification. But on lateral view the fracture planes were further classified as fractures extending distally as: 1. Antero-inferior, 2. Transverse, and 3. Postero-inferior. Internal fixations devices used were Dynamic Hip Screws (79), and Trochanteric nails (2). During surgery the spinning of femoral head was prevented by re-twisting in reverse, and were stabilised using additional guide wires, bone clamps, circlage wires and screws. Intraoperative and postoperative radiographs were assessed to check presence of any residual malrotations by 3 independent observers. Out of 44 left sided fractures 10 patients (22.7%) were rotationally unstable and prevention of malrotation was achieved in 7 patient (15.9%), but finally loss of reduction was seen in 3 hips (6.8%), compared to none on the 37 right sided fractures with spontaneous correction in 3 patients. We conclude that corrective measures should be taken to prevent the abnormal rotation of the left hips fractures especially in antero-inferior fracture geometry on lateral view.

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**Session: Paediatrics Free Papers 2**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54852**

**RESULTS OF A STANDARD VERSUS ACCELERATED PONSETI  
PROTOCOL IN CLUBFOOT: A PROSPECTIVE RANDOMISED STUDY**

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The aim of conducting this study was to compare the results of a standard once-weekly Ponseti casting technique to an accelerated twice-weekly regime in our population cohort. A prospective randomized controlled study was conducted with a total of 100 consecutive patients (158 feet) being enrolled for the study. 50 patients were randomized to each group and were followed up for at least 1 year. Initial mean Pirani score was 4.67 and 4.35 in standard and accelerated group respectively and it decreased to 0.34 and 0.35 after treatment. Initial mean Dimeglio score was 11.75 and 10.51 in standard and accelerated group respectively and decreased to 0.79 in both the groups after treatment. An average no of 6.32 and 6.18 casts were required to correct all the deformities in standard and accelerated group. Average time spent in cast was 58.52 days and 39.38 days for standard and accelerated group respectively ( $p < 0.001$ ). Percutaneous Achilles tendon tenotomy was done in 86.42% and 84.41% of cases in standard and accelerated group. Final results were assessed using modified functional rating scoring system. 55.55% clubfeet had excellent results and 44.45% had good results among standard group, whereas 66.23% clubfeet had excellent results and 33.77% had good results among accelerated group. None amongst the two groups had fair or poor results. These results suggest that the accelerated Ponseti technique significantly reduces the correction time without affecting the final results and that it is as safe and effective as the traditional Ponseti technique.

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**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 55001**

**IS A ONE-DAY TRAINING COURSE USEFUL IN MAKING SKILFUL PONSETI PROVIDERS? A RETROSPECTIVE STUDY**

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Background: In many parts of the world, a one-day training program is organised to train physicians in the Ponseti method of clubfoot treatment. Our objective was to evaluate the effectiveness of such training course. Methods: We have retrospectively evaluated the outcome of the Ponseti method of clubfoot treatment provided by resident doctors of our institute. Out of 84 registered patients with a minimum follow-up of one and half year, 65 patients (95 feet) were available for evaluation and were included in the study. We have compared the results of 42 patients (62 feet) treated by resident doctors trained in a one-day Ponseti training course with that of 22 patients (33 feet) treated by resident doctors who didn't have any certified training. Results: Both the groups were similar in terms of their demographic properties, prognostic determinants and outcome, i.e. rate of successful treatment, which was 34% in the trained group and 39% in the untrained group (p-value- 0.40). The mean duration of cast phase in the trained group was 12 weeks and in the untrained group was 9.4 weeks (p-value- 0.64). Percutaneous tendo-Achilles tenotomy was performed in 74% feet of the trained group and 51.5% feet of the untrained group (p-value- 0.04). Conclusion: There was no significant improvement in the quality of treatment provided by trained resident doctors, except for the rate of tenotomy. Such training program must be improved so that the participants acquire the skill to achieve deformity correction in shortest possible time with a minimum rate of relapse.

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**Abstract no.: 53783**

**NEW HISTOLOGICAL FINDINGS IN CLUBFOOT DEFORMITY TISSUE – INCREASE IN THE LEVEL OF VASCULARITY AND NEWLY DETECTED PROANGIOGENIC PATHWAYS IN THE CONTRACTED SIDE OF THE CLUBFOOT**

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Introduction: Clubfoot deformity belongs to a group of fibro-proliferative disorders. The aetiology of this fibroproliferation remains undiscovered. Our study focuses on a histological and immunohistochemical comparison of contracted vs. non-contracted clubfoot tissue vascularity and its regulatory mechanisms. Methods: Applying immunohistochemistry, light microscopy and an image analyser, we compared vascular density, concentration of vascular endothelial growth factor (VEGF) as well as vascular endothelial growth factor receptor 2 (VEGFR 2) between contracted clubfoot tissue, i.e. the medial side of the foot (M-side), with non-contracted clubfoot tissue, i.e. the lateral side of the foot (L-side). Samples from ten patients were analysed (n=10 for M-side, n=10 for L-side). Results: We observed a significant increase in the microvessel and arteriole density in M-side of the clubfoot tissue, which was accompanied by a significantly higher concentration of VEGF and VEGFR 2 in the contracted clubfoot tissue. Conclusions: Fibroproliferation in the M-side side of clubfoot, is acquired by means of a higher microvessel and arteriole density. These processes are intermediated by specific proangiogenic pathways which we were able to detect. These findings may ultimately contribute to the clarification of the aetiology and subsequently the development of the disease as such, and thereby further develop the therapeutic strategies for clubfoot deformity. The study was supported by the Ministry of Health of the Czech Republic, Department Program for Research and Development (n. 17-31564A) and the KZCR, a.s., IGP KZ (n.217116002).

**Date: 2019-12-06**

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**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54317**

**CAN WE PREDICT WHICH CLUBFOOT PATIENTS ARE AT RISK OF RELAPSE?**

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**Purposes:** The Ponseti method is widely reported as being effective in achieving initial correction for most isolated clubfeet. However, recurrence of clubfoot deformity is a major challenge and results in repeat casting and the potential need for additional surgeries. The purposes of this study were to identify factors related to any surgical interventions after correction of the ICF by the Ponseti method. **Methods:** During the 2002-2014, 1006 consecutive infants (age;  $26.5 \pm 25.9$  (range; 4-181)) days, male; 805 (80%)) with Dimeglio 3-4 isolated clubfoot were reviewed. All infants completed the casting followed by percutaneous tendoachilles tenotomy (pTAL) and 4-year foot abduction brace (FAB) period. Patient demographics, recurrence and type of surgical interventions were recorded. Factors that might relate to risk of surgery after recurrence were evaluated by a univariate logistic regression analysis. **Results:** At an average  $8.9 \pm 2.8$  (range; 4.0-15.9) years follow-up, 50 children (5%) had recurrence and required additional treatment consisting of serial casting in all 50 followed by a repeat percutaneous tendoachilles tenotomy alone in 39 children and an anterior tibial tendon transfer (ATTT) combined with a percutaneous tendoachilles tenotomy in 11 children. The univariate analysis could not identify any factors related to risk of surgery after recurrences. **Conclusion:** Surgical interventions to address recurrences are needed in one third of the ICF patients with comparable deformity who adhere to the Ponseti protocol. Factors related to additional surgeries could not be elucidated, thus the physician needs to adhere to the Ponseti protocol to avert a probable relapse and curtail odds of surgical interventions.



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**Abstract no.: 53011**

**LONGITUDINAL OVERGROWTH OF THE FEMUR STIMULATED BY A SHORT-LEG AMBULATION IN CHILDREN**

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Stimulation of accelerated growth of the ipsilateral femur has been noticed in walking children with leg length discrepancy due to different aetiologies. The cases of 26 children were reviewed. All have leg length discrepancy (LLD) either due to congenital deficiency or lesions acquired in early childhood. All of them were ambulatory and shoe lift to compensate for LLD was not used regularly. Their ages ranged from five to fourteen years. There were 19 males and seven female children. The leg shortening resulted from: Chronic Haematogenous Osteomyelitis of the tibia in infancy (7 cases), Congenital Pseudarthrosis of the Tibia (6 cases), Tibial hemimelia (2 cases), Post-traumatic physal growth arrest (1 case) and fibular hemimelia (10 cases). Long leg radiographs and scanograms were studied for measurement of: length of both femora and tibiae, femoral neck-shaft angle, total limb length and LLD. Results: Femoral overgrowth ranged from 3-6 cm. Increased femoral neck-shaft angle contributed to the increased femoral length. Femoral overgrowth in congenital conditions has corrected up to 6 cm of LLD. In acquired conditions, the younger the child when tibial shortening occurred resulted in more femoral overgrowth. Discussion: The development of the adult value of the femoral neck-shaft angle is due to axial loading during walking. This indicates that the shorter limb is subjected to much less axial stresses than the normal side and contributed to the development of coax valga. Clinical significance: in children who have LLD, femoral overgrowth could be profound and should be considered when planning limb lengthening.

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**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 53435**

**HISTORICAL AND UP TO DATE STIMULATION OF THE DISTRACTION OSTEOGENESIS. RESEARCH AND PRACTICE IN ILIZAROV CENTER (KURGAN)**

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From mid-50s of XX century, the problem of regenerate stimulation was the mainstream for Prof. Gavriil Ilizarov and his team. Experimental section and practical application of different stimulation techniques were developed. Success of Ilizarov method was associated with discovery of practical skills of regeneration control. Purpose. To understand what experimental studies of distraction osteogenesis stimulation were applied to the clinical use. Materials and methods. We analysed 50 years of Ilizarov Center data in search of optimal approaches to regenerate stimulation. Historical stages of approaches were systematized. We determined "Failed" approaches (for example distraction epiphyseolysis) and success approaches that were applied in practice. We realized that the problem of stimulation can't be discussed without the assessment of regenerate quality. Conclusion. Analysis of Center's experience in stimulation of regenerate can give information about potential possibilities of surgeons in this area of orthopaedics, and save from wrong directions, which is more important. The main directions are callus quality assessment, osteotomy technique, distraction rate, distraction-compression techniques and combination of external and internal hardware. Ilizarov Center's experience shows that suggested methods of regenerate stimulation may conflict with comfort and safety of the patients, which we should consider while developing new strategies of stimulation techniques.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 2**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54406**

**INTRAMEDULLARY MAGNETIC NAILS FOR LIMB LENGTHENING: OUR EXPERIENCE**

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Introduction: Lengthening of the limbs is currently an accepted practice in orthopaedic surgery. The most recent implants allow an external remote controller. The first results demonstrated an excellent functional outcome with few associated complications. This work aims to describe our experience with this technique. Material and methods: A retrospective study of the clinical cases with the Precice implant option was carried out: patients, n = 18; nails, n = 21 (femur, n = 18, tibia, n = 3). After implantation of the nail, still in the operative block, a first elongation (1 mm) was made. Subsequently, at 7 days after surgery, they restarted the elongation at the mean of 1 mm / day. Bone consolidation became visible between the 4th and 6th postoperative month. Discussion: The use of the Precice nail allows a lower occurrence of complications, shorter time to bone consolidation, greater acuity in elongation control, and greater patient compliance when compared to competing techniques. The complication rate is low. However, although its cost is high, it is cost-effective when compared to the external fixation elongation. Conclusion: Our experience with this lengthening technique, although short, is in agreement with that available in the literature. Due to its cost-effectiveness and promising results, the use of this technique is now recommended in the recent literature as the implant of choice for femoral and tibial lengthening.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 2**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54984**

**SURGICAL BIOMECHANICS IN CEREBRAL PALSY – ROLE OF LEVER ARM DYSFUNCTION**

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Lever arm dysfunction (LAD) is the disruption in the moment generation of a muscle joint complex because of an ineffective lever or moment arm despite normal muscle force. The types of LAD in Cerebral Palsy (CP) are short lever-arm (coxa valga), flexible lever-arm (pes valgus), malrotated lever-arm (external tibial torsion), an abnormal pivot or action point (hip subluxation or dislocation), and positional LAD (crouch gait). The consequence of LAD is functional weakness and decreased power generation, due to abnormal direction of pull of muscles. The aim of the study to evaluate the functional outcome of single event multiple lever arm restoration and anti-spasticity surgery (SEMLARASS) and rehabilitation in 486 persons with CP (aged 3-34 years, 56% females). The pre-operative Gross Motor Functional Classification System (GMFCS) levels were I (4%), II (18%), III (20%), IV (34%) and V (24%). The surgical procedures included Intramuscular Release, Controlled Tendon Lengthening, Release of deep fascia, myofascia and inter-tendinous fascia, and restoration of LAD using osteotomies and external fixators, followed by protocol based, sequenced interdisciplinary rehabilitation for an average of 6 months. Functional Mobility Scale (FMS), Gross Motor Function Measure (GMFM), Manual Ability Classification System (MACS), Paediatric Quality of Life (PQOL) were measured before and after the treatment. The results at a follow up of 2 years showed a significant functional improvement. Median values of GMFCS before surgery and after rehabilitation were 4 and 2 respectively. Significant ( $p < 0.05$ ) improvement was noted in all the domains of GMFM, FMS, PQOL and MACS.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 2**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54844**

**DEPRESSION IN PAEDIATRIC PATIENTS WITH CEREBRAL PALSY:  
EVALUATING THE VALIDITY OF A PROMIS DEPRESSION SYMPTOMS  
DOMAIN AND AT-RISK PATIENT IDENTIFICATION**

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Introduction: The American Psychiatric Association recommends the Patient Reported Outcomes Measurement System (PROMIS) as a tool for clinical decision-making. The study purpose is to validate depression domains in the PROMIS questionnaire for cerebral palsy (CP) patients and investigate associations between patient characteristics and self-reported depression to identify those experiencing depression. Methods: In this retrospective cohort study, patients treated at a single academic institution from 2013-2018 were administered PROMIS sub-domains including Depression (Adult) and Depressive Symptoms (Pediatric). Convergent and discriminant validity were determined across the PROMIS depression domains and other physical, mental and social health domains. Known group validity and associations between patient characteristics and depression were investigated using demographics and GMFCS level. Results: 70 adults (32+12y,59%F) and 40 children (13.1+2.9y,27%F) were included. Patients with greater physical function exhibited lower depression domain scores (convergent validity) in both populations. Adults with higher social satisfaction and perceived ability to participate in social roles experienced less depression (convergent validity). No difference was observed in depression scores between GMFCS I-III and GMFCS IV-V in either population. No association between age or gender and depression scores was observed in both groups. Conclusion: The PROMIS depression domains have adequate validity demonstrating potential to serve as a patient reported outcome tool assessing depression in patients with CP. Possible risk factors of depression in patients were identified. Patient perception of low mobility/function, low social satisfaction and impaired ability to participate in social roles are associated with higher depression scores despite actual motor function skills measured by the GMFCS.

**Date: 2019-12-06**

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**Abstract no.: 52822**

**ANTERIOR KNEE PAIN IN ADULTS WITH CEREBRAL PALSY: A MIRACULOUS TREATMENT?**

Joshua HYMAN, Ahmad BAYOMY, Hung CHUN WAI, Thejas HIREMATH, Danielle ANNIS, Fay CALLEJO, Megan CAMPBELL, Nicole BAINTON, Hiroko MATSUMOTO, Lauren REDLER, Charles POPKIN, David ROYE  
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Introduction: Spastic cerebral palsy (CP) can result in anterior knee pain due to patella maltracking and instability. Patellar realignment surgery is a potential option to treat knee pain and disability in this population. Our purpose is to present a preliminary assessment of patellar realignment surgery in adults with CP and anterior knee pain. We hypothesize that surgery is associated with favourable pain relief and functional outcomes. Methods: This is a consecutive case series of adults with CP who underwent patellar realignment surgery due to anterior knee pain with patella alta and/or patellar instability. Data including Gross Motor Function Classification System (GMFCS) were recorded, and patellofemoral morphology was evaluated through radiographs and MRI. Patient-Reported Outcomes Measurement Information System (PROMIS) questionnaires were administered post-operatively. Pain scores were referenced to 66 adults from a CP registry organized by sex- and aged-matched groups. Results: Six patients met inclusion criteria ( $32.0 \pm 9.7$ y, 50%M/50%F), and 4 patients completed post-operative questionnaires. Mean follow-up was  $11.4 \pm 3.1$  months, and mean time to PROMIS completion was  $20.4 \pm 6.0$  months. Two patients had improved GMFCS levels post-operatively compared to prior to surgery. Two complications arose requiring re-operation. Postoperatively, all pain scores were lower than normative reference values except for two scores. Conclusion: Patellar realignment surgery in adults with CP resulted in stable or improved GMFCS and postoperative pain scores that were better than normative scores of age-matched peers with CP. The novel application of this surgery in the CP population should be established as a standard of care.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 2**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54467**

**MINIMAL INVASIVE TREATMENT TO PREVENT SPASTIC HIP DISLOCATION**

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Hip displacement is one of the main problems in children with cerebral palsy behind equines feet. Without treatment, we see a progression of about 7% per year (Terjesen et al., 2006). Main cause beside delayed verticalisation is pathologic muscle drawing of hip surrounding muscles (Flynn et al., 2002; Cornell et al., 1995; Doll et al., 2006). Mostly concerned are children with a restricted possibility of walking and standing self-contained, which is graded with the gross motor function classification system. It is common to stabilize muscle imbalance with soft tissue balancing in young age. Here we prefer percutaneous myofasciotomy to lengthen short muscle fascia. The iliopsoas muscle must be lengthened with mini-open access. In 99 hips observed for in mean 4,2 years in children with GMFCS 3-5 under 6 years, we found an improvement of hip displacement in 33%, a worsening in 5% and a stabilization in 62%. As muscle lengthening is not sufficient enough in risky hips in older patients, we use additional guided growth of the femoral head as a minimally invasive method to prohibit further hip displacement. Therefore two studies could show a positive effect (Lee et al., 2016; Portinaro et al., 2016). In our patients, we found in 16 hips an improvement of migration index of 5% and an improvement of femoral neck angle of 9° within 16 months mean follow up. Further studies must show the efficiency of this method.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 2**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54466**

**MINIMAL CORRELATION BETWEEN PEDIATRIC OUTCOMES DATA COLLECTION INSTRUMENT (PODCI) AND THE SHRINERS HOSPITAL UPPER EXTREMITY EVALUATION (SHUEE) SCORES IN CHILDREN WITH HEMIPLEGIC CEREBRAL PALSY**

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Introduction: This study aims to compare position and function sub-scores within the SHUEE and to compare SHUEE with PODCI scores in children with CP. We hypothesised that there is a positive correlation within SHUEE sub-scores and between SHUEE and PODCI UE scores. Methods: We retrospectively analysed 31 encounters with administration of both PODCI and SHUEE for 13 children with hemiplegic CP in a motion analysis laboratory between 2010-2017. Mean age was 12.4 +/- 3.9 yrs (range 6.6-19.6), with 6 male/7 female. For each visit, we compared dynamic positional analysis (DPA) and spontaneous functional assessment (SFA) scores within the SHUEE and correlated SHUEE subset scores (DPA and SFA) with each patient's PODCI Upper Extremity Function score (PODCI-UE). Results: Mean absolute SFA score was 19.9 +/- 8.9 (total possible= 45), range 2-43. Mean absolute DPA score was 40.0 +/- 11.6 (total possible = 72), range 18-60. Mean standardized PODCI-UE score (0-100 scale) was 70 +/- 12, range 38-92. There was moderate correlation between standardized (0-100%) SHUEE DPA and SFA scores for each visit,  $r=0.46$ . There was very weak correlation between PODCI-UE and SHUEE DPA,  $r=0.22$ , and essentially no correlation between PODCI-UE and SHUEE SFA,  $r=0.04$ . Summary: We find there is moderate intra-patient correlation between upper extremity position and function in children with CP as measured by the SHUEE, but there is little to no correlation between SHUEE and PODCI-UE scores. We conclude these instruments may be testing quite different aspects of upper limb function in patients with hemiplegic CP.



**Date: 2019-12-06**

**Session: Paediatrics Free Papers 3**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54336**

**ORTHOPAEDIC PRESENTATION OF CHILDREN WITH NON-ACCIDENTAL INJURIES**

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Background: The presentation of non-accidental injuries (NAI) in paediatric population can be subtle and varied. The diagnosis can easily be missed if the health-care professionals do not have a high degree of suspicion. The purpose of this retrospective review was to describe the orthopaedic manifestations of NAI in paediatric age group. Objectives: A descriptive assessment of NAI in children presenting to a busy district general hospital in the United Kingdom. Study Design & Methods: Retrospective review of records of 78 children who were investigated for suspected NAI between January 2015 & September 2018. Results: The process of investigation of 78 children for suspected NAI identified 28 children with proven non-accidental injury. 10 of these children were previously known to social services. The most common injury was isolated bruising which was seen in 11 children. Rib and femur fractures were seen in 5 children each. Conclusion: We identified a spectrum of injuries in our case series ranging from bruising to multiple fractures. This highlights the need to maintain a high degree of suspicion. Missed or delayed diagnoses may lead to significant morbidity and in some cases death. It is important to highlight the spectrum of these injuries, thus facilitating early diagnosis and care of these children.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 3**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 53113**

**RADIOGRAPHIC IMPROVEMENT AFTER SUBTALAR ARTHROEREISIS:  
THE FIRST STUDY WITH A CONTROL GROUP AND WITHOUT THE  
EFFECT OF SOFT-TISSUE PROCEDURE**

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Introduction: Subtalar arthroereisis is a common procedure for the treatment of paediatric flexible flatfoot. However, the isolated effect of soft tissue procedures cannot be easily evaluated as they are usually combined with arthroereisis. We hypothesized that device extrusion stood same status as patient has not been undergone subtalar arthroereisis, and conducted a retrospective study to determine the isolated effect of arthroereisis. Methods: We reviewed data of children with bilateral flexible flatfoot who underwent bilateral subtalar arthroereisis with bilateral Vulpius procedure between 2010-2017. We defined implant extrusion when the tip of the implant was found lateral to the middle third of talus on the weightbearing AP view of the foot. We included 118 feet of 59 patients with the implant in situ (arthroereisis group) and 86 feet of 43 patients with the implant in extrusion (control group). Two independent surgeons measured the talonavicular angle of 20 feet randomly to test interobserver correlation, interobserver coefficient values to examine interobserver reliability. We compared the radiographic parameters taken during outpatient department by using Kolmogorov-Smirnov test to examine the normality of variable distribution, independent t test and Mann-Whitney U test to compare the data according to normality. Medcalc® v17.9.7 was used for statistical analyses and  $p < 0.05$  was defined as significant. Results: Radiographic data revealed better calcaneal pitch, talonavicular angle and Meary angle in the arthroereisis than in control group (all  $p < 0.05$ ). Extra-osseous subtalar arthroereisis can improve radiographic alignment in paediatric flexible flatfoot even without the effect of soft tissue procedures.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 3**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 53093**

**KNEE AND FOOT CONTRACTURE AFTER LIMB LENGTHENING IN CHILDREN**

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Introduction: Limb lengthening and deformity correction in children has obstacles and complications during treatment like axial deviations , knee flexion contracture, drop foot and deformity in addition to congenital and acquired mal alignment , this need special method and strategy for treatment; for this reason a special hinge distraction system of external fixation was developed for combined lengthening and correction of axial deviations and a special adapted hinges added for treatment of knee and foot contractures and deformities. Methods: the External Fixation Hinge System /Salamehfix 1, SLDF 1/; has international patent; is an arch hinged external system, with a various diameters and perimeters, to assemble the shape of extremity with connecting special hinges to correct axial and rotational deviations, stability and tolerance is high. Added hinges for gradual correction of knee and foot deformity and contracture is a simple functional arc system. Results: Since 1995 to 2018 this new system was used in 548 patients with different indications in the lower and upper limbs they presented with limb length discrepancies, axial deviation and combined deformities, results were 312 excellent, 164 good, 84 fair and 6 poor. Complications where mostly superficial pin infections, breakage of wires in 5 cases, no nerve or vascular injuries. Conclusion: Knee and foot flexion contraction after lengthening is frequently cases of Hemimilia of fibula or tibia or just congenital shortness of lower extremity and modified hinge system is more comfortable to child allows weight bearing and in small size in addition to full correction of knee or foot contracure.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 3**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 53127**

**EPIDEMIOLOGY OF CONCOMITANT INJURIES IN SKELETALLY IMMATURE PATIENTS WITH PELVIC INJURIES**

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Background: Pelvic fractures in children are rare injuries with high morbidity and mortality rate. High energy trauma is the mechanism of these injuries. Methodology: This prospective, cross-sectional study was done for a duration of 02 years from 14th May 2016 to 13th May 2018. Inclusion criteria were children aged up to 12 years (having open tri-radiate cartilage) with pelvic fracture from a blunt trauma mechanism. Injuries were classified by Modified Torode classification system. Data recorded on printed questionnaires with information on age, sex, mechanism, injury severity score, Glasgow coma scale, associated injuries, length of hospital stay, blood transfusion, etc. Data entered and analysed using SPSS version 23. Results: A total of 72 patients who met the inclusion criteria were included in the study. Out of these, 51 (70.83%) were male and 21 (29.17%) females. Mean age was  $7.4 \pm 2.2$  years. Most common mechanism of injury was being struck by a motor-vehicle (59.72%). All patients had associated extremity injuries, with fracture shaft of femur being the predominant one (40.27%). 37 (51.39%) patients had multiple injuries to the pelvis. 9 (12.5%) patients required orthopaedic intervention for pelvic fractures. Those who required orthopaedic stabilization were mostly more than 6 years old ( $p < 0.01$ ) and were likely struck by a motor-vehicle ( $p < 0.01$ ). These operative patients more likely required blood transfusion and remained admitted for more than a week ( $p < 0.01$ ). Conclusion: Skeletally immature patients are more likely to have concomitant injuries along with pelvic fractures which must be diagnosed early to limit the morbidity and mortality associated with it.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 3**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 53598**

**TREATMENT OF DEVELOPMENTAL COXA BY THE DYNAMIC HIP SCREW**

**Abdel-Azim WAHSH**

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Developmental coxa vara is a three-dimensional deformity of the proximal femur including varus, retroversion, anterior bowing, and shortening that appears when the child begins walking. We used the DHS in treating 13 hips in 11 patients. The average age was ten years and the average follow up was six years. The average Hilgenreiner-epiphyseal angel was 83 degrees and the average neck-shaft angel was 84 degrees. The average retroversion was 25 degrees and the average negative articlotrochanteric distance was six millimeters. In all the cases we started by fixing the DHS screw in the centre of the neck followed by fixing the plate to the screw which is of angel of average 135 degrees then we made a transverse intertrochanteric osteotomy using the oscillating saw. The desired correction is done by manipulating the DHS plate to reach the femoral shaft while internally rotating the distal femur to correct the retroversion. At follow-up all the osteotomies healed in an average nine weeks. The average post-op Hilgenreiner-epiphyseal angel was 34 degrees, the average neck-shaft angel was 137 degrees. The articlotrochanteric distance improved in all the hips to an average 11.5 millimeters (positive articlotrochanteric distance) and the retroversion improved in all the hips. The average AIWA score improved from 74 to 97. One patient developed pull out of the lag screw which was revised and healed successfully. In conclusion this method can correct the three-dimensional deformity of developmental coxa vara and the shortening easily.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 3**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 52887**

**THE EFFECTS OF SURGICAL TREATMENT WITH CHONDROBLASTOMA IN CHILDREN AND ADOLESCENTS IN OPEN EPIPHYSEAL PLATE OF LONG BONES**

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Chondroblastoma commonly originates in the epiphyseal plate of long bones. An aggressive curettage is recommended. However, it might jeopardize an open epiphyseal plate and incur limb shortening and deformity for the young patients. This study aims to explore influences on limb growth and development for aggressive curettage. We retrospectively reviewed 18 cases of long bone chondroblastoma with open epiphyseal growth plate during March 2004 to October 2010 in our centre. 7 females and 11 males with mean age of  $11.6 \pm 2.0$  years old were included. All patients were treated with meticulous intralesional curettage and inactivity with alcohol followed by bone grafts. All cases were followed up  $8.2 \pm 1.7$  years (5–11.5 years). All had no local recurrence and distance metastasis. The length of the affected limb was short,  $18.47 \pm 7.22$  mm (1.5–30 mm). There was no obvious relativity with tumour activity ( $P = 0.061$ ). Meanwhile, there were obvious relativity with the greatest dimension of the lesion (TGD) ( $P = 0.003$ ), the vertical dimension between edge of lesion and epiphyseal line (TVD) ( $P = 0.010$ ), and area ratio of lesion to local epiphysis (lesion/growth plate) ( $P = 0.015$ ). The MSTS93 (Revised Musculoskeletal Tumor Society Rating Scale 93) and SF-36 (Medical Outcomes Study 36-Item Short-Form Health Survey) had been significantly improved ( $P < 0.01$ ). Early detection and prompt surgical treatment intervention, which reduced significantly the tumour to influence limb growth and development, get encouraging limb function.

**Date: 2019-12-06**  
**Session: Paediatrics Free Papers 3**  
**Time: 16:00 - 17:30**  
**Room: Grand Ballroom Hall A2**

**Abstract no.: 53695**

**RESULTS OF OSTEOCLASIS IN CORRECTION OF KNEE DEFORMITIES**

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Osteoclasis is an old method used for correction of knee deformities. In this study we used it in 125 cases. The average follow-up was 3.5 years. The average age was 8.2 years. Sixty-two were males. Thirty-two cases had genu varum, 11 cases Blount disease, 25 cases genu valgum, nine cases flexion deformity, two cases genu recurvatum, six cases anterolateral bowing of leg, three cases posteromedial bowing, 12 cases in-toeing, seven cases external torsion, and 18 cases mixed deformities. The CORA was determined on the X-Rays then percutaneous drilling at that site was done in different directions in a single plane under image intensifier till the bone becomes weak enough to allow correction of the deformity followed in most of the cases by K-wire fixation, then high above the knee plaster cast applied till healing of the bone. The desired correction could be achieved in 87.% of cases and bone healing achieved in all the cases in an average 8.2 weeks. Under correction more than 5 degrees found in 10.4% of cases and over correction more than 5 degrees in 1.7%. Superficial pin tract infection in 3% of cases and breakage of the drill bit in 4% of cases. This method is easy, cheap and cosmetic with very small scars. The drilled surfaces make a gear-like effect catching both ends together. If under correction or over correction detected early it can be managed by wedging of the cast and if detected late the same procedure can be repeated.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 3**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54718**

**NEUROMONITORING FOR PROXIMAL FIBULAR OSTEOCHONDROMA EXCISION**

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Background: The peroneal nerve is at risk while excising tumours in the proximal fibula area. The rate of nerve injuries varies from 3 to 20%. The goal is to report and describe the resection of osteochondromas in the proximal fibula and the utility of neuromonitoring during excision. Methods: An IRB approved retrospective review was performed. Patients with osteochondromas in the proximal fibula with neuromonitoring performed during the excision were involved. Period 2002-2018. Neuromonitoring provided by a single group using a multimodality protocol: spontaneous electromyography (EMG), transcranial motor evoked potentials (MEP) and somatosensory evoked potentials (SSEP). Results: 36 patients, 41 extremities (20 right and 21 left). 19 (52.8%) female and 17 (48.8%) male. The average of age: 12.8 years. Solitary osteochondroma 13 (36.1%) and multiple 23 (63.9%). Preoperatively 24 had pain and 19 peroneal sensory-motor deficit. Abnormal baseline monitoring in 8/41 (19.51%). Alerts intraoperatively 15/41 (36.58%). EMG (5), EMG/MEP/SSEP (4), MEP (4), SSEP (2). No neuromonitoring in 7 patients. 14 corrective actions: pause 6, changes of position 6, and release of tourniquet 2. These solved the alerts. Post-operatively 6 extremities with neurologic deficit; 4 of this were pre-existing (3 paraesthesia and 1 paresis) and 2 new paraesthesia noted around the scar (spontaneous recovery). Not foot drop post-operative. The average follow up: 32.2 months. Conclusions: Neuromonitoring during proximal fibular osteochondroma excision demonstrated a high number of intra-operative alerts. Use of timely corrective action may help decrease the number of post-operative neurologic deficits. The use of neuromonitoring should be considered in high risk cases.



**Date: 2019-12-06**

**Session: Paediatrics Free Papers 3**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 53755**

**SURGICAL RECONSTRUCTION « à LA CARTE » OF SEVERE IDIOPATHIC FLEXIBLE FLATFOOT IN CHILDREN: A REPORT OF 34 CASES.**

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Background: Treatment of symptomatic, severe idiopathic flexible flatfoot (SSIFFF) in children is still debated. The purpose of this study is to evaluate the clinical, functional and radiographic outcome of the surgical reconstruction « à la carte » of the foot. Methods: 34 feet of 24 patients (13 boys, 11 girls) with mean age of 11.3 years underwent surgical reconstruction. Mean follow-up was 8.2 years. Unresponsive to conservative treatment, pain, functional disability and early deformity of shoes were common. Standing anteroposterior and lateral radiographs of the foot were analysed with twelve measurements. AOFAS score were used. Results: Surgical reconstruction of the feet were performed by the same surgeon. Two and three chronological surgical stages were achieved: - First stage: lengthening of Achilles and peroneus brevis tendons with calcaneal lengthening osteotomy on 34 feet; - Second stage: plantar-medial plication of the talonavicular joint capsule with advancement of the tibialis posterior tendon on 7 feet - Third stage if rigid supination of the forefoot: a plantar-medial closing-wedge osteotomy of the medial cuneiform on 4 feet. The average AOFAS score had improved from 63 to 96 points. Calcaneocuboid joint subluxation was observed in 8 feet. All patients were asymptomatic at the last follow-up and all the parents were satisfied with surgery results. Conclusion: Surgical reconstruction « à la carte » of SSIFFF in children combining soft tissues and bony procedures allows to restore the normal morphology and function of the foot.

**Date: 2019-12-06**

**Session: Paediatrics Free Papers 3**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54287**

**FEMORAL HEAD REDUCTION IN PERTHES AND PERTHES-LIKE DEFORMITIES**

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Introduction: The surgical goal of femoral head reduction in Perthes deformities is: containment, joint stability, and articular congruency to avoid the biomechanical and structural abnormalities that lead to secondary osteoarthritis under improper loading conditions. Method: In all cases was used the surgical hip dislocation with "Berne" approach.: initial exposure is via the Kocher-Langenbeck approach, sliding trochanteric osteotomy, retraction of trochanter, and attached gluteus medius, outline of Z-shaped capsular incision, dislocation of the hip with exposure of the articular surface of the acetabulum. It's very important to be careful of the blood supply to the femoral head. With this surgical approach were made 37 intracapsular osteotomies since 2001. Age at surgery: 9-21 years. Follow-up: from 2 months to 10 years. Additional osteotomies: 26 PAO, 1 IO, 6 Colonna. Results: in all the cases the results were good and the patients were very pleased about the improved hip motion. Complications: 2 fractured stable column, healed with screw fixation. No necrosis. Conclusion: Head reduction osteotomy is a direct approach to severe coxa plana and magna with hinged abduction. Best age between 9 and 15 years. Additional PAO improves stability of the „new“ head. The results are surprisingly good with clear advantages over salvage procedures. Next step is computer simulation of the best segment size and cut direction.

**Date: 2019-12-06**

**Session: Sports Medicine Free Papers 3**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 52891**

**DOUBLE TUNNEL ANATOMICAL CORACOCLAVICULAR LIGAMENT RECONSTRUCTION WITH DOUBLE TIGHTROPER SUSPENSORY FIXATION IN ACUTE AC JOINT DISLOCATIONS**

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**INTRODUCTION:** Acromioclavicular joint is an integral component of Shoulder Complex and common site of injury particularly for athletes involved in sports such as Football, Cricket, Rugby and Shotput. Classic surgical techniques are associated with high complication rates. **MATERIALS & METHODS:** A prospective study at 4 centres from 2015-2017. 32 patients with Acute grade 3, 4, 5, 6 Acromioclavicular joint dislocations, were operated with Minimally Invasive Double Tunnel Anatomical Coraco-clavicular Ligament Reconstruction. Outcomes were evaluated with Visual Analog Scale, Constant functional scale, Start of Movement, Return to Work, Satisfaction index and Coraco-clavicular distance over 12 months. **RESULTS:** Mean follow-up was  $14 \pm 3.8$  months. Visual analogue scale and Constant scores revealed significant advancements  $0 \pm 0.5$  (range, 0-2) and  $95 \pm 3$  (range, 92-98) scores at 12 months respectively. The coraco-clavicular distance significantly reduced from  $23 \pm 2.4$  mm to  $8 \pm 0.5$  mm. Mean return to work by 7 days. 98.6% were satisfied with surgical results. **CONCLUSION:** DT-ACCLR is simple and creative surgical technique which provides stable, reliable and painless AC joint. The patients are allowed to move the shoulder same day and return to Work by 5-7days and Sports 3-4 weeks.

**Date: 2019-12-06**

**Session: Sports Medicine Free Papers 3**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 55238**

**OUTCOMES OF ARTHROSCOPIC SURGERY IN PATIENTS WITH JOINT LAXITY AND HYPERMOBILITY SYNDROMES: A SYSTEMATIC REVIEW**

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**BACKGROUND:** Joint laxity and hypermobility refer to joints with increased range of motion. While they have traditionally been associated with poorer outcomes in open orthopaedic procedures, the picture isn't so clear with modern arthroscopic procedures. This review aims to assess outcomes of arthroscopic surgery in patients with joint laxity and hypermobility syndromes. **METHODS:** A systematic review of the literature was undertaken following PRISMA guidelines. This study included English articles with joints of living human subjects. Case reports, case series, case controls, cohorts, cross sectional studies and randomised control trials were included. **RESULTS:** This systematic review found 40 papers with outcomes being overall joint function, Pain, Patient satisfaction, Joint instability, Return to surgery and Return to sport on joints of the shoulder, knee, hip, and ankle. Hip joint outcomes were good, and matched non-hypermobile patients. Similarly, ankle joint had good outcomes, although some studies suggested worse outcomes compared to non-hypermobile patients. Shoulder patients showed improved outcomes except for higher rates of instability and re-operation. Knee outcomes were mixed, and hypermobile patients didn't appear to do as well as non-hypermobile patients but, satisfaction levels remain high. **CONCLUSION:** There is lack of clear definition of hypermobility, and there is a need for high quality control studies. Nevertheless, for the majority of outcomes, hypermobile patients have good results that match non-hypermobile patients, with different joints providing different outcomes. Caution should be applied regarding recurrent instability and rates of re-operation, especially for the shoulder joint, highlighting the importance of a good post-operative rehabilitation programme.

**Date: 2019-12-06**

**Session: Sports Medicine Free Papers 3**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 54529**

**MEDICAL SUPPORT REDUCED LOW BACK PAIN IN JUVENILE BASKETBALL PLAYERS -FIVE YEAR RESULTS-**

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**INTRODUCTION:** Low back pain (LBP) is a serious problem not only in the adults, but also in elementary and middle school students. The purpose of this study was to evaluate the effectiveness of medical support for LBP in juvenile basketball players. **METHODS:** Eight hundred forty-eight basketball players (416 boys, 432 girls, average age: 10.9 years) were included in this study. All players received medical support which consisted of physical examination, medical lecture about sports injuries, and training session of stretching. Current LBP and history of LBP were examined by self-administered questionnaire. Lumbar extension, flexion, and Kemp's sign were examined whether LBP was induced with these motions. Heel-buttock distance (HBD) and straight leg rising (SLR) test were examined for evaluation of flexibility of lower extremity. Statistical analysis was performed by chi-square test and Cochran-Armitage test. A p-value less than 0.05 was considered significant. **RESULTS:** The prevalence of past LBP in 2013 was 18.4% (45/245) and 4.2% (5/119) in 2017 which significantly decreased year by year ( $p < 0.05$ ). For physical findings, LBP with lumbar motion was found in 58 players (25.4%) in 2013 and 17 players (13.4%) in 2017. It significantly decreased year by year ( $p < 0.05$ ). The flexibility of lower extremity was significantly improved year by year ( $p < 0.05$ ). **DISCUSSION:** The present study showed that LBP of juvenile basketball players decreased year by year together with improvement of flexibility of lower extremity after introduction of medical support. These findings indicate that continuous medical support is effective to prevent LBP for juvenile basketball player.

**Date: 2019-12-06**

**Session: Sports Medicine Free Papers 3**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 52854**

**RADIAL NERVE ANATOMY AT THE ELBOW JOINT AND ITS ARTHROSCOPIC RELEVANCE**

Srinath KAMINENI, Ashfaq HAMZA, Satya ALLURI, Vikas DHAWAN  
University of Kentucky, Lexington (UNITED STATES)

**Purpose:** To study the anatomy of the radial nerve at the elbow joint. **Methods:** Seventy fresh frozen cadaveric elbows were studied for the anatomy of the radial nerve, with respect to the adjacent and arthroscopically relevant bony landmarks (radial fossa, radial head, proximal radio-ulnar joint, and capitulum). Measurements were taken with digital calipers, with the forearm in neutral, pronation, and supination. **Results:** The average transverse dimensions of the radial fossa and capitulum were 8.0mm (range 7.5-8.4mm), 17.0mm (range 16.6-17.5mm) respectively. The radial head dimensions in supination, neutral and pronation were 24.8mm (range 23.0-25.4mm), 25.2mm (range 23.0-25.9mm), and 24.75mm (range 23.0-25.3mm) respectively. The radial nerve translates medially upon the capitulum and radial head during pronation, with an average excursion of 1.8mm at the capitulum and 10.5mm at the radial head. During its course the radial nerve lies lateral to the medial edge of the radial fossa and the anterior margin of the proximal radioulnar joint, and on the medial half of the capitulum. A medial free space of 1.1 mm at the radial fossa, 3.4mm at the capitulum and 16.9mm at the radial head exists in supination. The medial free space in neutral rotation at the capitulum is 5.5mm. The medial free space in neutral rotation and pronation at the radial head is 13.1mm and 6.5mm respectively. **Conclusion:** When performing any arthroscopic anterolateral elbow compartment procedure, the radial nerve can be endangered if the anterior capsule is breached lateral to the medial radial fossa margin, or lateral to the proximal radio-ulnar joint. The radial nerve was not found to breach these anatomical landmarks in 70 consecutive cadaveric elbows. These simple intra-articularly accessible anatomical landmarks are safe guides for.

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**Abstract no.: 52853**

**ARTHROSCOPIC ANATOMY OF THE MEDIAN NERVE AND BRACHIAL ARTERY NEUROVASCULAR BUNDLE AT THE ELBOW**

Srinath KAMINENI, Ashfaq HAMZA

University of Kentucky, Lexington (UNITED STATES)

**Purpose:** Elbow arthroscopy is a useful technique but the reported prevalence of neurological complications range from 0-14%. We studied the arthroscopically relevant anatomy of the anterior neurovascular bundle at the elbow joint. **Methods:** Seventy cadaveric elbows (Median nerve and brachial artery) were studied, with respect to the bony anatomy that is visible during elbow arthroscopy. The bony landmarks utilized were the base width of the coronoid fossa, width between the medial and lateral trochlea ridges at the level of the medial epicondyle inferior margin, and the lateral rim width of the coronoid process. **Results:** The average width of the coronoid fossa base, trochlea and the lateral coronoid ridge were 14.3mm (range 13.9mm-14.6mm), 22.5mm (range 21.6mm-22.9mm), and 7.4mm (range 7.1mm-7.6mm) respectively. The average diameter of the neurovascular bundle at the coronoid fossa base, trochlea and coronoid process was 8.6mm (range 8.2mm-8.9mm), 8.4mm (range 7.9mm-8.6mm), and 8.3mm (range 8.0mm-8.5mm), respectively. The neurovascular bundle lies 1.6mm (range 1.4mm-1.9mm) medial to the coronoid fossa base, 2.4mm (range 2.1mm-2.9mm) lateral to the medial trochlea ridge and 2.2 mm (range 1.9mm-2.5 mm) medial to the tip of the coronoid process. **Conclusion:** The median nerve is a structure at risk when performing elbow arthroscopy of the antero-medial compartment. Our data supports the concept of a safe corridor of anterior elbow arthroscopic surgery. A medial safe corridor is laterally bounded by the medial boundary of the coronoid fossa, and medial face of the medial trochlea ridge. A lateral safe corridor is medially bounded by the lateral boundary of the coronoid fossa, the trochlea groove, and the apex of the coronoid process. These zones allow the arthroscopist to incise the capsule in.

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**Abstract no.: 54097**

**SURGICAL MANAGEMENT OF CHRONIC INCOMPLETE AVULSION INJURIES OF THE PROXIMAL HAMSTRINGS**

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Introduction: Chronic incomplete avulsions of proximal hamstrings are associated with slow healing, a chronic history, distal neurological deficits and persistent strength loss. Purpose of this study was to assess the post-surgical outcomes of such patients followed-up for 2 years after surgery. Methods: Prospective study of 41 patients with chronic incomplete avulsions of the proximal hamstrings were followed up for at least 2 years after surgery. All injuries were confirmed on MRI(s) and all surgeries were performed by the senior author using a standard technique. 6 Study outcomes were measured at pre-op, 3-month, 1-year and 2 year post-op. Results: 92.7% patients were satisfied with surgical outcome at 3-months follow-up. Mean patient isometric hamstring strength (relative to contralateral limb) improved considerably in first three months after surgery at 0 degrees ( $p < 0.001$ ), 15 degrees ( $p < 0.001$ ) and 45 degrees ( $p = 0.001$ ). Mean passive straight leg raise (PSLR) angle of the injured limb improved in 3 months post-surgery by 50% ( $p < 0.001$ ). Median LEFS scores at 3 months post-op improved from 48 to 72 ( $p < 0.001$ ), while median Marx sporting activity score showed significant improvement between 3 to 12 months post-op (4 to 10;  $p = 0.01$ ). Mean return to sporting activity was at 18 weeks and all sporting patients returned to their pre-injury level of sporting. 1 patient developed complex regional pain syndrome and no recurrent tears were reported. Conclusion: Surgical repair of chronic incomplete proximal hamstring avulsion tears are associated with high levels of patient satisfaction and post-op functional recuperation and low risk of complications.



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**Abstract no.: 54749**

**DUAL BUNDLE MPFL RECONSTRUCTION: THE ANGULAR ARC OF SAFETY**

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**Introduction** The anatomical dual bundle medial patellofemoral ligament (MPFL) reconstruction technique is a technique used to treat lateral patellar instability. Two patella bone tunnels are created, where grafts are inserted. However, there are risks of patella fracture and breaching of the patellofemoral articular surface. **Objectives and Aims** The study aims to investigate the angular arc of safety of the superior and inferior patella bone tunnels, as well as the geometry of patella bone tunnels. This enables the surgeon to improve the positioning of patella bone tunnels intra-operatively, reducing complication risks. **Methods** In this pilot study, MR knee images of patients with intact MPFLs were investigated. The angular arc of safety of superior and inferior bone tunnels were measured – the angle between the tunnels and the superior aspect of the patella. Superior and inferior bone tunnel maximum length and diameters of the tunnels at the medial and widest aspect were also measured. **Results** Our study population consists of 100 male patients. The superior patella bone tunnel has a mean length 43.18m; mean arc angle of safety of 21.80°; mean medial-most, and widest diameter 5.26m, 19.38m respectively. The inferior patella bone tunnel has a mean length 43.82m; mean arc angle of safety of 23.89°; mean medial-most, and widest diameter 5.69m, 20.14m respectively. **Conclusion** With optimal bone tunnels placement, the risk of fracture or articular surface penetration can be reduced during surgery. This study provides easily reproducible parameters for the surgeon to optimize tunnel siting and positioning intra-operatively.

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**Abstract no.: 55797**

**EARLY OUTCOMES OF ARTHROSCOPY SURGERY FOR FEMORO-ACETABULAR IMPINGEMENT: A STUDY USING THE NON-ARTHROPLASTY HIP REGISTRY (NAHR) DATASET**

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Femoroacetabular impingement (FAI) is a condition that can result in pain and functional impairments for patients. Despite what is known about the condition, there is limited data on certain factors influencing outcomes for FAI surgery, particularly notable is the lack of data on patient reported outcomes measures (PROMs) based on morphology type and data on the improvements in PROMs scores, rather than the absolute values. There are, however, results from randomised control trials are now available which demonstrate the superiority of surgery over physiotherapy in patients with FAI. A retrospective study cohort study was undertaken, reviewing, prospectively collected registry data from the national "Non-Arthroplasty Joint Registry" for patients undergoing arthroscopic surgical intervention for femoroacetabular impingement, between January 2011 and September 2018. Baseline demographic data was collected along with information on FAI morphological subtype and PROMs Scores (iHOT-12 and EQ5D) were completed at 6 and 12 months. A cohort of 3,867 patients who underwent arthroscopic treatment of FAI were established from the NAHR database. Overall, for the entire cohort, there was significant improvement in preoperative iHOT-12 score from 32.2 to 57.8 at 12 months ( $p < 0.0001$ , mean patient improvement +25.3 (95%CI 23.8 to 26.9)) and EQ-5D Index improved from 0.517 to 0.672 ( $p < 0.0001$ , mean improvement +0.14 (95%CI 0.133 to 0.160)). Overall and for each pathology group, approximately 70% of patients maintained the MCID up to 12 months. This study demonstrates that hip arthroscopy is an effective surgical treatment for patients with symptomatic FAI and results in a statistically significant improvement in PROMs which are maintained at 12 months follow-up. However, certain factors. Including age greater than 40, extremes of BMI and pincer lesions, were associated with poorer outcomes and understanding these factors will aid

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**Abstract no.: 53552**

**THE USE OF A MINI ALL SUTURE ANCHOR REDUCES POST-OPERATIVE PSOAS IRRITATION IN PATIENTS UNDERGOING HIP ARTHROSCOPY FOR FEMOROACETABULAR IMPINGEMENT.**

Paul HAGGIS, Tony ANDRADE

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Introduction: We present the incidence of psoas irritation following hip arthroscopy within a series of primary hip arthroscopies for femoroacetabular impingement (FAI), and compare to a series in which a mini all suture anchor was introduced specifically to address labral pathology within the psoas notch. Methods: From 2013, all patients undergoing hip arthroscopy for FAI by a single surgeon within a single hospital were identified, all treated according to a standardised protocol, including post-operative physiotherapy. If psoas irritation was diagnosed clinically at any follow-up appointment, then a radiologically guided injection was performed. A mini all suture anchor was introduced in January 2017. Results: From January 2013 to December 2016, 14 (all female, average age 27, range 18-46) of 369 patients required a radiologically guided injection to address psoas irritation. Of these 14 patients, all were found intra-operatively to have labral tears at the psoas notch at primary arthroscopy; repair was made in all using a knotless anchor, placed as medially as bone stock would allow. From January 2017, and with a minimum of one year follow-up, a further 61 arthroscopies were carried out. The mini all suture anchor was inserted to repair the labrum at the psoas notch in 17 (28%). None of these 61 have required an injection to treat psoas irritation. Conclusion: Addressing labral pathology within the psoas notch through the use of a mini all suture anchor reduces the incidence of psoas tendinitis post-operatively.

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**Abstract no.: 53938**

**SURGICAL REPAIR OF THE ADDUCTOR LONGUS MUSCLE ENSURES RETURN TO SPORT IN MALE SOCCER PLAYERS**

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Adductor injuries are frequent in the sports involving kicking and changes of direction, like soccer. No consensus exists on management of the adductor tears. Studies on surgical treatment reported good outcomes after failed conservative treatment, with preferable technique of adductor tenotomy. Anatomical studies demonstrated that restored adductor anatomy is crucial for the proper function of the lower girdle. The purpose of this study was to report the outcomes of the surgical repair of the adductor partial tears in professional soccer players. Twenty five male professional soccer players after failed non-operative 4 months protocol, treated with surgical repair of the adductors were identified and prospectively followed. The mean age at the time of surgery was 28.6 years. Follow-up examination was at 12 months and then at the end of their career (8 years on average, range 6-10). Stay-in-sport rate, HAGOS score, hip ROM and the severity of sport dysfunction scale was assessed as follows: Level 4 — prevented training, Level 3 — limited training, Level 2 — affected performance, Level 1 — unrestricted performance. All players returned to sport activities in 12 weeks (mean 7.6 weeks) and stayed in sport activities till the end of their careers. There was significant improvement in the severity of sport dysfunction scale ( $p=0.00$ ) after surgery. HAGOS at 12 months follow-up and the final exam showed no differences and the best results in the physical function and physical activities sub scales. Surgical adductor repair gave a consistent high rate of return-to-sport and stay- in-sport.

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**Abstract no.: 53977**

**ARE WE DOING CORRECT INDICATIONS FOR HIP ARTHROSCOPIC TREATMENT? A NATIONAL MULTICENTRE STUDY**

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**INTRODUCTION.** Indications for hip arthroscopy is the key issue to obtain successful clinical results. Main objective of present study was to analyse trends in arthroscopic management for hip pathologies in one nation cohort. Methods: A retrospective study was conducted including 483 patients undergone arthroscopic treatment from a prospectively collected database of 617 patients from six specialised centres in a specific country. Exclusion criteria included revision scopes and refusal to participate in the study. Results: Our study included 347 males and 136 females with age range 15 to 62 years (mean 37.8 years). FAI classified as 188 Cam, 56 Pincer and 239 mixed type. Tönnis classification was grade 0 and I in 356 cases, grade II in 60 cases. Magnetic resonance arthrography (MRA) revealed labral tears in 370 and 97 with chondral lesions. Alpha angle was range 50-89 degrees (mean 65.30 degree) and postoperatively with range 31-69 degrees (mean 51.64 degree). Labral lesions were found at Ilizaliturri zones two and three in 335 patients and in 117 for chondral lesions in same zones. Labrum was sutured in 252 cases, microfractures were indicated in 86 patients. Mean improvement of Hip Outcome Score (HOS) at one year was 17.39 points with preoperative mean of 61.36 points and postoperatively 78.75 points. Mean Follow-up was 14.52 months (range 6.02-97.67 months). Revision surgeries were in 12 cases of re-arthroscopy (2.48%) and 5 cases of total hip replacement conversion (1.03%). Conclusions: Arthroscopic treatment of hip pathologies has good clinical results with low complication rates.

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**Abstract no.: 53554**

**LABRAL REPAIR IN FEMOROACETABULAR IMPINGEMENT;  
COMPARING PATIENT OUTCOMES BETWEEN TWO DIFFERENT  
ARTHROSCOPIC KNOTLESS SUTURE ANCHORS.**

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Introduction: Labral repair for femoroacetabular impingement (FAI) is increasing. We hypothesize that the type of knotless anchor utilised does not affect patient-recorded outcomes. Methods: From a single surgeon at a single hospital, 15 patients undergoing hip arthroscopy for FAI were retrospectively matched for age ( $p=0.37$ ) and sex ( $p=0.62$ ), with labral repair using Bioraptor knotless anchor (Smith and Nephew, London, United Kingdom) or Speedlock Hip (Smith and Nephew). Hip Disability and Osteoarthritis Score (HOOS), International Hip Outcome Score 12 (iHOT-12), and Non-Arthritic Hip Score (NAHS) were recorded pre- and post-operatively (average 2 years, range 3 months - 3 years). A standard surgical technique and post-operative protocol was utilised in both cohorts. Results: The Bioraptor cohort contained 13 females and 2 males, average age 37 years (range 19-57); Speedlock 12, 3, 41 (16-59). Kellgren and Lawrence grade was same (average 0,  $p=0.58$ ). Two anchors used on average per case ( $p=0.575$ ). Radiological acetabular index, lateral centre edge angle, and alpha angle were same ( $p=0.72$ ,  $p=0.54$ ,  $p=0.67$ ). Bioraptor showed average improvement in HOOS: pain 30 ( $p=0.001$ ), stiffness 28 ( $p=0.001$ ), activities of daily living 27 ( $p=0.002$ ), sports 44 ( $p=0.0005$ ), and quality of life 42 ( $p=0.00002$ ); Speedlock of 21 ( $p=0.01$ ), 25 ( $p=0.003$ ), 21 ( $p=0.01$ ), 21 ( $p=0.02$ ), and 29 ( $p=0.0003$ ), with no difference between cohorts except sports ( $p=0.02$ ,  $p=0.13-0.75$ ). Similar improvements were found with iHOT12 and NAHS, with no difference between cohorts ( $p=0.68$ ,  $p=0.15$ ). Conclusion: The knotless anchor used to repair the labrum during primary hip arthroscopy for FAI does not affect the patient-recorded outcomes.

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**Room: Grand Ballroom Hall A3**

**Abstract no.: 55004**

**TIMING OF ACL SURGERY IN ACUTELY INJURED PATIENTS HAS PROGNOSIS IMPLICATIONS: A PROSPECTIVE STUDY ON ELITE PLAYERS.**

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Method: 59 patients ACL injury categorised into 3 groups according to time since injury: A(>6weeks), B(6-12weeks)and C(>12weeks). Three groups were evaluated pre-operatively for inflammatory markers in synovial fluid for IL-1, IL-6 and Tnf- $\alpha$ , intraoperatively for chondral and meniscal injuries, and post-operatively for Lysholm scoring of knee joint till 1year. Results: Out of 59, Group A, B and C had 14, 16 and 29patients. We analysed values of interleukins in all 3 groups and observed a decreasing trend related to time. Mean level of IL-6 in GroupA, GroupB and GroupC are  $108.7\pm 84.4$ ,  $55.9\pm 73.6$ and  $55.35\pm 65.5$  respectively. Difference between all groups was insignificant (p-value0.065), however with Mann-Whitney test between GroupA and GroupC, result was significant (p-value0.029). We analysed presence/absence of grade3 meniscal tear in all 3groups and observed 12.1% patients in groupA(5/14) and 66.1% in groupC(24/29) had Grade3 meniscal tear, and difference was significant(p-value 0.009). We observed presence/absence of grade3 or more chondral lesion in 3groups and observed a significant difference between GroupA and C (p-value 0.22). Post-operatively, Lysholm-scale at 1year was compared in all 3groups and observed no significant difference (p-value >0.05). However, we also observed significant correlation of increased IL-6 with decreased Lysholm-score in all patients at 1year follow-up (p-value0.001). Conclusion: Patients with acute ACL injury (>6weeks) have Increased levels of inflammatory-markers (IL-6) as compared to patients with>12 weeks of time since injury. Increased levels of inflammatory markers (IL-6) are associated with decreased functional knee scoring with Lysholm scale. Patients with >12 weeks of time since injury are more associated with grade 3 or more meniscal tear and chondral lesions.

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**Session: Sports Medicine Free Papers 4**

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**Abstract no.: 54767**

**CLINICAL, IMAGING AND HISTOLOGIC OUTCOME OF OSTEOCHONDRAL LESIONS OF THE KNEE TREATED USING THE LIPO-AMIC TECHNIQUE**

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Goal of our study was to assess the clinical, imaging and histologic outcome of LIPO-AMIC technique (autologous matrix-induced chondrogenesis + ADSCs and adipose tissue transfer) consisting of osteochondral lesion debridement, microfracturing and filling with bilayer cell-free collagen scaffold soaked in adipose regenerative product. Methods Eighteen patients (age range: 28-58) with OCL repaired using LIPO-AMIC technique were clinically evaluated through IKDC, KOOS and VAS scores, with follow-up between 12 and 60 months. MRI examinations were performed at 6, 12 months and yearly thereafter. ADSCs have been isolated and characterized in terms of viability and cell composition using multicolour FACS analysis. Results No complications after surgery were encountered. Patients showed relevant, immediate and durable improvement of various scores already from initial follow-up. At intermediate and final follow-up all scores were significantly increased ( $p < 0.001$ ). MRI examination, completed by T2 mapping imaging, showed early subchondral lamina regrowth and progressive maturation of the repair tissue. Histological studies shown that stem cell population resided in a perivascular location with preserved architecture and where ADSCs coexisted with pericytes and endothelial cells. FACS analysis confirmed high viability and an increased percentage of endothelial cells. Conclusion Repair of full-thickness cartilage injuries by LIPO-AMIC technique provides good to excellent clinical improvement, MRI defect filling and, at histologic evaluation, high percentage of ADSCs and endothelial cell populations with high viability and niche preservation. Results resulted improved in respect to standard AMIC technique and comparable to MACI, at significantly reduced costs.



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**Room: Grand Ballroom Hall A3**

**Abstract no.: 54101**

**SURGICAL MANAGEMENT OF DISTAL HAMSTRING (BICEPS FEMORIS) NON-AVULSION TEARS AT T-JUNCTION**

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Introduction: Biceps femoris (BF) tears at confluence of two heads result during strenuous and explosive sporting activities. Surgical treatment of these injuries is not described in literature and non-operative treatment is associated with long periods of rehabilitation and high recurrence rates. This study aimed to evaluate post-surgical outcomes of such patients followed-up for 2 years after surgery. Methods: Prospective study of 34 athletes with injuries at T-junction of two heads of Biceps Femoris, all confirmed with MRIs and operated (within 4 weeks of injury) by one surgeon. Primary outcomes measured were recurrence rates and time to return to play with 5 secondary outcomes measured as well at 3-months, 1-year and 2-years post-op. Results: 91.1% patients were satisfied with surgery at 3 months follow-up. At 3 months, isometric hamstring strength improved considerably at 0 degrees ( $p=0.002$ ), 15 degrees ( $p< 0.001$ ), 45 degrees ( $p< 0.001$ ) of knee flexion compared to the contralateral side. Mean PSLR angle improved from 24.1 to 69.7 degrees ( $p< 0.001$ ) at 3 months post-op. LEFS significantly improved at 3-months follow-up compared to preoperative values ( $p< 0.001$ ) while MARS showed improvement between 3 and 12 months post-op ( $p< 0.001$ ). All study patients returned to sporting activity at mean 16.4 weeks after surgery. No recurrences were seen in 2 years follow-up. Conclusion: Our findings show that surgical management of distal BF T-junction tears is associated with minimal recurrences, high levels of patient satisfaction, good muscle strength recuperation, improved functional outcome scores and early restoration to sporting activity at short-term follow-up.

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**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53285**

**MEDIAL PATELLOFEMORAL LIGAMENT (MPFL) RECONSTRUCTION  
ARE THOSE PATIENT HAPPY!**

Suwailim AL GHANAMI, Ismail AL HABSI, Arafat ALFIKEY

Khoula Hospital, Muscat (OMAN)

Patellar instability can affect patient's daily activities especially in community like ours where people likes to set in the ground for their daily livings and also during prayers. Sports participation is also affected in athletics as majority are usually young .most of the cases are a traumatic and those patient usually suffers recurrent dislocations and pain before they present to us. Khoula hospital is the main orthopaedics centre in Oman and we receive good number of cases from peripheral hospitals. Old techniques for treating patellar instability like lateral release and imbrications are associated with higher rate of revision and there is a big move nowadays for reconstructing MPFL. Reconstruction is associated with excellent results and majority of patients get very good functional scores after the surgery. This surgery is highly demanding and learning curve takes a while and complications reported in the literatures are commonly patella fracture, loss of flexion, pain and instability. We have different techniques for reconstructing MPFL however general principles are same. We use either part of Quadriceps tendon or Gracilius/ semitendenious with or without Fulkerson osteotomy. We have done nearly 22 cases between 2014 -2018 and our results are excellent. Slight predominance in females .those patients usually kept non-weight bearing mobilization with full extension in brace, rehabilitation is crucial and usually we allow them to participate in sport in 8 months.

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**Abstract no.: 52975**

**THE ARTHROSCOPIC LATARJET: AN INTERNATIONAL, MULTI-SURGEON LEARNING CURVE ANALYSIS**

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Introduction: The Latarjet is an established technique for patients with risk factors for failure following soft tissue stabilisation of the shoulder. Arthroscopic execution of the procedure has potential benefits but is a demanding technique to gain proficiency in. The aim of this study was to analyse the learning curve of the arthroscopic Latarjet using a more advanced learning curve modelling technique compared to previous studies. Methods: 573 consecutive primary arthroscopic Latarjet procedures performed by 12 surgeons from 5 countries without prior experience of this procedure were included. Data collected included: operative time, CT-radiographic parameters, PROMs and complications. A validated segmented linear regression technique was employed to model the learning curve for the data set. Results: Two surgeons showed steep learning and reached a plateau of 70-80 minutes operative time after 30-40 cases. Seven surgeons who completed 20-30 cases showed learning but did not reach a plateau. Two low-volume surgeons did not demonstrate evidence of learning. One surgeon demonstrated improvement in operative speed at 43 cases, reaching a plateau at 134 procedures. Accuracy of subequatorial bone-block positioning on postoperative CT demonstrated significant improvement over the first 30 cases for 4 surgeons. There was no change in PROMs or complications with experience. Conclusions: At least 30 cases are required to reach a plateau in operative time and efficiency when adopting the arthroscopic Latarjet procedure. There is some evidence that graft positioning improves over the same time frame. Consistent PROMs and a low rate of complications can be maintained during this learning period.

**Date: 2019-12-06**

**Session: Sports Medicine Free Papers 4**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53674**

**COULD IT BE AN ALTERNATE FOR LATARJET PROCEDURE? A CADAVERIC STUDY OF OPEN, ARTHROSCOPIC-ASSISTED AND ALL-ARTHROSCOPIC TECHNICAL FEASIBILITY OF BICEPS RE-ROUTING AND TENODESIS TO THE DEFICIENT ANTERO-INFERIOR GLENOID**

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-Background: Latarjet procedure represents the gold standard management of significant anterior glenoid bone loss. However, concerns about short and long term complications do still be reported. -Hypothesis: As an alternate to Latarjet procedure; (1) "Is re-routing and tenodesis of long head of biceps to deficient antero-inferior glenoid technically feasible open and arthroscopic-assisted approach?", (2) "Is this tenodesis able to restore gleno-humeral stability?", and (3) "Does this tenodesis increase the risk of nearby neurovascular injury?". -Study Design: Cadaveric laboratory study. -Materials & Methods: Six shoulders were prepared. Through delto-pectoral approach, significant (>20%) antero-inferior glenoid bone defect was created. Then, long head of biceps was tenotomised from superior labrum, mobilised from bicipital groove, passed through a subscapularis window and fixed to deficient antero-inferior glenoid using 2 suture anchors. Pre- and post-tenodesis humeral head translation during provocative 90°-90° abduction-external positioning were compared. Following subscapularis repair, biceps tendon excursion was evaluated. The transverse distance between subscapularis window and axillary nerve was measured. -Results: Statistical analysis revealed significant reduction in post-tenodesis gleno-humeral translation compared to pre-tenodesis one (P-value<0.002). Following tenodesis, the average biceps excursion was 10.15mm (range: 10-13mm) and the distance between the axillary nerve and the subscapularis window is 19.8mm (range: 18-22mm). -Conclusion: Re-routing and tenodesis of long head of biceps brachii to the deficient antero-inferior glenoid are technically feasible and safe and can effectively restrain gleno-humeral translation; and provide the chance for new open, arthroscopic-assisted and all-arthroscopic gleno-humeral stabilizing interventions as alternate to Latarjet procedures while avoiding the complications of the later.

**Date: 2019-12-06**

**Session: Sports Medicine Free Papers 4**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53557**

**ARTHROSCOPIC REPAIR OF TORN SUBSCAPULARIS TENDON USING ALL SUTURE ANCHORS**

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Introduction Subscapularis tendon tear is more frequent than previously estimated. The worldwide use of arthroscopy in rotator cuff surgery has allowed recognizing the true prevalence of subscapularis tendon lesions. The purpose of this study was to evaluate subscapular tear by clinical examination and MRI scan. And to assess the clinical outcomes after arthroscopic repair with single-row mattress suture for subscapularis tendon tears. Method This study consisted of 20 shoulders that presented with subscapularis tear and had arthroscopic surgery between January 2014 and March 2016. The arthroscopic surgeries were performed by a single senior surgeon using all suture anchors in single-row mattress configuration between April 2014 and July 2017. Preoperative physical examination includes range of motion measurement (ROM), the lift off, and the belly press, and the bear-hug test. Preoperative radiology included: AP and Axial x-ray, and MRI of the affected shoulder. Pre-operative and Post-operative UCLA score was obtained for patients Result The follow up ranged from 26 to 37 months with a mean of 25 months. All patients presented for follow up assessment. Postoperative UCLA score showed that the range of scores was from 64.6 to 99 points, with a mean of 85.6 points. We found that 65% of the patients had excellent results, 15%, good, and 20% adequate Conclusion Arthroscopic repair of isolated or combined subscapularis tears with the single-row mattress suture results in significant clinical improvements at intermediate follow-up.

**Date: 2019-12-06**

**Session: Sports Medicine Free Papers 4**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53150**

**MINI-OPEN INTERVAL SLIDE REPAIR WITH PROGRESSIVE REHABILITATION FOR TREATMENT OF MASSIVE ROTATOR CUFF TEARS**

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**Objective** To explore the effect of mini-open rotator cuff repair using interval slide technique combined with postoperative progressive rehabilitation exercises on postoperative shoulder function recovery and postoperative complications. **Methods** A retrospective analysis of 24 patients undergoing mini-open rotator cuff repair due to massive rotator cuff tears from January 2012 to October 2016 was performed. The interval slide technique was used to achieve balance reconstruction of the rotator cuff muscles intraoperatively. After surgery, the progressive rehabilitation exercises were conducted under the protection of the adjustable abduction brace. The range of motion, shoulder function scores (Constant score, ASES score), VAS pain score, retear and stiffness were evaluated. **Results** The range of motion, shoulder function scores (Constant score, ASES score) and pain were significantly improved at 6 months postoperatively, which were further improved at 24 months after surgery compared with 6 months postoperatively. At the last follow-up, 3 patients were found rotator cuff retear (retear rate 12.5%). One patient suffered from shoulder stiffness. **Conclusion** Mini-open rotator cuff repair using interval slide technique combined with postoperative progressive rehabilitation exercises significantly improved range of motion, shoulder function, pain relief, and kept lower stiffness rate and retear rate, and achieved good clinical results.

**Date: 2019-12-06**

**Session: Sports Medicine Free Papers 4**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53604**

**A META-ANALYSIS OF CLINICAL SUCCESS RATES FOLLOWING MENISCAL REPAIR OF RAMP LESIONS AND HORIZONTAL, RADIAL, AND ROOT TEARS**

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This study evaluated the current evidence on the clinical success of repairing the following meniscal tear types: horizontal tears (HT), radial tears (RadT), root tears (RootT), and ramp lesions (RL). In April 2017, four separate systematic literature reviews for each tear type were performed using the PubMed and Embase databases. Studies were eligible if they were written in English, published beginning in 1990 onwards, and reported clinical outcomes following meniscal repair specific to the tear type of interest, and ineligible if they were non-clinical studies or included <10 patients. Twenty eligible studies were identified: 3 HT (73 repairs; mean follow up [mFU], 3.2 years), 4 RadT (56 repairs; mFU, 2.4 years), 10 RootT (301 repairs; mFU, 2.9 years), 4 RL (208 repairs; mFU, 1.7 years). Clinical success was defined as “no need for reoperation or resolution of clinical symptoms.” Proportional meta-analyses were performed using the random effects model to account for heterogeneity between studies. Final figures were reported as proportions alongside 95% confidence intervals (95% CIs). Clinical success rate was 89% for HT (95% CI: 75-98), 95% for RadT (95% CI: 79-100), 99% for RootT (95% CI: 97-100), and 99% for RL (95% CI: 94-100). This proportional meta-analysis demonstrates that high rates of success can be achieved in tear types that may not routinely be considered for repair. There are limited studies reporting on outcomes of meniscal repair in these tear types and follow-up periods are short in some instances.

**Date: 2019-12-06**

**Session: Sports Medicine Free Papers 4**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53606**

**LONG-TERM RISK OF DEGENERATIVE CHANGE FOLLOWING MENISCAL REPAIR AND PARTIAL MENISCECTOMY: A META-ANALYSIS**

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This study compared published rates of long-term risk of degenerative changes following partial meniscectomy and meniscal repair. In April 2017, systematic literature reviews were performed using the PubMed and Embase databases. Studies were eligible if they were written in English, published beginning in 1990 onwards, reported the presence or progression of osteoarthritis (OA) following partial meniscectomy and meniscal repair, and had a minimum 5-year follow up. Studies were excluded if they had <10 patients. From 358 articles identified for partial meniscectomy and 18 for meniscal repair, 22 (1,726 cases; mean age, 32.7 years; mean follow up, 10 years) and 6 (205 cases; mean age, 39.0 years; mean follow up, 9.6 years), respectively, were deemed eligible. Proportional meta-analyses were performed using the random effects model to account for heterogeneity between studies. Final figures were reported as mean proportions alongside 95% confidence intervals (95% CIs). Progression of OA was noted in 32% (95% CI: 16-52%) of those undergoing meniscal repair, compared with 57% (95% CI: 47-67%) of those undergoing partial meniscectomy, representing a 78% higher relative risk of long-term degenerative changes for the latter. This meta-analysis suggests that, where possible, meniscal tears should be repaired rather than resected. Although consistent with other studies directly comparing meniscal repair and partial meniscectomy, demographic differences between the groups (i.e., mean age at surgery) and the relatively smaller group of studies reporting OA changes after meniscal repair may impact the results of the analysis.



**Date: 2019-12-06**

**Session: Sports Medicine Free Papers 4**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53761**

**TORN DISCOID LATERAL MENISCUS**

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Introduction: Discoid lateral meniscus anomaly is not uncommonly seen. The objective of this study was to evaluate clinical and functional results of arthroscopic meniscopectomy with repair of the associated meniscal tears in 14 cases of discoid lateral meniscus treated between July 2010 and May 2017. Methods: This is a series of 14 knees. The mean age range of these patients was 19 years (mean range 11 to 27 years). There were 6 females and 8 males. The main presenting symptoms were loss of full extension, painful clicking and repeated locking. MRI confirmation of the pathology was available preoperatively in all patients. Peripheral menisco-capsular detachment was present in 12 knees. Having performed saucerisation of the central meniscus disc, cleavage tear of the remaining meniscus body was observed in all patients. Repair of the associated tears with either outside-in technique +/- all inside sutures was performed. Clinical outcome was determined based on symptoms, complications, and IKDC score. Results: The cases were reviewed at a mean of 28 months (20-36 months). The mean IKDC score was 82.5 points (65-100). Twelve patients were satisfied with the result. 2 cases with complications were present 1 case with non-healed meniscal repair and 1 case that did not regain full ROM with flexion only up to 125 degree. Conclusion: Arthroscopic saucerisation with stabilization of the unstable tear of the symptomatic discoid lateral meniscus was effective in clinical improvement and preserving knee function during the midterm follow-up period.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 53912**

**DISAPPOINTING RESULTS WITH THE INSPACE® BALLOON SPACER FOR FAILED-REPAIRED/IRREPARABLE MASSIVE ROTATOR CUFF TEARS**

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**Purpose:** We studied a carefully selected cohort of patients treated with the InSpace balloon for irreparable or failed-repair rotator cuff defects, and assessed short- and medium- term results (Oxford Shoulder Score, and further surgery). **Methods:** After institutional approval, two fellowship-trained shoulder surgeons recruited patients with massive irreparable or failed-repaired rotator cuff tears between February 2016 and May 2017. Their notes were retrospectively reviewed as part of a service evaluation, and the following data were recorded: 1) demographics, 2) pre- and post-operative (6 weeks, 3,6,12 and 18 months) symptoms, ranges of motion (ROM), and Oxford Shoulder Scores (OSS), 3) previous/subsequent procedures, 4) findings on shoulder AP radiographs. **Results:** Seven patients [M:F 7:1, mean age 66.3 (54.7 – 80.8)] had eight shoulders implanted with the balloon spacer for failed repairs (n=6) and irreparable tears (n=2). Pain improved in five while ROM improved in four shoulders. OSS (where available) improved gradually up to 6 months and then declined to scores similar to pre-operative values. There were five returns to theatre in the subsequent 18 months: 1) one retrieval for early balloon rupture, 2) one margin-convergence repair with allograft, 3) three reverse shoulder replacements. **Conclusions:** Our results with the balloon spacer are disappointing, and in stark contrast to those reported nationally (two studies) and internationally (ten studies). This is despite our series having similar patient inclusion criteria, age ranges and grades of cuff tear arthropathy. We heed caution in the use of this implant. Other options need to be explored for this problem.

**Date: 2019-12-06**  
**Session: Shoulder & Elbow Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 54053**

**ULTRASOUND ASSESSMENT OF SUPRASPINATUS TENDON POST ANTEGRADE INTERLOCKING NAIL OF THE HUMERUS**

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Introduction: Interlocking nailing (ILN) of humeral shaft fractures has recently gained popularity. In the current study, we have evaluated the incidence of supraspinatus (SSP) tendon tear as a consequence of (ILN) of the humerus. Methods: Patients who were operated in the period from 2013 to 2017 at our Center were called and had clinical and Ultrasound assessment. Results: Nineteen out of 26 patients were included. The mean duration of follow up was 21.5 months. The mean age was 42.7 years. Thirteen patients (68.4%) out of 19 had SSP tendon tears at the ultrasonic rotator cuff assessment. The mean Constant score was 75.8 (72.5 with SSP tear and 82.8 without SSP tear). The mean ASES score was 80.2 (78.2 with SSP tear and 84.4 without SSP tear). Discussion: The study demonstrated good clinical outcomes for ILN. However, it showed an astonishing 68.4% of patients have SSP tendon tears. Mall et al. found that 22.5% of asymptomatic rotator cuff tears become symptomatic over a two-year period, confirming that a sonographic lesion of rotator cuff must not be underestimated(1). Conclusion: The study showed that more than two third of the patients treated with ILN have residual SSP tendon tear. Reference: 1. Mall NA et al. Symptomatic progression of asymptomatic rotator cuff tears. JBS Am. 2010 Nov 17;92(16):2623–33.

**Date: 2019-12-06**  
**Session: Shoulder & Elbow Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C1**

**Abstract no.: 53793**

**STUDY ON EFFICACY OF PLATELET RICH PLASMA VERSUS STEROID  
IN THE TREATMENT OF ROTATOR CUFF TENDINITIS.**

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Introduction: Rotator cuff tendinitis is a significant source of disability and can limit daily activities because of pain. There is no clear consensus over the benefit of using Platelet rich plasma (PRP) for tendinitis, with some studies reporting a clear benefit while other studies reporting no more benefit than the controls. Methods: Patients with shoulder pain for more than 3 months not responding to NSAIDs or physiotherapy with a diagnosis of Rotator cuff tendinitis confirmed by MRI were included in the study. We did a simple randomization. 21 patients received 5ml of PRP injection and 19 patients received 40mg of Triamcinolone injection in the subacromial space. All patients then underwent a 6-week exercise program. The patients were followed up at 3 weeks, 6 weeks, 3 months, 6 months and at 1 year. Visual Analog scale was used to assess pain and the Constant shoulder score was calculated both pre and post injection. Results: The mean Constant score in the PRP group and the steroid group improved from 42.57 (pre injection) to 83.8 and 51.6 (pre injection) to 70.3 respectively and this was found to be statistically significant ( $p < 0.05$ ). The pre injection mean VAS score in the PRP group and steroid group improved from a mean of 8.2 to 2.3 and 8.6 to 3.6 respectively. Conclusion: PRP injection in our small study group showed good results in rotator cuff tendinitis with improvement in both the VAS and the Constant shoulder scores and can be recommended for refractory rotator cuff tendinitis.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 54443**

**REAL-TIME EVALUATION OF PERFUSION AT THE SUPRASPINATUS TENDON WITH MODERN CONTRAST ENHANCED ULTRASOUND**

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Introduction: The supraspinatus tendon is a localization of common degenerative and traumatic lesions and has so a great clinical relevance. It is still unclear what role the perfusion of the tendon does have. Objectives: With modern contrast enhanced ultrasound (CEUS) it is now the first time that a method allows a direct, non-invasive assessment of real-time perfusion evaluation up to microcirculation level. Methods: Using CEUS a study to assess perfusion at the supraspinatus tendon of the right shoulder among 16 right-handed healthy male subjects aged 20 to 30 years (mean age 24.1 years) was performed. Four different regions of interest (ROIs) were defined in relation to the bursal- and articular-side parts of the tendon. For changing the position of abduction (0°, 30° and 60°) in the glenohumeral joint a shoulder orthosis was used and a continuous light physical exercising ensured a steady-state blood flow. Finally the so-called perfusion-kinetics were measured. Results: Perfusion-kinetics showed a typical behaviour for the tendon with a slow wash-in and wash-out of the contrast agent, whereby regional reproducible and statistically significant differences were detected within the tendon ( $p < 0,05$ ). Approximately 1cm above the tendon insertion at the humeral head a hypoperfused area, which can thus demonstrate the so-called critical zone as it is discussed in the literature, could be verified. Increasing abduction in glenohumeral joint did not lead to any further changes. Conclusions: The obtained results thus appear interesting for the genesis of rotator cuff degeneration and tears and will therefore be discussed with the current literature.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 54223**

**IS THERE A ROLE FOR PLATELET-RICH PLASMA THERAPY IN THE TREATMENT OF ROTATOR CUFF TENDINOPATHY? A SYSTEMATIC REVIEW AND META-ANALYSIS**

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Background: There is an increasing body of literature indicating that platelet-rich plasma (PRP) is proving to be an effective biological treatment for tendinopathy. However, there is a scarcity of evidence to support the use of PRP for rotator cuff tendinopathies. We conducted a systematic review and meta-analysis of studies that had evaluated the effectiveness of PRP specifically in shoulder tendinopathies. Methods: Studies were identified by searching the PubMed, PubMed Central, Embase and Cochrane databases. Data were extracted from all relevant studies, and fixed models were used to calculate the summary estimate of effect in rotator cuff tendinopathy. Results: Only six studies met with our inclusion criteria and were included in this review and meta-analysis. The review suggested that the combined estimate for use of PRP vs other modes of therapy in shoulder tendinopathies is not more effective than other available treatments (relative risk: 0.91; 95% confidence interval (CI): 0.86-0.97). However, no major side effects were reported in the PRP group. Conclusion: There are insufficient data to come to a valid judgment on the efficacy of the use of PRP in shoulder tendinopathies. However, our review has revealed that there have been no adverse reactions, in the use of PRP in shoulder tendinopathies, reported so far. This is a very useful clinical information. Keywords: Platelet-rich plasma; PRP; Rotator cuff tendinopathy; a systematic review.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 54083**

**SYNTHETIC AUGMENTATION FOR MASSIVE ROTATOR CUFF TEARS**

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Background: The treatment of massive chronic tears is problematic. The re-tear rate following surgery for extensive cuff tears remains high, and there is little consensus regarding optimum treatment. Aim: To investigate the outcome of a cohort of patients who had open repair of an extensive cuff tear using the Leeds Kuff patch as an augment. Methods: A retrospective cohort study of consecutive patients with a massive cuff tear who had surgery in our regional elective orthopaedic centre over a two year period from January 2015 to Dec 2016. All patients followed identical rehabilitation protocols, supervised by physiotherapists with an interest in the shoulder. Outcomes assessment was undertaken at a minimum of 12 months by a registrar or physiotherapist who was not part of the treating team. Pre-op data collection included; range of motion, pain score, Oxford shoulder score (OSS), assessment of muscle atrophy on MRI. Results: Data collection was completed in 15 patients. The mean age was 62 yrs (56 – 75). The mean pre-op OSS was 22, improving to a mean of 43. The range of motion and pain score improved. There were no intra-operative complications. One patient required a second surgery for evacuation of a haematoma at 10 days post op. One patient had an obvious re-tear at 4 months. Conclusion: ORCR with synthetic Kuff patch augmentation for chronic degenerative tears appears worthwhile when assessed at 12 months and they continued to improve even at 18 months. This treatment method may be a useful option for patients > 70 years old.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 53846**

**MANAGEMENT OF PERIARTHRITIS SHOULDER BY SUPRA-SCAPULAR NERVE BLOCK VERSUS PLATELET RICH PLASMA**

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**INTRODUCTION:** Periarthritis (PA) of shoulder is characterised by painful and global restriction of glenohumeral range of motion in at least two directions most notably shoulder abduction and external rotation. It is more common in females, 40-60 years age and in diabetic patients. Platelet Rich Plasma (PRP) is an emerging treatment option and its efficacy needs to be examined and compared with old and effective treatment modality, suprascapular nerve block (SSNB). **AIM:** To assess the efficacy of PRP injection and compare it with SSNB in the treatment of PA shoulder. **MATERIALS AND METHODS:** Patients with PA shoulder (n=40) were randomised to receive single injection of PRP (4ml) (n=19) or SSNB (n=21) (40 mg methylprednisolone + 5ml 2% lignocaine). All participants were also advised to perform a home based 10 minute exercise therapy. The outcome were measured by using Constant and Murley shoulder score. Participants were evaluated at 0, 3rd day and 1 month. Student t-test and RM-ANOVA tests were used to determine significant differences. **RESULTS:** PRP treatment shows significant increase in pain for few participants at 3rd day, causing decreased active range of motion. But at 1 month PRP treatment resulted in statistically significant improvements over SSNB in CONSTANT score. No major adverse effect were seen in both the modality. **CONCLUSION:** This study demonstrates that single injection of PRP is effective and better than single injection of SSNB in treatment of PA shoulder.



**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 55885**

**INTERNAL BRACING OF THE CORACOCLAVICULAR LIGAMENT IN A RECENT ACROMIOCLAVICULAR JOINT DISLOCATION**

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Introduction: acromioclavicular (AC) joint dislocations are common, accounting for 9% of all shoulder injuries more common in males and athletes. Rockwood classification system used to classify them. Treatment of Type 3 Acromioclavicular joint dislocation is controversial, the rationale of surgical treatment is to restore normal anatomy, enabling the patient to regain normal shoulder function. A wide variety of surgical procedures have been reported, including ligament reconstruction with a soft tissue graft, Modified Weaver-Dunn, autograft & allograft, fixation, suture, hook plate, CC screw (Bosworth), cortical flip button (e.g. Dog Bone) (+/- arthroscopic assistance), K-wire. Patients and methods This were a prospective series of 18 patients with acute grades III–V AC joint dislocations through internal bracing using non-absorbable suture Ethibond number 5. There were 12 males and 6 females, age from 28 to 50 years, more common in right side 70% than the left side 30%. Rockwood type III in 12 patients, type IV in 5, and type V in one. Results: the mean follow-up period was 15 months (12–24 months). This procedure allowed for both satisfactory functional outcome and a low complication rate, with excellent or good results in more than 90% of the patients, with full return to previous activities in 6 months. Conclusion CC internal bracing provides satisfactory results. This method aims at a reconstruction in which the course of the Ethibond slings is very close to the course of the original CC ligaments. No need for a second surgery. Keywords: acromioclavicular dislocation, acromioclavicular joint, coracoclavicular ligament.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 55793**

**RADIOGRAPHIC AND CT CHARACTERISTICS OF CORONOID FRACTURES AND INTER-OBSERVER RELIABILITY OF CORONOID FRACTURE CLASSIFICATION**

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Purpose To compare X ray measurement of coronoid fracture size and morphology with CT scans and to determine the inter-observer reliability of the Regan-Morrey and O'Driscoll classification systems. Methods 72 fracture dislocations of the elbow with the presence of a coronoid fracture were included. The coronoid fragment size was measured using plain radiographs and as a percentage of the intact coronoid. Paired CT scans on the same patients were used to perform the same measurements. Fractures were classified on X ray using the Regan-Morrey system and on CT using the O'Driscoll classification. Measurements were taken independently by two researchers and compared using Cohen's Kappa method. Results The mean x ray coronoid fragment height was 5.5mm (0.7 - 12.6), compared to 6.6mm (1.8 - 14.7) on CT. According to the Regan-Morrey classification, there were 37 Type 1; 31 type 2 and 4 type 3 fractures. For the O'Driscoll classification, there were 11 Type 1-2; 5 type 2-1 (isolated anteromedial); 54 type 2-2 and 2 type 2-3 fractures. 91% of O'Driscoll type 1 fractures were <5mm in size on X ray measurement. The majority of fractures assessed (85%), involved the anteromedial facet of the coronoid. Fracture size >5mm on x ray had a sensitivity of 0.59 and specificity of 0.91 for involvement of the anteromedial coronoid. X rays underestimated the fragment size by a mean of 17% when compared to CT. Inter-observer reliability was moderate (k=0.42) for Regan Morrey; and fair (k=0.27) for the O'Driscoll system. Conclusion Coronoid fracture size and morphology is underappreciated on plain x rays. Fractures >5mm are likely to involve the anteromedial part of the coronoid. Based on these findings, CT scans are recommended for all coronoid fractures. A simplified

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 54244**

**HYDRODILATATION FOR PRIMARY ADHESIVE CAPSULITIS:  
FLUOROSCOPICALLY ASSISTED VERSUS ECO-GUIDED**

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Introduction: Objective: To compare two hydrodilataion techniques in primary patients: fluoroscopically assisted versus eco-guided. Methods: Retrospective study: two groups (48 primary adhesive capsulitis patients each) treated with fluoroscopically-contrast guided hydrodilataion-anterior portal (Group S) and patients treated with eco-guided hydrodilataion-posterior portal (Group E). Patients were evaluated: VAS (visual analogue scale) for pain, passive mobility range (PROM) and Constant score at 1, 3 and 6 months and data were compared with pre-hydrodilataion values. We monitored: technique's duration, pain during hydrodilataion and patients needing arthroscopic arthrolisis for unsuccessful hydrodilataion. Results: Patients in both groups (comparable in terms of sex and age distribution) have less pain and better PROM at 1 month, even better at 3 months and stabilized at 6 months, comparing with pre-hydrodilataion ( $p < 0,01$ ) without differences between the groups ( $p = 0,63$ ). The average Constant in Group S went from 40 pre-hydrodilataion to 69 at month, 75 to 3 months and 80 to 6 months ( $p < 0,001$ ). In Group S Constant's averages were similar, without significance comparing Group E. The average technique's duration in Group E decreased by 0,35 ( $p < 0,001$ ). Patients in Group E experienced less pain during hydrodilataion comparing to Group S ( $p < 0,04$ ). In Group S, four patients requires arthroscopic arthrolisis and in Group E two patients. Conclusion: The two hydrodilataion techniques provides good and comparable results, reducing pain, improving progressively PROM and Constant at one, 3 months and stabilizing at 6 months. The technique is performed faster, patients report less pain during the eco-guided hydrodilataion and requires less arthroscopic arthrolisis.

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**Session: Shoulder & Elbow Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 54375**

**COMPARISON OF OUTCOME OF TENNIS ELBOW PATIENTS TREATED WITH USG GUIDED (PRP AND STEROID INJECTION) VS BLIND (STEROID & PRP INJECTION) IN A RANDOMISED CONTROLLED TRIAL**

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Purpose: To quantify effectiveness of 4 injection protocols-USG-guided PRP[Platelet rich plasma]vs USG guided Steroid vs Blind PRP vs Blind steroid injection in terms of pain relief & daily elbow use, and identify most effective conservative procedure. Study Design: Randomised controlled trial; Level of evidence-1. Material & methods: 72 consecutive patients (non-athletes) with clinical diagnosis of lateral epicondylitis and failure of conservative therapy for minimum 3 months of mean age 41.9years (range: 22-60), predominantly females (60%) were randomly allocated into one of 4 groups and injected by same orthopaedician. VAS(Visual Analog Scores),DASH(Disabilities of the Arm, Shoulder and Hand)score, USG evaluation and Pronation & Supination ranges were observed pre & Post-procedure, at 2 weeks,1 month,3 months & 1 year follow-up. Exclusion criteria: Previous surgery for same indication, diabetes or neurological involvement. Same post-injection protocol followed for all. Threshold was 1 injection. If no relief then MRI and arthroscopic debridement was planned. Results: Successful treatment->25% reduction in VAS/DASH score without a reintervention after 6 months. VAS SCORE showed significant improvement(p value<0.05) from 7.6□3.7 and DASH SCORE also had statistically better results(p value<0.05) from 42.90□19.19 in all 4 modalities with better overall results in USG PRP group and similar results in remaining 3 modalities at 1 year.3 patients failed conservative approach and required surgery. Conclusion: There is no such study in literature comparing all 4 modalities ever. Injecting lateral epicondylitis patients with corticosteroid (blind or USG guided) injections causes short term relief comparable to PRP injections (USG-guided or blind) (p value>0.05). PRP reduces pain and significantly increases function, superceding the effect of other modalities in medium & long-term.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 54105**

**COMPARATIVE EVALUATION OF NON-OPERATIVE TREATMENT MODALITIES FOR FROZEN SHOULDER**

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This study evaluates the effectiveness of Analgesia and ultrasonic therapy(A), intra-articular injection(anterior(B1) and posterior approach(B2)) and saline distension of shoulder joint(C) in the treatment of frozen shoulder. Method: The study includes 168 patients. In GroupA the analgesics with Ultrasonic therapy was given. The injection group(B) was given intra-articular steroid injection via anterior approach(42 patients) and the other via posterior approach(46 patients). 58 patients underwent saline distension of shoulder. Exclusion criteria includes: bony injury around shoulder joint, Rotator cuff tear, Impingement syndrome of shoulder. FBS levels & HbA1c was done in all patients. Results: The decrease in VAS score was significant in patients treated with intra-articular injections ( $p < 0.05$ ). The VAS Score initially decreased in group C for 3 weeks and then it rises again. There was significant increase in the ROM in group B & C with no significant difference in B1 & B2. Average SPADI scores were significant for group B( $p < 0.05$ ). The average SPADI score was 26 & the patient Satisfaction score was 8 in GroupB. There was no co-relation found between the level of HbA1C and the severity of symptoms. Conclusion: There is significant improvement in ROM, decrease VAS & SPADI Score in Group B & C. There was no statistical difference found in the anterior or posterior approach to the shoulder injection, though anterior approach was found to be superior and easy to administer. The saline distillation in shoulder joint is difficult to administer. The VAS score and SPADI scores increases after 3 weeks, the ROM decreases.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 54550**

**CEMENTED VERSUS UNCEMENTED GLENOID COMPONENTS IN TOTAL SHOULDER ARTHROPLASTY FOR SHOULDER OSTEOARTHRITIS: A NEW ZEALAND JOINT REGISTRY STUDY**

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Introduction: NZJR was used to review TSA for osteoarthritis and compared revision rates and functional outcomes for cemented vs uncemented glenoids. METHODS: NZJR - TSA for osteoarthritis 2000 - 2017. Revision rates per 100 component-years. Analysis repeated excluding the SMR L2. Kaplan-Meier survival analysis performed. Oxford shoulder scores, 6-month, 5-years. RESULTS: 2613 TSA. 62.1% female. 44.8% 65-74y years. Cemented components 69.6%, uncemented 30.4%. Uncemented, 86.6% SMR, 6.5% Bigliani, 4.0% Aequalis. Cemented, 49.8% Global, 15.3% Aequalis, 10.6% Bigliani. Revision rate significantly higher with uncemented, 2.03/100-cys (95% CI 1.63-2.50) versus cemented 0.41/100-cys (95% CI 0.30-0.55,  $p < 0.001$ ). Hazard ratio - uncemented 5.0 (95% CI 3.5-7.2) versus cemented. No significant difference in Oxford Scores between groups. Most common mode of failure, loosening, cemented (44.4%), polyethylene liner failure in uncemented (34.8%). Rotator cuff pathology, deep infection and instability comparable between groups. SMR L2 excluded from analysis, the uncemented continued to show increased revision rate vs cemented. SMR cemented vs SMR uncemented excluding the SMR L2, no significant difference between revision in two groups ( $p = 0.47$ ). SMR L1 had a significantly higher revision rate ( $p = 0.009$ ) vs all non-SMR uncemented. NZ uncemented use peaked in 2011. CONCLUSIONS: TSAs for osteoarthritis have a significantly higher revision rate when glenoid component is uncemented. TSAs using uncemented components are 5.0 times more likely to undergo revision. When excluding SMR L2 glenoids from the analysis, the significantly higher revision rate remained for uncemented glenoids.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 54856**

**FACTORS ASSOCIATED WITH NEED FOR BLOOD TRANSFUSION AND PROLONGED LENGTH OF STAY (LOS) FOLLOWING SHOULDER ARTHROPLASTY**

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The aim of this study was to identify factors associated with the need for blood transfusion and prolonged length of stay (LOS) following shoulder arthroplasty. 100 consecutive shoulder arthroplasty cases, over a two year period (August 2015 – August 2017) were identified. Demographics, type of surgery, indication, LOS, pre and post-operative haemoglobin, haematocrit and Total blood loss (TBL) were recorded. Multivariate analysis was performed. There were 49 Reverse Total Shoulder Replacements, 28 Anatomic Total Shoulder Replacements, 12 Hemi-arthroplasties and 11 revisions. The mean age was 74 (range 25-90). The average LOS was 4 days (1-17). 28% were discharged by day 1 post-operatively, 50% by day 2 and 63% by day 3. Factors associated with prolonged LOS were related to anticoagulation and social factors. Transfusion rate was 9% with pre-operative anaemia and fracture treated with Reverse Replacement as risk factors. The average LOS for transfused patients was 6 days [2-14]. The average haemoglobin drop was 21 [3-56] and the TBL (using Hb-balance method) average was 160mls [22-367]. This did not correlate with need for blood transfusion. Patients with pre-existing anaemia and those with fractures treated by Reverse Total Shoulder Replacements have a higher risk for requiring blood transfusion and prolonged LOS. These patients may benefit from targeted pre-operative optimisation protocols.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 55792**

**DO ALL ANTEROMEDIAL CORONOID FRACTURES REQUIRE SURGICAL FIXATION?**

Paul CAMERON, H SYED, Joideep PHADNIS

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Background: Anteromedial coronoid fractures (AMCF) are associated with posterior medial varus instability of the elbow (PMVI), which can lead to rapid post-traumatic arthritis. Surgical treatment is frequently recommended; however, our experience is that many AMCFs do not require fixation. This study reports the radiographic and functional outcomes of a large cohort of patients with elbow instability that did not have fixation of the AMCF. Methods: 49 patients with an AMCF fracture were included. Fractures were classified according to the Regan-Morrey, and O'Driscoll classifications. Outcome measures of interest were: (1) Functional outcome (Oxford Elbow Score, OES and visual analogue score (VAS)); (2) Elbow motion and stability, (3) radiographic sequelae (post-traumatic arthritis, instability, and heterotopic ossification). Results: 6 fractures were classified as O'Driscoll anteromedial subtype 1; 42 were subtype 2 and 1 was subtype 3. 15 patients had an AMCF without dislocation and 5 had a dislocation. 27 had an associated radial head fracture. 12 of these had a dislocation and 15 did not. 1 had an associated radial neck fracture and 1 had a capitellum fracture. 22 patients were managed without surgery. 27 had ligament repair +/- radial head fixation/replacement, or capitellum fixation without AMCF fixation. Mean follow up was 18 months (range 6-56 months). Radiographic follow up was available for 42 patients (86%) and clinical follow up for 45 patients (92%). Mean flexion-extension arc was 122° (40°-140°). Mean rotation arc was 171° (40°-180°). The median OES and VAS were 45 (9-48) and 1 (0-8) respectively. Three patients had clinical evidence of instability at most recent follow up. Grade 1 arthrosis was present in three patients and grade 3 in three patients. Conclusion: AMCFs can be managed without surgical fixation in many cases. Based on our experience we have developed an algorithm for the safe management



**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 52851**

**TREATMENT OF MILD AND ADVANCED CASES OF ELBOW OA WITH  
ARTHROSCOPIC DEBRIDEMENT AND INTRA-ARTICULAR  
HYALURONIC ACID INJECTIONS**

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**Aims of the study:** This study investigates the efficacy of arthroscopic debridement with/without intra-articular hyaluronic acid (HA) injections with respect to pain relief, arc of movement, and functional improvement in 24 elbows with osteoarthritis. **Material & Methods:** 24 elbows were treated for posttraumatic (n=12) or primary degenerative (n=18) osteoarthritis of the elbow by arthroscopic debridement. HA injection protocol was either preoperative (5 cases), postoperative (n=5), combined pre- and post-operative (n=5) intraarticular HA (Synvisc) injections, or without additional Synvisc injections (n=9). A clinical examination and Mayo elbow performance score was conducted at an average of 15 months (range 12-18months) post-operation. The results were statistically analysed with the Mann-Whitney and Wilcoxon tests. **Results:** Intra-articular cartilage changes were observed to be mild fraying (n=7), significant fraying/fibrillation (n=9), and significant fibrillation with areas of bare bone (n=14). The arthroscopic debridement with Synvisc resulted in statistically significant pain reduction for both posttraumatic and primary degenerative OA groups, in which bone was not exposed. **Discussion & Conclusions:** Our findings reveal a trend toward symptomatic and functional benefit when HA is combined with debridement in osteoarthritic elbow joints without exposed bone. There is a symptomatic detriment associated with HA in osteoarthritic joints with exposed bony areas. This results support the use of HA in combination with elbow debridement in earlier stages of osteoarthritis, but not in advanced cases with exposed bone.

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**Session: Shoulder & Elbow Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 53999**

**CT-SCAN ASSESSMENT OF BOTH TUBEROSITY HEALING AFTER REVERSE SHOULDER ARTHROPLASTY FOR FRACTURE. A 24 CASES SERIES WITH A MINIMUM ONE YEAR FOLLOW-UP**

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Introduction. Reverse Shoulder Arthroplasty (RSA) may be indicated in displaced proximal humerus fractures in elderly patients. The rate of tuberosity healing varies from 37 to 84% in this population. The aim of our study was to assess both tuberosity fixation and healing on CT-scan, after RSA for fracture of proximal humerus. Methods. In this retrospective, multicentre study, RSA with a straight, cementless stem were implanted from September 2014 and April 2017. Systematic CT-scan was performed to assess both tuberosity position and healing, combined with a clinical evaluation. Results. At a 14,4 month follow-up, 24 patients (20 females) had a clinical examination and a CT-Scan. The mean age at surgery was 76 years. Greater tuberosity was healed in 20 patients (83.3%), lesser tuberosity in 21 patients (87.5%) and both tuberosity were healed in 18 patients (75%). Greater tuberosity healing improved Constant Score ( $p=0.02$ ), active forward flexion ( $p=0.02$ ) and external rotation ( $p=0.05$ ). Lesser tuberosity healing improved Constant Score ( $p=0.04$ ). Both tuberosity healing was associated with better Constant Score ( $p<0.01$ ), adjusted Constant Score ( $p=0.03$ ), and better active forward flexion ( $p=0.04$ ) and external rotation ( $p=0.05$ ). Discussion. The use of a straight, space-saving cementless stem resulted in a high rate of tuberosity healing. Greater and lesser tuberosity healing was assessed with a systematic CT-scan. Greater or lesser tuberosity healing was associated with better functional results and active range of motion. These results were improved by the good healing of both tuberosity, with a cumulative effect of greater and lesser tuberosity healing on functional results.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 53834**

**TRANEXAMIC ACID VERSUS PLACEBO IN SHOULDER ARTHROPLASTY: A META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS**

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Tranexamic Acid (TXA) was first discovered in 1962, it has been recently used in total shoulder and reverse shoulder arthroplasty. Unfortunately, there is no Level-I Meta-analysis carried out on RCTs assessing TXA in shoulder arthroplasty and there has been no America Academy of Orthopaedic Surgeons (AAOS) guidelines on its use in shoulder arthroplasty. Our meta-analysis aims to address this issue by studying and comparing all Level-I RCTs in order to provide a comprehensive and high level of evidence comparing TXA to placebo in shoulder arthroplasty surgery. Methods: PubMed, MEDLINE, EMBASE, Web of Science, Cochrane Library and ClinicalTrials.gov were search in August 2018 using the following keywords: “tranexamic acid” AND “total shoulder” AND “arthroplasty”. Data about post-operative calculated total blood loss, blood loss via drainage, haemoglobin change, intra-operative estimated blood loss, complications, number of packed red blood cells (PRBCs) units transfused and length of hospital stay were extracted by two independent authors. Four RCTs were found on this topic, the mean age ranged from 67 to 71.3 across all studies. A total number of 375 patients were included in study. In conclusion, the use of TXA in ATSA and RTSA can safely decrease surgical blood loss but the clinical value remains questionable. Additional high quality RCTs are needed in order to determine efficacy and clinical effectiveness.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 53826**

**LONG TERM RESULTS OF RADIAL HEAD REPLACEMENT - "WHEN TO DO, HOW TO DO AND WHAT TO DO"**

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Background -Radial head replacement has been a debatable treatment option considering its lack of literature in operative techniques, functional results or complications and implant / prosthesis designs. The present study was carried out to establish an operative technique and analyse the long term clinical results after treatment of irreparable radial head fractures with radial head replacement. Methods: 37 patients with irreparable radial head fractures were treated with cemented monoblock radial head prosthesis during 2014-2016. The patients were followed up for a period ranging from minimum of 28 months to a maximum of 56 months, with average being more than 3 years. During each visit their functional outcome with any associated complications were noted and were graded with Mayo's elbow performance score (MEPS). Results: At the final follow up, 29 patients (78.4%) had excellent results, 6 (16.2%) good and two (5.4%) had fair results. 6 patients were associated with complications like pain, stiffness and valgus elbow instability. Variables like MEPS, pain and stiffness were found to have significant association with time interval between injury and surgery, with cases being operated earlier showing better results. Significant association was also seen between associated elbow injury and elbow instability. No case of radiocapitellar overstuffing was seen. Conclusion: We conclude that radial head arthroplasty restores elbow kinematics and stability with good functional outcome, provided care has been taken to avoid overstuffing of the joint by following proper intra-operative guidelines. Identifying at risk patients for elbow instability is important and post-operative regime thus modified accordingly.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 53257**

**LOW INCIDENCE OF SCAPULAR NOTCHING IN UNCEMENTED TRABECULAR METAL REVERSE SHOULDER SYSTEM- 7 YEAR RESULTS**

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Introduction: Despite the high success rates of reverse shoulder replacements, complications of instability & scapular notching remain a concern. However, factors reducing relative motion of implant to underlying bone which include a lateral offset to the centre of rotation, screw & central peg insertion angle and early osteo-integration are maximized in the Trabecular Metal Reverse Total Shoulder system. Objectives: We present clinical and radiological outcomes of the uncemented Trabecular Metal Reverse Total Shoulder system at 7year follow-up. Methods: Prospective analysis of a single surgeon series of 171 Reverse Total Shoulder replacements in 160 patients was performed. All patients were assessed using pre-operative pain score, Constant score, Oxford score and radiographic reviews with standard X-Rays at 6 weeks, 3, 6, 12 months and yearly thereafter. Any complications were also recorded. Results: The cohort comprised 103 females and 57 males. Mean age was 68y (range 48- 88). Pain on the visual analogue scale decreased by 98% (p<0.01). Constant score improved by 81.8% (p<0.05), Oxford shoulder score by 76.7% (56 to 13) (p<0.05). X-rays revealed 95.6% of humeral stems had no radiolucent lines. 5.57% showed radiographic signs of scapular notching at 84 months. Complications included two glenosphere revisions, four stitch abscesses and two Acromial fractures in patients who had a fall two years after the procedure. Conclusions: Our mid-term validated outcomes show promising results for the Uncemented Trabecular Metal Reverse Total Shoulder system with low pain scores, improved Constant and Oxford scores and a low incidence of scapular notching.

**Date: 2019-12-06**

**Session: Shoulder & Elbow Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C1**

**Abstract no.: 53453**

**A NOVEL POSITION FOR ANTE GRADE HUMERAL NAILING**

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Introduction: Ante grade humeral nailing is typically done either in beach chair/supine or lateral position. Surgeon and anaesthetist face various problems like crowding at head end and risk to anterior NV structures while locking distally in these positions. To avoid these issues a novel modified lateral position has been described to facilitate the procedure. Technical note: A total of 4 cases were done using this position where the patients head was placed away from the anaesthesia machine and connected to the anaesthesia machine with long connecting tube thus avoiding the overcrowding issue at the head end. As patient is in lateral position there is always an option of performing posterior to anterior distal locking which greatly reduces the risk to anterior NV structures Conclusion: The new position keeps surgeon and anaesthetist comfortable during the surgery along with reducing the risk to NV structures while locking distally. Both the anaesthetist, surgeon and OT staff are familiar with lateral positioning which is used routinely in hip arthroplasty. A larger number of surgeries should be done using this position to establish this new position.

**Date: 2019-12-06**

**Session: Infections Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54359**

**IDENTIFYING OPTIMAL THERAPY ROUTE AND PREDICTORS OF ADVERSE OUTCOMES IN PAEDIATRIC ACUTE HAEMATOGENOUS OSTEOMYELITIS**

Zaid ALHINAI<sup>1</sup>, Morvarid ELAHI<sup>2</sup>, Bill FOO<sup>3</sup>, Brian LEE<sup>3</sup>, Kimberle CHAPIN<sup>3</sup>, Penelope DENNEHY<sup>3</sup>, Michael KOSTER<sup>3</sup>, Pablo SANCHEZ<sup>2</sup>, Ian MICHELOW<sup>3</sup>

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Background: Predicting long term morbidity in paediatric acute haematogenous osteomyelitis (AHO) is challenging. The effect of route of therapy remains the subject of debate. Objective: To identify early predictors of poor outcomes in paediatric AHO. Methods: Children with AHO meeting eligibility criteria were identified retrospectively at two paediatric tertiary care centres by searching relevant ICD9/10 codes. Diagnoses were verified with clinical and radiographic data. Exclusion criteria included age <1 month or >18 years, non-haematogenous infections, underlying chronic illness, skull or spinal infections, and Bartonella osteomyelitis. Adjusted early predictors of poor outcome were identified. The effect of route of therapy on outcomes was assessed. Propensity score matching was used to adjust for differences in baseline characteristics. Results: 261 patients were enrolled, 27 (10%) suffered chronic complications. After binary logistic regression, significant early predictors of chronic complications were the need for bone debridement, persistently elevated c-reactive protein after 2-4 days of antibiotics, and multifocal infection. A composite score named the C-SCORE was created, and showed a favourable ROC curve (AUC 0.802), performing significantly better than a previously published severity of illness score (AUC 0.699). Patients who had peripherally inserted central catheters (PICCs) for prolonged intravenous antibiotics suffered more therapy-related adverse events. Patients transitioned to oral antibiotics were more likely to be lost to follow-up. Conclusions: Early findings such as the need for surgical intervention, persistent inflammation despite antibiotic therapy, and multifocal infection significantly predicted chronic morbidity. Use of PICCs for prolonged intravenous antibiotic therapy resulted in more adverse events.

**Date: 2019-12-06**  
**Session: Infections Free Papers 1**  
**Time: 08:00 - 10:00**  
**Room: Grand Ballroom Hall C2**

**Abstract no.: 54809**

**WRIST TUBERCULOSIS IN PAEDIATRIC PATIENTS: OUR EXPERIENCE  
IN 44 PATIENTS**

Jatin PRAKASH

VMMC and Safdarjung Hospital, Delhi (INDIA)

Introduction: Hand and wrist tuberculosis is rare, accounting for less than 1% of all osteoarticular TB. Still, TB of the hand and wrist is a cause of major morbidity due to a delay in diagnosis, causing residual stiffness and pain after treatment. Further the disease course differs in children compared to their adult counterpart. The disease may affect the growing bone, causing residual deformities. Methods: A total of 44 patients with skeletal lesions in the hand and wrist were studied. The diagnosis was confirmed by biopsy. Patients were started on multidrug antitubercular treatment (ATT). Those not responding were scheduled for debridement. All patients were assessed using the Green O'Brian scoring system. Results: pain was the commonest complain followed by swelling. The proximal phalanx of the fourth digit and the metacarpal of the fifth digit were the most commonly involved bones in hand and the capitate was the most common carpal bone, followed by the lunate. The duration of symptoms ranged from 5 weeks to 24 weeks (mean: 7.6 weeks). Three of our patients not responding to ATT had multidrug resistance. Conclusion: A very high index of suspicion, MRI and early biopsy are required for a timely diagnosis of skeletal TB of the hand and wrist. Early commencement of ATT was the most important factor for good results. The possibility of multidrug resistance should be kept in mind for patients not responding to treatment.



**Date: 2019-12-06**

**Session: Infections Free Papers 1**

**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 55208**

**NONTUBERCULOUS MYCOBACTERIAL PHALANGE OSTEOMYELITIS  
IN CHILDREN AND LITERATURE REVIEW**

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Nontuberculous mycobacterial (NTM) infections involving the musculoskeletal system are uncommon. The hand and wrist are the most frequently reported sites of NTM tenosynovitis because of their abundance of synovial fluid and tissue combined with a higher probability of penetrating injury. We reported a rare and delayed diagnosis case of osteomyelitis. An 8-year-old girl presented swelling and necrosis of nail bed in her right index finger 1 month without injury and special contact history. The culture of wound and tissue biopsy was negative. After twice debridement, the necrosis of bone and soft tissue was Progressive aggravation. At last, the distal interphalangeal joint was amputated in right index finger. The definitive diagnosis and identification of the causative agent were shown by PCR assay finally. The patient healed after one year chemotherapy. Here, we will show all the detail history and images and review published literature. The clinical course of the disease is typically protracted and undetectable; average time from onset of symptoms to diagnosis may be as long as 10 months. It is very important to notice this serious condition in order to prevent irreversible tissue destruction and bone disorders. The prompt and accurate diagnosis is essential and chemotherapy is necessary.

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**Time: 08:00 - 10:00**

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**Abstract no.: 54827**

**STERNOCLAVICULAR TUBERCULOSIS: RARE CAUSE OF  
INCORRIGIBLE SHOULDER PAIN**

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Introduction: Shoulder pain is multifactorial with aetiologies lying within and outside shoulder girdle. However one rare but important source frequently overlooked is tuberculosis of sterno-clavicular joint. Methods: we present the clinical and radiological findings in 19 patients suffering from sternoclavicular tuberculosis. Results: all patients had history of pain to shoulder joint, pain in all arcs of shoulder movements and difficulty in falling asleep due to pain. Only 6 complained of pain at sterno-clavicular area while in others tenderness could only be elicited on deep palpation. The MRI showed focal oedema on sterno-clavicular joint and histopathology confirmed the diagnosis. Multidrug ATT had a good response when begun timely. Conclusion: a high index of suspicion for Tuberculosis must be kept for relentless shoulder pain with no obvious cause and sterno-clavicular joint imaging should form the part of investigation protocol for all chronic shoulder pain.

**Date: 2019-12-06**

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**Time: 08:00 - 10:00**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 55029**

**RECONSTRUCTION OF EXTENSIVE LONG BONE DEFECTS BY RADIAL  
DISTRACTION OSTEOGENESIS AND TRANSPLANTATION OF THE  
ENHANCED FIBULA**

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Introduction: Established procedures for the reconstruction of extensive defects in long hollow bones such as callus distraction result in a prolonged treatment with a high incidence of complications. Our aim is the optimization of defect reconstruction to significantly reduce the duration of treatment, complications and to drastically increase the patient's comfort. This is to be achieved by the combination of well-established procedures: catheterization, callus distraction, transplantation and intramedullary nailing. The patient's fibula is osteotomised longitudinally and then gradually expanded radially with a balloon catheter. After completion of the expansion to an inner diameter of 12 mm, the autologous graft is transplanted into the defect zone. The expanded fibula is then stabilized together with the affected bone by an intramedullary nail offering a primary stable situation. Methods: We designed an expansion system consisting of a subcutaneous port, tube and multi-stage balloon catheter and determined its expansion behaviour by gradually inserting an increasing amount of fluid through the port with a syringe. The system performance was then evaluated via expanding 3D-printed models of several human fibulae. Results: First results show that a uniform and gradual expansion of the catheter can be achieved, which lead to the intended stepwise diameter increase of the model fibulae. Outlook: To assess the effect of soft tissue in a biological environment, the system will be further evaluated in a human cadaver. Furthermore, the development of a suitable model for the developing callus tissue is paramount, in order to determine its influence on fibula expansion.

**Date: 2019-12-06**

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**Abstract no.: 55018**

**BONE QUALITY IN PATIENTS OLDER THAN 60 YEARS WITH CHRONIC OSTEOMYELITIS OF LONG BONES OF THE LOWER LIMBS ACCORDING TO DATA OF MULTI-SLICE COMPUTER TOMOGRAPHY**

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**Introduction** The purpose of the work is to study results of MSCT in patients older than 60 years with chronic osteomyelitis and revealing roentgen morphological changes in order to choose the optimal tactics of treatment. **Materials and methods** 30 patients at the age older than 60 years with chronic osteomyelitis of long bones of the lower limbs were examined by method of roentgenography and multi-slice CT (MSCT). Among the examined the male patients with posttraumatic osteomyelitis of the tibia prevailed. 16 patients had chronic osteomyelitis for 5 years; 9 patients – for more than 15 years. Two control groups included 30 patients at the age 20-45 years and 30 patients at the age 46-59 years with chronic osteomyelitis of long bones. Results of the study revealed extensive changes not only in the segment in question but also in the adjacent segment and joints in all of the examined patients of the main group. Change of bone architectonics manifested in evident polymorphism without obvious manifestations of osteoporosis, because long inflammatory process led to extensive sclerosis in the osteomyelitic focus. There were differences in the cortex density at the site of osteomyelitic cavity, located in the proximal and distal parts of the tibia. **Conclusions** Information received in the preoperative period by the MSCT method was comprehensive and revealed location of purulent and necrotic focus, character of destruction, extension and borders of the bone tissue damage, which provided the possibility to choose the optimal surgical intervention.

**Date: 2019-12-06**

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**Room: Grand Ballroom Hall C2**

**Abstract no.: 53495**

**SURGICAL OUTCOME OF INFECTED NON-UNIONS OF LONG BONES USING MONOPLANAR RAIL EXTERNAL FIXATOR (LRS)**

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Due to increasing number of high-energy traumatic events, the incidence of complex and compound fractures are also in the rise. Such fractures are often exposed to various environmental contaminants, inadequate debridement and sometimes erroneous decision making leading to cases of infected nonunions. Eradication of infection in such cases and achieving union may sometimes pose serious challenge to orthopaedic surgeons. Presence of comminution, bone gap or deformity can seriously complicate the situation. No definite surgical technique has been found to be full-proof in dealing with these infected nonunion cases. In this scenario the limb reconstruction system (LRS) fixator is emerging as a useful option for infected nonunions with deformity or gap nonunion. Fifty one cases of infected nonunions involving tibia (n=37), femur (n=13) and humerus (n=1) were treated by LRS fixators after debridement of the infected nonunion site. Flap cover procedure was done as per necessity. Bone gaps and limb length discrepancies were dealt with bone transport or limb lengthening by the LRS instrument. Weight-bearing and removal of fixator was decided according to the radiological evidence of healing. All the nonunion sites except 1 and all the regeneration sites healed uneventfully, although the union time was varied (range, 21-52 weeks). Commonest complication was pin-tract infection and pain. The mean lower extremity functional score (LEFS) was 60.3 out of 80. LRS fixator is an excellent tool for management of infected nonunions which is easy to apply, comfortable for the patient with minimum complications and with predictable as well as reproducible outcomes.

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**Abstract no.: 54949**

**LONG-TERM FOLLOW-UP ON POST-OPERATIVE DIAPHYSEAL OSTEOMYELITIS TREATED BY CUSTOM-MADE ANTIBIOTIC CEMENT ROD AND SIGN NAIL**

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Infection is a dreaded complication of musculoskeletal trauma. It occurs most commonly after open fracture but can also develop after surgery of closed fracture. Conventional management protocol of intramedullary infection after nailing, plating or Ex-fix includes removal of the hardware, debridement in some cases insertion of antibiotic impregnated cement beads for high concentration of antibiotic delivery to the affected bone as because the standard I/V antibiotic treatment cannot deliver sufficient high concentration locally. This study was carried out at Comilla Medical College & Hospital in the Department of Orthopedics and traumatology. Study period was between Jan 2011 to Dec 2017. All the selected patients suffering from Chronic Osteomyelitis following diaphyseal fracture fixation. This non randomized study includes 30 cases that were treated, of which twenty were tibia and ten were femur. We have made our own custom made intra-medullary replica nail with antibiotic bone cement which was chosen according to the sensitivity of cultured materials from the infection site. Replica nail was removed between 6 to 8 weeks following insertion. After extraction medullary cavity culture found no growth. Then refixation of non-united cases done with SIGN nail. Average follow up period was about 40 months. During each follow up we checked lab parameters of infections, radiological findings and clinical improvements. Antibiotics impregnated cement replica nails inserted in post-operative chronic intra or extra medullary osteomyelitis implies a good recovery from this dreaded consequence. This custom made low cost method of treating osteomyelitis can make the simple solution of a difficult problem.

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**Abstract no.: 55017**

**OSTEOMYELITIC CAVITIES AS A FORM OF CHRONIC OSTEOMYELITIS  
FROM VIEWPOINT OF ROENTGEN MORPHOLOGY**

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**Introduction** Osteomyelitic cavities are a very severe manifestation of chronic osteomyelitis; their treatment takes long time, complex application of conservative and surgical interventions and associated with recurrences. Study of bone quality in this pathology, ways of determining borderlines of pathologic process should facilitate development of more up-to-date, recurrence-free techniques of treatment. **Materials and methods** We studied peculiarities of roentgen morphology of the femur and the tibia in 48 patients with chronic osteomyelitis with osteomyelitic cavity by the method of poly-position roentgenography and multi-slice computer tomography (MSCT). **Results** Analysis of MSCT data in 40 patients with chronic osteomyelitis showed that at the site of osteomyelitic cavity the bone lesion spread throughout the entire thickness of the cortex, the structural changes – throughout the entire length of the bone; there were sinuses, sequestrs, changes of soft tissues. In five patients at the site of the cavity the entire thickness of the cortex was affected, there was a sinus, but half of the bone length had normal structure with decrease of its density. Two of the patients had chronic osteomyelitis and the hardware had not been removed, one patient had recurrence after filling-in the cavity with osteo-inductive material. **Conclusions** Results of the work showed that presence of osteomyelitic cavity in patients with chronic osteomyelitis leads to extensive disorders of the structure and density of the bone, extensive changes of the cortex, multi-layers, defects, significant changes of the density, especially in the medullary canal.

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**Abstract no.: 53698**

**RESECTION WITH SHORTENING AS THE MOST RATIONAL OPTION FOR THE TREATMENT OF INFECTED FALSE JOINTS AND DEFECTS OF THE FEMUR AND TIBIA**

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The combination of nonunion of fractures with osteomyelitis is a challenging problem in orthopaedics. Our aim was to optimize the technique of shortening after resection of the ends of bone fragments in the treatment of patients with infected false joints and bone defects. From 2003 till present, 68 patients with false joints and tibial defects, 19 with similar problems on the hip, 13 with defects after purulent complications of knee arthroplasty. History ranged from 6 months to 28 years. In all cases, acute shortening after resection of bone affected by osteomyelitis was applied. External osteosynthesis according to Ilizarov was used. Alternative to bone transport, this technique minimizes the difficulties associated with the "docking site". Addressing three main tasks: 1- Restoration of the supporting capacity of the segment (most important) 2- Correction of shortening 3- Elimination of the purulent process. Without solving the first task, efforts to solve the other two, seem meaningless. Operation consisted of: revision of the suppurative focus; resection of the bony ends; application of an external fixator; compression to complete bone contact; wound closure. Compression was performed usually 3-5 cm, preserving the diastasis. Postoperatively, continued to bring together fragments @1-3 mm/day. Topical antibiotics, and vacuum drainage to eliminate the suppurative focus, is advisable. However, almost 70% of patients refuse to lengthen the shortened segment after the restoration of support ability. Acute shortening in the treatment of defects and false joints with osteomyelitis is a simple and reliable way to restore the support ability of the limb.



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**WEBER-CABLE-TECHNIQUE FOR TREATMENT OF OSTEOMYELITIS**

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Introduction: Different salvage procedures for treatment of osteomyelitic bone segments are known in the literature. The complete excision of the infected bone segment ensures the best long term outcome for treatment of infected bone. The resulting bone defect can be solved ideally by segmental bone transport with callus distraction. The advantages of using the Weber-Cable-Technique according to other bone transport techniques are demonstrated. Materials and Methods: Our clientele with complex treatment procedures after segmental bone resection and their successful management with flexible cable wires and pulleys mounted on an Ilizarov frame, Taylor Spatial Frame or Mini-Ring fixator are demonstrated. Results: The patient's case histories will be used to demonstrate this versatile technique. The modifications permit the fixation of the required distractors directly on the frame to avoid protruding and cumbersome constructs. Thus, a restriction of the range of motion is avoided, while early weight bearing can be permitted. Conclusions: The advantages of this method utilising flexible cables and pulleys as part of the transport mechanism are outlined as follows. It will be possible to avoid the usual problems associated with K-wires and the standard Ilizarov-Procedure for segmental bone transport. The application of this technique should not present a problem for surgeons familiar with the Ilizarov ring fixator system. The reduction of treatment times in the fixator, as well as the increased patient acceptance and comfort, less scarification and full weight bearing, are some of the definite advantages of this technique.

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**Abstract no.: 55250**

**NECROTISING FASCIITIS OF LOWER LIMBS (ON 10 CASES)**

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Necrotising fasciitis is necrosis of the skin, subcutaneous tissue and fascia. Pathology often not well understood so the first description made by Meleney was back in 1924; it occurs in a traumatic or post-surgical context, spontaneously or often in state of several comorbidities. Its locations are varied. The goal of this study is to report ten cases of necrotising fasciitis located at the level of the lower limb amongst which a bilateral case, seen between January 2014 and December 2018 in the service of orthopaedic and trauma surgery. There was a clear male dominance. There extreme ages were 40 and 80 years old. In seven cases, the infection was as a result of trauma. One patient was HIV positive; three had cardiopathies. Bacteriological sampling was positive in three patients and identified several germs. The treatment consisted of an emergency debridement and antibiotherapy. In one case we performed mid-thigh amputation and below knee in another. A secondary skin graft was performed on six limb meanwhile; in two patients healing was guided. There was one death. Necrotising fasciitis is a rare form of soft tissue infection without muscle involvement. It sometimes leads to death by septic shock as evidenced by the high percentage of mortality in literature (20 to 50%). It is therefore a medico-surgical emergency that requires early diagnosis and appropriate treatment. Good information of the practitioner is vital to allow for a rapid clinical diagnosis to improve the prognosis. Key words: necrotising fasciitis, lower limbs.

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**Time: 16:00 - 17:30**

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**Abstract no.: 54676**

**BIOFILM & ORTHOPAEDIC PRACTICE**

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Biofilms are communities of sessile bacteria embedded in a matrix of extra cellular polymeric substances of their own synthesis that adhere to a foreign body like such as metals, plastics, soil particles, medical implant materials or mucosal surface with impaired host defence. Structure of Biofilms: These contains the bacterial wastes, bacterial cells with different genetic information which constitute only 10-20% of the volume. The rest is polysaccharide (alginate). Surface associated cells enclosed in a polymer matrix containing open water channels. Biofilm formation is typically described in five stages- Attachment of bacteria, Irreversible binding by bacteria, Formation of microcolonies, Maturation of microcolonies and Dispersal. Bacterial biofilms can form on any artificial surface that has been introduced into the human body, as well as on tissues adjacent to the implanted surface. Implant infections can result acutely when infectious bacteria enter the implant site during surgery or recovery. However, many implant infections are subacute or chronic and result from systemic seeding of the implant following a septic event. Surgical planning and operative technique must account for the properties of biofilms to achieve a higher probability of curing these infections. Treatment strategies: Detection of different intracellular signals indicates signal manipulation as a possible target to control growth. Interruption of quorum sensing & inhibition of the transcription of biofilm controlling genes or genes involved in cell attachment. Disruption of the protective extra polymer matrix through mechanical or chemical means. Probiotic approach: colonization of susceptible mucosal surfaces with nonpathogenic bacteria that inhibit the growth of pathogens.

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**Abstract no.: 55021**

**ALPHA-DEFENSIN (SYNOVASURE) TEST IN PROSTHETIC HIP & KNEE INFECTION- RELEVANCE IN CURRENT PRACTICE**

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Background Prosthetic joint infection continues to remain a diagnostic challenge for unhappy primary arthroplasty of hip and knees. There is increasing dependence upon alpha-defensin test to make key decisions like whether to revise or not & to decide between one-stage versus two-stage. Objectives This study aims to assess diagnostic accuracy of alpha-defensin test in determining prosthetic hip & knee infection and to provide guidance for appropriate use of this novel but expensive investigation. Study Design & Methods Retrospective review of all alpha-defensin investigated patients in an orthopaedic institute between February 2015 & March 2017 was performed. Clinical and radiological outcomes including re-infections, re-operations were analysed and alpha-defensin outcomes were compared with that of other available investigations. Results Of total 52 tests performed (17 hips & 35 knees), 3 were positive. On comparison with intra-operative culture (gold standard), sensitivity is 100%. All suspected prosthetic hip infections have good clinical outcomes following their decisions being made based upon alpha-defensin test. Among the negative knee test results, 6 patients developed signs of infection in the post-operative period, 4 of which have been revised with washout, poly exchange or full revision. Conclusions No single clinical investigation can accurately predict prosthetic joint infection in revision for suspected infection. Alpha-defensin test, however, is a useful adjunct to intra-operative surgeon's findings & pre-operative investigations to decide for crucial decisions like whether to revise or not & for deciding between single and two stage.

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**Abstract no.: 54079**

**IN VITRO STUDY OF POLYMETHYLMETHACRYLATE-BASED ANTIBACTERIAL COATINGS**

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There are lots of studies of antibiotic elution from cement beads and spacers, but lack of experiments investigating the efficacy of PMMA-based implant coatings. Objective: to evaluate the antibiotic activity in antibiotic coatings against pathogens causing posttraumatic osteomyelitis. Methods: PMMA-based coatings impregnated with antibiotics (gentamycin-0.5, vancomycin-2, colistin-0.24, meropenem-2, fosfomycin-2 per 40g of PMMA) were formed on titanium plates. Plates were divided into 3 groups. Plates were rinsed with sterile saline. Group 1(control) – no rinse, Group 2 – 7-day rinse, Group 3 – 14-day rinse. Antibiotic concentrations were estimated by serial broth microdilution method. Antibacterial activity against the antibiotic-sensitive and antibiotic-resistant *S.aureus* and *Ps.aeruginosa* strains was estimated by bilayer agar method. Results. Meropenem and fosfomycin concentrations in the solutions obtained at one-fold (16 µg/ml for both antibiotics) and two-fold treatment (2 µg/ml for meropenem and 8 µg/ml for fosfomycin) were sufficient to suppress the control strains. One-fold rinse of colistin samples eliminated their antibacterial activity completely. High activity of meropenem and fosfomycin samples persisted against antibiotic-sensitive *P. aeruginosa* ATCC 27853 strain after 2 rinse cycles; single-rinsed fosfomycin samples also maintained activity against extensively antibiotic-resistant *P.aeruginosa* BP-150. Vancomycin-containing samples possessed sufficient antibacterial activity against both methicillin-sensitive and methicillin-resistant *S.aureus*; two-fold rinse of the samples eliminated their bactericidal properties. Conclusion: PMMA+fosfomycin and meropenem coatings possess the most marked and long-lasting antibacterial activity mainly against the antibiotic-sensitive strains. Vancomycin concentration was enough for sufficient antibacterial activity in one week, but too low after two weeks. Elution of antibiotics from PMMA-based coating is generally consistent with elution from cement beads and spacers.

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**Abstract no.: 54174**

**KNOWLEDGE VS ATTITUDE OF ORTHOPAEDIC SURGEONS  
REGARDING PROSTHETIC JOINT INFECTIONS**

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Introduction: Total joint arthroplasty (TJA) is one of the most important and effective procedures that improve the quality of life and regenerate extremity or joint functions. On the other hand, prosthetic joint infections (PJI) occurring after these procedures can cause morbidity and mortality. Level of knowledge and attitude of the surgeons have the key role in both prevention and management of PJI. Method: We conducted a web-based survey to evaluate the knowledge level and attitude of orthopaedic surgeons regarding PJI. Likert scale was used, and survey included 30 questions. Questions are prepared based on the "Proceedings of the International Consensus Meeting on Periprosthetic Joint Infection". Results: Two hundred sixty-four surgeons participated to the survey. Mean age was 44.8 years, 173 (65.5%) of the participants have more than 10 years of experience, and 162(61.4%) were performing more than 50 TJA per year. We found no statistically significant relationship between knowledge level and years of experience of the surgeon. Similarly, knowledge level and the number of performed procedures per year were not found to be correlated. However, we found that the knowledge level of the participants working in the training and research hospitals were higher when compared with employees of state hospitals. There was no correlation between knowledge and the attitude of the surgeon regarding both prevention and management of PJI. Conclusion: Even though the orthopaedic surgeons have sufficient knowledge about prevention and management of PJI, their attitude can be contradicted with their knowledge.

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**Abstract no.: 54112**

**PRO-IMPLANT FOUNDATION PJI TREATMENT PROTOCOL IN UHC  
SESTRE MILOSRODNICE, CROATIA, EU**

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SABALIC

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With the increase of total joint arthroplasties (TJA) being performed annually in Croatia, the number of prosthetic joint infections (PJI) necessitating revision surgery is increasing. PRO implant Foundation (PIF) protocol (Charite Hospital, Berlin, Germany) suggests that sonication fluid from infected joints is more appropriate material for the diagnosis of periprosthetic infections than just periprosthetic tissue analysis. In painful joint prosthesis, with signs of premature loosening, a prosthetic infection must be ruled out by joint aspiration. One should preserve the implant only in the case of early postoperative infection (<3 weeks postoperative period), stable implant and no soft tissue lesions. In all other cases, the implant must be exchanged in one or two stages. A short interval (2-4 weeks) two-stage exchange is possible if the biofilm is susceptible to antimicrobial therapy. In the case of persistent pain after joint prosthesis upon implantation or early loosening, negative cultures must be treated as well. In this case, other (non-microbiological) criteria must be sought. By adoption of PIF diagnostic and treatment protocol sampling and sonication, our positive culture rate was raised by 19% compared to previous diagnostic protocols. With promising preliminary results (87% cured PJI), PIF paradigm of "infection as the best possible complication" is being proven in our everyday practice.

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**Abstract no.: 52807**

**TOTAL HIP ARTHROPLASTY OVER CHRONIC OSTEOMYELITIS**

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Introduction. Total hip arthroplasty (THA) is common and well established procedure. But in certain circumstances it is very difficult to address the hip if there are concomitant bone infection elsewhere. Thorough preparation and precise prophylaxie is mandatory in such cases. The one presented here is an example of primary chronic osteomyelitis of the left ankle, with fistula and infectious sinostosis of the tibia, the talus and the calcaneus and advanced hip osteoarthritis on the contralateral leg. 67 yo, male, no known comorbidities, left shin osteomyelitis for over 35 years, with an active fistula. Bone sampling, antibiogramme, focused venous treatment, VAC dressing and surgical debridement, followed by FBC, inflammatory markers and marked leucocytes CT to advice on the osteomyelitis activity. Non cemented total hip followed, with a year follow up and excellent functional outcome and pain control.



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**Abstract no.: 53226**

**A RARE CASE OF STREPTOBACILLUS MONILIFORMIS PERI-PROSTHETIC INFECTION & LITERATURE REVIEW: A LOCALLY DESTRUCTIVE INFECTION WITH DISTANT SEEDING TO A PROSTHETIC JOINT**

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Case report: 66-year-old Caucasian female presented to the Emergency Department seven days after suffering a wild mouse bite to her thumb. She initially experienced localised infection of the thumb pulp, and subsequently developed a red, hot and swollen right prosthetic knee. Clinically the patient had new reduced range of motion in the affected joint compared to the contralateral knee. The patient was febrile with raised inflammatory markers. Following aspiration of her knee under sterile theatre conditions, she soon became overtly septic, requiring admission to Intensive Care Unit (ITU). Joint aspirates grew *Streptococcus moniliformis*, a bacterial strain with only scarce evidence in European literature. Once antibiotic and Critical Care measures had provided clinical improvement, she received Plastic and Orthopaedic surgical management to debride infected thumb tissue - and revise her right total knee arthroplasty in a single stage. She was later discharged safely to complete long-term IV antibiotics under outpatient supervision. Discussion: *Streptobacillus moniliformis* is a gram-negative rod with limited anecdotal evidence in peer-reviewed publications- and rarely mentioned in peri-prosthetic microbiology. We aim to raise awareness and collate a body of existing evidence surrounding a bacterium that is both difficult to detect - as standard culture bottles contain inhibitors that prevent its growth - and clearly has the potential to produce both destructive local infection and distant joint seeding. This case highlights differentiating between rat-bite fever as a systemic condition and septic arthritis of the joint. This is the first case to demonstrate a deep peri-prosthetic infection and its subsequent management.

**Date: 2019-12-06**

**Session: Infections Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54357**

**EFFICACY OF LOCAL ANTIBIOTIC THERAPY IN CHRONIC BONE INFECTION.**

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The use of local antibiotics in the treatment of chronic osteomyelitis is common, safe and effective practice and is supported by numerous clinical studies. Polymethyl-methacrylate (PMMA), with excellent elution and structural properties has been the mainstay of application of local antibiotics. Antibiotic -impregnated PMMA beads or nails have been used since last few decades. The purpose of this study is to determine the efficacy of antibiotic laden PMMA in the treatment of Chronic Osteomyelitis. This Prospective study included 22 patients of Chronic Osteomyelitis treated with thorough debridement followed by application of antibiotic laden PMMA. Patients were followed-up for an average of 2 years. Sinus tract healed in 19 cases at a follow-up of 10 weeks. In two cases, sinus tract healed after removal of PMMA. One patient had persistent sinus along with bone gap and had to be treated with Ilizarov procedure. The ability to deliver levels of antibiotics locally in concentrations that are 200 times higher than levels achieved with systemic antibiotic administration while mitigating the systemic adverse effects has proven effective in the treatment of osteomyelitis.

**Date: 2019-12-06**

**Session: Infections Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54683**

**THE NEED FOR BETTER EDUCATION OF MUSCULOSKELETAL DISORDERS AND EXPOSURE TO ORTHOPAEDICS AT MEDICAL SCHOOL – SEPTIC ARTHRITIS AS A SINGLE DISEASE VIEW**

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Introduction: It has been well documented that Orthopaedics and musculoskeletal disorders are amongst the weakest taught subjects at Medical School, this manifests itself as a subsequent delayed referral of Orthopaedic Emergencies, thus affecting patient outcomes. Presentation of the acute, hot swollen joint is common; correct identification and swift referral of a possible Septic Arthritis is crucial. This study assessed the understanding of Septic Arthritis management by junior doctors in a single trust. Methods: A twelve-question questionnaire was disseminated to over 40 junior doctors of all specialties across East and North Hertfordshire NHS Trust. Questions investigated the doctors' understanding of required investigations of a suspected Septic Arthritis, their ability to aspirate joints and their thoughts on undergraduate medical education. Results: There was a poor understanding of the management of suspected Septic Arthritis, in particular with regards to National Guidelines (75% unaware of their existence) and the mandatory investigations for diagnosis. This was exhibited in the inability of junior doctors to perform aspiration of a suspected septic joint, with only half self-identifying as "competent". Most compelling; two-thirds of doctor's felt that Medical School did not provide adequate preparation to recognise and manage musculoskeletal disorders. Conclusion: A clear failing in undergraduate education of musculoskeletal disorders is evident and this impacts the care of patients who present with a hot swollen joint. Following the results of this study, a pilot postgraduate educational programme is currently being designed to address the curriculum failings surrounding musculoskeletal disorders, with the ambition that this will improve patient outcomes.

**Date: 2019-12-06**

**Session: Infections Free Papers 2**

**Time: 16:00 - 17:30**

**Room: Grand Ballroom Hall C2**

**Abstract no.: 54585**

**ARE WE PICKING UP ALL JOINT INFECTIONS? A RETROSPECTIVE OBSERVATIONAL STUDY OF ADHERENCE TO NATIONAL GUIDELINES ON SEPTIC ARTHRITIS.**

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Introduction: Presentations of hot swollen joints are common, conferring a variety of differential diagnoses; most importantly septic arthritis. The National guidelines outline the necessary diagnostic investigations with synovial fluid analysis being the gold standard. This study assessed whether septic arthritis referrals were systematically treated to ensure high standards of care and uniformity good pre-operative work-up. Method: A retrospective analysis of patients referred to the Orthopaedic Department for an acute hot swollen joint from August-October 2018 was conducted. Inclusion criteria included patients with a native joint and who underwent subsequent aspiration. Analysis of notes determined whether the national guidelines were adhered to both prior and subsequent to referral. Results: Of the 66 patients identified, 56% met the inclusion criteria. An average of 73% mandatory blood tests were performed across the sample, with blood cultures accounting for the lowest percentage (25%). Only 39% of patients had an aspiration performed prior to administration of antibiotics ( $p < 0.0001$ ). This may account for only 27% of patients who subsequently underwent a washout procedure having a positive finding (gram stain or culture) on pre-operative synovial fluid analysis. Conclusion: We are currently failing to meet the national guidelines' pre-referral management of acute hot swollen joints. Our antibiotic administration prior to aspiration likely accounts for the low yield from synovial fluid analysis. Therefore, we propose the implementation of a trust-wide guideline alongside a multidisciplinary approach to ensure all teams are aware of how to manage a suspected septic joint appropriately and educate future cohorts of clinicians.

**Date: 2019-12-06**  
**Session: Knee Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 53777**

**5 YEAR RESULTS FROM THE SWEDISH KNEE OSTEOTOMY REGISTER**

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Introduction: Knee osteotomy is a joint preserving surgery for which new techniques and implants constantly are being introduced. In order to increase the knowledge of their use and results, the Swedish Knee Arthroplasty Register (SKAR) was complemented with a national knee osteotomy register (SKOR) in 2013. We report on the information gathered on osteotomies during the first five years. Method: All patients having knee osteotomy (distal femur and proximal tibia), primaries as well as re-operations are intended to be included in the prospective registration. We describe the patient demographics, diagnoses and surgical techniques. Additionally, the knee osteotomy register was linked to the SKAR to calculate the cumulative risk of conversion to knee arthroplasty (CCR). Results: During the first 5 years 988 knee osteotomies were reported, with a completeness of the registration varying between 76 and 86%. The majority of the patients were men, the median age at surgery was 50 (17-75) years and 90% of the surgery was for osteoarthritis. Open wedge osteotomy (OWO) with internal fixation was the most common (68%) using the Tomofix plate for fixation in half of them. The CCR at 5-years for all patients was just under 8%. The CCR was similar for both internal- and external fixation, gender, as well as for the age-groups younger than 55 vs 55 years and older. Conclusion: As relatively few patients are being treated with knee osteotomy and the rapid development of techniques and new implants, a nationwide registration of knee osteotomies is relevant to monitor the outcome.

**Date: 2019-12-06**  
**Session: Knee Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 54610**

**ACCURACY OF THE TIBIAL COMPONENT POSITIONING IN ROBOTIC ARM ASSISTED VS CONVENTIONAL UKR. A COMPARATIVE RADIOGRAPHIC STUDY**

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**INTRODUCTION:** Robotic surgery has evolved in the western countries as a tool to achieve the desired limb alignment and implant position in knee arthroplasty. Semi active robotic systems allow the surgeon to use or control the robot to perform the operation according to the tailor made preoperative plan for the patient. **AIM:** To determine whether the use of MAKO robotic arm assisted systems provides more accuracy in implant positioning in Uni-Knee replacement (UKR) compared to the conventional jig based technique. **MATERIALS AND METHODS:** Study group 1 consists of a series of 24 knee's which underwent MAKO assisted UKA for which a three-dimensional CT-based preoperative plans were created to determine the desired orientation for the tibial and femoral components. Group 2 has 12 knees' which underwent UKA with a fixed bone cutting Jig based technique. Post-operative Anteroposterior and lateral radiographs were taken to determine the Implant position and orientation which were compared to their preoperative plan respectively. The mean error value was obtained for Posterior Tibial Slope and Varus/Valgus angulations of the tibial implant in both study groups respectively and compared to determine the accuracy of the post-operative tibial implant placement. **RESULTS:** The mean error for tibial slope/ Varus alignment was 0.4786/0.49 for the robotic group and 1.6570/1.41 for the manual group. The result was significant and confirmed with Mann-Whitney Test. **CONCLUSION:** MAKO robotic arm assisted system was more accurate compared to the manual JIG based technique in achieving the planned orientation and alignment of the tibial implant.

**Date: 2019-12-06**  
**Session: Knee Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 54169**

**MANAGEMENT OF LARGE BONE DEFECTS AROUND THE KNEE USING POROUS TANTALUM TRABECULAR METAL CONES DURING COMPLEX PRIMARY AND REVISION TOTAL KNEE ARTHROPLASTY**

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With the rising numbers and indications of primary as well as revision total knee arthroplasty (TKA), managing bone defects around the knee is an emerging challenge. This retrospective study conducted on a consecutive series of patients operated between January 2007 and March 2016, evaluates the outcomes of Trabecular Metal (TM) cones used to address bone defects in 79 TKA cases. This included 20 (25.3%) patients undergoing primary TKA for various indications – neglected osteoarthritis (5 cases), rheumatoid arthritis (4 cases), GCT (femur – 5, tibia – 2), comminuted distal femoral fracture with OA (2), chronic tibial plateau fracture with OA (2). Most common indications for revision TKA (59 patients, 74.7%) included patients with prosthetic joint infection (26 cases) and aseptic loosening (17 cases). Dual stacked cones for distal femoral defect was used in 16 knees. The mean age of the cohort was 65.3 (43-81) years and average follow-up was 6.6 years. The overall average ROM increased from a pre-operative value of 76.3° to 105.5°. A significant improvement in the overall average KSCS was recorded from a 40.4 pre-operatively to 75.9 post-operatively ( $p < 0.001$ ). Complete osteointegration was observed in all the cases. The number of patients developing at least one complication was 26.6% (21/79 knees) and rate of deep infection was 2.5% (2/79). Overall, major complications requiring re-operation were seen in 4 (5%) knees with an overall survival of 95%. TM cones are an effective option for treating severe bone defects during TKA with predictable osteointegration and good long-term clinical outcomes.

**Date: 2019-12-06**

**Session: Knee Free Papers 3**

**Time: 08:00 - 10:00**

**Room: Junior Ballroom A**

**Abstract no.: 53438**

**PREDICTORS OF PATIENT SATISFACTION FOLLOWING UNICOMPARTMENTAL KNEE ARTHROPLASTY**

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**Background** Recent studies have reported factors affecting postoperative satisfaction after total knee arthroplasty (TKA), however, there are few reports of unicompartmental knee arthroplasty (UKA). Therefore, the purpose of this study was to examine factors influencing postoperative patients satisfaction of UKA. **Methods** Seventy-three consecutive medial UKAs were enrolled in this study. Fixed bearing design were used in all cases. We examined patient satisfaction using 2011 knee society score (KSS) at one year after surgery and the correlation of patients satisfaction with intraoperative component gap, postoperative alignment, tibial implant alignment, and postoperative range of motion. **Results** Although there was no correlation of patients' satisfaction with intraoperative component gap, postoperative alignment, and tibial implant alignment, patients satisfaction showed a significantly positive correlation with postoperative knee flexion angle. **Discussion** UKA has been reported to be more satisfied than TKA, however factors affecting patients satisfaction in UKA has not been examined. According to the results of this study, a significant positive correlation was found between the postoperative knee flexion angle and patients satisfaction, suggesting that obtaining a deep knee flexion angle after UKA may lead to improvement in patients satisfaction.



**Date: 2019-12-06**  
**Session: Knee Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 54165**

**BIPLANAR MEDIAL OPENING WEDGE HIGH TIBIAL OSTEOTOMY FOR EARLY OSTEOARTHRITIS OF KNEE - THE SOUTH INDIAN EXPERIENCE**

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Introduction: Osteoarthritis of knee is becoming highly prevalent in south India. Knee preservation in the form of timely and well done high tibial osteotomy can delay the arthroplasty. To append the sparse literature from South India, Our study evaluated the functional and radiological outcome of biplanar medial opening wedge high tibial osteotomy in terms of function, pain and patient satisfaction with functional scores and radiological indices and assessed any complications. Methods: From June 2016 to December 2018, a prospective, observational study of 26 patients in the age group 35-70 years with medial compartmental OA were treated with opening wedge high tibial osteotomy with HTO plate and beta TCP wedge. Assessment was done by an orthoscanogram of lower limbs for correction of the varus deformity, mechanical axis deviation, hip knee ankle axis, varus regression, tibial slope, Insall Salvati ratios. Functional scores like knee society score and WOMAC score were used to assess the functional outcome of the surgery. Results: The average knee society score improved from 43.09+/- 6.34 to 62.80+/- 11.66 and 79.15+/- 11.21 respectively on follow ups ( $p < 0.001$ ) and WOMAC scores improved from 68.11+/-6.52 to 45.61+/-9.80 and 24.69+/-14.24 respectively. Insall Salvati ratio decreased from 1.172+/-0.1 to 1.096+/-0.01 post operatively. Tibial slope increased from 11.023+/-0.93 to 11.639+/-0.96 degrees and MPTA values increased from 82.59+/-1.12 to 87.20+/-1.70 degrees Conclusion: Medial opening wedge High Tibial Osteotomy when performed in early grades of Osteoarthritis has given us good functional outcome. Lateral hinge fracture is a complication to be avoided.

**Date: 2019-12-06**  
**Session: Knee Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 53733**

**APPLICATION OF 3D PRINTED PATIENT-SPECIFIC INSTRUMENTATION (PSI) IN HIGH TIBIAL OSTEOTOMY (HTO)**

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**Purpose:** To explore the clinical significance of using 3D printed Patient-specific Instrumentation (PSI) in high tibial osteotomy. **Methods:** 30 cases, unilateral knee osteoarthritis May 2016-August 2017, double-blind, divided into observation (HTO by 3D printed PSI) and control (HTO by freehand) groups, 16:14 cases respectively. All patients were fixed with same manufacturer proximal tibial plate. Measured data: operation time, incisional length, number of X-ray exposure, eccentric angle and medial proximal tibial angle (MPTA). VAS and HSS scores at 6mths post op were also captured. **Results:** All patients in this study were able to be followed up, recovered smoothly, knee pain disappeared and no surgical complications. Results in observation and control groups were as follows, incision length (7.18±0.29)cm vs (10.26±0.52) cm, X-ray exposure (14.94±1.73)times vs (23.29±1.38)times, operation time (30.24±1.73)mins vs (40.13±1.64) mins and eccentric angle (0.34°±0.36°) vs (1.18°± 0.87°). Observation group had lower values were of significant difference (P <0.05). However, for 6months postop in the observation and control group, MPTA (88.20° ±1.10°) vs (88.10°±1.08°), VAS (0.75±0.58)points vs (0.86±0.66)points and HSS (86.31 ± 3.30)points vs (85.86±2.88)points were of no significant difference thus (P> 0.05). **Conclusion:** HTO is an effective and important method and part of the ladder treatment of knee osteoarthritis. Whereas both HTOs can correct knee varus deformity, correct alignment, treat knee pain, restore knee function and obtain satisfactory clinical effect, 3D printed PSI HTO has the advantages of shorter operation time, more accurate alignment correction, lesser frequency of X-ray exposure during operation, shorter incision length and lesser soft tissue.

**Date: 2019-12-06**  
**Session: Knee Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 53166**

**LONG TERM RESULTS AND RADIOGRAPHIC ANALYSIS OF METAPHYSEAL SUPPORTED SLEEVED REVISION HINGE KNEE PROSTHESIS**

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**INTRODUCTION:** Rotating hinge knee prostheses are extremely useful when dealing with patients with excessive bone loss and ligamentous instability as a consequence of previous knee surgeries. Soon, a significant increase in the number of revision knee arthroplasties has been projected, given the increased prevalence of primary total knee arthroplasties and an ageing population. **METHOD:** This study is a retrospective clinical and radiographic analysis of 42 patients who received 44 S-ROM Noiles (DePuy Inc, Warsaw, IN) mobile bearing hinged revision knee prosthesis between 1998 and 2008. All surgeries were performed by the same senior consultant in the hospital. Twenty three out of the 44 patients underwent revision for collateral ligament deficiency and other indications included septic and aseptic loosening and extensive bone deficiencies. **RESULTS:** The mean age of the patients was 70 years (46 years to 89 years). The average follow up period among the patients was 8 year (longest follow up 15 years). Kaplan Meier survival at 8 years and 13.5 years was 85.3 percent and 67 percent respectively. Eight out of the 44 patients developed infection in our study (18%). Three of the infected revisions were originally operated for septic loosening. 18 patients died with the prosthesis in-situ. 34 out of the 44 knees showed spot welding on radiographs. **CONCLUSION:** This prosthesis provides a reliable method of reconstruction in patients with severely depleted bone stock and extensive ligament deficits around the knee.

**Date: 2019-12-06**

**Session: Knee Free Papers 3**

**Time: 08:00 - 10:00**

**Room: Junior Ballroom A**

**Abstract no.: 54699**

**WEIGHT BEARING IN MEDIAL OPENING WEDGE HIGH TIBIAL  
OSTEOTOMY: EARLY OR DELAYED?**

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**Background:** In medial open-wedge high tibial osteotomy, there are concerns regarding the initial stability and ability to retain the correction. Rehabilitation protocols vary depending on the osteotomy technique and the fixation methods. Ideally, the fixation technique used should be strong enough to allow early joint motion and early full weight bearing postoperatively. **Method:** Thirty patients of median age 47 years undergone MOWHTO for isolated medial compartment OA and varus alignment using Tomofix plate. Patients were randomized into an Immediate or a Delayed weight bearing group. Improvement in pain and functional outcome were assessed postoperatively for all patients and compared. The primary outcome measure was the knee society score while secondary measures included the VAS pain score and rate of complications. **Results:** There were no significant difference between the groups in terms of pain, functional outcome and the complication rate. **Interpretation:** Immediate weight bearing after MOWHTO appears to be safe and can allow patients to quicker return to activities. The guidelines for the allowed weight-bearing limit are given by the individual surgeon. For unstable osteotomies, or if there are complications related to healing, weight bearing strengthening exercises may be delayed.

**Date: 2019-12-06**  
**Session: Knee Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 53110**

**DOES ROBOTIC UNICOMPARTMENTAL KNEE ARTHROPLASTY HAVE A LEARNING CURVE FOR ACCURACY OF IMPLANT POSITIONING? A PROSPECTIVE COHORT STUDY**

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**Purpose:** The primary objective of this study was to determine the effect of cumulative robotic unicompartmental knee arthroplasty (UKA) experience on accuracy of implant positioning and limb alignment. Secondary objectives were to determine the learning curve of robotic UKA with respect to operative times, surgical team comfort levels, and postoperative complications. **Methods:** This prospective cohort study included 60 consecutive conventional jig-based UKAs followed by 60 consecutive robotic-arm assisted UKAs performed by a single surgeon. Independent observers recorded surrogate markers of the learning curve including accuracy of implant positioning, limb alignment, operative times, stress levels amongst the surgical team using the state-trait anxiety inventory (STAI) questionnaire, and complications within 30 days of surgery. Cumulative summation (CUSUM) analyses were used to assess study outcomes. **Results:** Cumulative robotic experience did not affect accuracy of implant positioning ( $p=0.52$ ), posterior condylar offset ratio ( $p=0.71$ ), posterior tibial slope ( $p=0.68$ ), native joint line preservation ( $p=0.55$ ), and postoperative limb alignment ( $p=0.65$ ). Robotic UKA was associated with a learning curve of six cases for operating time ( $p<0.001$ ) and surgical team confidence levels ( $p<0.001$ ), with no additional risk of complications compared to conventional jig-based UKA. **Conclusion:** Implementation of robotic-arm assisted UKA does not have a learning curve for achieving the planned implant positioning or limb alignment but does lead to increased operative times and heightened levels of anxiety amongst the surgical team for the initial six cases.

**Date: 2019-12-06**  
**Session: Knee Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 54670**

**BILATERAL HTO IN THE SAME SITTING: PERIOPERATIVE CHALLENGE OR FEASIBLE OPTION?**

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**Abstract:** Objective: The objective of this study was to analyse the feasibility of doing a bilateral high tibial osteotomy in the same sitting for patients with isolated medial compartment osteoarthritis, its effect on Patient Related Outcome Measures at 6 months and 2 years follow up as well as the correction achieved post op. Methods: Bilateral simultaneous HTO using Tomofix®6 (Depuy, Synthes, Warsaw, IN, USA) for medial compartment OA knee was done in 30 patients (60 knees), between April 2010 and August 2014, in the age group of 45-55 years (mean = 48.3 years). The patients were kept non weight bearing for 2 weeks followed by weight bearing as tolerated with crutches from 2-4 weeks followed by full weight bearing without crutches. Patients were followed up for 2 years. Correction achieved, functional knee score, intra-operative difficulties, post-op complications, rehabilitation difficulties and patient's overall perception of the procedure were evaluated. Results: Knee score (Insall modification) improved from mean  $41.87 \pm 9.7$  pre-op to a mean  $92.80 \pm 2.75$  at 2 years post op and Pain score (VAS) improved from pre-op mean of  $57.90 \pm 6.8$  to  $10.03 \pm 6.28$  at 2 year post-op, both scores being statistically significant. The femoro-tibial angle was corrected from mean 4.1 degree varus to 1.15 degree valgus. The osteotomy healed in 5.2 months (4-7 months) on an average. There were no complications. Conclusions: Bilateral HTO in the same sitting for selected patients is a feasible option without any added complications.

**Date: 2019-12-06**  
**Session: Knee Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 54495**

**AUTOLOGOUS COLLAGEN INDUCED CHONDROGENESIS (ACIC®: SHETTY-KIM TECHNIQUE): MICRO-SCAFFOLD AUGMENTED MICRODRILLING FOR ARTICULAR CARTILAGE REPAIR - A SIX YEAR FOLLOW UP STUDY**

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**Aim:** We describe the development of a micro-scaffold augmented microdrilling technique for cartilage repair, Autologous Collagen Induced Chondrogenesis (ACIC® Shetty-Kim technique) progressing from in-vitro analysis, through animal model preclinical trials to a 6-year follow-up clinical study. **Materials and Methods:** In our clinical series, we prospectively investigated 30 patients with International Cartilage Research Society Grade III / IVa symptomatic chondral defects of the knee treated with this technique. The mean age of the patients was 44.5 yrs (range 19-60 yrs) and they were followed up until 72 months. Clinical evaluation was done using functional knee scores and radiologically by morphological MRI evaluation (MOCART Score) and qualitative MRI scan. (T2\* mapping and dGEMRIC Scan). **Results:** Statistically significant clinical improvement was noted by 2 years and was sustained for 6 years of the study. At six years, mean Lysholm score was 78, compared to 51 pre-operatively ( $p < 0.05$ ). Symptomatic KOOS improved to 91 from 65 ( $p < 0.05$ ). Subjective IKDC also showed improvement from 39 to 83 ( $p < 0.05$ ). The T2\* relaxation-times calculated were 26 and 30 for the repair tissue and native cartilage respectively. The MOCART scoring performed showed an average of 78 for all lesions. **Conclusion:** This arthroscopic technique is an enhancement of the traditional microfracture method with use of an off-the-shelf collagen scaffold. The technique holds promise for widespread adoption for cartilage repair owing to its ability to regenerate hyaline-like cartilage with excellent clinical results along with the added advantage of being cost-effective and technically simple.

**Date: 2019-12-06**  
**Session: Knee Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom A**

**Abstract no.: 52992**

**WEIGHT DYNAMICS IN PATIENTS WITH MORBID OBESITY WITH TOTAL KNEE ARTHROPLASTY**

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Introduction: One of the important factors affecting the complications of total knee arthroplasty (TKA) is severe (morbid) obesity (MO), therefore, we decided to evaluate the effectiveness of treatment and body mass index (BMI) dynamics. Methods: We conducted a retrospective study in the clinic of traumatology, orthopaedics and joint pathology at Sechenov University in the period from 2010 to 2018, where 2482 patients who underwent primary TKA were treated. Age ranged from 18 to 89 years. There were 1968 women (79.3%) and 514 men (20.7%). There were 246 (9.91%) patients with a BMI of more than 40 kg / m<sup>2</sup>, of whom 230 (93.5%) women and 16 (6.5%) men were women. 85 (34.55%) patients during 6 years of observation developed various complications in the form of superficial or deep infection, aseptic loosening and wear of prostheses, periprosthetic fractures. Results: 69 patients with MO (from 2015 to 2017) in the preoperative period for 6 months were prescribed conservative treatment of obesity (diet and metformin, or orlistat). Only 22 patients managed to reduce BMI to 10%, from 10 to 20% - 5 patients, weight in 42 patients increased to 10% of BMI. In the postoperative period, patients were recommended a low-calorie diet and aerobic exercise, 1 year after surgery in 60 (87%) patients out of 69 the body weight returned to preoperative or increased to 10% BMI. Conclusion: that conservative treatment of morbid obesity in patients with knee arthritis in terms of preparation for total arthroplasty is not effective.



**Date: 2019-12-06**  
**Session: Knee Free Papers 4**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom A**

**Abstract no.: 55076**

**TOURNIQUET VERSUS NO TOURNIQUET IN TOTAL KNEE ARTHROPLASTY**

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**Background:** The use of tourniquets in Total Knee Arthroplasty (TKA) has always remained controversial. This study was done to determine the outcome of tourniquet use in terms of blood loss, need for transfusion, operative time, hospital stay and complications. **Methodology:** This randomized controlled trial was done from 16th march 2017 to 15th march 2018. All patients undergoing primary unilateral total knee arthroplasty (TKA) for advanced osteoarthritis knee were included in the study. Patients with bleeding disorders, bilateral TKA, revision TKA, peripheral vascular disease etc were excluded from the study. Patients were divided into 2 groups; A and B. Group A in which tourniquet applied to upper thigh set at 150 mm Hg above the systolic blood pressure while no tourniquet in group B. Of the total 142 patients, 71 placed in each group. All arthroplasties were performed by the same Orthopaedic surgeon and cemented implants were used. Electrocautery was used for haemostasis. Data analysed using SPSS. **Results:** Out of the 142 patients, 106 (74.65%) females and 36 (25.35%) males. Patients in group A had a mean age of  $65.87 \pm 5.09$  years while  $64.09 \pm 4.83$  years in group B. Average BMI of patients was  $27.31 \pm 2.54$  Kg/m<sup>2</sup>. Patients in group A had significantly less intra-operative blood loss than group B ( $p < 0.01$ ). Patients in group B required more blood transfusions ( $p < 0.52$ ) and had longer operative time ( $p = 0.01$ ). However, patients in group A had more post-operative blood loss ( $p < 0.01$ ), longer hospital stay ( $p = 0.01$ ) and more complications ( $p = 0.57$ ). **Conclusion:** Use of tourniquet results in no significant advantage over no tourniquet usage in TKA.

**Date: 2019-12-06**  
**Session: Knee Free Papers 4**  
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**Room: Junior Ballroom A**

**Abstract no.: 54508**

**COMPARISON OF POSTOPERATIVE ANALGESIC EFFECT BETWEEN INTERSPACE BETWEEN THE POPLITEAL ARTERY AND THE CAPSULE OF THE POSTERIOR KNEE AND PERIARTICULAR MULTIMODAL DRUG INJECTION IN TOTAL KNEE ARTHROPLASTY**

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Purpose: ACB is not effective method for pain arising from posterior and lateral side of knee joint. Local anaesthetic infiltration between the popliteal artery and capsule of the knee (IPACK) and periarticular multimodal drug injection (PMDI) has been introduced for controlling pain after TKA. The aim of this study is to compare the postoperative analgesic effect between IPACK and PMDI in addition to ACB after TKA. Materials and Methods: 100 knees were enrolled for this study. All knees were undertaken primary TKA due to primary osteoarthritis. All TKAs were performed under spinal anaesthesia and received ACB. 50 knees were received a single injection 15mL of 0.75% ropivacaine as IPACK block in addition to ACB. 50 knees were received a PMDI in addition to ACB. Postoperative NRS, used volume of patient controlled analgesia (PCA), opioid consumption and injection related complications were compared during postoperative 7 days. Results: NRS at postoperative 1day was better in IPACK ( $P=0.032$ ). NRS at postoperative 2, 3, 4, 5, 6 and 7 day were not different between IPACK and PMDI. Used volume of PCA and opioid consumption was not different. Procedure time for IPACK were significantly longer than PMDI ( $P=0.004$ ). Injection related complications in both groups were not occurred. Conclusion: IPACK is a more effective method for pain control at postoperative 1 day in patient undergoing TKA than PMDI. Procedure for IPACK took a longer time than PMDI. However, there was no difference between groups regarding to used volume of PCA and opioid consumption.

**Date: 2019-12-06**  
**Session: Knee Free Papers 4**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom A**

**Abstract no.: 54778**

**SLEEP PATTERN DISTURBANCES IN PATIENTS UNDERGOING TOTAL KNEE ARTHROPLASTY**

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**Introduction:** Sleep deprivation a common problem in the postoperative period as it can lead to hyperalgesia and cognitive problems. In our study, we aim to describe the sleep architecture, total sleep time and time required to adapt to normal sleep pattern in patients undergoing total knee arthroplasty and the effects on knee function. **Materials and Methods:** This was a prospective study from June 2018 to October 2018 including 107 consecutive patients (83 female and 24 male) undergoing unilateral primary total knee arthroplasty. All patients were evaluated for Knee society score (KSS) and sleep pattern through PSQI (Pittsburg Sleep Quality index) preoperatively. KSS was evaluated every 2 week and PSQI every week post operatively for 6 weeks. **Results:** The mean age was 65.35 years (47-84 years), mean BMI 29.24 (21.4-44.1) and the mean HBA1c level was 7.65 (5.2-11.1). The Mean KSS was 52.53 (26-76). Hypertension was found in (55.6%) followed by Diabetes mellitus (30.5%) and hypothyroidism (25.9%). Elderly patients with age >70 years (26) show higher PSQI level at 6th week postoperatively ( $p < 0.05$ ). Diabetic patients with HBA1c >9.0 (5 patients), hypothyroid patients with TSH >5mU/L (9 patients) and patients with BMI >35 (12 patients) shows high PSQI level at postoperative 6th week ( $p < 0.05$ ). **Conclusion:** Sleep disturbance is consistently found in patients with risk factors like elderly patients (age >70 years), BMI >35, diabetic patients (HBA1c >9.0) and hypothyroid patients. Optimization of modifiable risk factors preoperatively will alleviate sleep disturbances and improve knee function subsequently. **Key Words:** Sleep; total knee arthroplasty; functional outcome; PSQI

**Date: 2019-12-06**

**Session: Knee Free Papers 4**

**Time: 16:00 - 17:30**

**Room: Junior Ballroom A**

**Abstract no.: 54411**

**FUNCTIONAL PERFORMANCE AFTER PHYSIOTHERAPY IN ROBOTIC-ARM ASSISTED VERSUS CONVENTIONAL TOTAL KNEE ARTHROPLASTY IN A FEMALE OUTPATIENT SET UP: A RETROSPECTIVE COHORT STUDY**

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Background: Robotic-arm assisted knee arthroplasty is increasingly becoming common as it offers more accurate implant positioning and limb alignment, and reduced early postoperative pain. It is not known whether it enhances functional improvement as compared to conventional knee arthroplasty after undergoing physiotherapy rehabilitation. The aim of this study is to assess and compare functional outcomes of female subjects, having undergone physiotherapy, after total knee arthroplasty (TKA) of either type. Study Design and setting: Retrospective cohort study. Methods: A search of female physiotherapy out-patient records was conducted for the period March 2018 to December 2018 to identify subjects who underwent physiotherapy for knee arthroplasty. A total of 45 subjects were identified and 13 subjects were excluded for not meeting the criteria. Final sample size of 32 age matched controls (16 per group) were studied. The primary functional outcome measures used were the 8-meters walk test, stairs ascend/descend time, and timed up-and-go test, with pain and range of motion as secondary measurements. All measurements at specified intervals of 1, 2, and 3 months after surgery were recorded for analysis. Mixed-ANOVA was used for data analysis and results reported at 95% CI. Results: The subjects in both groups improved significantly over time in all outcome measures. Between group comparison showed higher mean difference in function at 1 month for all outcomes in the Robotic group, especially for the 8m-walk test. Subjects were similar in terms of most tests at 2 and 3months follow-up. Conclusion: Robotic TKA demonstrated faster short-term functional improvement.

**Date: 2019-12-06**  
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**Abstract no.: 52834**

**FOOT LOADING PATTERN AND HIND FOOT ALIGNMENT ARE RESTORED IN VARUS KNEES FOLLOWING TOTAL KNEE ARTHROPLASTY: A PEDOBAROGRAPHIC ANALYSIS OF 121 KNEES**

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Ganga Medical Centre & Hospitals Pvt. Ltd, Coimbatore (INDIA)

Background: Osteoarthritis of knees with varus deformity is associated with a compensatory valgus deformity of the hindfoot and a lateral loading foot pressure pattern. However, whether this deformity and loading pattern get corrected following limb alignment following total knee arthroplasty (TKA) is unclear. Methods: The anatomical alignment and loading pattern of 91 consecutive patients (121 knees) undergoing total knee arthroplasty with pre-operative varus more than 10° were evaluated prospectively with static conventional radiography and dynamic pedobarography pre-operatively and 1 year post-operatively. We assessed mechanical femorotibial mechanical angle, tibia-hindfoot angle, hindfoot valgus/varus index, foot line of pressure laterality and peak pressure at both time points. Results: Of 121 knees, 98(81.0%) regained anatomic alignment of the knee and 114(92.4%) of the hindfoot. Similarly, peak pressure ( $p < 0.001$ ), valgus/varus index (pre-operative:  $-0.29 \pm 0.22$ , post-operative:  $-0.04 \pm 0.23$ ,  $p < 0.001$ ) and line of pressure laterality (pre-operative: 7.4% medial, post-operative: 95.9% medial,  $p < 0.001$ ) all medialized post-operatively. Conclusion: Our study shows that, following the correction of knee varus with TKA, hindfoot alignment and foot loading pattern are both restored. TKA offers both static and dynamic correction as seen in the hindfoot and loading pattern respectively. Study Design: Prospective Study Level of Evidence: Level II

**Date: 2019-12-06**  
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**Abstract no.: 54810**

**COMPARISON OF EFFECTIVENESS OF INTRA-ARTICULAR, INTRAVENOUS AND TOPICAL WASH TRANEXAMIC ACID IN TOTAL KNEE ARTHROPLASTY**

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Background: There is volume of literature regarding effectiveness of tranexamic acid in reduction of blood loss in TKR. However, the ideal mode of administration is debatable. We conducted a randomised trial for three modes of administration: intra-articular, intravenous and topical wash. Methods: Fifty patients in four groups were enrolled for study. Group 1 received drug intravenously, group 2 had topical washing with drug before closure, group 3 received drug after closure through drain and group 4 was control that received no tranexamic acid. Post-operative blood loss, calculated blood loss, haemoglobin drop, transfusion requirements and complications were studied for all four groups. Results: Tranexamic acid results in lower bleeding irrespective of the mode of administration compared to control group. Total loss at end of 5 days is similar in all tranexamic acid groups irrespective of method used to deliver the drug. Requirement for blood transfusion was found to be lower in all tranexamic acid patients compared to non-tranexamic acid group. The requirement was highest in topical wash group among all tranexamic acid groups. Conclusion: We conclude that intra-articular administration through drain and IV administration are equally effective and superior to topical wash method in reducing blood loss, haemoglobin fall and transfusion requirements.

**Date: 2019-12-06**  
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**Abstract no.: 55075**

**CAN WE PREDICT LEG LENGTH CHANGE (LLC) AFTER UNILATERAL TOTAL KNEE ARTHROPLASTY (TKA)?**

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Background: Limb length change (LLC) after total knee arthroplasty (TKA) was not extensively studied as in total hip arthroplasty, the objective of this study was to detect if there is a constant predictable pattern of change in the limb length after unilateral TKA. Methods: 242 patients included in the study, 168 females and 74 males, mean age 56 years, knees with valgus deformity excluded, pre- and postoperative degree of fixed flexion deformity (FFD) measured clinically, on a long film (hip to knee to ankle); degree of coronal deformity was measured (HKA) angle, and functional leg length was measured from the centre of the femoral head to the centre of the ankle. Results: 223 (92.1%) showed increased limb length after TKA. Average LLC was 10.7 mm (SD, 9.5 mm; range, -24 to 47 mm). Mean preoperative HKA was 11° (SD, 5.3°) improved significantly to 2.3° (SD, 2.3°). Mean preoperative FFD was 8.1° (SD, 4.6°) improved significantly to 1° (SD, 2.1°). Change in HKA and FFD was significantly correlated to the amount of LLC. By running a multiple regression model, a linear relationship between change in limb length and change in HKA and FFD was established, demonstrating that: a 10° improvement in HKA would result in a LLC of nearly 4 mm; a 10° improvement in FFD would result in nearly 8 mm change. Conclusion: LLC after TKA can be predicted and calculated, patient should be informed about possibility of lengthening post-operatively, correlation to the clinical outcome still to be determined.

**Date: 2019-12-06**  
**Session: Knee Free Papers 4**  
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**Abstract no.: 54528**

**EPSILON-AMINOCAPORIC ACID VERSUS TRANEXAMIC ACID IN TOTAL KNEE ARTHROPLASTY: A META-ANALYSIS STUDY**

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Introduction: Total Knee Arthroplasty (TKA) surgery can be associated with blood loss. The objective of this meta-analysis was to determine whether tranexamic acid (TXA) or epsilon-aminocaporic acid (EACA) was more effective in reducing perioperative blood loss, and lessening the need for blood transfusion following knee arthroplasty surgery. Method: Relevant articles published between 1980 to 2018 were included. A double extraction technique was used. Outcomes analysed included blood loss, perioperative haemoglobin, patients requiring transfusion, units transfused, operative and tourniquet time. Results: A total of 1691 patients were evaluated. Estimated blood losses were similar. (95% CI, -0.50, 0.04; Z = 1.69; P = 0.09). No differences for percentage of patients requiring transfusion, (95% CI, 0.14, 4.13; Z = 0.31; P = 0.76). No difference in the perioperative haemoglobin, (95% CI, -0.36, 0.24; Z = 0.38; P = 0.70). No difference in the average number of transfused units, (95% CI, -0.53, 0.25; Z = 0.71; P = 0.48). No difference in the operative and tourniquet time respectively, (95% CI, -0.35, 0.36; Z = 0.04; P = 0.97), (95% CI, -0.16, 0.34; Z = 0.72; P = 0.47). No difference in percentage of venous thromboembolism, (95% CI, 0.17, 2.80; Z = 0.51; P = 0.61). Conclusion: This study did not demonstrate TXA to be superior to EACA. In fact, both antifibrinolytic therapies demonstrated similar efficacy in terms of intra-operative blood loss, transfusion requirements and complication rates. Currently EACA has a lower cost, which makes it an appealing alternative to TXA for TKA.



**Date: 2019-12-06**  
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**Abstract no.: 53860**

**STERIODS REDUCE RATES OF EARLY POST-OPERATIVE POSTURAL HYPOTENSION AFTER TOTAL KNEE ARTHROPLASTY**

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<sup>1</sup>Tan Tock Seng Hospital, Singapore (SINGAPORE), <sup>2</sup>Lee Kong Chian School of Medicine, Singapore (SINGAPORE)

Introduction: Early ambulation after total knee arthroplasty (TKA) reduces post-operative morbidity and hospital length of stay. Patients with postural hypotension (PH) are less able to do so. Dexamethasone, which is commonly used for post-operative nausea and vomiting, has anti-inflammatory properties and may suppress post-operative systemic inflammatory response, hence decreasing post-inflammatory parasympathetic or vagal activity. Methods: Patients who underwent elective TKA under a single Adult Reconstruction team were retrospectively studied. Physiotherapy sessions were commenced on post-operative day 0 or 1. Demographic data, intra-operative data such as type of anaesthesia, and post-operative data such as type of analgesia were recorded. During the first physiotherapy session, pre-mobilisation resting blood pressures and sitting/standing blood pressures were recorded. PH was defined as a decrease of more than or equal to 20mmHg systolic blood pressure, or a decrease or more than or equal to 10mmHg diastolic blood pressure. Results: A total of 168 patients were studied. 77 (45.8%) of these 168 patients received intravenous dexamethasone and normal saline (NS) drip for 24 hours post-surgery. 31 (18.5%) of these 168 patients had PH during physiotherapy sessions of which 10 (32.3%) were symptomatic. 9 (11.7%) of 77 patients who received dexamethasone and NS drip had PH, while 22 (24.2%) of 91 patients who did not, had PH; Fisher's test,  $p=0.0461$ ; Univariate logistic regression,  $p=0.0414$ . 7 (70%) of 10 patients with symptomatic PH were unable to participate in physiotherapy. Conclusion: The use of intravenous dexamethasone and fluid therapy post-operatively is significantly associated with lower PH rates.

**Date: 2019-12-06**  
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**Time: 16:00 - 17:30**  
**Room: Junior Ballroom A**

**Abstract no.: 54917**

**WHAT IS THE REAL REASON OF PAIN AFTER PRIMARY TKA**

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Introduction. TKA is the most effective surgical procedure in severe degenerative knee arthritis. According to literature above 20% patients are unsatisfied and from 60 to 80% of all knee revisions are in 2-5 years after primary TKA. The most common patient complaint is pain. Materials and methods. In our prospective study were evaluated 79 patients with chronic pain after primary TKA. The mean time after TKA was 27 months, mean age was 67 y.o. All patients were examined with the algorithm proposed by S. Hofmann (2011), which include medical history, CT scans, special X-rays and PJI exclusion tests. Results. The reason of pain was identified in all patients. PJI was identified in the most part of our cohort – 39 (49.4%) patients. Among PJI patients the components malposition was founded in 6 (15.4%) patients. The second group was with components malposition – 22 (27.8%). Aseptic loosening was identified in 13 (16.5%) and 6 (46.2%) patients in this group has the components malalignment according to early X-rays after TKA. The ligament instability was in 3(3.8%) patient. Extraarticular reason was identified in 2(2,5%) patients. It's very important, that in 15 (19%) patients several reasons of knee pain were identified. Conclusion. All unsatisfied patients suffer from pain and poor knee function, but it's very difficult to identify the real problem. The most common definition as “arthrofibrosis” is usually only a symptom. According to our research, the most frequent reasons of unsatisfied knee were PJI and component malposition. Only 2 (2.5%) patients has an extraarticular reasons. The comprehensive examination can help to identify the real problem.

**Date: 2019-12-06**

**Session: Spine Free Papers 3**

**Time: 08:00 - 10:00**

**Room: Junior Ballroom B**

**Abstract no.: 53016**

**INCORPORATING ACTIVE VERTEBRAL APEX CORRECTION (APC) ALONGSIDE GUIDED GROWTH TECHNIQUE FOR CONTROLLING SPINAL DEFORMITY IN GROWING CHILDREN: A MODIFIED SHILLA TECHNIQUE**

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Summary of Background Data: The two common surgical philosophies for posterior-approach correction of spinal deformity in growing children are distraction based and guided growth based, former achieved with growing rods, VEPTR, and MAGEC, and the latter with SHILLA procedure. Distraction system either cause immense morbidity to the patient by several consecutive and invasive distraction episodes or are extremely expensive and not immediately affordable for a major of patients worldwide. SHILLA procedure, although doesn't result in consecutive surgeries, there still remain severe complications of loss of correction or reappearance of deformity through crankshafting or adding-on. The main culprit of this complication is the vertebral growth anteriorly at the apex, which mostly remains unmodulated by static fusion posteriorly. The current study presents a modified approach to SHILLA that could help dynamically remodulate, i.e. reverse modulate, the apex of the deformity. Method: 20 patients with either scoliosis or kyphoscoliosis underwent a modified SHILLA approach, where instead of apical fusion, an active apex correction was applied. In this modified technique, the most wedged vertebra was selected followed by insertion of pedicle screws in the convex side of the vertebrae above and below the wedged one. Mean follow up duration was 32 months. The convex and concave heights of the wedged and control vertebrae were recorded at the time of the surgery and at follow up duration, both using CT. Results: The wedged vertebra demonstrated in average a 17% ( $p=0.00014$ ) increase in the proportion of concave to convex heights ratio, whereas the control vertebra didn't show any relative change in the wedged vertebra heights at the follow ups. Conclusion: Active apex correction, instead of apical fusion in SHILLA remodulates the apex vertebra, which may in turn help mitigate loss of correction on long term due to crankshafting and adding-on.

**Date: 2019-12-06**  
**Session: Spine Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 54051**

**DOES FRESH WHOLE BLOOD IMPROVE THE CLINICAL OUTCOME AND SEROLOGICAL PARAMETERS BETTER THAN BLOOD COMPONENTS TRANSFUSION IN MAJOR SPINE SURGERIES? A PROSPECTIVE RANDOMISED STUDY**

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**Objective:** To compare fresh whole blood (FWB) and component transfusion in improving clinical outcome and serological parameters following major spine surgery. Studies done in cardiothoracic and onco-surgeries could be biased as primary pathology itself can confound coagulation and inflammatory markers. Elective spine surgery is devoid of these confounding factors and study in this condition is an urgent necessity. **Methods:** Prospective randomized study in tertiary spine deformity centre. Patients undergoing surgery with more than 6 levels of fusion, expected blood loss more than 750ml and surgical duration more than 4 hours were randomized into two groups. FWB group received fresh whole blood and CG received components. Parameters assessed: intra-operatively fusion level, graft-type, procedure duration, transfusion volume and blood loss; post-operatively drain collection, duration of oxygen support and ICU stay, transfusion volume, complications including facial puffiness, well-being score, PT, ABG, calcium, electrolytes, lactate and interleukin-6. **Results:** 65 patients-(AIS(31), congenital scoliosis(16), neuromuscular(15), neurofibromatosis(3)) were included. Pre-operative parameters were comparable. Intra-op blood loss was 926ml(FWB) and 845ml(CG), transfusion was 1.90units(FWB) and 1.61units(CG). FWB significantly superior to CG in duration of oxygen dependence(36.34hours vs 43.29hours), mean pH(7.445in FWB and 7.397in CG( $p < 0.01$ )) and Interleukin-6(30.63in FWB and 34.48in CG). Facial puffiness was present in 18 out of 35 CG and only 7/30 in FWB( $P < 0.01$ ). ICU stay was less in FWB(40.44hours vs 45.53hours). Post-op drain collection was more in FWB(516.84ml vs 406.19ml, $p < 0.15$ ). Other biochemical parameters were similar. **Conclusion:** Patient transfused with FWB achieved better clinical outcome in immediate post-operative period in terms of decreased oxygen dependence and had lesser inflammatory response.

**Date: 2019-12-06**  
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**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 53364**

**RESEARCH ON GLOBAL SAGITTAL POSTURAL PATTERNS OF ASYMPTOMATIC CHINESE ADULTS**

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The present study aimed to describe the distribution of sagittal spino-pelvic postural patterns of asymptomatic Chinese adults. A cohort of 266 asymptomatic young Chinese adults was recruited, aged at  $22.7 \pm 4.4$  years old averagely. Full-length postero-anterior and lateral X-rays were taken and sagittal parameters including thoracic kyphosis (TK), lumbar lordosis (LL), sacral slope (SS), pelvic incidence (PI), pelvic tilt (PT), spino-sacral angle (SSA) and sagittal vertical axis (SVA) were measured. The Roussouly type was then decided. Comparison was undertaken between males and females and different populations. We found that PI of the cohort averaged at  $46.5^\circ \pm 9.6^\circ$ . Sagittal parameters were consistent over the age period of this study. Females had larger LL, PI, SSA and SVA but comparable TK, SS and PT with males. 47.7% of the cohort had a Roussouly Type 3 sagittal pattern, while 22.9%, 14.3% and 15.0% for Type 1, Type 2 and Type 4, respectively. Males and females had a similar distribution of sagittal patterns ( $P=0.125$ ), with 45.3% and 51.4% in Roussouly Type 3, respectively. All sagittal parameters except PT and SVA were significantly different among different Roussouly types. 4.5% of asymptomatic Chinese adults stood with anterior shift of C7 plumbline, which was lower than the percent in Caucasian counterparts ( $P=0.028$ ). In conclusion, asymptomatic Chinese adults had a different distribution of sagittal spino-pelvic from that of Caucasian adults, with higher percent of Chinese adults in Roussouly Type 3. Though females tended to stand more backwards than males, they had a similar distribution of sagittal patterns.

**Date: 2019-12-06**

**Session: Spine Free Papers 3**

**Time: 08:00 - 10:00**

**Room: Junior Ballroom B**

**Abstract no.: 53520**

**UNILATERAL POSTERIOR LUMBAR INTERBODY FUSION FOR CORONAL BALANCE CORRECTION IN PATIENTS WITH DEGENERATIVE LUMBAR SCOLIOSIS**

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Background: There was paucity of literature paying attention to coronal imbalance. The current study reports radiological outcomes in patients with degenerative lumbar scoliosis (DLS) undergoing instrumented fusion and unilateral PLIF. Methods: 24 consecutive patients with DLS who underwent instrumentation and unilateral PLIF. All eligible patients meeting a minimum 2-year follow up. The radiological parameters, measured on the pre- and post-operative were compared and analysed. Patients were classified into three groups (group A, B, and C) according to coronal balance and the convex of curvature. In Group C (convex type), we inserted PLIF cage unilaterally on concave side paying attention to the fractional curve to correct tilting of L4 vertebral body. The primary outcome was postoperative improvements in radiological parameters at 6-week and last follow up, assessed using the paired t test. Result: Differences of the radiological parameters between pre- and post-operation concerning Cobb angles both the main curve and fractional curve, apical vertebra rotation, TK, LL, SS, PT, and SVA, were significant improved ( $P<0.05$ ). Main TL/L Cobbs was improved from 25.51 degree to 15.70 degree ( $P<0.05$ ). Fractional curve (L4-S1) Cobb was improve from 17.40 degree to 3.70 degree ( $P<0.05$ ). Coronal imbalance was improved from 4.15 cm to 2.60 cm. ( $P<0.05$ ). In our cohort, we found the group C was also improved in curve correction, coronal and sagittal balance after surgery. Conclusion: The posterior instrumented fusion and unilateral PLIF might provide the improvement of coronal balance in DLS. Although interbody cage was inserted unilaterally, the sagittal parameters were also improved effectively.

**Date: 2019-12-06**  
**Session: Spine Free Papers 3**  
**Time: 08:00 - 10:00**  
**Room: Junior Ballroom B**

**Abstract no.: 52925**

**SULT1C2A-MIR-466C-5P-FOXO4 IN CONGENITAL SCOLIOSIS**

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Introduction : Congenital scoliosis (CS) is caused by anomalous vertebrae development, but the pathogenesis of CS remains unclear. We performed sequencing data analysis to build ceRNA networks in embryonic tissues of rats with VAD-CS. Long non-coding RNAs (lncRNAs) have been implicated in embryo development, but their role in CS remains unknown. Vitamin A deficiency (VAD) during pregnancy can induce CS in postnatal rats. Methods: The competitive endogenous RNA (ceRNA) mechanism was validated by bioinformatics analysis and a dual luciferase reporter gene assay. SULT1C2A, rno-miR-466c-5p, and Foxo4 expression in embryos was detected by quantitative RT-PCR (qRT-PCR) and northern blot analysis. Western blot analysis was performed to measure PI3K, AKT and phosphorylated AKT expression. Results: Bioinformatics analysis and quantitative RT-PCR (qRT-PCR) indicated that SULT1C2A expression was down-regulated in VAD-CS rats, accompanied by increased rno-miR-466c-5p but decreased Foxo4 and somitogenesis-related gene as Pax1, Nkx3-2 and Sox9 expression on gestational days (GD) 9. Luciferase reporter and siRNA assays showed that SULT1C2A functioned as a ceRNA to inhibit rno-miR-466c-5p expression by direct binding and rno-miR-466c-5p inhibited Foxo4 expression by binding to its 3'untranslated region (UTR). The spatiotemporal expression of the SULT1C2A-rno-miR-466c-5p-Foxo4 axis was dynamically altered on GD 3, 8, 11, 15, and 21 were detected by qRT-PCR and northern blot analysis, which paralleled changes in AKT phosphorylation and part of PI3K expression. Conclusion: Taken together, SULT1C2A enhanced Foxo4 expression by negatively modulating rno-miR-466c-5p expression via the PI3K-ATK signalling pathway. Our findings suggest that SULT1C2A may be a potential target for treating CS.

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**Abstract no.: 54256**

**NEUROLOGICAL DEFICIT IN DELAYED PRESENTATION OF CONGENITAL VERTEBRAL DEFORMITIES (CVD) – AN ANALYSIS OF RISK FACTORS AND SURGICAL OUTCOME.**

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Introduction: congenital vertebral deformities (CVD) manifest as deformity progression or neurological deficit and there is paucity of literature on neurodeficit in delayed presentation, pertaining to risk factors and surgical outcome. Methods: Prospective case control study including CVD patients with neurodeficit (case) and without neurodeficit (controls) from 2008 to 2016 was done. Radiographs, CT and MRI were analysed for the type of the anomaly, apical position, curve magnitude, deformity angular ratio (DAR) and increased signal intensity (SI) change in the cord. Risk factors and surgical outcome was analysed statistically. Results: 33 cases with mean age of neurodeficit at 19.3 years and 30 controls with a mean age 13.5 years were studied including 39 males and 24 females with a mean follow-up of 3 years. Type I anomaly was common among cases (57.57%). Apex at or above T6 was found in 54.5% of cases whereas only 6.7% among controls ( $P < 0.001$ ) with no significant difference in curve magnitude. 39.3 % of cases had cord SI change versus none in controls. 24 patients among cases (Group A) and 30 controls underwent vertebral column resection (VCR) and fusion. 9 cases underwent circumferential decompression and In-situ fusion (Group B). 5 patients in Group A had post-operative neurological worsening and none in Group B or controls with no correlation in DAR. Conclusion: CVD with a delay in presentation beyond 14 years, apex at or above T6, type I anomaly and increased SI change are high risk factors for developing a neurodeficit. Stability rather than deformity correction is paramount.



**Date: 2019-12-06**

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**Time: 08:00 - 10:00**

**Room: Junior Ballroom B**

**Abstract no.: 54831**

**THE ASSOCIATION BETWEEN SUBJECTIVE HEALTH RELATED QUALITY OF LIFE OUTCOMES AND OBJECTIVE PULMONARY FUNCTION TESTING**

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Introduction: Investigations in associations between subjective health-related quality of life (HRQoL) measures and objective clinical assessments in patients with early onset scoliosis (EOS) are limited. The study purpose is to investigate the association between patient proxy reported pulmonary function and pulmonary function testing (PFT) in EOS. We hypothesize higher PFT scores will be associated with higher reported pulmonary function. Methods: In this cross-sectional study patients with EOS at any stage of treatment from 2009 to 2018 were identified in two registries including 34 centres. Parents' perception of pulmonary function was evaluated by the pulmonary function domain (PFD) in the EOS 24-item questionnaire. PFT measures included FVC % predicted, FEV1/FVC, and TLC % predicted. All PFT predicted values utilized arm span. PFT and questionnaires were completed within 180 days of each other. Results: 176 patients (mean age: 10.4yo, female: 56%) were identified. 33% of patients were of congenital/structural aetiology, 27% neuromuscular, 26% syndromic, and 14% idiopathic. Wide variance and lower PFD scores were reported at lower FVC % predicted values (<50%). As FVC % predicted values increased, PFD scores increased with a simultaneous decreases in variance with few exceptions. Conclusion: More variability and lower PFD scores are reported when FVC % is < 50%. This likely reflects children adapting to restrictive lung disease and the limits on adaptation that occur in more severe disease. It appears that the PFD and PFT do not measure the same qualities; however, the information provided by both can be clinically useful.

**Date: 2019-12-06**  
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**Abstract no.: 54991**

**COMPARISON OF DUAL SURGEON VERSUS SINGLE SURGEON APPROACH FOR SCOLIOSIS SURGERY. A SYSTEMATIC REVIEW AND META-ANALYSIS**

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Introduction: Corrective surgery for scoliosis is a complex and challenging prospect for experienced paediatric spine surgeons due to prolonged duration of surgery and the significant level of technical skill and expertise required. Traditionally, shorter operative time and lower blood loss have correlated well with improved outcomes and as such, efforts have been made to affect these metrics including the use of two attending surgeons for major cases in preference to one. This systematic review and meta-analysis assessed the available literature to further clarify the potential benefit that adopting a dual surgeon approach offers over single surgeon operations. Methods: A systematic review and meta-analysis assessed the effect of dual-surgeon operating compared to single-surgeon with respect to a number of indicators including blood loss, operative duration and length of hospital stay. In addition, we evaluated whether subgroups (adolescent idiopathic scoliosis V neuromuscular disorder scoliosis) imparted a particular benefit. Result: Five studies met our inclusion criteria. Mean difference indicated shorter duration of surgery (-84.11 min, 95% CI [-98.39, -69.83]) and a lower blood loss (-380.91ml, 95% CI [-549.85, -211.97]) in the dual-surgeon group compared to the single surgeon group. Four studies reported mean length of stay and also favoured the dual-surgeon group (-0.87 days, 95%CI [-1.19, -0.54]). Conclusion: This review observed that there are no randomised control trials evaluating dual surgeon versus single surgeon operating for scoliosis. We provide aggregated data and analysis of available literature, suggesting that outcomes in complex scoliosis surgery may be improved by adopting a dual surgeon approach.

**Date: 2019-12-06**  
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**Abstract no.: 53544**

**PELVIC INCIDENCE-LUMBAR LORDOSIS MISMATCH LESS THAN 10 DEGREES (PI-LL<10) HAS LIMITED APPLICABILITY AS A CRITERION OF ADULT SAGITTAL SPINAL DEFORMITY (ASD) CORRECTION**

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A criterion of corrected LL in ASD is PI-LL < 10°. (Schwab 2012) Distribution of preoperative PI in ASD was not taken into consideration when this criterion was proposed. The purpose of this study is to assess the applicability of the PI-LL < 10. A cross-sectional study performed. Inclusion criteria: age >20 yrs old, male and female; group-1: no spinal deformity; group-2: patients with ASD (preoperative). Parameters studied: PI, LL (L1-S1), and PI-LL. Statistical analysis: 1) evaluation of the distribution, mean (M); standard deviation (SD); 2) pooling the obtained and published results by random-effect modelling; 3) whole distribution restoration using the Monte-Carlo simulation; 4) regression analysis of LL by PI. Enrolled: N=98, female 61, mean age 55yrs (21-85): group-1, 31; group-2, 67. The distributions in healthy subjects (pooled data): 1) PI: normal, M=52, SD=11.9, min. =17, max. =94, N=953; 2) LL: normal, M=58.9, SD=12.8, min. =13, max. =109, N=244, 70% ranged from 40 to 70; 3) PI-LL, normal, M=-4.4; SD=9.9; min. =-21; max. 16; 10% >10, N=31. The regression of LL by PI is sloped: LL=33.5+0.47\*PI; R<sup>2</sup>=0.35; P<0.001. The distribution of PI in ASD (pooled data): normal, M=56.3, SD=13.9; min. =10, max. = 106, (N=192); 65% of PI ranged from 50 to 80 degrees. Applying PI-LL < 10 in these cases allow reach LL typical for 70% of subjects without ASD. The use of this criterion may cause inappropriate - correction, if preoperative PI is out of this range. Conclusion: correction of LL based on preoperative PI is not always applicable in ASD.

**Date: 2019-12-06**  
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**Abstract no.: 54729**

**OUTCOME OF MINIMALLY INVASIVE SCOLIOSIS SURGERY IN ADOLESCENT IDIOPATHIC SCOLIOSIS**

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**Objective:** Functional outcome of Minimal Invasive Scoliosis Surgery (MISS) in adolescent idiopathic scoliosis with moderate deformity. **Methods:** This prospective case series was carried out using non-probability consecutive sampling technique. The study was conducted at Orthopedic Spine Institute, Doctors Hospital & Medical Center, Lahore from 1st March 2017 to 28th February 2019. A sample size of 21 patients presented in our hospital with flexible curves between 40 to 70 degree recruited in the study and followed prospectively. Patients with rigid curves, curves more than 70 degree and congenital scoliosis were excluded from study. All patients had preoperative radio-graph and screening MRI. All patients were operated by the same surgeon. The outcome measures were degree of correction achieved and hospital stay. Patients were follow up at 3 weeks, 6 weeks, 12 weeks, 6 months and then yearly. **Results:** The mean age was 16.5 year. Male to female ratio was 2:1. Average duration of surgery was 5.6 hours in first 15 cases then 3.5 hours for last 6 cases. Mean estimated blood loss was 250cc. One transient neuromonitoring changes intraoperative that returned to baseline during surgery. One infection of the superior portal occurred. All patients were mobilized on first postoperative day. Mean hospital stay was 2.8 days. Average Cobb Angle was 55.6 degree preoperatively and 13.8 degree postoperatively. **Conclusion:** In the short term this procedure decreases the morbidity of the open surgery. In the long run hopefully will decrease the incidence of junctional problems associated with long segment fusions. **Keywords:** Minimally Invasive Scoliosis Surgery (MISS).

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**Abstract no.: 54319**

**LONG-TERM EVALUATION OF FUSION RATES IN THORACO-SCOPE-ASSISTED MINIMAL INVASIVE (MIS) ANTERIOR INTERBODY SPINAL FUSION**

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Introduction: Minimal invasive thoracoscope-assisted procedures results in lesser morbidity compared to traditional approaches to spine. There is still debate if MIS can achieve similar rates of fusion compared to open techniques. Methodology: A retrospective review was performed of patients who had a single-stage thoracoscope-assisted spinal fusion in prone position with posterior spinal instrumentation. The fusion rate was assessed according to a new classification using lateral X-rays at follow up. The patients were evaluated on a regular basis with a minimum follow-up of 9 months. Results: 200 patients with 251 levels were evaluated. The mean follow-up was 65.19 months (9m-15.7yrs). The mean X-rays available and analysed per patient were 5 (2 - 18). The diagnoses were Pyogenic Spondylitis (levels) (63), Fracture (74), Ankylosing Spondylitis (35) and Degenerative (79). At final follow-up the fusion state was Grade 0 (trabecular bridging of > 50 % of the AP-diameter and absence of former endplates) in 151 levels, grade1 (trabecular bony bridging of < 50%) in 39, grade 2 (28), grade 3 (28), grade 4(2), grade 5 (failure) (3). No case with grade 1 while only 2 cases with grade 2 deteriorated to grade 5. Solid fusion (grade 0/1) was reached in 75.8% (overall) of cases, 54/68 levels in spondylitis, 47/ 74 in fracture, 28/35 in Ankylosing spondylitis and 61/69 in degenerative at final follow-up. Conclusion: Thoracoscopy-assisted anterior spinal fusion with long radiological follow-up yielded high rates of bony union. Cases in general followed a trend from grade 4 to grade 0.

**Date: 2019-12-06**

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**Time: 08:00 - 10:00**

**Room: Junior Ballroom B**

**Abstract no.: 53895**

**AXIAL PLANE CHARACTERISTICS OF PRIMARY THORACIC (LENKE 1) SCOLIOSIS.**

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There is insufficient information regarding the axial plane characteristics of scoliosis despite its 3D nature. The posterior-anterior vertebral vector (VV) has been proposed to characterize the axial plane appearances of Lenke 1 thoracic scoliosis. This non-randomized retrospective study aimed to highlight the importance of having knowledge of axial plane features when determining fusion levels and correction techniques of thoracic curves. In this study, 254 Lenke 1 curves were analysed with VV to determine axial plane characteristics. The SterEOS 3D measurements were then compared with the VV-based projected angle calculations. K-means clustering was used to identify axial plane curve patterns. VV projected angle data were used to determine apical vertebral (APV) axial rotations, APV lateral displacement, and intervertebral rotations (IVR) in the axial plane. Regression analysis was used to determine the relationship between the coronal angles and axial plane characteristics. Pearson correlation and Bland-Altman tests revealed a close correlation between 3D angles and VV projected angles. Eight axial plane clusters were distinct exhibiting different lateral APV displacement toward the interacetabular axis with relatively small axial rotations and a simultaneous decrease in sagittal curves. Knowing the IVR in the axial plane helps to accurately determine the limits of the structural curves. The regression analysis results showed that the correlation of coronal curve magnitude was significantly stronger ( $r = 0.89$ ) with APV lateral translation than with APV axial rotation ( $r = 0.69$ ). Based on these findings, the primary goal of scoliosis correction should focus on minimizing lateral translation rather than eliminating axial rotation.

**Date: 2019-12-06**  
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**Abstract no.: 52916**

**COMPARISON OF COMPLICATIONS AND CLINICAL OUTCOMES OF PRIMARY AND REVISION SURGERY IN PATIENTS WITH ADULT SPINAL DEFORMITY WITH SAGITTAL IMBALANCE USING COMBINED ANTERIOR AND POSTERIOR PROCEDURE**

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Revision surgery seems intuitive, with increased risk of complications and poor clinical outcomes. Previous studies comparing primary versus revision surgery included data for wide variety of disease entities, age; however, literature comparing primary and revision surgery in patients with ASD with sagittal imbalance undergoing anterior and posterior combined surgery is less. We retrospectively reviewed 54 consecutive patients of ASD with sagittal imbalance who underwent primary (n=30) versus revision (n=24) surgery with a minimum 2-year follow-up. Patient, surgical, and radiological data, complications and clinical outcomes were included. Patient characteristics, including prevalence of sarcopenia, were similar between the 2 groups. Pedicle subtraction osteotomy was performed more frequently in revision group, although there was no statistical significance. The primary group had more proximal junctional problems, whereas the revision group had more rod breakage (p<0.05). There were significant improvements between the preoperative and 2-year postoperative clinical outcomes in both groups. ODI, VAS score, and assessment activities of daily living for sedentary Asian culture were similar in both groups 2 years postoperatively. Additionally, sarcopenia did not affect clinical outcome. Patients who underwent revision surgery for ASD with sagittal imbalance showed similar general and surgical characteristics as those who underwent primary surgery. However, revision group achieved relatively more benefit from surgery at 2-year follow-up than did the primary group. This is probably because they had greater pain and disability at the time of the revision procedure. Therefore, the revision status of the patient should not be an obstacle to the treatment of ASD with sagittal imbalance.

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**Session: Spine Free Papers 4**

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**Room: Junior Ballroom B**

**Abstract no.: 53406**

**A COMPARATIVE ANALYSIS OF BONE STRAIN IN PULLOUT VS TOGGLE PEDICLE SCREW TESTING**

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Summary: Pedicle screws are tested by measuring pullout strength (POS). (Tensile force to pull screw from vertebrae.) More clinically relevant is screw toggling (applied moment or bending force) leading to pedicle screw loosening. Rosette strain gauges are used to measure bone surface strain in pullout and toggling tests. Hypothesis: The toggling motion of pedicle screws produces more bone strain than pullout in mechanical testing. Design: Cadaveric biomechanical testing using hybrid six-degree-of-freedom protocol. Introduction: POS has been optimized for pedicle screws yet screw loosening and screw failure still exist. There is a need to understand how pedicle screws act on bone to better understand failure. This data leads to better understanding of why hardware failure still exists in deformity surgery. Methods: Seven cadaveric lumbar spines were instrumented at L2-L3. Strain gauges were attached to bone surface on the cranial sides of screws. Flexion-extension (6 Nm), lateral bending (6 Nm), axial rotation (6 Nm), and POS mechanical tests were conducted. Results: Average peak strain extension - 85  $\mu$ strain, average POS strain - 24  $\mu$ strain ( $p = 0.0093$ ). Average strains for flexion and rotation were also significantly different than POS, 73  $\mu$ strain ( $p=0.0289$ ) and 110  $\mu$ strain ( $p = 0.0228$ ) respectively with no significant difference ( $p=0.0648$ ) between lateral bending, POS strains. Conclusion: The hypothesis is supported and shows that extension, flexion, and rotation strains are significantly larger than pullout strains, extension showing the greatest significance. Further studies are needed to understand the impact of screw diameter and screw pitch.



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**Abstract no.: 53268**

**UNFOLDING THE OUTCOMES OF SURGICAL TREATMENT OF LUMBAR SPINAL STENOSIS – A PROSPECTIVE 5- AND 10-YEAR FOLLOW-UP STUDY**

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Surgical rate in lumbar spinal stenosis (LSS) is increasing and it is a leading cause for spinal surgery in the elderly. Purpose of this prospective observational 10-year follow-up study was to obtain satisfaction rate to surgical outcome in patients with LSS after 5 and 10 years postoperatively and to gather information of the natural course of the condition. The study patients consisted of 100 LSS patients who underwent decompressive surgery, and 72 of the original sample participated in the 10-year follow-up study. The patients completed the questionnaire preoperatively, 3 months, 5 and 10 years postoperatively. Outcome measurements were satisfaction with the surgical outcome, Oswestry disability index (ODI), Visual analogue scale (VAS). Postoperative improvements at 5- and 10-year were analysed using linear mixed models while comparisons between postoperative values were made for clinical course of pain, disability and walking ability. At 10-year follow-up, satisfaction rate with the surgical outcome was 68%. Interestingly, at both 5- and 10-year follow-up time, the mean VAS values deteriorated when compared with values collected at 3-month follow-up. Similarly, the mean ODI increased at 10-year follow-up when compared to 3-month values showing worsening in outcomes. However, a statistically significant improvement was shown in all the measured outcomes compared to baseline. Ten years after the decompressive surgery, patients with LSS experienced more disability and pain compared to the 3-month postoperative time point. Nevertheless, all outcome measures showed significant improvement from baseline, with majority of patients being satisfied with the achieved results at all time points.

**Date: 2019-12-06**

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**Room: Junior Ballroom B**

**Abstract no.: 53083**

**CAN WE PREDICT ADVERSE OUTCOMES IN LUMBAR FUSION FOR PRIMARY DEGENERATIVE DISORDERS? A MODIFIED FRAILITY INDEX BASED STUDY**

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Introduction: Higher rates of adverse outcomes and complications are reported in elderly patients undergoing lumbar fusion for spinal degenerative disorders. Risk stratification based on the age alone is not ideal. Predicting the events following surgery preoperatively using Frailty index has been followed in several surgical fields, but not widely in spine surgery. We analysed the efficacy of modified frailty index (mFI) to predict adverse outcomes and its effect on functional outcomes in lumbar fusion. Methods: All adult patients undergoing posterior lumbar interbody fusion or transforaminal lumbar interbody fusion at our centre between 2014-2018 were included. Postoperative complications, hospital stay, reoperations and mortality rates were assessed. mFI was calculated and correlated with modified ODI score at 6 months postoperative period. Results: 125 patients, had a mean mFI of 0.11(0-0.63). Increasing mFI score was associated with increased complications, reoperations and hospital stay ( $P < 0.05$ ). As the mFI score increased beyond 3 variables ( $3/11 = 0.27$ ), the complications of Urinary tract infections, wound healing issues and reoperations increased ( $p < 0.05$ ). Important to note that patients with age  $< 60$  ( $n = 38$ ) but  $mFI > 0.27$  also had increased complications. Worse modified ODI scores were noted with higher mFI scores ( $p < 0.05$ ) indicating worse functional outcomes in these patients. Conclusion: Modified Frailty index can be used as a predictor of complications and would be useful in preoperative counselling for patients undergoing lumbar fusion. Frail patients are at a higher risk of complications, show worse functional outcomes and should be carefully monitored during their hospital stay to prevent reoperations.

**Date: 2019-12-06**  
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**Abstract no.: 53625**

**OUTCOME ASSESSMENT OF POSTERIOR LUMBAR INTERBODY FUSION (PLIF) AND TRANSFORAMINAL LUMBAR INTERBODY FUSION (TLIF) IN SPONDYLOLISTHESIS**

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Introduction: From a posterior approach, Posterior Lumbar Interbody Fusion (PLIF) and Transforaminal Lumbar Interbody Fusion (TLIF) are widely accepted but the clinical outcomes of these two techniques had been inconsistent in different literatures. Purpose: To compare the early outcome of PLIF versus TLIF in surgical management of Spondylolisthesis. Methods: Retrospective review of the records of 138 cases during the period of January 2012 to December 2018 was done. Within the range of 40-69 years, 60 patients 12 men and 48 women (mean 50 years) who underwent PLIF and 78 patients with the same, 22 men and 56 women (mean 49years) who underwent TLIF were reviewed. The surgical time, duration of hospital stay, intra-operative blood loss w s compared. Self-evaluated low back pain and leg pain status (using Visual Analogue Score) and disability outcome (using Oswestry disability questionnaire) was analysed. Radiological fusion (using Hackenberg criteria) and restoration of lumbar lordosis was also compared. overall functional outcome assessed by using MacNab`s criteria. Statistical analysis was done using SPSS. Results: Surgical time and intra-operative blood loss was significantly more with PLIF but post operative hospital stay had no significant difference. Pain and disability status improvement, radiological fusion and lordosis restoration was significant in both groups but PLIF had been more associated with neural complications. Conclusion: Both methods are statistically effective in relieving symptoms and achieve significant fusion but TLIF can be recommended in Spondylolisthesis for its avoidance of neural complication.

**Date: 2019-12-06**  
**Session: Spine Free Papers 4**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 53603**

**ASSOCIATION OF LUMBAR SPINAL STENOSIS WITH DISABILITY OR MORTALITY AMONG COMMUNITY-DWELLING OLDER ADULTS: THE LOCOMOTIVE SYNDROME AND HEALTH OUTCOMES IN THE AIZU COHORT STUDY (LOHAS)**

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Background: Several studies have reported a high prevalence of various morbid states in patients with lumbar spinal stenosis (LSS); however, no study has investigated the long-term burden of LSS. We investigated the association between LSS and future disability or mortality. Methods: This prospective cohort study was based on data obtained from the Locomotive Syndrome and Health Outcomes in the Aizu Cohort Study (LOHAS). We enrolled independent community-dwelling older adults aged 65 years or older at the time of baseline health check-up in 2008. LSS was diagnosed using the Konno's diagnostic support tool. The primary endpoint was a composite of disability (long-term care insurance certification grade 4 or 5) or mortality. We used Kaplan-Meier method and log-rank test to compare the interval between the baseline and the pre-determined endpoint and Cox proportional hazards model to estimate cause-specific hazard ratios in the LSS group with adjustments for baseline covariates. Results: Of the 2058 patients enrolled, we investigated 1608 without missing covariates (274 [17%] diagnosed with LSS). After a median 5.8 years of follow-up, the rate of disability or mortality was 0.022 per year in the LSS group and 0.012 per year in the control group ( $P=0.003$ ). Unadjusted and adjusted hazard ratios for disability or mortality in the LSS group were 1.82 (95% confidence interval [CI] 1.22 to 2.71) and 1.57 (95% CI 1.03 to 2.39), respectively. Conclusions: LSS was associated with disability or mortality in community-dwelling older adults. Our results highlight new findings that focus on the significance of treatment for LSS.

**Date: 2019-12-06**  
**Session: Spine Free Papers 4**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 54628**

**SURGICAL OUTCOME OF DECOMPRESSION AND FIXATION OF DEGENERATIVE LUMBOSACRAL SPONDYLOLISTHESIS SURGERY IN A PAKISTANI POPULATION**

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To find out the outcome of posterior decompression with reduction and fixation of lumbosacral spondylolisthesis. This study was conducted from 1st July 2013 to 15th February 2017 including 94 patients with lumbosacral spondylolisthesis. The myerding classification was used to grade the extent of vertebral slippage. The assessment was done using the Oswestry Disability Index (ODI). There were 50(53.19%) males and 44(46.80%) females with a mean age of 44 years  $\pm$ 10.49 SD. Backache was present in all patients and claudication in 85(90.42%) patients. There were 10(10.63%) patients with spondylolisthesis at L3-L4, 36(38.29%) at L5-S1 and 48 patients(51.06%) at L4-L5 level. In 48 patients with L4-L5 level, 38(79.16%) were in grade II while six(12.5%) were in grade III. According to the preoperative ODI score, 38 patients were placed in moderate disability, 52 patients were severely disabled while four patients were disabled. Good outcome was achieved in a total of 79(84.04%) patients. In 40(42.55%) patients, with complete reduction, the good outcome achieved in 35(83.33%) while in 22(23.40%) patients there was no reduction and a good outcome was achieved in 17(77.27%) patients. In 38(40.42%) patients with moderate disability, 32(84.04%) patients had a good outcome. Post-operative CSF leak occurred in five(5.31%) and wound infection in seven(7.44%) patients while there was no mortality. Reduction with decompression can have a good outcome in spondylolisthesis, and ODI should be used as a predictor of outcome. It also shows that proper decompression is required and not a complete reduction.

**Date: 2019-12-06**  
**Session: Spine Free Papers 4**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 53463**

**HOW USEFUL IS SEDIMENTATION SIGN FOR THE DIAGNOSIS AND THE  
OUTCOME OF SURGICAL TREATMENT?**

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Lumbar canal stenosis is one of the most common causes of spinal surgery. The correlation between the clinical and the imaging findings is not always constant spinal stenosis simply means narrowing or reduction in the size of the canal this can be confirmed by plain x-ray, CAT scan, MRI or neurophysiological studies. Bars in 2010 described the absence of sedimentation of the nerve roots to the dorsal region of the dural sac in the axial section of the MRI by the force of gravity as a positive sign, he feels this important sign added for deciding on surgery. This demonstrated that in patients with LSS above L5 the sedimentation sign is positive in 94% of patients. □ I shall present in details the value of sedimentation in the diagnosis of LSS for the evaluation of the outcome of surgery and also for the need to repeat decompression on long run.

**Date: 2019-12-06**  
**Session: Spine Free Papers 4**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 53735**

**FOLLOW-UP COMPARATIVE STUDY OF ABSORBABLE SUTURE FAILURE OF THE NUCHAL LIGAMENT IN THE EARLY POST-OPERATIVE PERIOD AFTER CERVICAL LAMINOPLASTY**

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We reported on the post-operative changes of nuchal ligament in MRI findings and considered the procedure of closing the nuchal ligament (The 39th SICOT OWC). After that, we increased the number of knots (three times to four times) and examined suture failure of the nuchal ligament. This study was conducted with 98 patients in two groups (three knots group; 61 men and 13 women; mean age 70.3 years; age range 47-92 years; period July 2012 to November 2017, four knots group; 18 men and 6 women; mean age, 68.6 years; age range 44-85 years; period December 2017 to December 2018) who underwent open-door cervical laminoplasty on 4 or more laminae. At whatever level we performed laminoplasty, we resected the spinous processes at the same level. Closed-suction drain was used for all patients. We used 0-vicryl® for closure of the nuchal ligament. Suture failure was determined to have occurred if T2-weighted axial MRI showed any tear in the nuchal ligament. As a result of this study, suture failure of the nuchal ligament was confirmed in 11 out of 24 patients (46%) of the four knots group. An increase in the number of knots significantly reduced the suture failure of the nuchal ligament (P-Value<0.01, chi-squared test). An increase in the number of knots reduced suture failure of the nuchal ligament but it still occurred in 46% of cases. Therefore, there is a possibility that suture of the nuchal ligament using absorbable suture itself is difficult.

**Date: 2019-12-06**  
**Session: Spine Free Papers 4**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 54553**

**APPLICATION OF CERVICAL ARTHROPLASTY USING MOBI-C FOR CERVICALSPONDYLOTIC RADICULOPATHY**

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To investigate the feasibility and effectiveness of the cervical total disc arthroplasty using Mobi-C artificial cervical disc for cervicalspondylotic radiculopathy. From March 2012 to February 2016, 87 patient who suffered from cervicalspondylotic radiculopathy were treated with the cervical total disc arthroplasty using Mobi-C artificial cervical disc with the same implantation technique. The short form (36) health survey (SF-36) and VAS score was evaluated preoperatively, 3 days, 6 months, 1 year and 3years after the surgery to observe the recovery of neurofunctional condition and clinical effectiveness . Anterior-posterior and flexion-extension X-ray images were taken to observe the disc height and range of motion of the operated level and the incidence of HO (heterotopic ossification). 79 cases were followed up for an average of 44.8 months. All of patients had satisfied outcome. There was significant difference between the preoperative and postoperative SF-36 on six items and VAS score ( $P < 0.05$ ). The disc height increased from preoperative  $6.5 \pm 1.1$ mm to postoperative  $7.7 \pm 0.9$ mm ( $P < 0.05$ ). There was no significant difference between the preoperative and postoperative ROM ( $P > 0.05$ ). There was no other complications related to operation except 39(49.3%) the heterotopic ossifications (according to McAfee classification, Class I 27case , Class II 12case) without symptoms 3 years after the operation. The cervical total disc arthroplasty using Mobi-C artificial cervical disc for cervicalspondylotic radiculopathy is able to improve neurofunctional condition and clinical symptom effectively, as well as to increase the disc height and maintain the ROM effectively.



**Date: 2019-12-06**  
**Session: Spine Free Papers 4**  
**Time: 16:00 - 17:30**  
**Room: Junior Ballroom B**

**Abstract no.: 55131**

**'AJMI' GRADING SYSTEM FOR CERVICAL MYELOPATHY**

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Introduction: The study proposed a simple method of assessing the severity of cervical Spondylogenic myelopathy (CSM) based on clinical signs. The 'AJMI' scoring system is based on four different criteria which include clinical assessment of ambulation, reflexes as a part of motor assessment, motor deficit in hand and bowel and bladder function. Methods: The study assessed 50 patients with presentation suggestive of cervical myelopathy. After a detailed history of patients, 12 objective tests were performed and based on that a score of 4-12 was given. A score of 4 or less would be mild form and 4-8 was moderate and was more considered more suitable for surgery on elective basis. A score of between 8-12 was considered severe. Preoperative and postoperative AJMI grade noted of each patient were documented. Results: The new 'AJMI' grading system to assess the severity of the myelopathy is simple and easily reproducible tool for any clinician to grade CSM. The patients in the moderate severe category had the most benefit from surgical decompression while patient in severe grade had the least post operative improvement. Conclusion: 'AJMI' grading system is a highly sensitive tool to evaluate the patients with cervical myelopathy. It also outlines the management strategy based of the severity of the grade and predicts the patients with better outcome in moderate disease as compare to poor out come in the high grade of the disease. Further evaluation of this tool by other centres would be required in future.

**Date: 2019-12-06**  
**Session: Tumours Free Papers**  
**Time: 08:00 - 10:00**  
**Room: Meeting Room 9**

**Abstract no.: 53915**

**ARTHROPLASTY OF SHOULDER AND ELBOW JOINTS IN CASES OF BONE TUMOURS**

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Introduction: Malignant tumours of the bone amount less than 0,2% of all malignant tumours. Treatment of malignant bone tumours is a complex issue. Surgical treatment of bone tumours is the primary method of treatment. Arthroplasty is one of the methods of surgery for tumours of the bone. Methods: From 2009 to 2019, joint replacement of the shoulder and elbow joints with bone tumours were performed in 37 patients. Morphologically met: giant cell tumour - 14 cases metastatic tumours - 11, chondrosarcoma - 7, osteosarcoma - 4, Ewing's sarcoma - 1. Arthroplasty of shoulder joint was performed in 23 patients, the elbow – 14. Implants that were used: "Inmed" (Ukraine) and "Valdemar Link" (Germany). The functional outcome of the operated limb was calculated on a MSTS scale. The survival rate of patients was evaluated by Kaplan – Meier method. Results: Postoperative complications amounted 10,8%. Tumour recurrence – 5,4%. Limb functional outcome after total shoulder joint arthroplasty – 64,2%; of the elbow – 76,6%. The total three-year survival rate: 76,2±1,6%, five-year - 55,6±2,8%. Conclusion: Complications of joint replacement depends on the size of the tumour, the surgical technique of the operation and design of the implant. For more effective results of treatment, the structural implants and surgical techniques must be improved.

**Date: 2019-12-06**  
**Session: Tumours Free Papers**  
**Time: 08:00 - 10:00**  
**Room: Meeting Room 9**

**Abstract no.: 53789**

**THE EFFICACY AND SAFETY OF INTRAOPERATIVE NAVIGATION IN SPINAL TUMOUR SURGERY.**

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Background: Disadvantage of traditional tumour surgery is that extension of the tumour cannot be accurately determined intraoperatively, and therefore complete tumour excision becomes difficult. Computer-assisted navigation (CAN) systems are largely used for pedicle screws positioning in degenerative, deformity and traumatic spine surgery. In oncologic spine surgery its use is developing and could be extended for tumour identification and excision. Materials and methods: 51 patients with primary benign or malignant spine tumours operated between June 2010 to March 2017 with the aid of CAN were included. Demographic details, operative time, accuracy of screw placement, hospital stay, biopsy report, recurrence of tumour and complications were reviewed. Patients with inconclusive biopsy reports were excluded. Results: 51 (29 males, 22 females) patients with average age of 31.9 years (9-65 years) were included in the study. 26 (52.9%) benign lesions which included 3 osteochondroma, 11 osteoid-osteoma, 7 osteoblastoma, 2 hemangioma, 2 chordoma, 1 BFH. 13 (25.4%) malignant lesions which included 10 myeloma, 3 chondrosarcoma. 12 (23.5%) tumour like lesions- 6 GCT, 4 ABC and 2 FD. Regional distribution showed 28 cervical, 11 thoracic, 9 lumbar and 3 sacral tumours. The average operative time was 3.8 hours (1-10hours) and hospital stay was 9.4 days (2-29 days). The average follow up was 12.63 months (2-44months). 133 pedicle screws were applied for instrumentation which included 47 cervical, 61 thoracic, 24 lumbar screws. Conclusion: CAN offers advantage of reduced radiation exposure to operating room personnel and the ability to use minimally invasive approaches that limit tissue injury.

**Date: 2019-12-06**  
**Session: Tumours Free Papers**  
**Time: 08:00 - 10:00**  
**Room: Meeting Room 9**

**Abstract no.: 53983**

**SURGERY OF FEMORAL METASTASIS: RESULT OF SELECTING PROCEDURES BASED ON PATIENT PROGNOSIS**

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Introduction: Prognosis is extremely important indicator in selecting an operative procedure for femoral metastasis. The purpose was to evaluate the results of procedures for femoral metastasis selected based on patient prognosis. Methods: From 2002 to 2017, 148 consecutive patients underwent surgery for femoral metastasis. Preoperative risk assessments were performed according to Katagiri's scoring system for prognosis. In general, the low-risk group underwent resection followed by endoprosthetic replacement (EPR), while the high-risk group underwent internal fixation (IF) followed by radiotherapy. For the intermediate risk group, operative procedures were selected with case by case fashion. Overall survival rate, local failure, walking ability, and complications were evaluated. Results: Eighty-three patients underwent EPR and 63 patients underwent IF. The 1-year survival rate was 71% for EPR and 15% for IF ( $p < 0.001$ ) . The one-year local control rate was 93% for EPR and 67% for IF ( $p=0.016$ ), and the 5-year local control rate for EPR was as high as 88 %. The ambulatory rate was 99% for EPR and 60% for IF. The cause of non-ambulation was not a local problem but mainly systemic progression of cancer. The time to ambulation and hospital stay were shorter in the IF group. The systemic complications was comparable between the two groups (EPR, 18%; IF, 22%) .

Conclusions: EPR is expensive but can lead to excellent long-term results; therefore, recommended for low risk patients. IF is associated with local failure within a year; however, inexpensive and less invasive with a shorter hospital stay, which is beneficial for patients with short-term prognosis.

**Date: 2019-12-06**  
**Session: Tumours Free Papers**  
**Time: 08:00 - 10:00**  
**Room: Meeting Room 9**

**Abstract no.: 54264**

**EARLY EXPERIENCE WITH CT-GUIDED COMPUTER NAVIGATION-ASSISTED SURGERY IN MUSCULOSKELETAL TUMOUR SURGERY**

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Klemens VERTESICH<sup>2</sup>, Gerhard HOBUSCH<sup>2</sup>, Joannis PANOTOPOULOS<sup>2</sup>,  
Reinhard WINDHAGER<sup>2</sup>

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Computer navigation-assisted surgery with intra-operative CT-guidance for musculoskeletal tumours may provide additional accuracy for tumour resection. We reviewed the first 19 operations in 18 patients (five female) with CT-guided computer navigation-assisted surgery. In ten of these patients, navigation was used for resection and/or reconstruction. In one patient the intra-operative CT scan was performed, however the resection was not navigated due to a conversion to amputation. Seven patients underwent eight surgeries of the spine, intra-operative CT-guidance was used for navigated screw positioning. Average follow-up of patients with CT-guided resection and/or reconstruction was 10 months (range, 4-22 months). In 8 patients there was no evidence of disease, one was alive with disease, one had died of disease. There were no intra-operative complications. Two patients sustained persistent peroneal palsy. In one patient tumour infiltration required resection of the femoral nerve. Five post-operative complications were observed: Three patients (two with additional radiotherapy) developed wound healing disturbance. One patient developed ischemia of the contralateral leg after external hemipelvectomy, resulting in knee disarticulation. One patient had a septic complication after internal hemipelvectomy which resulted in external hemipelvectomy. Five tumours were excised with wide margins and four with marginal resection. There was one local recurrence in a patient with a wide resection, and one patient died of disease after metastatic dissemination. In three of five wide resections the closest margin ranged from 1mm to 7mm (mean, 3mm). CT-guided computer navigation-assisted surgery may provide additional assistance in complex tumour resection and thus may enable more limited resections.

**Date: 2019-12-06**  
**Session: Tumours Free Papers**  
**Time: 08:00 - 10:00**  
**Room: Meeting Room 9**

**Abstract no.: 53439**

**90-DAY COMPLICATIONS AFTER SURGERY FOR SPINAL TUMOURS**

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STUDY DESIGN: Retrospective Cohort Study. OBJECTIVE: The purpose of the present study was to determine the types and incidence rates of 90-day complications following spinal tumour surgery. METHODS: The orthopaedic subset of the Humana database (PearlDiver) was retrospectively queried for spinal tumour surgical procedures performed between 2007 and 2017 using International Statistical Classification of Diseases 9 & 10 (ICD-9 & ICD-10) and Current Procedure Terminology (CPT) codes. Spinal procedures evaluated included laminectomies, discectomies, corpectomies, and fusions at all spinal levels. Incidence rates of complications (neurologic, cardiac, pulmonary, vascular, thromboembolic, wound-related, instrumentation/implant-related, and other medical) were then determined within 90 days of the index procedure. The composite "other medical complications" included genitourinary (GU), gastrointestinal (GI), and infectious (excluding SSI) complications. RESULTS: 1730 patients who underwent spinal tumour surgery were identified and included in the final analysis. Of these patients, there were 22 (1.27%) neurologic, 110 (6.36%) vascular, 125 (7.23%) wound related, 59 (3.41%) instrumentation/implant related, 97 (5.61%) thromboembolic, 88 (5.09%) pulmonary, 132 (7.63%) cardiac, and 346 (20%) other medical complications. CONCLUSIONS: In this Humana database analysis, 20% of patients who underwent spinal tumour surgery suffered medical (GU, GI, or infectious) complications within 90 days following spinal surgery. The next most common complications included cardiac (7.63%) and wound-related complications (7.23%). The present study demonstrates the potentially high rates of complications following surgery for spinal tumours. These results can be used by surgeons for preoperative patient counselling and risk stratification.

**Date: 2019-12-06**  
**Session: Tumours Free Papers**  
**Time: 08:00 - 10:00**  
**Room: Meeting Room 9**

**Abstract no.: 52879**

**IMPROVED VIRTUAL SURGICAL PLANNING WITH 3D-MULTIMODALITY IMAGE FOR MALIGNANT GIANT PELVIC TUMOURS**

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**Purpose:** We sought to assess the early clinical outcome of 3D-multimodality image (3DMMI) based virtual surgical planning for resection and reconstruction of malignant giant pelvic tumours. **Materials and methods:** In this retrospective case-control study, surgery was planned and performed with 3DMMI-based patient-specific instruments (PSI) in 13 patients with giant pelvic malignancy, and without 3DMMI-based PSI in the other 13 patients. In the 3DMMI group, 3DMMI taking advantages of computed tomography (CT), contrast-enhanced computed tomography angiography (CTA), contrast-enhanced magnetic resonance imaging (MRI), contrast-enhanced magnetic resonance neurography (MRN) and that revealing the whole tumour and all adjacent vital structures was utilised, based on which virtual surgical planning was conducted and the corresponding PSI was then designed. The median follow-up was 8 (3-24) months. The median age at operation was 37.5 (17-64) years. The mean tumour size in maximum diameter was 13.3 cm. Surgical margins, intraoperative and postoperative complications, duration of surgery, intra-operative blood loss were analysed. **Results:** In the non-3DMMI group, the margins were wide in six patients (6/13), marginal in four (4/13), wide-contaminated in two (2/13), and intralesional in one (1/13). In the 3DMMI group, the margins were wide in ten patients (10/13), marginal in three (3/13) and no wide-contaminated or intralesional margin. 3DMMI group achieved shorter duration of surgery ( $p=0.354$ ) and lower intraoperative blood loss ( $p=0.044$ ) than the non-3DMMI group. **Conclusions:** The 3DMMI-based technique is advantageous to obtain negative surgical margin and decrease surgical complications related to critical structures injury for malignant giant pelvic tumour.

**Date: 2019-12-06**  
**Session: Tumours Free Papers**  
**Time: 08:00 - 10:00**  
**Room: Meeting Room 9**

**Abstract no.: 52877**

**TOTAL FEMORAL PROSTHESIS REPLACEMENT FOLLOWING RESECTION OF FEMORAL MALIGNANT TUMOURS**

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Background: The essential factor for the good functional outcome after total femoral prosthesis replacement (TFR) was the preservation of muscles around the femur. Patients with extensive muscles invasion usually means a wide surgical resection and less preservation of muscles. Rectus femoris is important to the stability of the prosthesis. We studied the interrelation between the tumour invasion the rectus femoris and the functional outcome after TFR. Methods: Between 2010 and 2017, 14 patients with a mean age of 44.8 years were treated for femur tumour with TFR. We categorized the cases into 2 groups: group A (with rectus femoris invasion) and group B (without rectus femoris invasion). Outcome was evaluated by gait analysis, Musculoskeletal Tumor Society Score (MSTS) and Harris hip score (HHS), and complications, by the ISOLS method modified in 2014. Results: The average MSTS and HHS score of group A was  $17.6\pm 3.1$ ,  $55.38\pm 13.30$ , whereas the average score of group B was  $23.0\pm 4.8$ ,  $80.17\pm 6.24$ . There was significant difference between the groups in MSTS ( $P = 0.02$ ,  $< 0.05$ ) and HHS ( $P = 0.001$ ,  $< 0.05$ ). The group without rectus femoris invasion also achieved better limb function (supporting and gait) and active ROM ( $P < 0.05$ ). Conclusions: Patients treated with total femur resection and TFR, which without rectus femoris invasion had a better limb function, and greater active hip ROM than those who with. Keywords: Femur, Tumour, Total femoral prosthesis replacement, Limb-salvage, rectus femoris invasion



**Date: 2019-12-06**  
**Session: Tumours Free Papers**  
**Time: 08:00 - 10:00**  
**Room: Meeting Room 9**

**Abstract no.: 54691**

**IMPLANT SURVIVAL IN HIP REPLACEMENT FOR TUMOURS AROUND THE HIP**

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Introduction: Hip replacement is an option for pathological fractures, primary and secondary malignancies, and benign tumours around the hip. Both hemiarthroplasty (HA) and total hip replacement (THR) are used. Little is known about implant survival in these patient groups. We investigated mortality and implant survival in patients undergoing hip replacement due to any tumour-related indication in Sweden. Methods: All HA and THR procedures (n=806 and n=1704) due to any tumour-related diagnosis performed 1999-2018 as registered in the Swedish Hip Arthroplasty Register were identified. Mortality and implant survival was estimated using the Kaplan Meier survival function. Results: The majority were performed due to secondary malignant tumours including myeloma (92 %), followed by primary malignant femoral or pelvic tumours (7 %) and benign tumours (1 %). Among the secondary malignant tumours, 63% were complete fractures and 37% impending fractures. 90-day mortality was 31% (95%CI 28-34) for HA and 21% (19-23) for THR patients. There were 90 revisions, the most common reason was dislocation (28%), followed by infection (25%), loosening/osteolysis (21%) and periprosthetic fracture (11%). 5-year implant survival was 79% (71-88) for HA and 90% (87-94) for THR patients. Discussion: Patients with hip replacement due to tumours around the hip have high mortality and low implant survival. The differences between HA and THA observed probably reflect differences in patient populations which warrants further investigation.

**Date: 2019-12-06**

**Session: Tumours Free Papers**

**Time: 08:00 - 10:00**

**Room: Meeting Room 9**

**Abstract no.: 54664**

**3D-PRINTED TITANIUM CUSTOM-MADE PROSTHESES IN RECONSTRUCTION AFTER RESECTION OF PELVIC TUMOURS: RESULTS AT MEDIUM FOLLOW-UP**

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Introduction: after wide resection, 3D-Printed Titanium Custom-Made Prosthesis (3DPTCMP) could be a valid alternative in complex reconstructions. The aim of the present paper is to analyse the first 10 pelvic prostheses implanted by our research group, evaluating indications, complications and mid-term results. Methods: The first ten 3DPTCMP implanted in two major orthopaedic research institutes were considered. Survival rate, local recurrence, short- and long-term complications and functional status were considered. Results: Eight patients underwent hemipelvis resection and reconstruction with 3DPTCMP and hip prosthesis, two patients in which the sacroiliac joint was involved underwent hemipelvis resection and reconstruction with 3DPTCMP linked to a spinal stabilization. Complications: four cases of infection, whereof two were resolved with debridement, one died for iliac vein rupture and the forth prosthesis was removed and replaced with an antibiotic-loaded cement. Survival: at 29 months of average follow-up, seven patients are alive, of which five without evidence of disease, one with a stable disease (already metastatic at index surgery) and the last with a solitary rib metastasis; one patient died of heart attack one year from surgery, one patient died of septic shock complicating an erisipela infection after 15 months from surgery and one for vein rupture at one month from surgery. Conclusions: 3DPTCMP is an effective resource for reconstruction after resection of complex segments such as the pelvis and the scapula but it can play a role in particular cases in other segments as well. Even if they can be considered a valid alternative to massive homograft reconstruction, further studies are necessary to evaluate long-term results.

**Date: 2019-12-06**  
**Session: Tumours Free Papers**  
**Time: 08:00 - 10:00**  
**Room: Meeting Room 9**

**Abstract no.: 54899**

**RETROSPECTIVE AND PROSPECTIVE STUDY OF GIANT CELL TUMOUR OF BONE: MULTI-MODAL APPROACH**

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**Introduction:** The clinical behaviour and treatment of Giant Cell Tumour (GCT) of Bone is still perplexing. The aim of this study is to clarify the clinico-pathological correlation of tumour and its relevance in treatment and prognosis. **Materials and Methods:** This is a retrospective study conducted in Orthopaedics department of GSVM Medical College, Kanpur. It includes 32 patients, aged 18-45 years, with a Male: Female ratio of 3:2 treated by different methods between the years 2008-2012. Relevant history, clinical examination, radiological and histopathological investigations were performed. The tumour was classified according to Campanacci et al grading and Enneking staging systems. The various treatment modalities used were: 1.Curettage and bone grafting (autologous/hydroxyapatite/mixed) 2.Curettage and cementing 3.En-bloc resection with/without reconstruction 4.Radiotherapy 5.Amputation. **Results:** The most common site affected was the distal end of radius (n=8). 7 out of 32 cases showed recurrence. In this study, we observed that high grade (Grade II/III) tumours treated by curettage and bone grafting showed higher rates of recurrence compared with those treated by en-bloc resection. 6 out of 32 cases were malignant on histopathological examination and these cases had a shorter duration of history as compared to the mean duration of symptoms. **Conclusion:** For radiologically well-contained and histologically typical tumour, curettage and bone grafting is the treatment of choice. The typical tumours with radiologically deficient cortex, clinically aggressive tumours and tumours with histological Grade III should be treated by wide excision and reconstruction.

**Date: 2019-12-06**  
**Session: Tumours Free Papers**  
**Time: 08:00 - 10:00**  
**Room: Meeting Room 9**

**Abstract no.: 54432**

**MANAGEMENT OF GIANT CELL TUMOUR OF LOWER THIRD TIBIA WITH CURETTAGE AND RECONSTRUCTION BY CEMENTATION AND LOCKING PLATE: A CASE REPORT.**

Vipul SHET<sup>1</sup>, Eknath PAWAR<sup>2</sup>, Amit YADAV<sup>2</sup>, Akash SARAOGI<sup>2</sup>, Ankit MARFATIA<sup>2</sup>, Sandeep GAVHALE<sup>2</sup>

<sup>1</sup>Grant Govt. Medical College & Sir J.J. Group of Hospitals, Mumbai, Mumbai (INDIA), <sup>2</sup>Grant Govt. Medical College & Sir J.J. Group of Hospitals, Mumbai, MUMBAI (INDIA)

Introduction: Giant cell tumour (GCT) of bones is an unusual neoplasm that accounts for 4% of all primary tumours of bone. GCT generally occurs in skeletally mature individuals with its peak incidence in the third decade. Distal femur and proximal tibia are the commonest sites followed by distal radius. Less than 4% of these tumours are known to affect the ankle joint, but the tumour's biological behaviour at this site is quite unpredictable. Moreover, restoring the ankle joint functionality following tumour resection is a challenging task. Case Summary: A 27 year old female presented with pain over right ankle since two years. Biopsy was suggestive of GCT of lower third tibia. We managed this case with intralesional curettage using phenol and bone cement as an adjuvant and reconstruction of defect by cementation along with locking plate. Discussion: In cases of GCT, the management depends upon the various factors such as site, age and extent of bone involvement. Extra-articular GCT can be managed with extended intralesional curettage. Bone cement plays a dual role as an adjuvant and an agent for reconstruction of the defect. Conclusion: Surgical management remains the main treatment modality for GCT. Essential factor in the treatment of giant cell tumour is meticulous curettage. Bony defects can be filled with autografts or bone cement. Locking plate serves to provide additional stabilization of the construct. This modality of treatment offers good stability and early ankle mobilization. Nevertheless, a periodic follow-up is warranted to watch out for late recurrences.

**Date: 2019-12-07**  
**Session: Trauma Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Auditorium**

**Abstract no.: 54122**

**SUPRAPATELLAR TIBIAL NAILING REDUCES RADIATION EXPOSURE AND OPERATIVE TIME COMPARED TO CONVENTIONAL TIBIAL NAILING**

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Introduction: Intramedullary nailing is a reliable way of treating tibial fractures. Suprapatellar (SP) nailing has gained popularity due to technical advantages. The concerns regarding articular damage have not been confirmed. We have adopted this technique at our hospital and compared our results with the conventional approach for tibial nailing. Methodology: 19 Consecutive patients underwent suprapatellar tibial nailing between September 2017 and December 2018 using the Depuy -Synthes Tibial Nailing system. Sixteen were fresh fractures, 1 delayed fixation (7 weeks post external fixator), 2 were pathological fractures. Patients were positioned supine with slight knee flexion on a radiolucent table. Suprapatellar jig with inbuilt suction port was utilized. A comparison of positioning time and radiation exposure was carried out with similar series of tibia fractures performed by transpatellar (TP) approach. Results: The average radiation exposure in the SP group was 90 cGy (58.4-151) in comparison to 125cGy (58.01-272) in the TP group. The positioning time for SP group was average 10.8 minutes (5-17mins) and 19.8 minutes (5-33mins) TP group. The suprapatellar approach was used successfully for all levels of tibial fractures. Conclusion: The patient positioning is easier and less time consuming with the suprapatellar approach. Easier imaging resulted in reduced overall radiation exposure for the procedure. The use of this approach requires careful attention to certain steps. The procedure can be reliably performed for all levels of the fractures. Overall, tibial nailing with suprapatellar approach can be used as a better alternative to conventional approach with equally good results.

**Date: 2019-12-07**  
**Session: Trauma Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Auditorium**

**Abstract no.: 54210**

**DOES BONE GRAFTING AT THE DOCKING SITE LEAD TO IMPROVED UNION FOLLOWING BONE TRANSPORT FOR SEGMENTAL BONE DEFECTS OF THE TIBIA AND THE FEMUR? A RETROSPECTIVE COHORT STUDY**

Hasan NAHOULI<sup>1</sup>, Karim MASROUHA<sup>1</sup>, Rima ABDUL-KHALEK<sup>2</sup>, Asdghig DER-BOGHOSSIAN<sup>1</sup>, Ali RTEIL<sup>3</sup>, Wassim MOURAD<sup>1</sup>, Said SAGHIEH<sup>1</sup>

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Introduction: Non-union at docking site is a critical complication of bone transport procedures. This retrospective cohort pilot study aims to explore the impact of bone grafting at docking site on union rates in patients who underwent bone transport for segmental bone defects of the tibia or femur. Methods: Consecutive cases of patients aged 18+ admitted for bone transport between 2001-2017 were analysed. Baseline characteristics of patients, bone transport procedure data, and outcomes were compared between those who had bone grafting at docking site compared to those who did not, using the Wilcoxon Mann-Whitney U and Fisher's exact tests. Results: 32 patients had a bone transport procedure. Out of 11 patients with bone graft at docking site, 10 patients achieved union (90%). Out of 21 patients with no graft, 15 patients achieved union, with no statistically significant difference noted (90.9% vs. 71.4%; p=0.374). Among those who underwent bone transport with no grafting, a better alignment in the sagittal plane was significantly associated with achieving union (p=0.026). The distraction gap of those who achieved union (m=9.33) was significantly smaller than those who developed non-union (m=15.17), with a marginal statistical significance noted (p=0.051). Conclusion: Non-union was found to be associated with higher distraction gap and mal-alignment in the sagittal plane among patients with no grafting. Grafting was not shown to be associated with a higher rate of union when compared to no grafting. The present could be considered as a pilot to guide the research question of prospective studies with larger sample sizes.

**Date: 2019-12-07**  
**Session: Trauma Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Auditorium**

**Abstract no.: 54219**

**THE USE OF ANATOMICAL LOCKED PLATE AS AN EXTERNAL FIXATOR FOR SHCATZKER (VI) FRACTURES.**

Rafid AL ADHAB

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Introduction: Complex proximal tibia (juxta-articular and intra-articular) fractures are commonly encountered by orthopaedic surgeons. It remains a challenging condition due to soft-tissue compromise and short segments for fixation. So it is not a good indication for intramedullary nail or open reduction and internal fixation. Its treatment includes spanning of the involved joint with a bulky external construct (conventional or circular), leading to subsequent morbidity like stiffness, osteoporosis and gross muscle atrophy. Furthermore it is annoying to the patients (even it is temporary). With the evolving of LC-DCP (Limited-Contact Dynamic Compression Plate), it became possible to be applied as a low-profile external fixator with the property of fitting the bone shape and fixing even the osteochondral fractures. Method: From 2014 to 2018 Ten male patients aged (26-52 years)with Schatzker type VI (or)AO/OTA 41-C fractures were prospectively studied ; six patients have open fractures while four patients have closed fractures .All cases had been treated with externally applied locked plates guided by fluoroscopy. The patients followed up monthly for the first 3 months, then every 3 months for 9 months. Results: Nine cases ended with solid union through the follow up period without significant complications, one case loss the follow up. Conclusion: low-profile LC-DCP presents a good alternative and definitive method for the treatment of Schatzker VI fractures; preserving fracture biology and sparing the knee joint while maintaining its early mobility. So it is safe, effective and more acceptable by the patients with high success rate and less complications.

**Date: 2019-12-07**  
**Session: Trauma Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Auditorium**

**Abstract no.: 54150**

**DIA-METAPHYSEAL FRACTURES OF DISTAL TIBIA TREATED WITH INTRAMEDULLARY NAILS WHICH IS DISTALLY LOCKED WITH AN INNOVATIVE LOCKING SYSTEM: A PROSPECTIVE CLINICAL STUDY.**

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Introduction: Obtaining proper closed reduction and a sustainable alignment in treatment of distal tibia dia-metaphyseal fractures with nails is challenging. Our aim was to present our clinical and functional results of distal tibial dia-metaphyseal fractures treated by the use of an intramedullary nail which is locked distally with an innovative distal locking system called distal supportive bolt locking screw (DSBLS). Methods: Study was conducted in a prospective manner. 48 patients with distal tibia dia-metaphyseal fracture treated with the nail locked with DSBLS system were included to the study. Radiological and functional results were evaluated according to Johner and Wrush criteria. Results: Mean follow up time was 33 months (14-52). All fractures were healed. Average healing duration was mean 17,4 weeks (8-24). No loss in the initial reduction was detected during follow-ups for any of the patients. Initial fixation in recurvatum between 5 to 10 degrees was detected in 6 patients. However union was obtained without loss of initial reduction in these patients. According to Johner and Wrush criteria, 42 patients were evaluated as excellent and 6 were evaluated as good. DSBLS loosening, migration or breakage was not observed in any patient. Conclusion: Our study concludes that, this innovative distal locking system may be an alternative to conventional distal locking tibial nail systems by providing a stable anchor point for the nail even for very short metaphyseal fragments.



**Date: 2019-12-07**  
**Session: Trauma Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Auditorium**

**Abstract no.: 54365**

**COMPLICATIONS ASSOCIATED WITH PLATE FIXATION OF DISTAL FIBULAR FRACTURES**

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Background: The most common method of surgical stabilization of fibular fractures is plate osteosynthesis. Despite its ubiquity, there is a dearth of large series reporting implant-related outcomes and complications. The purpose of this study was to report on short-term complications and hardware removal after plate fixation of distal fibula fractures. Methods: A retrospective chart-analysis and review of radiographic images was performed of 461 ankle fractures between 2011 and 2017. In 404 cases, a fibular fracture was treated surgically; 94.1% underwent 1/3 tubular and 5.9% locking plate fixation. The primary outcome was radiographic union with a mean follow-up of 11.6 months. Minor, intermediate, and major complications were recorded, as well as the rate of hardware removal. Results: The union rate with plate fixation was 99.5% (402/404). The overall complication rate was 19.3% (n=78/404). 79.5% (62/78) of these complications were considered minor. These complications included erythema, heterotopic ossification, neurapraxia, delayed union and deep vein thrombosis. 20.5% (16/78) of the complications were considered intermediate (9/78, or 11.5%) or major (7/78, or 9.0%). Intermediate and major complications included deep infection, non-/malunion, and osteomyelitis. Subsequent surgery was needed in 7 cases (1.7%, or 7/404). In another 93 patients, hardware related symptoms were identified; 54 of which underwent hardware removal (13.4%). Conclusion: This study shows a low rate of reoperations and a high union rate of 99.5% for fibular plate osteosynthesis in a large cohort. Any other treatment including other fixation techniques will need to show an equivalent or better complication and reoperation profile.

**Date: 2019-12-07**  
**Session: Trauma Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Auditorium**

**Abstract no.: 54717**

**SURGICAL TREATMENT OF COMMINUTED INTRAARTICULAR DISTAL RADIUS FRACTURE WITH EXTERNAL FIXATION. FUNCTIONAL OUTCOME AND SHORT TERM FOLLOW UP.**

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Background: severely comminuted distal radius intraarticular fracture is one of the fractures that are difficult to be treated and unless you achieve and maintain nearly anatomical reduction, poor function, pain and instability will be the end result. Objectives: To study the efficacy of the External Fixator for the treatment of comminuted intraarticular fracture of distal radius. Materials and method: Between Jan 2016 and December 2018, a total of 38 patients with isolated closed comminuted intraarticular distal radius fracture were treated with a spanning (mini AO) external fixation. The mean age of the patients was 32 years (range, 20-50 y). The fractures are either AO-23C3, 17(45%) or AO-23C2, 21(55%). The mean operation time was 15min (range, 15-25 min). The mean time until the external fixator was removed was seven weeks. The functional evaluation of the patients was done at 3, 6 and 12 months follow-up. Outcome was assessed using Modified Green and O'Brien score. Results: Three cases were suffered from pin tract infection, reduction was unstable in 6 cases and EF.FIX was augmented by percutaneous k-wires. All patients had nearly normal value in radiographic parameters of distal radius. According to the modified Green and O'Brien clinical rating system, 21(55%) cases had an excellent result, 11(29%) were good, 4(11%) and 2(5%) cases rated fair and poor respectively. conclusion: Spanning external fixation for comminuted distal radius fractures is a minimal invasive fixation and it can restore radiographic parameters, maintain reduction, and provide satisfactory functional results.

**Date: 2019-12-07**

**Session: Trauma Free Papers 4**

**Time: 10:30 - 12:00**

**Room: Auditorium**

**Abstract no.: 54398**

**OUTCOMES FOLLOWING CONSERVATIVE VERSUS SURGICAL TREATMENT IN DISPLACED DISTAL RADIUS FRACTURES**

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Introduction: Distal radius fractures (DRFs) are the most frequent type of fractures in elderly patients. The aim of our study is to evaluate the radiological and functional outcomes following surgical and conservative treatment of DRFs. Methods: 379 patients were retrospectively analysed for 3 years. Out of this, 161 patients were included in the Surgery treated group, where it was practice ORIF (open reduction and internal fixation) and 218 patients were included in the Cast group (closed reduction and cast immobilization). The patients were radiological (volar tilt, radial inclination, radial height) and functional (QuickDASH score) assessed preoperatively and after 3 months. Results: The mean age of the patients included in the Cast group was 69.12±12.13 years compared to 54.46±15.76 for the Surgery group. The average volar tilt measured after 3 months was 6.67±5.62 in the Cast group (57% normal values) compared to 9.19±4.8 in the Surgery group (79% normal values), p<0.01. Radial inclination had normal values in 65% of the patients from Cast group (20.02±2.65) compared to 80% of the patients from Surgery group (22.06±3.8), p<0.001. The radial height was restored to normal values in 50% of the cases for the Cast group versus 67% for the Surgery group, p<0.001. The QuickDASH score was 20.1 (0-64) for the Cast group, compared to 19.3 (0-41) for the Surgery group without statistical significance. Conclusion: Radiographic outcomes after DRFs are significantly better for the patients treated surgically but clinical outcomes didn't show better results, in particular concerning patients over 65 years old.

**Date: 2019-12-07**  
**Session: Trauma Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Auditorium**

**Abstract no.: 54242**

**THE OUTCOME OF DELTOID LIGAMENT REPAIR IN ANKLE FRACTURES: A META-ANALYSIS**

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The dilemma whether to repair the deltoid ligament or not in ankle injuries with widened medial clear space and no medial malleolus fracture is still controversial. Many Authors reported no difference in long term functional outcomes; on the other hand the rates of persistent medial clear space widening and mal-reduction were reported higher in the unrepaired group. This meta-analysis aims to report the current evidence about the outcomes of deltoid ligament repair in ankle fractures. Several databases were searched through May 2018 for comparative studies. Primary outcome was the medial clear space correction; secondary outcomes included maintenance of medial clear space reduction, pain score, functional outcome, operation time and total complications. Three comparative studies were eligible for the meta-analysis, with a total of 192 patients, 81 in the deltoid ligament repair group and 111 in the no repair group. The medial clear space correction was superior in the deltoid ligament repair group with statistical significance; also the maintenance of correction on the final follow up x-rays was significantly better in the repaired group. Although the pain score was better in the repair group at the final follow up, the functional outcome did not show any difference between the two groups. No difference in the operation time was detected between the two groups with the same complications rate. The repair of the deltoid ligament in ankle injuries is superior in early post-operative and late follow up radiological correction of the medial clear space which represents the quality of ankle reduction, despite no difference in the functional outcomes, operation time and the complications rate.

**Date: 2019-12-07**  
**Session: Hip Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 53222**

**STRESS MANAGEMENT, ART EXHIBITIONS AND TOTAL HIP AND KNEE ARTHROPLASTY IN AMBULATORY SURGERY**

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The state of mind and motivation are essential in surgery. The originality at Schweitzer is to complete the usual stress management measures with artistic and photographic exhibitions to create a pleasant and reassuring environment to divert attention from pain and stress. The anxiety is often irrational, logic and medical explanations are sometimes hard to understand for patients. This is why an artistic component can be associated with the surgical rigor to facilitate the management of the emotions and to improve the therapeutic communication by serving as interpreter between the emotions and the reason. Indeed, it is important that patient doesn't have the feeling of being a sick person but remains a player responsible for his health with a rewarding partnership with the care team. The stress management also benefits the caregivers through the establishment of wellness workshops at work that reinforces the meaningfulness of the treatment, because the wellbeing of staff goes hand-in-hand with the wellbeing of patient. These measures strengthen the purpose of treatment which is no longer limited to a surgical act but remains within comprehensive care and patient empowerment, reconciling the wellbeing of patients and personnel with the economic imperatives and the quality of care. The results are sometimes surprising in outpatient surgery and, more importantly, for fragile patients avoiding the disadvantages of prolonged hospitalization. Since 2014, these measures have led to an improvement in our practices: more than one hundred total hip and knee prosthesis performed on an outpatient basis, halving the average length of stay.

**Date: 2019-12-07**

**Session: Hip Free Papers 4**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 54599**

**MULTIMODAL THROMBOPROPHYLAXIS IN PATIENTS WITH A PRIOR HISTORY OF VENOUS THROMBOEMBOLISM UNDERGOING PRIMARY HIP ARTHROPLASTY**

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We studied the safety and efficacy of multimodal thromboprophylaxis (MMP) in patients with a history of venous thromboembolism (VTE) undergoing total hip arthroplasty (THA). MMP includes discontinuation of procoagulant medications, VTE risk stratification, regional anaesthesia, an intravenous bolus of unfractionated heparin before femoral work, rapid mobilization, pneumatic compression boots, and chemoprophylaxis tailored to patient's risk. From 2004 to 2018, 257 patients (67 years; 26-95) with history of VTE underwent 277 THAs (9 single-stage bilateral, 20 staged bilateral) by two orthopaedic surgeons. 186 (67%), had a history deep vein thrombosis (DVT), 43 (15.5%) pulmonary embolism (PE), both 48 (17.5%). Chemoprophylaxis: aspirin in 38, anticoagulation in 239 patients (Coumadin 182, low-molecular-weight heparin 3, clopidogrel 1, rivaroxaban 3, combination 50). 48 (17.3%) had a vena cava filter. Follow-up: 120 days to detect complications, one year to detect mortality. Postoperative VTE occurred in 7 (2.5%): DVT in 5, PE with and without DVT in one each. Bleeding occurred in 2, one requiring surgical evacuation of a hematoma. Seven died during the first year (2.5%): one 5 months postoperatively during open thrombectomy of a PE, and one died of a stroke while receiving Coumadin. PE or bleeding was not suspected in the remaining 5 fatalities. Conclusions: MMP is safe and effective. Postoperative anticoagulation should be prudent as very few patients developed postoperative VTE (2.5%) or died of PE. Mortality during the first year was mostly unrelated to VTE or bleeding.

**Date: 2019-12-07**  
**Session: Hip Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 53805**

**VALIDATION OF THE WORLD HEALTH ORGANISATION QUALITY OF LIFE INSTRUMENT (WHOQOL-BREF) HINDI QUESTIONNAIRE IN TOTAL HIP REPLACEMENT PATIENTS.**

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THR is a standard procedure for diseased or damaged hips for which various scoring tools are available to evaluate the outcomes. Majority of these scores were devised in western countries and their cross-cultural compatibility is rarely demonstrated. The World Health Organisation QOL-BREF (WHOQOL-BREF) questionnaire is one of the best known multilingual instruments for assessment QoL. It has 4 domains. Its validity has never been demonstrated for THR and the present study was conceptualised for the same. THR done over 6 years were followed up retrospectively. The number of patients included in the study was 96 with 115 operated hips. The average age of these patients was 41.40 years ranging from 17 to 80 years. There was strong male preponderance in our series of patients with 90 THRs. The mean score of domain 1 was 70.8 (SD 21.6), domain 2: 72.4 (SD 18.8), domain 3: 74.7 (SD 16.8) and domain 4: 75.4 (SD 14.8), which showed significant functional improvement post THR in domain 2 (P = 0.0001), domain 3 (P = 0.0010) and domain 4 (P= 0.0001) when compared to scores of general healthy population. Similarly, the scores were significantly improved in all domains as compared to post operative acetabular and hip fractures taken from another study. The score was found to be a reliable tool with Cronbach alpha of 0.952 and strong correlation was present with the standard Harris hip scores (p=0.000). Thus, WHO-QoL is a potent tool to assess postoperative outcomes in patients undergoing THR.

**Date: 2019-12-07**

**Session: Hip Free Papers 4**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 52823**

**HIP MUSCLE STRENGTH AND GAIT SPEED AFTER HIP SURGERY FOR THE TREATMENT OF OSTEOARTHRITIS OF THE HIP IN ADULT: RAO VERSUS THA**

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Background: Osteoarthritis (OA) of the hip due to acetabular dysplasia is common in Japan. Surgical treatment for hip OA depends on the age, stage of OA, occupation, etc. However, recovery after surgery has not been well discussed in comparison for each surgery. Purpose: To examine and compare the changes in the hip muscle strength and gait speed after hip surgery, total hip arthroplasty (THA) and rotational acetabular osteotomy (RAO), for 1-year. Materials and Methods: Ninety-two patients who were treated with hip surgery (THA: 47 hip, RAO: 45 hip) were included. Changes in muscle strength of the operated hip and gait speed were analysed during each postoperative clinical visit as the primary outcome. Results: Muscle strength of the operated hip recovered to the preoperative level at postoperative 3-month after THA, on the other hand, it recovered to preoperative levels at 6-month after RAO. At 1-year follow-up, significant improvement was observed in hip muscle strength both for THA and RAO. Gait speed showed a gradual improvement for 1 year follow up. The mean gait speed after RAO was better than that of THA at final follow up. Conclusion: Muscle strength of the hip after THA improved to preoperative level earlier compared with that of RAO. Gait speed increased gradually during study windows both for THA and RAO. We believed that surgical approach, indication, and patients characteristics affect these results.



**Date: 2019-12-07**  
**Session: Hip Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 52922**

**IS 'SAFE SURGICAL DISLOCATION OF THE HIP' REALLY SAFE? OUR EXPERIENCE**

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Introduction: Surgical dislocation of the hip was long time considered as an operation with unpredictable risks for avascular necrosis of the femoral head. Detailed studies of the vascular anatomy of the proximal femur, however, helped to design a safe approach to surgical dislocation of the hip. Aim: To determine how safe is the safe surgical dislocation of the hip in adolescent hip pathologies. Materials and methods: A Total of 37 cases were included in our study with 28 cases of chronic slipped capital femoral epiphysis correction by modified Dunn's osteotomy, 7 cases of reduction of deformed Perthes head, 2 cases of synovial chondromatosis. All traumatic fracture dislocations were excluded as they themselves carry a very high risk of Avascular necrosis. Period of study was between 2008-2018 with age group between 10 to 18 years of age with an average follow-up of 3.5 years. 28 male patients and 9 female patients were included in our study. Functional outcome was assessed by Harris hip score and Radiological outcome assessed by Ficat and Arlet classification and incidence of Avascular necrosis was followed up. Results and conclusion: Out of 37 cases, a total of 2 cases of avascular necrosis of femoral head was noted both being in the chronic slipped capital femoral epiphysis correction group. 2 other complications being screw penetration and chondrolysis noted. No evidence of AVN was noted in other groups. Excellent functional outcome with average Harris hip score of 88 was noted.

**Date: 2019-12-07**

**Session: Hip Free Papers 4**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 52861**

**PELVIC OBLIQUITY AFTER TOTAL HIP ARTHROPLASTY: IS IT CORRECTABLE COMPLETELY?**

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Introduction: Pelvic obliquity may be seen before total hip arthroplasties because of some reasons. Destruction of head of femur due to avascular necrosis, destructive joint disorder, nonunion of neck of femur may cause leg length discrepancy. Adduction contracture and flexion contracture also may result leg length inequality. Leg length discrepancy after some years may result in pelvic obliquity. After total hip arthroplasty, true leg length may be equal but because of pelvic obliquity apparent leg length may remain unequal. It may be correctable or not. This study tries to show which obliquities have probability of correction. Materials and methods: From 2005 to 2018 every primary total hip was studied. Total hip after acetabulum fracture failure, total hip fracture after DHS failure, THA in dysplastic hips were excluded. Pre operative pelvic obliquity, leg length discrepancy, contractures around hip joint were recorded. Results: 588 cases of primary THA were studied. There were 989 cases had pelvic obliquity mean 14 degree (5 to 28 degree). There were 780 true leg length discrepancies and 109 apparent LLD. Post operative pelvic obliquity decreases. Mean pelvic obliquity post operatively was 4 degrees (0 to 13 degrees). There were leg length discrepancy post operatively from 5mm to 15mm. Discussion: If Pelvic obliquity was due to leg length discrepancy, it will be corrected postoperatively if there is no contracture around hip joint. If there is contracture around hip, abduction contracture will be corrected better and sooner and consequently pelvic obliquity will be corrected.

**Date: 2019-12-07**

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**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 53499**

**TOTAL HIP ARTHROPLASTY WITH AN UNCEMENTED WAGNER CONE STEM FOR PATIENTS WITH DEFORMITY OF THE PROXIMAL FEMUR OR SUBLUXATION/ DISLOCATION HIP**

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Purpose: Developmental hip dysplasia and a post osteotomised hip can cause significant acetabular and femoral abnormalities, and performing total hip arthroplasty (THA) can be challenging in such cases. We retrospectively reviewed THA using a Wagner cone stem in patients with deformity of the proximal femur or hip subluxation/ dislocation. Method: Mean age of patients was 39–80 years (mean 63.9 years). THA using a Wagner cone stem was performed in 18 hips in 17 patients (14 women and 3 men), and THA with step-cut subtrochanteric shortening osteotomy was performed in 4 patients. Based on Crowe's classification, 5, 4, 4, and 5 hips were classified as grades 1, 2, 3 and 4, respectively. Patients were evaluated clinically using the Japanese Orthopaedic Association (JOA) scoring system and investigated complications tabulated and reoperation. Radiographs were evaluated to assess femoral loosening and subsidence. Results: At final follow-up, the mean JOA scores improved from 47 (range 14–85) to 86 (range 61–100). One patient (grade 3) developed foot drop, which improved a year later. Three hips required fixation for intraoperative greater trochanteric fracture. Three patients (1 hip: grade 2, 2 hips: grade 4) required reoperation, 2 fractures and dislocated cup because of pelvic discontinuity. At final follow-up, no femoral loosening and subsidence were observed except in the 2 aforementioned fracture cases. Conclusions: THA with a Wagner cone stem is feasible in patients with deformity of the proximal femur or hip subluxation/ dislocation. However, precautions are required to prevent intraoperative fracture caused by fins of the stem.

**Date: 2019-12-07**

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**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 53994**

**ACCURACY AND REPRODUCIBILITY OF VISUAL ESTIMATION OF THE ACETABULAR CUP POSITIONING ON AP AND LATERAL RADIOGRAPHS BY THE ORTHOPAEDIC SURGEONS IS VERY POOR.**

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Surgeons normally estimate the acetabular cup positioning of total hip arthroplasty (THA) on the radiographs visually in their busy clinical practice rather than performing formal measurements. This estimation has a potential effect on clinical decisions and patient advice. We aimed to find out the accuracy and reproducibility of such visual estimation. Standard AP and cross table lateral view radiographs of 25 different THAs were randomly selected in two district general hospitals in the UK. Inclination of the acetabular component (IAP) and anteversion of the acetabular component in AP view (AAP) and lateral view (AL) were measured by a single operator using PACS software. All the radiographs were presented to 5 consultant orthopaedic surgeons and 5 trainee orthopaedic surgeons (SpRs) who visually estimated these three angles. Five THA radiographs were re-presented to them to estimate the intra-observer variability. Mean angles of AAP, IAP and AL on formal measurements were 15.2°, 45.4° and 19.9° and the visual estimates were 17.5°, 45.9° and 18.2°, respectively. However, Bland and Altman 95% intervals for the difference between visual and formal measurements were -19° to 15° for AAP, -10° to +14° for IAP and -12° to +24° for AL. Pearson Correlation Coefficient between estimates of surgeons and formal measurements ranged from very poor to very good (-0.28 to 0.82). Intra-observer reproducibility was moderate for all angles. The difference between the consultants and SpRs was not significant. We conclude that visual estimation of acetabular positioning is inaccurate and highly variable. Orthopaedic teams should consider formal measurement protocols.

**Date: 2019-12-07**

**Session: Hip Free Papers 4**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A1**

**Abstract no.: 53203**

**HYPERBARIC OXYGEN THERAPY VERSUS CORE DECOMPRESSION AUGMENTED WITH BONE SUBSTITUTE IN PRE-COLLAPSE AVASCULAR NECROSIS OF THE HIP**

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Introduction: Osteonecrosis of the femoral head is a potentially crippling disorder, mainly affects the young adults. Core decompression has been used by Ficat for the treatment of the osteonecrosis of the hip. Hyperbaric Oxygen Therapy is a suggestive joint preserving treatment for osteonecrosis of the hip. This study aimed to compare the functional outcome of core decompression versus hyperbaric oxygen therapy in pre-collapse Avascular Necrosis of the femur head (AVN). Methods: Prospective cohort study was conducted for all pre-collapse AVN of the hip which was treated by core decompression (CD) or hyperbaric oxygen therapy (HBO) at Hamad Medical Corporation. Data for patient's demographic, comorbidities, radiological stage, functional outcome (SF 12 and Oxford Hip Score) were collected. Results: 22 patients (23 hips), 10 (43.4%) in CD and 13 (65.6%) in HBO. 12 (52.1%) males and 10 (47.9%) females, the average age was  $37.4 \pm 11$  with average follow up  $33.5 \pm 20$  months. 2 were alcoholic, 6 smokers, 3 sickle cell, 4 on steroid and 8 idiopathic. 16 patients completed one year follow up after the treatment. The mean SF 12 PHS and MHS was  $39.1 \pm 9$  and  $37.9$  in CD whereas  $48.5 \pm 9$  and  $40.6 \pm 22$  in HBO with statistical difference in both groups (p value: 0.077 and 0.790) respectively. The Oxford Hip Score was significantly better in HBO (P value 0.031). Conclusion: The functional outcome of Hyperbaric Oxygen Therapy for AVN of hip showed promising results comparing to core decompression.

**Date: 2019-12-07**  
**Session: Hip Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 53739**

**OUR ORIGINAL NON-INVASIVE MECHANICAL NAVIGATION TECHNIQUE FOR CEMENTLESS TOTAL HIP ARTHROPLASTY (THA) HAS DEMONSTRATED A HIGH LEVEL OF ACCURACY IN COMPONENT PLACEMENT ON OBESE PATIENTS AS WELL AS NON-OBESE PATIENTS**

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**Introduction:** Several reports argued that precisely installing component (cup and stem) for cementless Total Hip Arthroplasty (THA) is difficult on obese patients. Thus, the purpose of this study was to examine the differences in accuracy level of the component placement between obese patients (O-group) and non-obese patients (N-group), by utilizing our non-invasive mechanical navigation technique. **Methods:** We conducted a case-control study by evaluating the level of accuracy concerning the placement of cementless component. We divided 209 hip cases that underwent THA (2013-2018) in two groups, O-group (BMI equal or above 30) and N-group (BMI below 30). We measured cup abduction, anteversion angle, and stem varus-valgus angle in each case through anteroposterior radiograph. All operations were performed with modified direct lateral (Hardinge) approach in the lateral decubitus position at the same hospital conducted by the same surgeon. The cup placement was performed at 45-degrees (°) abduction and 15-degrees (°) anteversion in radiographic target. The differences between the two groups (clinical evaluation) were assessed using un-paired t-test and F-test. A P-value of <0.05 was considered significant. **Results:** Cup abduction, anteversion and stem varus-valgus angles were: O-group (43.3 +/- 5.1, 14.7 +/- 4.6, 0.1 +/- 0.6), N-group (44.8 +/- 4.7, 16.2 +/- 5.4, -0.1{minus means varus} +/- 0.7), respectively. There were no significant differences between the two groups. **Conclusion:** The accuracy measures of component placement in both groups are satisfactory. Furthermore, the results have validated that our mechanical navigation system contributes to increase the accuracy in component installation, despite the differences in BMI among patients.

**Date: 2019-12-07**  
**Session: Hip Free Papers 4**  
**Time: 10:30 - 12:00**  
**Room: Grand Ballroom Hall A1**

**Abstract no.: 55214**

**IS HIP ARTHROSCOPY COST-EFFECTIVE FOR THE TREATMENT OF FEMOROACETABULAR IMPINGEMENT (FAI)? A SYSTEMATIC REVIEW OF ECONOMIC EVALUATIONS**

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**BACKGROUND:** FAI is abutment of the femoral head-neck junction against the acetabular rim during the physiological range of movement of the hip joint. This mechanical process leads to a progressive breakdown of the chondro-labral junction, which in turn may lead to osteoarthritis (OA) necessitating a total hip replacement (THR). Arthroscopic management of FAI which has proven to be safe and efficacious, has grown in popularity and is focussed on abolishing symptoms as well as reducing the risk of OA development. **METHODS:** This study is developed by following the PRISMA statement. The study is registered in PROSPERO: CRD42019118529. The articles included will be gathered from Medline, Scopus, Embase, Cochrane, EBSCO, Web of Science Core Collection and Google Scholar databases. Articles will then be exported to Mendeley reference manager software. All records will be screened for eligibility and data will be extracted into a spread sheet. The studies will be assessed for quality using the Joanna Briggs Institute Critical Appraisal Checklist for Economic Evaluations. The cumulative confidence in evidence will be evaluated using the GRADE tool. **RESULTS:** Four articles were found to estimate the cost effectiveness of hip arthroscopy. Three were from the US and one from the UK. The three US articles scored 90% in study strength while the study from the UK scored 77% and it did not use adequate economic evaluation models but was based on statistical analysis. All four studies showed the hip arthroscopy is a cost effective procedure compared to conservative and open surgery.

**Date: 2019-12-07**

**Session: Pain/Osteoporosis Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54567**

**RISING NEEDLE SIGN DURING LUMBAR FACET INJECTION: A USEFUL SIGN IN HELPING LOCALISING THE FACET AND REDUCING RADIATION EXPOSURE.**

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Lumbar facet injection can be carried out under florescent radiography, CT scan guided or recently Ultrasound. Several attempt often needed to achieve the localising required by operator prior to injection whether intra-articular or peri-articular technique is used. Even in the expert hand radiation exposure, and in the case of U/S time and pain/discomfort to the patient with every localising attempt. This can even more clear for new operator hence attempt of training using simulator by attempted. Understanding the anatomy and its manifestation by the what I call the Rising Needle Sign help the operator reduce the radiation exposure, attempts and time. We also recommend using two needles simultaneously when by later faces injections is needed, or two adjacent levels. To understand the benefit anatomical consideration and illustration to the lumbar facet and adjacent structure is needed. If we look at an anatomy of the facet caudally to cranially we could easily see that the facet is the highest point or the top with the pedicle above and below at the bottom therefore as the injection needle is inserted at the pedicle then towards the facet it rises as it reaches the top of the middle of the facet cranio-caudally. In real anatomy the facet is even higher than the skeletal one because the capsule and facet hypertrophy in diseased facet to be injected make it even higher as illustrated in a patient's prior and post exposed during surgery with the needle placed demonstrating the Rising Needle Sign.



**Date: 2019-12-07**

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**Room: Grand Ballroom Hall A2**

**Abstract no.: 53523**

**'HAND ON HIP SIGN': A NOVEL SIGN AND DIAGNOSTIC TOOL IN  
PIRIFORMIS SYNDROME**

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Piriformis syndrome is a form of non discogenic sciatica, occurring as a result of sciatic nerve impingement below the piriformis muscle. Piriformis syndrome has for long been a difficult condition to diagnose. It is difficult for the treating physician to identify and treat the condition as currently there is no gold standard clinical test or investigation available to diagnose this condition. We have identified a specific pose in which the patient describes the pain in the gluteal region in cases of suspected piriformis syndrome called Hand on hip pose or Rampwalk sign. In the typical form of this pose the patient is standing erect with the shoulder slightly abducted, elbow flexed, wrist resting over the greater trochanter, fingers pointing anteriorly and the thumb pointing towards the sacrum. We found that the patients describe the pain to be originating from the point which the tip of the thumb is pointing at. We assume that when the wrist is resting on the tip of the greater trochanter, the tip of the thumb can be easily used to point towards the tender point in the piriformis muscle. This classical description was not found in other causes of gluteal pain. We found that the hand on hip sign has a very high sensitivity of 75 % and positive predictive value of 85%. Thus hand on hip sign is an effective screening test on the diagnosis of piriformis syndrome.

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**Session: Pain/Osteoporosis Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 53255**

**OPIOID DOSE AFFECTS INCREASE LOS**

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**Aim:** The purpose of this study was to assess the number of patients receiving opioids pre-operatively and the association between opioid dose and length of hospital stay. **Methods:** A retrospective review of all patients who had arthroplasty surgery in the unit between 2016 and 2017. 625 patients were included. The patients are divided into 4 groups; patients taking >12 mg Morphine Equivalent Dose (MED) opioids, patients taking < 12 MED, non users and allergic patients. A Kruskal-Wallis analysis was performed using SPSS. **Results:** 61.3% (383) of our group were not on any opioids, in comparison to 13.9% (87) and 20.3% (127) who were on > 12 MED opioids and <12 MED opioids respectively. The remaining 4.5% (28) had side-effects and were not allowed any opioid therapy. Median length of hospital stay scores were statistically significantly different between the patient groups  $\chi^2(3) = 10.220$ ,  $p = .017$  Subsequently Pairwise comparisons were performed using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons. Adjusted p-values are presented. This post hoc analysis revealed statistically significant differences in median length of hospital stay scores between the 'no opioids' (6.24) and the >12 MED opioids (6.75) ( $p = .031$ ), but not between any other group combination. **Conclusion:** Patients who are taking > 12 MED opioids are more likely to stay longer in hospital post elective arthroplasty surgery when compared to patients who do not.

**Date: 2019-12-07**

**Session: Pain/Osteoporosis Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 52869**

**QUALITY OF LIFE AFTER AMPUTATION IN PATIENTS WITH ADVANCED COMPLEX REGIONAL PAIN SYNDROME-A SYSTEMATIC REVIEW**

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**Aims:** To assess the impact of amputation on quality of life in patients with advanced stage of Complex Regional Pain Syndrome (CRPS), resistant to multiple conservative measures. **Methodology:** Literature review was done on databases including EMBASE, CINAHL, MEDLINE, PUBMED, AMED, and grey literature. No randomized control trial related to the topic was found. Case-control, observational studies, case series and case reports meeting the eligibility criteria were included. Two researchers independently reviewed literature and carried out data extraction. **Results:** Eleven studies reporting ninety-six patients were included. Sixty-six (68%) of patients who underwent amputation due to resistant CRPS had improvement in quality of life (QOL) while deterioration in pain and symptoms were noticed in twenty-eight percentages of patients. In more recent and good-quality studies, amputation proved to be more beneficial (81% of cases had improvement) than older poor-quality studies (11% of patients improved). Post amputation complications included phantom limb pain (65%), stump pain (30%) and recurrence of CRPS (43%). Two thirds of patients were satisfied, only 7 were not pleased with their choice and no information was available for rest of amputees. **Conclusion:** In selected cases with advanced, unresponsive CRPS, amputations can be considered as an option for amelioration of QOL, however, there are risks of further deterioration and complications predominantly phantom pain and recurrence of CRPS. Results are better if amputation is carried out at specialised centres and after multidisciplinary assessment for suitability.

**Date: 2019-12-07**

**Session: Pain/Osteoporosis Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54304**

**ICE-CAN ROLLING AND STRETCHING TECHNIQUE IN ACUTE PLANTAR FASCIITIS AS AN EFFECTIVE TREATMENT**

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Introduction: Plantar fasciitis and problems associated with it are increasing day by day in various age groups. People with busy lifestyles and obesity are at high risk in developing plantar fasciitis. Many techniques have been adopted for the treatment, most being non-invasive. Symptomatic treatment with analgesics and anti-inflammatory have always been the first line of treatment. Local steroids are again a treatment of choice but again they have their side effects. Material and Methods: We studied 180 patients diagnosed with acute plantar fasciitis. We advised patients to take up Ice-can rolling under the feet with acute pain, following ankle stretching. At least three sessions of the same procedure was repeated every day for minimum 20 minutes duration. Results: Among 180 cases 155 shows excellent recovery after 6-8 weeks with the procedure. And rest 25 patients were complaining of mild to moderate pain but the pain reduced a lot before the treatment. It reduces the oedema and allows the swelling to decrease to make the subject comfortable. Conclusion: It is understood that in general practice, initial treatment may include analgesics or corticosteroid injections. They may relieve symptoms, especially during an acute flare or even with chronic pain; but recent studies suggest that less-invasive techniques like ice-can rolling technique can be equally effective at providing long-term relief. Patients need to be counselled that satisfactory improvement may not be seen before six to eight weeks.

**Date: 2019-12-07**

**Session: Pain/Osteoporosis Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 55178**

**REVIEW OF THE FIRST FRACTURE LIAISON SERVICE OF OUR HOSPITAL IN AN INDIAN HEALTHCARE PERSPECTIVE**

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Introduction: Fracture liaison service is a multidisciplinary clinic with a dedicated nurse who coordinates among various concerned departments. The aim of the study is to find any difference in the biochemical parameters of those with a bone mineral density T score equal to or less than -2.5 against those with Tscore more than -2.5. This study is also intended to analyse the patient characteristics reporting in the clinic and to provide recommendations for modification in the FLS. Methods: All the patients having a fragility fracture aged more than 50 years arriving in the FLS clinic from November 2017 to December 2018 were included in the study. Bone mineral density was estimated using DEXA scan for most patients and participants were classified as osteoporotic or non osteoporotic as per the WHO definition. A detailed biochemical evaluation including vitamin D levels, blood creatinine levels, calcium levels, etc. was done for most patients. Results: Total 270 patients were included in the study. 76 patients were male and 194 patients were female. The average age of the patients was 64.3 years. BMD was done in 216 patients among whom 107 patients were osteoporotic and 109 patients were non- osteoporotic. There was no difference between the two groups classified as osteoporotic and non-osteoporotic on the basis of their BMD in their biochemical parameters except for their INR which was significantly higher in the osteoporotic group (P value- < 0.0001). Conclusion: We report the first implementation of FLS in the Indian healthcare setting.

**Date: 2019-12-07**

**Session: Pain/Osteoporosis Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54937**

**FACTORS AFFECTING BONE MINERAL DENSITY IN AN INDIAN ADULT POPULATION AND THEIR RESPONSE O THERAPY**

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Introduction: Co-morbidities often adversely affect the management of osteoporosis. There is a need for detailed information on the co-morbidities that may alter the course of osteoporosis by reducing the bone mineral density. We aimed to determine the factors affecting bone mineral density. Materials and methods: BMI, Brief history (including co-morbidities & time since menopause) taken and documented. The BMD (T score) was measured using an ultrasound based scan. All the patients were prescribed standard calcium and vitamin D preparation. Followup of every three months noted. Results: 542 cases (445F, 97M) were included. The BMI calculated showed significant difference between the groups ( $p=0.035$ ). There was significant difference between overweight and obese ( $p=0.047$ ). On assessment of t-score on the first visit males had a mean of  $-1.25\pm 1.40$  and the females had a mean of  $-1.66\pm 1.31$ . On follow up both the groups had a positive response to treatment. But males had a slower response to treatment ( $p=0.005$ ). The menopausal women ( $n=311$ ) had a negative relationship between BMD and duration of menopause. There was positive trend in the response to treatment in diabetics and hypertensives, but there was no statistical difference between cases with diabetes and hypertension and those without. Conclusion: Contrary to the current literature, high BMI can be associated with lower levels of BMD. Response to treatment is slower in male in comparison to females. There is an inverse relationship between BMD and duration of menopause. There is a positive response to treatment even with patients with co-morbidities.

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**Session: Pain/Osteoporosis Free Papers**

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**Room: Grand Ballroom Hall A2**

**Abstract no.: 54248**

**DOES SARCOPENIA INCREASE THE RISK OF FRESH VERTEBRAL FRAGILITY FRACTURES? A CASE CONTROL STUDY**

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Background: Sarcopenia is an age-associated decrease in muscle mass, strength and physical performance. We aimed to investigate whether sarcopenia increased the risk of vertebral fragility fractures in an elderly population. Materials and methods: A Prospective, matched, case-control study involving 51 consecutive patients with fresh vertebral fragility fractures and 51 age and sex matched controls without fracture was done. Outcome measures: Sarcopenia, T-score, presence of pre-existing fractures, and body mass index (BMI) were compared between groups. Sarcopenia was diagnosed as decreased Total Psoas cross-sectional area (TPA) calculated on axial MRI and decreased hand grip strength measured by dynamometer. Results: Normative TPA values were 1576 & 2723 mm<sup>2</sup>, and cut-off values were 86 & 1641 mm<sup>2</sup> for women and men respectively. 29.4% of cases and 7.8% of controls had sarcopenia (p=0.005). 56.8% cases and 13.7% controls had previous vertebral fractures. Sarcopenia was more prevalent in those with previous fractures (38% vs 7.6%, OR=7.76, p<0.001). TPA was higher in the control group (1569 vs 1278 mm<sup>2</sup>, p=0.001) and also in those without previous fractures (1563 vs 1168 mm<sup>2</sup>, p<0.001). Handgrip strength was higher in those without old fractures (19.6 vs 16.3kg, p=0.05). Conclusion: Sarcopenia is more prevalent and TPA is significantly less in elderly population with vertebral fragility fractures. However, sarcopenia is not an independent risk factor for fresh vertebral fragility fractures whereas old fractures and lower T-score were significant risk factors for fresh vertebral fragility fractures in a multivariate model.

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**Session: Pain/Osteoporosis Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 54115**

**WHEN TO DO BIOPSY IN BENIGN LOOKING OSTEOPOROTIC FRACTURES RADIOLOGICAL AND CLINICALLY**

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Vertebral fractures by trivial trauma quite common in females after the age of fifty, many times pt. don't remember trauma and have mild discomfort, diagnosed on x-ray, some have severe pain requiring narcotics in the beginning and slowly pain subsides along with routine osteoporotic treatment, but in about five percent of patients pain keep on persisting, general health deteriorated. This is study of 200 benign looking fractures as per radiological and clinical criteria. Out of ten patients who didn't respond to treatment seven turned out to be multiple myeloma and two were of metastasis and one autoimmune disorder. The patients of multiple myeloma, four could be diagnosed on serum chemistry and in two histology revealed, these ten patients subjected to biopsy and pet CT; one patient of seventy years was suffering from seronegative autoimmune disorder in which osteoporotic treatment became effective when DMRDS started. Multiple myeloma patients responded when specific treatment started along with osteoporotic treatment. It was observed that if patient is having only simple osteoporosis fracture he definitely responds to routine treatment like Bisphosphonates, Calcitonin, Vit D& Serms. Others needed in resistant type as after steroids use. When patient on routine not relieved its indication for biopsy, kyphoplasty may help in symptomatic relief in secondary osteoporosis as in tuberculosis treatment failure can be due to wrong diagnosis, resistant bacilli, decreased immunity etc but not in malignancy etc. patient condition keep on worsening, how many level one will go for vertebroplasty etc, till cause treated patient will not improve.



**Date: 2019-12-07**

**Session: Pain/Osteoporosis Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A2**

**Abstract no.: 53610**

**EFFICACY AND SAFETY OF ONCE-YEARLY ZOLEDRONIC ACID ADMINISTRATION FOR THE SUPER ELDERLY ~ SHORT-TERM RESULTS ~**

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**Purpose:** In Japan, zoledronic acid (ZOL), an osteoporosis treatment option, administered once yearly, is being covered under insurance since 2016. Although it seems useful for elderly patients who cannot frequently visit hospitals, there are few reports on its efficacy and safety for people >85 years. Here, we report the short-term efficacy and safety of ZOL for the super elderly. **Methods:** From July 2017 to December 2018, we included osteoporosis patients >85 years using ZOL at our hospital. Lumbar spine and femoral neck bone density and bone metabolism markers were measured pre-administration and every 6 months post-administration. Serum Ca and eGFR were measured pre-administration, 1 month and every 6 months post-administration. Acute phase reaction (APR) was confirmed on a check-sheet. **Results:** There were 30 patients (3 male, 27 female; average age: 86.8 years). In 26 patients, ZOL was the initial osteoporosis treatment and 4 patients were switched from other drugs. Six months post-administration, increases of 3.4% and 0.8% in BMD were observed in the LV and FN, respectively. P1NP and TRACP-5b decreased by 71.0% and 60.4%, respectively. During the study course, eGFR decreased in 2 cases, but remained within the normal range. Corrected serum Ca level tended to decrease to 8.84 mg/dL 1 month post-administration. No symptomatic hypocalcaemia was identified. Five patients had APR, mainly complaining of fever, arthralgia, and fatigue, but they were mild and required no treatment. **Discussion:** ZOL is considered an important treatment option for elderly osteoporosis patients. We plan to continue observation and report long-term progress.

**Date: 2019-12-07**

**Session: Emerging Technology Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 54116**

**COMPUTER ASSISTED LIVE NAVIGATION FOR GLENOID BASEPLATE FIXATION IN SEVERE GLENOID BONE LOSS DURING REVERSE SHOULDER ARTHROPLASTY.**

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Computer Assisted Navigation Surgery (CANS) provide accurate images to facilitate planning for placement and sizing of the baseplate and glenosphere during reverse shoulder arthroplasty (RSA). Newer systems (ExactechGPS shoulder navigation system) provide live feedback intraoperatively during central peg insertion and guiding the direction of screw placement through the baseplate into the scapula. Aim: Evaluate radiological parameters from post-operative CT scans regarding baseplate fixation and screw placement following navigation guided RSA done for patients with severe bone loss, described as type A2, B2, B3,C glenoid according to the modified Walch classification (and/or presenting with  $\geq 20^\circ$  retroversion (for types B2,B3) pre-operatively. 23 patients were included in our study. The average age was 62.4 years with follow-up ranging from 6-18 months (16 patients with more than 12 months of follow-up). The mean pre-operative retroversion was 22.8 degrees which got corrected to 5.4 degrees post-operatively. The average inclination was 7.3 degrees superior pre-operatively and got corrected to 2.1 degrees inferior post-operatively. A significant improvement in the functional scores has been seen in all the patients. 15 patients had post-operative version and inclination correction within 3 degrees of that planned. All patients had post-operative measurements within 8 degrees of planned. Posterior screw perforation was seen in 2 cases, with no incidence of central peg perforation. Augmented baseplate was required in 22/23 cases. An integrated use of 3-dimensional surgical planning, augmented glenoid components and image-based intraoperative navigation potentially reduces the risk of glenoid placement outside of a neutral position in patients undergoing RSA.

**Date: 2019-12-07**

**Session: Emerging Technology Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53428**

**ACCURACY AND SAFETY EVALUATION OF ROBOT ASSISTED  
SUBDERMAL INTERMUSCULAR PEDICLE SCREW TECHNIQUE**

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**OBJECTIVE:** To compare the accuracy and safety properties of Robot assisted subdermal intermuscular pedicle screw technique (RA-SIPST) versus conventional freehand fluoroscopy-assisted pedicle screw insertion technique in patients with spine disease. **METHODS:** This study included 40 patients with spine disease treated with pedicle screw internal fixation in the Department of Orthopedic surgery, the First Hospital of China Medical University between May 2018 and March 2019. Patients were randomly assigned to receive either Ti-robot assisted subdermal intermuscular pedicle screw insertion (RA-SIPST group) or freehand fluoroscopy-assisted pedicle screw insertion (FA group). The accuracy of screw placement was assessed with postoperative computed tomography. Operative time, pedicle screw placement time, radiation exposure to the medical team, and intraoperative blood loss were recorded. **RESULTS:** A total of 233 pedicle screws were inserted in 40 patients. 127 pedicle screws were placed in the RA-SIPST group, and 106 pedicle screws were placed in the FA group. The accuracy of screw placement was significantly higher with RA-SIPST (95.28% [121/127]) compared to the freehand technique (90.57% [96/106]) ( $P<0.05$ ). RA-SIPST was associated with reductions in radiation exposure to the medical team ( $2.42\pm 0.44$  vs.  $3.67\pm 0.67$  fluoroscopic images), and intraoperative blood loss ( $167.75\pm 86.77$  vs.  $387.25\pm 102.12$  ml;  $P<0.05$ ). The mean operative time did not differ significantly between the two groups. **CONCLUSION:** Our preliminary study of RA-SIPST showed a high level of accuracy for screw insertion and this technique was found to be a feasible, safe procedure and effective surgical option for patients.

**Date: 2019-12-07**

**Session: Emerging Technology Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53111**

**CAN ROBOTIC TECHNOLOGY TAKE ENHANCED RECOVERY ARTHROPLASTY ONE STEP FURTHER? A PROSPECTIVE COHORT STUDY**

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<sup>2</sup>University College London Hospital, Watford (UNITED KINGDOM)

**Aims** The objective of this study was to compare early postoperative functional outcomes and time to hospital discharge between conventional jig-based total knee arthroplasty (TKA) and robotic TKA. **Patients and Methods** This prospective cohort study included 40 consecutive patients undergoing conventional jig-based TKA followed by 40 consecutive patients receiving robotic TKA. All surgical procedures were performed by a single surgeon using the medial parapatellar approach with identical implant designs and standardized postoperative inpatient rehabilitation. Inpatient functional outcomes and time to hospital discharge were collected in all study patients. **Results** There were no systematic differences in baseline characteristics between the conventional jig-based TKA and robotic TKA treatment groups with respect to age ( $p=0.32$ ), gender ( $p=0.50$ ), body mass index ( $p=0.17$ ), American Society of Anesthesiologists score ( $p=0.88$ ), and preoperative haemoglobin level ( $p=0.82$ ). Robotic TKA was associated with reduced postoperative pain ( $p<0.001$ ), decreased analgesia requirements ( $p<0.001$ ), decreased reduction in postoperative haemoglobin levels ( $p<0.001$ ), shorter time to straight leg raise ( $p<0.001$ ), decreased number of physiotherapy sessions ( $p<0.001$ ) and improved maximum knee flexion at discharge ( $p<0.001$ ) compared with conventional jig-based TKA. Median time to hospital discharge in robotic TKA was 77 hours (interquartile range (IQR) 74 to 81) compared with 105 hours (IQR 98 to 126) in conventional jig-based TKA ( $p<0.001$ ). **Conclusion** Robotic TKA was associated with decreased pain, improved early functional recovery and reduced time to hospital discharge compared with conventional jig-based TKA.

**Date: 2019-12-07**

**Session: Emerging Technology Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 52954**

**MECHANICAL TESTING OF A NOVEL 3D-PRINTED FEMORAL STEM UNDER DYNAMIC LOADING**

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**INTRODUCTION:** Long-term fixation of a non-cemented total hip replacement is highly dependent on initial stability. With recent advancement of 3D printing and robotic technologies, the ability to customize implants to fit a patient's unique anatomy has become attractive. The present study compared initial stability of a novel, custom-fit 3D-printed femoral stem in robotically milled bone to a commercially available stem under combined dynamic axial and torsional loading. **METHODS:** The custom stem was designed and printed to achieve maximal cortical contact with the proximal femur (Sawbone Model number 3406-5) and implanted into specimens milled with the Monogram robot. Standard surgical technique was used for the non-cemented flat-wedge tapered stem. Loading was applied by an MTS 858 biaxial servohydraulic load frame (MTS, Minneapolis, MN). A combined dynamic axial and torsional load was applied cyclically. Micromotion at the bone-stem interface was measured using a system developed by the investigators [1-5]. **RESULTS:** Peak per-cycle motion at the implant-bone interface was calculated for compressive loading at 2,000N. During these cycles of high loads, the micromotion of the 3D custom stems remained well below 25µm at all transducer locations while standard stems often exceeded 100µm (Fig. 2) **DISCUSSION:** Custom stems demonstrated nearly eight times less micromotion when compared to standard stems. Cyclic motions measured for the standard stems, were statistically higher in every location ( $p < 0.04$ ). Previous studies have established the threshold for implant stability to achieve successful bone ingrowth to range from 28-40 microns and for fibrous ingrowth, as high as 150 microns [6-8].

**Date: 2019-12-07**

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**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 52843**

**MORPHOMETRIC ANALYSIS OF THE ODONTOID PROCESS AND INFLUENCE OF SCREW DESIGN IN ODONTOID FIXATION: A STUDY IN AN INDIAN POPULATION**

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Background: Anterior odontoid fixation is an effective method for treating odontoid fractures. It provides high union rate. Many studies have determined the dimensions of odontoid in various population groups. However none of them have virtually or actually placed the screws to determine the ideal screw size. Methods: The study was done on 30 patients(M:F=1). We utilized MIMICS and 3matics 3D software to create 3D model of odontoid and to measure height of the odontoid process with anterior body, insert angle, AP and transverse diameters at base and minimum AP and transverse diameters. We also determined the best sized screw by virtually placing cylinders for various sizes into the odontoid as per anterior fixation technique. Results: The mean insert angle was 63.01(SD 1.72). The mean AP diameter at base was 12.48 (SD 0.998). The mean transverse diameter at base was 12.29(SD 0.74). The mean minimum AP diameter was 10.91(SD 1.24). The mean minimum transverse diameter was 9.90(SD 0.79). The mean lengths of the best placed cylinder was 34.6(SD 1.75). The diameter of the best placed cylinder was 3.5 mm in 28 out of 30 patients. Conclusion: Our Study tells 3.5 mm diameter screws are best suited for odontoid fractures in Indian population and which is less often provided by implant companies in India. Our procedure is low cost and technology based. It is simple, accurate, and cost effective.

**Date: 2019-12-07**

**Session: Emerging Technology Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 54193**

**ROBOTIC-ASSISTED TOTAL KNEE ARTHROPLASTY MAINTAINS POSTERIOR CONDYLAR OFFSET WITH GREATER FEMORAL COMPONENT FLEXION, SMALLER COMPONENT SIZE AND BETTER FUNCTIONAL RESULTS**

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Introduction: Sagittal balance and functional performance of a total knee replacement requires restoration of posterior condylar offset. We hypothesized that pre-operative CT planning and intra-operative virtual adjustment of femoral components resulted in better posterior condylar offset ratio in patients undergoing robotic assisted TKA compared with conventional TKA. Methods: A surgeon's first 31 robotic assisted TKAs were compared with the immediate preceding 47 conventional TKAs. Pre-operative and post-operative posterior condylar offset and slope were assessed. Femoral component flexion was compared between both groups. In-hospital functional performance was compared between groups. Results: There were no demographic differences between the groups. There was no difference in post-operative PCOR between conventional and robotic assisted TKAs ( $0.5 \pm 0.04$  versus  $0.5 \pm 0.04$ ). Robotic assisted TKA femoral components were more flexed compared to conventional TKA femoral components ( $10.3^\circ \pm 4.5$  versus  $5.3^\circ \pm 3.5$ ;  $P < 0.001$ ). Femoral components were smaller relative to pre-operative AP diameter in the robotic assisted group compared with the conventional group ( $P = 0.034$ ). There was no difference in post-operative slope measure of error between groups ( $P = 0.13$ ). Patients undergoing robotic assisted TKAs went home earlier, performed straight-leg raise sooner, required less therapy and had greater flexion at discharge ( $P < 0.001$ ). Conclusion: Robotic-assisted total knee arthroplasty maintains posterior condylar offset with greater femoral component flexion, smaller component size and better immediate post-operative functional results.

**Date: 2019-12-07**

**Session: Emerging Technology Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 54128**

**ACCURACY OF IMPLANT POSITIONING IN ROBOTIC ARM-ASSISTED PRIMARY TOTAL KNEE REPLACEMENT VERSUS CONVENTIONAL JIG BASED TKR.**

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**Introduction:** To improve the precision of implant positioning and limb alignment in TKR, a new tool in the form of robotic-arm has been recently added to the armamentarium of arthroplasty surgeons. Our study aims to compare the accuracy of implant positioning & limb alignment in robotic-arm assisted TKR versus conventional jig-based TKR. **Patients & Methods:** This was a prospective study conducted in a tertiary-care teaching hospital between April 2018 and November 2018. 30 consecutive robotic-arm assisted TKRs were compared to 30 consecutive jig-based TKRs with independent observers evaluating the accuracy of implant positioning & limb alignment. Parameters were measured according to the Knee Society Roentgenographic Evaluation System and scanogram. The outcomes were defined based on the degree of deviation as 'excellent' when < 2 degrees, 'acceptable' when between 2-3 degrees, and 'outlier' when > 3 degrees from the planned position. **Results:** Statistically significant outcomes were observed favouring the robotic group with respect to coronal inclination of femoral component (p-value =.037), sagittal inclination of tibial component (p-value =.011) and limb alignment (p-value = .002). The number of outliers was significantly less with regard to implant positioning in the robotic-arm assisted group (4.1%) compared to conventional group (20.03%). There were absolutely no outliers in terms of limb alignment in the robotic group versus 26.7% in the conventional group. **Conclusion:** Robotic-arm assisted TKR improved the accuracy of implant positioning and limb alignment compared to conventional jig-based TKR, even though the surgeons were more experienced in the latter.



**Date: 2019-12-07**

**Session: Emerging Technology Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53215**

**ROBOT ASSISTED SUBDERMAL INTERMUSCULAR PEDICLE SCREW TECHNIQUE IN THE MINIMALLY INVASIVE TREATMENT OF ADOLESCENT IDIOPATHIC SCOLIOSIS: ACCURACY AND SAFETY EVALUATION OF THIS NOVEL MINIMALLY INVASIVE TECHNIQUE.**

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**OBJECTIVES:** To evaluate the accuracy and safety properties of the combination of robot assisted subdermal intermuscular pedicle screw technique (RA-SIPST) in the minimally invasive treatment of adolescent idiopathic scoliosis (AIS). **METHODS:** This was an experimental and prospective study. Selected consecutive patients with adolescent idiopathic scoliosis received RA-SIPST procedure using the TianJi Robot system operated by one senior surgeon from May 2018 to March 2019. The accuracy of screw insertion and perioperative screw-related complications were evaluated. Screw encroachments were evaluated on postoperative CT images. And, screw-related complications including intraoperative pin skidding, screw malposition and adjustment, together with postoperative neurological symptoms that correlated with screw malposition were recorded. **RESULTS:** Six AIS patients, with an average age of 15.1 years, were selected and recruited in this study. Seventy-two transfacet screws were inserted by robotic assistance. The average surgical time was  $3.5 \pm 1.2$ h). The mean blood loss was  $100 \pm 43$  mL. Intraoperative guidance accuracy showed  $0.98 \pm 0.22$  mm (ranging from 0.63 to 1.28 mm) translational deviation and  $2.09^\circ \pm 0.25^\circ$  (ranging from  $1.35^\circ$  to  $2.61^\circ$ ) angular deviation. The gradings of screw encroachment were: 62 screws (86.11%) with Grade A, and 10 screws (13.89%) with Grade B. No pin skidding occurred intraoperatively and no postoperative neurological complications were found. **CONCLUSION:** Our preliminary study of RA-SIPST showed a high level of accuracy for screw insertion and this technique was found to be a feasible and safe procedure for minimally invasive treatment of AIS.

**Date: 2019-12-07**

**Session: Emerging Technology Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53109**

**ROBOTIC SURGERY IMPROVES ACCURACY IN RESTORATION OF NATIVE HIP BIOMECHANICS AND REDUCES OUTLIERS IN SAFE ZONES OF ACETABULAR IMPLANT POSITIONING**

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**Objectives:** The primary objective was to compare accuracy in restoring the native centre of hip rotation in patients undergoing conventional manual total hip arthroplasty (THA) versus robotic THA. Secondary objectives were to determine differences between these treatment techniques for THA in achieving the planned combined offset, component inclination, component version, and leg-length correction. **Materials and Methods** This prospective cohort study included 50 patients undergoing conventional manual THA and 25 patients receiving robotic THA. Patients undergoing conventional manual THA and robotic THA were well-matched for baseline demographics. All operative procedures were undertaken by a single surgeon using the posterior approach. Two independent blinded observers recorded all radiological outcomes of interest using plain radiographs. **Results** Robotic THA was associated with improved accuracy in restoring the native horizontal ( $p<0.001$ ) and vertical ( $p<0.001$ ) centres of rotation, and improved preservation of the patient's native combined offset ( $p<0.001$ ) compared with conventional THA. Robotic THA improved accuracy in positioning of the acetabular component within the combined safe zones of inclination and anteversion described by Lewinnek et al ( $p=0.02$ ) and Callanan et al ( $p=0.01$ ) compared with conventional THA. There was no difference between the two treatment groups in achieving the planned leg-length correction ( $p=0.10$ ). **Conclusion:** Robotic THA was associated with improved accuracy in restoring the native centre of rotation, better preservation of the combined offset, and more precise acetabular component positioning within the safe zones of inclination and anteversion compared with conventional manual THA.

**Date: 2019-12-07**

**Session: Emerging Technology Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 54915**

**3D PRINTING AND 3D MODELS AS A PART OF PREPLANNING FOR COMPLEX TOTAL HIP ARTHROPLASTY.**

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**AIM:** To assess the role of 3D printing and 3D Models, as a part of preplanning in patients undergoing Complex Total Hip Arthroplasty (CTHA) and their functional outcome. **Material and Method:** This is part of our on going prospective study. The CTHA cases done with the help of 3D printing and 3D models since October 2015 to October 2017 with minimum six months follow-up are included in the study. **RESULTS:** 3D models were made as a part of preplanning for ten cases posted for CTHA. These cases were grouped into three A, B, C depending on their aetiology and evidence of infection. Group A consisted of 5 cases were of post traumatic secondary osteoarthritis following acetabular fracture with no signs of infection. Group B consisted of 4 cases were of post traumatic secondary osteoarthritis following acetabular fracture with signs of infection and Group C included 1 case was of failed septic revision. All cases of Group A were done as one stage procedure. 2 out of 4 cases of Group B was done as two stage procedure and surgery was not done for the 2 other cases of Group B with persistent infection and elevated blood markers. One failed septic revision case of Group C was done as two stage procedure. **CONCLUSION:** 3D printing and 3D model helped in a proper and precise preplanning, appropriate implant selection, decreased operative time, less infection rate and good functional outcome.

**Date: 2019-12-07**

**Session: Emerging Technology Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall A3**

**Abstract no.: 53475**

**AN ULTRASOUND IMAGE-BASED SURGICAL NAVIGATION USING DEEP LEARNING NETWORK FOR A BONE CYST SURGERY**

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Most surgical treatments for a bone cyst involve a curettage that sometimes need large skin incision and bone window creation depending on the size and severity of the condition. These require long recovery time to patient. And it is difficult to figure out the exact cyst position form fluoroscopic images. We have developed an artificial intelligence integrated surgical robotic system for minimally invasive treatment of the bone cyst. In this report, we introduce an ultrasound image-based surgical navigation system. The system consists of an image acquisition unit and an interpretation unit. The image acquisition unit simultaneously save ultrasound images and probe positions calculated from two IMUs and two position sensors. The interpretation unit segments bone contour from ultrasound images using u-net architecture, and generates a 3D surface bone model. We measured positional and angular error of the image acquisition unit using an optical tracking system having 0.4mm accuracy. We designed four maxpool layers and four up convolutions as the u-net architecture, and used cross entropy as loss function and ReLU as activation function. We collected 65 series of ultrasound images from femur, tibia and humerus. Radiologist labelled bone contour to some of the ultrasound images, and we used labelled images for training, validation and test. The positional and angular error was 2.13mm and 2.60 degree in RMS, respectively. The u-net based bone contour segmentation results shows 69 % coincidence with radiologist annotation. We will merge 3D reconstructed bone model with processed MR images to in the next step.

**Date: 2019-12-07**  
**Session: Miscellaneous Free Papers**  
**Time: 10:30 - 12:00**  
**Room: Grand Ballroom Hall C3**

**Abstract no.: 55108**

**SOCIOECONOMIC STATUS OF PATIENTS IN A SWEDISH NATIONAL SELF-MANAGEMENT PROGRAM FOR OSTEOARTHRITIS COMPARED TO THE GENERAL POPULATION - A DESCRIPTIVE OBSERVATIONAL STUDY OF 72,069 PATIENTS**

Ola ROLFSON<sup>1</sup>, Kristin GUSTAFSSON<sup>2</sup>, Joanna KVIST<sup>2</sup>, Marit ERIKSSON<sup>3</sup>, Leif DAHLBERG<sup>4</sup>

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Introduction: We investigated socioeconomic status (SES) of the population that utilizes self-management program for osteoarthritis (OA) compared to the general Swedish population. Methods: We undertook an observational study with cross-sectional design including 72,069 patients with hip or knee OA, from the Register for Better Management of Patients with Osteoarthritis (BOA). Patients were registered before participation in a structured OA self-management program, between 2008 and 2016. A reference population (n=216,207) from the general Swedish population was selected by one-to-three matching of birth, sex and residence. Residential municipality, country of birth, marital status, family type, educational level, employment, occupation, income and sick leave were analysed. Results: The BOA population had higher educational level ( $\geq 10$  years) compared with their references, both in patients with hip- (77.5% vs 70%), and knee OA (77% vs 72%). Their disposable income were on average higher (median (IQR) in thousands of SEK): hip 184 (110) vs 168 (112), knee 187 (111) vs 175 (118) and more of them were married; hip 58% vs 54%, knee 59% vs 55%. Of those at work, 46% of patients with hip OA (references 45%), and 51% with knee OA (references 44%) had a blue-collar occupation. Sick leave was more common among those ( $\leq 65$  years) with hip and knee OA (26%) than their references (13% vs 12%). Discussion: The BOA population had a consistently higher SES than the general Swedish population. This indicates that self-management program for OA may not be optimized for more disadvantaged groups of individuals, with potentially greater needs.

**Date: 2019-12-07**

**Session: Miscellaneous Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 54693**

**RESULTS OF NON-SURGICAL MANAGEMENT OF FEMORAL NECK FRACTURES IN THE ELDERLY PATIENTS**

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Introduction: Fracture neck of femur in the elderly is associated with increased morbidity and mortality, and surgical management has increasingly become widely accepted. There is limited literature on the outcome of non-surgically managed fracture neck of the femur. We present the results of non-surgically managed fracture neck of femur patient over five years. Methods: We reviewed all admissions with fracture neck of femur at our organisation from 2014-2018. Of the 1700 patients admitted with fracture neck of femur; 33 were managed non-surgically. The majority were deemed medically unfit for anaesthetic/surgery by the Multi-Disciplinary Team [Anaesthetist, Orthopaedic Consultant and Ortho-geriatrician] and the non-operative management was followed. We looked at the 30 days and one-year mortality as our primary outcome measure, length of stay and destination of discharge as our secondary outcome. Results: We analysed all the 33 patients, 76% were females. The Mean age of patients treated non-surgically was 84 years. 68% had intra-capsular fractures, and the remaining were inter-trochanteric fractures. The average number of co-morbidities patient had been was five. The Mortality at 30 days and one year was 36% and 63.5% respectively. The mean length of hospital stay was 15 days, most needed residential or nursing home placements after discharge. Conclusion: Comparative studies have shown three times increased mortality with non-surgical management. 30-day mortality in our patient group was comparable, and one-year mortality was higher when compared to published literature. In fracture neck of femur patients with multiple co-morbidities and deemed unfit for surgery the mortality remains significantly high.

**Date: 2019-12-07**

**Session: Miscellaneous Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 53545**

**PREVALENCE OF PIRIFORMIS SYNDROME AMONG THE CASES OF LOW BACK/BUTTOCK PAIN WITH SCIATICA: A PROSPECTIVE STUDY**

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**Aim:** The aim of this study was to find out the prevalence and causes of piriformis syndrome in patients with complain of low back pain/buttock pain with sciatica attending Regional Institute of Medical Sciences (RIMS), Imphal. **Materials and Methods:** All the patients in the study group attending Orthopedic Outpatient Department were examined. Those with increased symptoms on sitting, localized significant tenderness on palpation of the muscle, presence of one or more of the following tests: Freiberg, pace, beatty, and FAIR (Flexion, Adduction and Internal Rotation) manoeuvres with negative X-ray, ultrasound, computed tomography and magnetic resonance imaging findings were subjected to piriformis muscle injection of lidocaine (2%) 2 ml and methyl prednisolone 2 ml (40 mg) for confirmation of diagnosis. **Result:** Out of 2910 patients, 182 cases (M: 28, F: 154) in the age range of 19-75 years with a mean age of 43 years were clinically diagnosed as piriformis syndrome. Prevalence of piriformis syndrome was 6.25%. **Conclusion:** Piriformis syndrome is one of the differential diagnoses of low back/buttock pain with Sciatica. Females are more affected than males. Causes are overuse, prolonged sitting, trauma, and vigorous massage. Diagnosis is by exclusion of other causes. Simple injection with local anaesthetic and steroid in the piriformis muscle is both therapeutic and confirmatory of diagnosis. Early diagnosis and treatment with injection of piriformis muscle can prevent further complications and risks of surgery, which is also not 100% curative. With proper care, piriformis injection can be carried out without any complication.

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**Session: Miscellaneous Free Papers**

**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 54711**

**A RANDOMISED CLINICAL TRIAL ON COMPARISON OF CORTICOSTEROID INJECTION WITH SPLINTING VERSUS AUTOLOGOUS PLATELET-RICH PLASMA (PRP) WITH SPLINTING IN PATIENTS WITH LATERAL EPICONDYLITIS**

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Introduction: Lateral epicondylitis is a common problem affecting 1-3% of the population. There has been much debate about the best treatment modality but, however, there is no conclusive evidence in support of any of the proposed treatment modalities. In this trial, we have studied the effect of corticosteroid injection with PRP in the treatment of lateral epicondylitis. Materials and Methods: In this double-blind, randomized clinical trial, individuals were randomly assigned to either of two treatment groups (30 each) and received either, 80 mg Depomedrol injection with splinting, or 2 cc PRP injection with splinting. They were evaluated using the Oxford elbow scale (OES) at 0, 4 and 16 weeks. Results: The corticosteroid injection groups had better pain relief as measured by OES at 4 weeks compared with the PRP injection group. Mean OES at week 4 was 29.5 and 26.9 in corticosteroid injection groups and PRP injection groups respectively ( $P < 0.05$ ) but at 16 weeks, there was only moderate benefit reported for the group which received steroid injection and splinting compared to the PRP injection group. The PRP injection group reported better improvement in OES scores (42.4) at the end of the trial compared to corticosteroid injection group (29.8) ( $P < 0.05$ ). Conclusion: Our results indicate that despite the clear pain reduction benefit associated with steroid injection in short term, this benefit in comparison with PRP injection fades by the 16th week. PRP injection has a more sustainable effect without having an effect on integrity of involved musculo-tendinous structure.



**Date: 2019-12-07**

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**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 54385**

**EXTRACORPOREAL SHOCKWAVE THERAPY FOR TREATMENT OF NONUNION, CROSS SECTIONAL STUDY**

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Introduction: the standard treatment of fracture nonunion is surgery, however treatment by nonoperative modalities will save patients from additional morbidities they face with revision surgery and sometimes multiple surgeries. The reported union rate after high energy shockwave therapy in literature is 72-75%.The rationale of the study is to adopt shockwave therapy as the first option of treatment to avoid revision surgery. Study population: all patients with nonunion or delayed union in the period from November 2016 to December 2018, Hamad General Hospital, Tertiary Orthopedics and Trauma Center, Doha, Qatar. Methods: Cross Sectional Study, 46 patients with nonunion/delayed union, including surgically and conservatively treated fracture patients and osteotomies nonunion are prospectively reviewed. Patients are given a single session, under general or spinal/regional anaesthesia using Orthogold280 machine (protocol: 3000 pulses, energy 4, frequency 4). The patients remains under followup for at least 6 months to determine the outcome (achievement of union), after which the session can be repeated if there is a radiological signs of progress, otherwise the patient will be considered for revision surgery. Results: union rate of 77.4% (after excluding the lost follow-up, under follow-up, early surgery and implant failure). Conclusion: saving 70% of patients from having another surgery makes extracorporeal shock therapy a promising non-invasive treatment modality. The achieved rate of union is comparable to the rate of union in previous studies.

**Date: 2019-12-07**

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**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 54117**

**EVALUATION OF OFFLOADING IN THE TREATMENT OF NEUROPATHIC FOOT ULCERS: A PROSPECTIVE STUDY**

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Neuropathic ulcers are the prime precipitant of diabetes-related amputations of the lower extremity. Effective reduction of pressure i.e. offloading is the key element of any treatment program. This study compared the outcome of an offloading modality i.e. Total Contact Casting (TCC) with traditional dressing treatment (TD) for treating neuropathic diabetic plantar ulcers. Thirty one patients with plantar ulcers without any gross infection, osteomyelitis or gangrene were randomly assigned to the TCC group (n = 15) or TD group (n = 16). In the experimental group, TCC was applied on the initial visit and subjects were instructed weekly follow up and to limit ambulation to one-third of their usual activity. Casts were changed weekly. Subjects in the TD group were prescribed dressing changes and were advised against bearing weight on the involved extremity. Ulcers were considered healed if they showed complete skin closure with no drainage. Non-healed ulcers were those which showed no decrease in size by 6 weeks or if infection developed requiring hospitalization. In the TCC group, 12 out of 15 ulcers healed in 48±7 days; in the TD group, 10 out of 16 ulcers healed in 58±9 days. Comparatively higher rate of ulcer healing with fewer infections was seen in the TCC group. New abrasions were a frequent complication of TCC which can be reduced with frequent cast changes. We conclude that when proper technique is followed, TCC is a more effective method than dressing for treating diabetic plantar ulcers thereby reducing the risks of amputation.

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**Abstract no.: 54048**

**THE USE OF PLATELET-RICH PLASMA APPLICATION IN THE TREATMENT OF DIABETIC FOOT ULCERS: A SYSTEMATIC REVIEW OF THE LITERATURE**

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Within the UK, diabetes is one of the most common chronic diseases with increasing prevalence. Diabetic foot ulcers affect up to 10% of people with diagnosed diabetes, and are the most common reason for performing non-traumatic limb amputation. Platelet-rich plasma therapy (PRP) is a treatment that contains fibrin and high concentrations of growth factors which are potentially promote wound healing in chronic wounds and studies have shown that PRP is indeed effective in stimulating healing. However, its effectiveness can vary according to the area of the body, the health of the patient and the chronicity of the injury or wound, and the effectiveness of PRP in diabetes, a state where inherent wound healing is impaired, is yet to be determined. We performed a search of the following databases: MEDLINE, Web of Science, Cochrane Central Register of Controlled Trials, for randomised-controlled trials or prospective comparative studies and selected studies based on a pre-set eligibility criteria. A total of 5 articles were analysed as Level II evidence. The primary outcome measures reported that were common to all studies were mean healing time and healing rates. The methodology of individual studies were further analysed. Review of the few trials in PRP for DFUs demonstrated an overall positive effect in increasing healing rate and decreasing healing time. Our recommendation is that further studies can add to this growing body of evidence through meticulous study design, larger study sizes and using standardised clinical outcome measures.

**Date: 2019-12-07**

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**Time: 10:30 - 12:00**

**Room: Grand Ballroom Hall C3**

**Abstract no.: 54269**

**PLATELET-RICH PLASMA INJECTIONS IN HIP OSTEOARTHRITIS: DOES IT WORK? A REVIEW**

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Osteoarthritis is a significant cause of chronic pain in the elderly population with hip osteoarthritis one of the main causes of functional disability and joint pain in adults older than 55 years. Intra-articular injections are commonly used to alleviate symptoms, with steroid and hyaluronic acid injections used most frequently. Platelet rich plasma (PRP) injections have been introduced for treatment of osteoarthritis. The goal of this study is to assess its effectiveness in the management of hip osteoarthritis. Methods: We performed a search of PubMed and EMBASE for published studies that assessed the effectiveness of PRP injections in the treatment of hip osteoarthritis, with a minimum follow up of three months. Primary outcome measures were WOMAC and VAS scores. Results: Five trials were identified with 185 patients undergoing treatment with ultrasound-guided intra-articular injections of PRP, compared to patients treated with hyaluronic acid alone (n=148) or hyaluronic acid combined with PRP (n=31) in one study. PRP was shown to improve patient outcome scores at follow up at 6 and 12 months compared to baseline, however there was no significant difference seen between patients treated with PRP or hyaluronic acid alone. Conclusion: Following this systematic review, we cannot currently recommend the use of intra-articular injections of PRP for the treatment of hip OA. Given that intra-articular steroid injections are the only injection recommended by international guidelines for the treatment of hip OA, further studies comparing PRP to steroid would be of benefit to determine the value of PRP injections in hip OA.

**Date: 2019-12-07**  
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**Abstract no.: 55172**

**ARE YOU SUFFERING PAIN NECK DUE TO SMART PHONE TEXT NECK SYNDROME**

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**ABSTRACT** Objective: Text neck causes neck pain and soreness. One's looking down on smart phone can suffer upper-back pain ranging from chronic nagging pain to sharp and sever upper back muscle spasm. Shoulder pain and tightness with possible shoulder pain. We determined the prevalence of different causes of text neck syndrome amongst medical undergraduates. Methods: It was a cross-sectional survey using non-probability convenient sampling technique from June 2018 to July 2018 in a period of two months. Sample of 101 undergraduate students from first year till final year. The inclusion criteria of the study were all medical undergraduates who were using smart phone, tablet and laptop for past six-month duration and above. We filled all questionnaire at the spot. The exclusion criteria of the study were all questionnaire which were filled with the help of colleague, going through internet, and left incomplete. Data was obtained using pre-tested self-administered questionnaire and neck disability index proforma. Results: Out of total 101 participants, there were 59 (58.4%) were female and 42 (41.6%) were male. All participants were using smart phone for past five years. Students were asked about the preference of usage device and e-reading. They were asked about warm-up exercise before using smart phone or other devices. Their practices were determined. Conclusion: Majority of the students were suffering neck pain that was aggravated with using smart phone or other electronic devices. They don't warm up before reading or using device. Key Words: Smart phone, neck pain, text neck syndrome

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**Abstract no.: 54974**

**FAILED BACK SURGERY SYNDROME: OUTCOME OF AN INTENSIVE, MULTIMODAL, INTERDISCIPLINARY REHABILITATION PROTOCOL**

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Failed Back Surgery Syndrome (FBSS) is estimated to occur in 10%-40% following surgery for disc-related pathologies and is associated with profound disability and economic consequences. A retrospective study was conducted to study the effectiveness of a sequenced, multimodal, interdisciplinary rehabilitation protocol for FBSS. 88 subjects (aged 22 to 82 years) with FBSS were evaluated and treated with sensory desensitisation, trigger point therapy, dry needling, soft tissue and myofascial mobilisation, taping, psychological approaches, aquatic therapy and exercises for 4 to 8 weeks. The Visual Analog Scale (VAS) and Oswestry Back Disability Index (OBDI) were measured before and after the treatment and at a follow up of 6 months. 100% had pain in the lower back and/or lower extremities, 66% had numbness, 52% burning and 38% tingling sensation. The commonest surgeries were discectomy (86%), laminectomy (38%) and spinal fusion (12%). The commonest preoperative indications were prolapsed intervertebral disc (84%) and spinal canal stenosis (8%). The commonest levels were at L4, L5 (40%), L5, S1 (35%) and multiple (18%). Five subjects underwent revision surgery on 2 occasions. All the subjects were diagnosed to have Myofascial Pain Syndrome of the lower back and lower limbs with Neuropathic Pain. Other co-morbidities included Fibromyalgia (38%), Hypovitaminosis D (38%), Low Bone Mineral Density (34%), Hypovitaminosis B12 (26%), Hyperuricemia (24%), Hypothyroidism (18%), Seronegative Arthritis (12%) and Rheumatoid Arthritis (4%), which were treated with medicines. A significant decrease in the pain level: VAS ( $p < 0.01$ ) and an increase in functional status: OBDI ( $p < 0.01$ ) was noted in all the subjects following the rehabilitation.

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**Abstract no.: 55213**

**TOTAL HIP ARTHROPLASTY: SURVEY OF ACETABULAR REAMING PRACTICES AMONG FRENCH SOCIETY OF HIP AND KNEE (SFHG) MEMBERS.**

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**Introduction** The authors carried out a survey on the practices of reaming the acetabulum when performing a total hip arthroplasty (THA). The objective was to analyse acetabular reaming techniques and to describe the trends observed among a targeted population of orthopaedic surgeons. **Material and methods:** The survey was conducted from a specific application (SURVEY MONKEY). 25 questions (average fill time of 10 minutes) were asked. The first part of the questionnaire included a chapter of generalities on the surgeon's habits (fixation, bearings, approach, planning), the second part analysed the reaming technique, and the third part the knowledge of the specificities of the reamer. **Results:** 135 invitations were made. 102 responded (response rate of 75.5%). 87.3% of the cups used were cementless, 45.74% were hard on hard bearings, the posterior approaches (53%) were the most used. The planning were done in 2D (68.89%). 75% of the cups were reamed gradually with reamers of increasing size, a complementary screwing was performed in 3.13% only if mobility of the trial cup was observed. Regarding reamers, 76.62% of surgeons trusted the manufacturer instructions for use (reaming performance and size), 43.66% of reamers were randomly renewed by the manufacturer under the request of the surgeon in 80% of cases. **Discussion** This survey seemed interesting to report because "manual" surgical techniques are variable and is opposed to the standardization of industrial tools and robotic surgery. It is certainly imperfect but has the merit of highlighting the diversity of surgical practices during a THA procedure.

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**Room: Grand Ballroom Hall C3**

**Abstract no.: 53346**

**3D-TECHNOLOGY IN DISTAL PROSTHESIS OF FINGERS' STUMPS.**

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Osseointegration performed for improvement of the function and cosmetic view on 35 stumps of fingers bones in 19 patients at the age from 15 to 57 years old. The first stage is inserting of titanium implant in the bone stump. Then exo-prosthesis with attachment to the titanium implant by abutment was made. Patients were trained to controlled movements under doctor's care. The most of patients were fixed standard mass-produced implants, 3 patients were applied 5 customized implants. Early outcome results were evaluated according to the DASH score, clinicoradiological data, device "Periotest M". In two patients with short bone stumps osteointegration was failed, the implants were movable in intramedullary canal and removed. Herewith the inflammation signs of soft tissues and bone structures were not found out. Also in removal of implants from stumps there was marked close contact and fixation with soft tissues which required small incision. We have found out that during long-term outcome (from 6 to 24 months) after osseointegration and prostheses use, patients had not indicated the complications as an inflammatory reaction, temperature increase, and purulence in implants location area. Early functional weight-bearing needs to be gradual and going together with weight-bearing on other fingers. Use of customized implants remains promising. Resolve the issue of short stumps integration needs design changing of screwing implant part and surgery technology.



**Date: 2019-12-07**

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**Room: Grand Ballroom Hall C3**

**Abstract no.: 53151**

**THE APPLICATION OF 3D PRINTING TECHNOLOGY IN ORTHOPAEDICS AND REHABILITATIVE DEVICES**

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Abstract: With the development of digital medicine, medical imaging systems, material science, CAD/CAM and other technology, the application of 3D printing technology is increasingly being integrated into orthopaedics and rehabilitative devices . Conforming to patients' anatomic structure, 3D printing technology can be used to make individualized orthopaedics models, surgical templates, implants, rehabilitative devices accurately and rapidly.3D printing technology has a number of advantages, such as patient-specification, saving material and time. To date, the application of 3D printing technology in orthopaedics and rehabilitative devices is also facing many problems because of material, cost, standardisation and other restrictions.

**Date: 2019-12-07**

**Session: Trauma Free Papers 5**

**Time: 10:30 - 12:00**

**Room: Meeting Room 8**

**Abstract no.: 54893**

**FIXATION OF PAEDIATRIC SUPRACONDYLAR FRACTURES: DOES THE SIZE OF THE K-WIRE PREDICT OUTCOME?**

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Introduction: Supracondylar distal humeral fractures are amongst the most common paediatric orthopaedic presentation requiring surgical intervention. Much work has examined the use of various k-wire configurations in their fixation and the utility of 2 or 3 wires to maintain satisfactory fracture reduction and avoid rotational displacement. Despite recent British Orthopaedic Association Standards for trauma guidelines (BOAST 11) advocating the use of 2.0mm wires for all fixation, little biomechanical or in vivo studies have compared the outcomes of percutaneously treated fractures with a smaller wire diameter. This series retrospectively reviewed outcomes of supracondylar fractures treated with closed reduction and percutaneous pinning using 1.6mm k-wires. Methods: Retrospective review of 25 consecutive patients presenting with a Gartland type II or type III fractures over a 5-year period. All open injuries and complex elbow fracture dislocations were excluded from the study. All patients underwent repeat radiographs at weeks 1 and 4, with removal of wires and mobilisation at week 4. Results: 16 underwent fixation by a consultant, and 8 by a senior registrar, no neurovascular complications were recorded. 2 wires were used in 84% of cases. 80% of all cases used a cross pinning configuration. Only one case showed a loss of reduction, this case utilised only lateral placed pins. Radiographically, no pins were seen to have migrated on repeat films. Discussion: This study suggests that 1.6mm wires can be used effectively in the percutaneous pinning of Gartland II and III supracondylar fractures and are a viable alternative to 2.0mm wires

**Date: 2019-12-07**  
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**Room: Meeting Room 8**

**Abstract no.: 53974**

**OCCULT PELVIC FRACTURE IN CHILDREN PRESENTING TO A MAJOR TRAUMA CENTRE**

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**INTRODUCTION:** Pelvic fractures in children are considered rare. This study looked at the incidence of such injuries presenting to a Major Trauma Centre over a two-year period. **METHOD:** A retrospective study of children presenting with an injury severity score greater than 4. All imaging was reviewed by two consultant Orthopaedic surgeons and if an injury was suspected the imaging was subsequently reviewed by a consultant radiologist. **RESULTS:** A total of 88 children were included. Nine children had a pelvic fracture identified on admission. The average age of these children was 8.9 years with an average injury severity score of 23.9. Interestingly, 14 other children were identified as having pelvic fractures not documented during admission. The average age of these children was 14.3 years with an average injury severity score of 20.4. **CONCLUSION:** The incidence of pelvic fractures in children presenting in our trauma centre was 6%, comparable to figures published in the literature. However, if occult pelvic fractures are included the incidence increases to 15%. The long-term significance of occult pelvic fractures is mostly unknown. However, it's well reported that even minor asymmetry of the pelvic ring can go on to cause sacroiliac joint pain and problems. Future work should look at the long-term outcomes of these children to highlight the importance of early diagnosis. We recommend a high clinical suspicion of pelvic fractures in any child with an injury severity score over 15. These children should be reviewed by an orthopaedic surgeon ensuring occult pelvic fractures are not missed.

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**Session: Trauma Free Papers 5**

**Time: 10:30 - 12:00**

**Room: Meeting Room 8**

**Abstract no.: 53534**

**SUCCESS RATES OBTAINED WITH THE USE OF TAYLOR SPATIAL FRAME EXTERNAL FIXATION FOR ACUTE TRAUMA AND DEFORMITY CORRECTION IN PAEDIATRIC POPULATIONS: A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS**

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This study aimed to determine the overall success rates of using the Taylor Spatial Frame™ (TSF), a circular external fixator linked to computer planning software, in the indications of acute trauma and deformity correction in paediatric populations. In September 2018, separate systematic literature reviews (SLRs) were performed using the Embase and PubMed databases to identify relevant clinical studies with TSF in paediatric populations (mean patient population age <18 years). Studies were eligible if they were published from 2008 onwards in a peer-reviewed journal, written in English, and had results on ≥10 patients. To calculate an aggregated treatment success metric for each outcome, a proportional meta-analysis (using the fixed effect model when I<sup>2</sup><50% and the random effects model when I<sup>2</sup>≥50%) was performed. Overall treatment success for acute trauma and deformity correction was defined as consolidation of the acute injury or successfully realised treatment goals for deformity correction, respectively. From 138 and 121 unique studies identified in the SLR for acute trauma and deformity correction, respectively, five (105 patients) and nine (360 patients) studies were eligible, respectively. In paediatric patients treated with TSF, there was a combined treatment success of 99% (95% CI: 95-100%) in acute fractures and 96% (95% CI: 91-100%) in deformity correction. These results indicate that TSF achieves high levels of treatment success for acute trauma and deformity corrections in paediatric populations. Future analyses of this and other external fixation devices should incorporate complications as an endpoint of interest.

**Date: 2019-12-07**  
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**Time: 10:30 - 12:00**  
**Room: Meeting Room 8**

**Abstract no.: 54373**

**COMPARISON OF ELASTIC AND RIGID INTRAMEDULLARY NAILING IN TIBIAL FRACTURES IN OLDER CHILDREN**

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Complicated situation in diaphyseal tibial fractures occurs in children 12–16 years old. We can choose between two surgical methods ETN (Expert Tibial Nail) or ESIN (Elastic Stable Intramedullary Nailing). ESIN allows secure insertion in growing skeleton, but is only relatively stable. ETN has to be inserted more invasively, however, it is absolutely stable with early mobilisation. The purpose of this study was to evaluate the results of therapy in both methods and to define the method of choice. In this prospective study, 20 patients were hospitalised between 2013 and 2019 with closed diaphyseal tibial or crural fracture, respectively - 9 patients were treated with ESIN and 11 patients with ETN. We observed following parameters: consolidation of fracture line, bone's recanalization, full weight-bearing and complete mobilization of knee joint and rate of complications. More successful healing was presumed in cases treated with ETN. In group treated with ESIN, average interval to fracture line consolidation was 178 days and to bone's recanalization 228 days. In group treated with ETN, these intervals were 177 days and 219 days, respectively. Considering these parameters, significant difference between the groups was not recorded. However, significant difference appeared in the interval from surgery until full weight-bearing. Performing total knee flexion was possible after 198 days with ESIN on average, but after 74 days with ETN. Results of our study points out preferable usage of ETN as a method of choice in above mentioned patients. ETN ensures great healing results in shorter time with minimum serious complications.

**Date: 2019-12-07**

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**Room: Meeting Room 8**

**Abstract no.: 53984**

**PATIENT REPORTED OUTCOME IN ADOLESCENT MID-SHAFT CLAVICLE FRACTURE: A MID-TERM REVIEW**

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Adolescent mid-shaft clavicle fractures are high energy fractures representing around 2.6% of all fractures. Treatments available for these fractures generate lot of controversy. A survey among POSNA members tips the balance towards operative intervention for older adolescents. Purpose of our study was to evaluate mid-term outcomes of non-operatively treated mid-shaft clavicle fractures in adolescents treated in our institute. Method: Adolescents treated between 1st of January 2005 – 31st of December 2015 were identified. Records were reviewed for demography, contact number, fracture pattern and type of treatment. Ethical approval for contacting patients was obtained. Quick-DASH Score and EQ-VAS was used to evaluate functional outcome. Results: 28 patients were identified. 15 patients, 11 males and 4 females (N=15) underwent non-operative management. Eleven patients had fractured left clavicle, while four the right clavicle. Mean age was 14 years (10 – 18). Mean shortening was 16.80 mm (0 – 26). Mean follow-up PROM data was at 7 years (4 – 11). Mean Quick-DASH score was 1.813 (0 – 4.5) (P= 0.0028). 4 patients reported moderate difficulty with recreational activity, while another 4 reported mild difficulty. Sport or Arts module of Quick-DASH was not collected. All 15 patients reported a score of 100 on EQ-VAS score. Conclusion: Results of our study suggest high demand patients with shortened clavicles are likely to benefit from operative fixation. Sub- analysis showed all patients having unsatisfactory Quick -DASH scores had shortening more than 15 mm. Limitation of our study is a small cohort of patients.

**Date: 2019-12-07**

**Session: Trauma Free Papers 5**

**Time: 10:30 - 12:00**

**Room: Meeting Room 8**

**Abstract no.: 52918**

**A THREE-YEAR FOLLOW UP FOR PHYSEAL INJURY AND FOREARM FUNCTION AFTER OPEN REDUCTION AND INTRAMEDULLARY FIXATION BY TRANSPHYSEAL PINS IN CHILDREN WITH FOREARM BOTH BONE FRACTURES**

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Introduction: Avoiding growth plate damage and restoring the normal range of motion are important factors after surgical treatment of fractures in children. The purpose of this study is to evaluate physeal injury and limitation of motion of forearm after open reduction and intramedullary fixation by transphyseal pins in children with forearm both bone fractures. Materials and Methods: This prospective study was done on 48 paediatric patients with unstable forearm fractures who were treated with transphyseal intramedullary Steinmann pins for 4-6weeks in Razi hospital in Ahvaz during 2015-18. Finally, the functional outcomes were evaluated by Quick DASH score and the range of motion of forearm and wrist were compared with contralateral normal arm. The probable physeal abnormalities were evaluated radiographically. Results: The mean age was  $9.78\pm 3.01$  years (range 5 to 16 years) and mean follow-up duration was 27.15 months (range 18.2 to 36.1 months). The clinical and functional results were excellent in all patients, except one patient that did not come for pin removal on the predicted time. Loss of forearm rotation was not observed in any patient and there was no difference in the range of motion of forearm and wrist between arms. Radiologically, there was no evidence of physeal injury or bar formation in the patients. Conclusion: Transphyseal intramedullary pinning is a simple, safe and effective technique for paediatric forearm both bone fractures. Physeal protrusion from radius and ulnar physes had no detrimental effects on the physes .physeal arrest or bar formation is not suspected for short duration of fixation.

**Date: 2019-12-07**  
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**Abstract no.: 52816**  
**CONGENITAL DISLOCATION OF PISIFORM**  
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Pisiform dislocation is very rare. Only few cases have been reported and all were post traumatic. Due to its rarity, there is no optimum treatment. Literature suggest close reduction, open reduction or excision of pisiform with good results. We present a case of dislocated pisiform identified post traumatically in a 10 year old female with ipsilateral greenstick radius and ulna fracture. She presented in ER after a simple fall over the outstretched hand. X-rays and CT scan confirmed the dislocated pisiform bone. Close reduction was attempted but failed. Open reduction attempted but no rent /space identified to relocate the pisiform back to its position. Diagnosed as congenital dislocation intra-operatively and was excised. The patient was given a below elbow back slab for 4 weeks. At 3 months follow up she was completely pain free with full range of motion of wrist and no functional deficit. We suggest that excision of Pisiform bone after dislocation can be performed without the risk of any future consequences. Removal of the bone does not interferes with the normal wrist function.



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**Abstract no.: 53879**

**FUNCTIONAL AND RADIOLOGICAL OUTCOME FOLLOWING  
CORRECTIVE OSTEOTOMY IN CUBITUSVARUS DEFORMITIES**

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Introduction: Cubitusvarus is the commonest complication following malunion of supracondylar fracture of the humerus in children. Here normal carrying angle at the elbow is reversed into varus resulting in ugly deformity. We would like to share our experience in the surgical treatment of cubitusvarus. Methodology: Prospective study of 9 patients with age group 3-15 years and mean 20 months old deformity from the date of injury. The mean humeroulnar angle was measured to be 23 degrees of varus. None of the selected patients for osteotomy had a distal neurological deficit or myositis ossificans. 7 cases underwent lateral closed wedge osteotomy and 2 patients reverse V osteotomy. All patients were followed up with biplanar x-rays at 3, 6 and 12 weeks. Clinically range of movements and carrying angle was measured with the goniometer. Results and complications: Loss of reduction occurred in two cases. Two patients developed "Z" deformity with functional impairment due to lateral condyle prominence. One patient developed septic arthritis of the elbow. The remaining 4 patients had full range of movements with no deformity in the coronal plane. Conclusion: Supracondylar corrective osteotomy for cubitusvarus deformity is not a simple procedure as it is made out to be. In a significant percentage of patients, early loss of correction and other complications can occur resulting in dissatisfied parents. It is important to be well planned. The distal fragment must be medially translated to reduce the lateral condylar prominence and fixation must be strong enough to prevent loss of correction.

**Date: 2019-12-07**

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**Room: Meeting Room 8**

**Abstract no.: 53469**

**NEGLECTED DISTAL FEMUR EPIPHYSEAL FRACTURE-SEPARATION  
MANAGEMENT: ABOUT 13 CASES**

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**INTRODUCTION:** Neglected epiphyseal fracture-separations of the distal femur are rare. Still reported in developing countries, they lead to therapeutic issues. The objective of the study is to describe their characteristics and to propose treatment options. **MATERIALS AND METHODS:** A 10 years ongoing study was held in our orthopaedics department. All patients with a neglected epiphyseal fracture-separations of the distal femur after a knee trauma were included in the study. Pre-operative and post-operative data were collected and analysed. **RESULTS:** A total of 13 cases of neglected traumatic epiphyseal fracture-separations of the distal femur were found among 8616 in-patients of the department. It was mainly boys (9M/4F) around 16 years received 14 weeks after a knee trauma. Most of injuries were a Salter-Harris' type II (n=12) distal femur malunion (n=10). Associated complications were cutaneous opening (n=7), superficial infection (n=4), deep infection (n=4). Fractures were management surgically (n=12) by an open osteoclast procedure (n=9), debridement (n=7) and a thigh amputation (n=1). The outcome was better if an open osteoclast procedure was early performed in closed distal femur mal-union with a complementary rehabilitation program. **CONCLUSION:** In order to avoid neglected epiphyseal fracture-separations of the distal femur in developing countries, specialized trauma care facilities must be increased, and trauma education program must be undertaken.

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**Abstract no.: 54274**

**A CASE REPORT OF PAEDIATRIC POSTERIOR CRUCIATE LIGAMENT AVULSION FRACTURE AND ITS MANAGEMENT**

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Posterior cruciate ligament avulsion fracture is a rare injury in children. Due to relative weakness of physis avulsion fractures are common in children than intrasubstance tears as seen in adults. This article presents a case of a 10 years old child who fell from a bicycle and presented with swelling and pain in the left knee. On examination patient had antalgic gait, swelling was present in popliteal fossa and range of motion was 20-90°. Radiograph showed a thin fleck of bone in posterior aspect of proximal tibia. CT scan confirmed the diagnosis. Surgical management was done with 4 mm cannulated cancellous screw. After 3 months post op follow up, Tegner Lysholm score was 91/100 and was 100/100 after 18 months post op follow up. No length or angular growth disturbance was seen during the 18 month follow up.

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**Abstract no.: 53774**

**DESCRIPTIVE EPIDEMIOLOGY OF PAEDIATRIC ORTHOPAEDIC TRAUMA IN SOUTHERN NIGERIA**

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Introduction; Trauma is a major cause of morbidity and mortality worldwide in the paediatric age group. It is a global problem of public health significance. The aim of this study is to describe the pattern of paediatric orthopaedic trauma in Southern Nigeria. Methods; Trauma victims below the age of 18years presenting to the paediatric accident and emergency department of University of Calabar Teaching Hospital and National Orthopedic Hospital, Enugu were enrolled in the study. A total of two hundred and twelve patients were included in the study. Results; There were 129 male patients in the study representing approximately 61% of the participants. The mean age was  $97.28 \pm 57.88$  months, with a range of (4 - 216) months. The highest number, 86(42.6%) of study participants were in primary school. Falls constituted approximately 54% of the cause of injury followed by domestic causes which made up 29.1%. Most injuries (58%) occurred in the home settings followed by roadways or playfields (29%). Injury occurred more in the evenings (36.5%), during dry seasons (74.8%), and the second term of the academic session (50.8%). The mean paediatric trauma score was 5.36 and 99.4% of the victims had mild Glasgow coma score. About 71% of these trauma victims were brought directly to the tertiary health facility, 73.1% completed treatment and were discharged. Mortality rate was 2.4%. Conclusion; paediatric trauma occurs mostly due to falls, more in the evenings and in the school environments. Most injuries are severe but do not involve loss of consciousness.

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**Room: Meeting Room 9**

**Abstract no.: 54355**

**TROCHANTERIC FRACTURE MANAGEMENT BY DYNAMIC HIP SCREW WITH TROCHANTERIC SUPPORT PLATE**

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Whereas newer implants are coming up with new hopes, Dynamic Hip Screw –the gold standard earlier is in disrepute. But our hypothesis was simple modification of it with side plate as a single piece can prevent medial displacement and can give predictable good result. Done over 20 years, more than 1500 cases, we did systematic prospective study on 110 cases of trochanteric /trochanto-subtrochanter fracture Union rate, time of union ,wound problems, duration of operation, post-op quality of reduction, amount of collapse with functional assessment was done up to at least 1 year. Results were analysed with p-value and compared with Pubmed series of intramedullary fixation. We found no statistically significant difference though collapse was higher with DHS, but union rate was higher, implant failure lower. Compliance of Indian population with high rate of satisfaction was evident.

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**Abstract no.: 54583**

**RETRACTILE SCARS ON AFRICAN BLACK SKIN: EPIDEMIOLOGICAL, CLINICAL AND THERAPEUTIC ASPECTS OF 52 CASES OBSERVED IN CAMEROON.**

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**Introduction** Retractable scars resulting from aggressions on African black skin are frequent, have a particular character but little studied. Our objective was to provide an update on the scars observed in hospital settings in order to help improve their management. Retractable scars resulting from aggressions on black skin are frequent, of a particular character but little studied. Our goal was to take stock of the scars observed in hospital settings to help improve management. **Methodology:** We carried out a descriptive, retrospective and prospective study over a period of 12 years in 2 health facilities of the place. The variables studied were: age, sex, geographical origin, occupation, level of education, aetiology, therapeutic steps, delay between initial aggression and consultation, therapeutic modalities and evolution. **Results:** The average age was 8.39 years old. The aetiologies were burns, infections, trauma, and surgery. The therapeutic steps were traditional healers and peripheral health facilities. The average consultation time after the assault was 26.71 months. Upper limbs were the most affected regions. Treatments consisted of excision + skin grafting, excision + plasty and re-education. **Discussion:** These results have been confronted with the rare African publications reported on the subject. **Conclusion:** Retractable scars cause serious functional, aesthetic and psychological repercussions. They are common among children of school age. Not supported, they will have a significant social impact on the lives of these people. **Keywords:** Retractable scars; epidemiology; clinical; treatment; Africa.

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**Abstract no.: 54345**

**PROSPECTIVE STUDY OF DEEP VEIN THROMBOSES (DVT) PROPHYLAXES IN A TERTIARY HOSPITAL IN INDIA**

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Deep vein thrombosis (DVT) prophylaxes recommended routinely in Western Countries in major orthopaedic operations based on robust evidence , but only few studies (around 12) undertaken in India. DVT prophylaxes by pharmaceutical agents not done in our set-up over the years with no significant reported adverse effect whereas the incidence of DVT is very low. Our hypotheses was Indian don't require routine pharmacological thromboprophylaxes. We therefore studied prospectively all major cases of lower limb surgery , above 45 years of age (45 to 96 ) in 50 cases in our set up : it included 5 cases of total knee replacement, 17 cases of thr, 13 cases of hemiarthroplasty, 15 cases of pelvi-acetabular surgery in the Department of Orthopedics in a Government Medical College & Hospital. Study was conducted from January 2017 to July 2018 by Color Doppler study in all cases in the 1st week and repeated if any clinical feature suggestive of DVT up to 6 weeks. 2 had DVT – diagnosed: one with femoral catheter - thrombus seen around catheter; other was a diagnosed case of multiple myeloma. None were clinically symptomatic. Most of patients were operated after 2/3 wks, exercises was only prophylactic modality undertaken with earliest mobilisation. Incidences of fatal systemic DVT none. No case of pulmonary embolism. We therefore conclude that routine prophylaxes is unnecessary in Indian population after major orthopaedic operations – to be confirmed by larger multi-centric random control trials.

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**Abstract no.: 54584**

**COMPLICATIONS OF THE SURGICAL TREATMENT OF TULIPS EQUINOVARUS IN AFRICA: ABOUT 74 CASES OBSERVED IN CAMEROON**

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Introduction: The clubfoot or talipes equinovarus foot is a vicious attitude of the foot often congenital of which 80% of the cases are met in the poor countries. However, due to limited access to specialised care, a high proportion of neglected club feet requires surgical management that is not free of any complication in our practice conditions. Our objectives were to assess the scope of these complications and to determine the associated factors. Methodology: We carried out a retrospective analytical cross-sectional study over a 12-year period from 2006 to 2017. It focused on the club feet operated in a National Center for the Rehabilitation of the Disabled. This data was collected and analysed from patient medical files, consultation records, and operative reports. Results: We reviewed 74 patients. There is a male predominance with a mean age of 5.2 years. The most common early complications were cicatricial disunion, but especially severe ischemia with extensive necrosis that led to the amputation of a foot and a toe. Late complications include limping, metatarsus varus, recurrence and hypercorrections. The age and clinical severity score were associated with the occurrence of complications. Discussion: Our results have been compared to those reported by the rare African essential series on the subject. Conclusion: The relatively high complications observed are the consequence of the diagnostic delay of the operated patients. Early treatment would improve these results. Keywords: clubfoot, surgical treatment, complications.



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**Abstract no.: 54049**

**NEGLECTED AVASCULAR NECROSIS OF FEMORAL HEAD  
SECONDARY TO QUACKERY.**

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Lack of awareness and high cost of medical treatment in the developing world promotes the culture of quackery. The quacks utilise these adversities and make an income from the illiterate population and giving false hopes to gain weight, lose weight and for treatment of various illness. Majorly, steroids are prescribed by quacks. Injudicious prescription leads to avascular necrosis (AVN) of femoral head and ultimately hip replacement ensues, which puts financial burden on the patient and government. This study highlights this issue. A cross-sectional study conducted in the clinics from April 2016 till December 2018. Patients age, gender, presenting complaint and its duration, duration of treatment with quacks, Harris Hip Score, Range of motion, medications prescribed by quacks and the diagnosis were recorded. Radiographs of Pelvis and Hip were taken and MRI was done to rule out concomitant pathologies. FICAT scoring was used. We treated 47 patients (53 hips), 33 (70.2%) were males and mean age was 35.15 years (19-56 years). Duration of symptoms were for 15.72 months, with a mean Harris hip score 47.06 and VAS 6.72. Unilateral hip were 41 (87.2) and bilateral involvement was present in 6 cases. FICAT staging yielded 17 (36.2%) hips in grade 5, 16 (34.0%) in grade 4, 11 (23.4%) in grade 3 and 3 (6.4%) in grade 2. majority belonged to rural areas and the most common cause was steroid medication 24 cases (51.1%) followed by neglected Neck of femur fracture 14 (29.8%) Quackery is putting an enormous burden on the government.

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**Abstract no.: 53034**

**AN INNOVATIVE MODEL FOR RURAL ORTHOPAEDIC TRAUMA CARE**

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In Nepal, government healthcare system is organized into district-level hospitals, staffed by General Practitioners (MDGPs). Presently, diagnosis of trauma is possible, but there is inadequate capacity for orthopaedic care, with absence of orthopaedic trauma surgeons being primary driver of this gap. In remote districts of Achham and Dolakha, Possible (Nyaya Health Nepal), runs Bayalpata and Charikot Hospitals respectively. This study uses MDGPs, trained in trauma surgery supervised by orthopaedic trauma surgeons, to fill the gap in care for trauma patients and reduce referral rates. At each hospital, MDGPs are provided training and supervision in surgical trauma care. One rotating orthopaedic surgeon directly trains and oversees the MDGPs, every 3 months, while another senior orthopaedic surgeon remotely analyses their work, provides feedback. All patient data, including clinical information and referrals, are recorded in an electronic health record. For this study, patient records from 1 January – 31 December 2017, were extracted. Over twelve months, 1252 and 593 patients with the diagnosis of “fracture” were treated at Bayalpata and Charikot respectively. Only 115 (9.2%) Bayalpata patients and 34 (5.7%) Charikot patients were referred to a higher level of care for further management. 100% of surgeries were conducted by MDGP-level surgeons with the support of an orthopaedic surgeon-mentor. To our knowledge, all fracture cases in these areas were referred to hospitals capacitated for orthopaedics, prior to this innovation. This model has reduced the referral rate for orthopaedic trauma cases. We will further investigate this model’s impact on disability prevention and economic savings for our patients.

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**Abstract no.: 54054**

**CAN SELECTIVE NERVE ROOT BLOCK AVOIDS SURGERY FOR LUMBAR RADICULOPATHY?**

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Introduction: There is still controversy regarding the treatment of Lumbar radiculopathy. Common modalities include anti-inflammatory agent, bed rest, physical therapy and surgery. Present study was done to determine the clinical effectiveness of selective nerve block for lumbar radiculopathy with a mild neurological deficit. Materials and method: 86 patients with a minor sensory/motor deficit and an unequivocal MRI finding (68 disc herniation, 18 foraminal stenosis) were treated with selective nerve root block from June 2014 to August 2018. All the patients were evaluated by Oswestry Disability Index of Fairbank at pre and post injection period with a regular interval. Methylprednisolone (80mg) with 0.5 ml 2% lidocaine was administered in all cases under c-arm and confirmed by radioculogram. Results: From the total of 86 patients 77 patients (89.53%) showed improvement in their symptoms in 1st week. Out of these 77 patients, 63 patients (81.81%) had long term improvement and 14 patients (18.18%) showed short term relief. Statistically significant improvement at every stage of assessment was observed. Conclusion: Selective nerve root block is very effective in patients with predominant lumbar radicular symptoms and indicated where surgery is not appropriate for whatever reasons.

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**Abstract no.: 55161**

**A VOLUNTEER JOINT CAMP AND MISSION TRIP TO A DEVELOPING NATION: A PROSPECTIVE**

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Joint arthritis is a very disabling condition and has a major socio-economic impact on the society. The impact is more pronounced on patient's livelihood in the underprivileged countries. The countries with resources can help such patients by volunteering work and educating the local physicians and health professionals for continuity of care. Organizing such trips requires a dedicated team of volunteers, time, resources and appropriate planning for success. We discuss details of organising such a mission trip / joint camp from ground level up and intricate a path to bring it to successful completion. We also discuss the challenges faced by the organisers and outline an algorithm to help guide the process.

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**Abstract no.: 54414**

**PATIENT SAFETY-A GLOBAL CHALLENGE**

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The epidemiology of silent patient harm epidemic is currently being unknotted and the figures are staggering. It is estimated that approximately 10% of patients admitted to hospitals will be harmed, 50% of which is considered avoidable. We do not have an infallible system, which can guarantee that there will be no harm to the patients by the system created to look after them. Approximately 6% of the patients suffer permanent disability and 8% face death. In many instances this is addressed as "medical error". For example over 5,000 people die as result of a nosocomial infections in United Kingdom each year. Nothing is new, we are already aware of the tales surrounding the "patient harm". What has transformed, however, is that the problem and its magnitude are being recognised and, most importantly, is now being openly discussed and addressed to find the everlasting solutions. So to say we know the extent of the epidemic; we understand some of the root causes; and we are beginning to find potential solutions. If we can pass on the emerging strong lessons to those working in healthcare, both in management and in clinical practice and motivate them to make the necessary changes to professional practice and organizational behaviour and culture, then we expect the healthcare to be much safer. We will then successfully be able to demonstrate the mapping and control of this iatrogenic silent patient harm epidemic.

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**Abstract no.: 54993**

**RESEARCH AND PUBLICATIONS IN THE ORTHOPAEDIC JOURNALS FROM INDIA ARE GROWING**

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We have studied the evolution of three Indian orthopaedic journals indexed in PubMed, Scopus and Embase namely Indian Journal of Orthopaedics (IJO), Journal of Clinical Orthopaedics and Trauma (JCOT) and Journal of Orthopaedics (JOO) in the last 5 years. We utilized journal metrics derived from the SCOPUS database, along with details provided on journal websites and some editorials. These include international diversity of the editorial board, number of articles, submission to first decision time, submission to final decision time, publication time, authors along with their institutions and countries, downloads, citations of these papers, acceptance rates, cite scores, source normalized impact per paper, and special issues, wherever available. A total of 654 papers were published in JCOT. These papers have been cited a total of 658 times. The H index of JCOT, was 12. The cites score of JCOT had recently surpassed that of other major Orthopaedic journals published from South Asia including Indian Journal of Orthopaedics, Journal of Orthopaedic surgery (Hong Kong) and Chinese Journal of Traumatology. An increasing trend was seen in the number of papers published in JCOT reflecting its rapid growth. A rising trend was also seen in publications in JOO, which has 581 publications. However, for IJO, which has 595 publications on Scopus in this period, the trend is almost constant, which reflects a uniform number of issues and publication rate in this period. Our bibliometric study has clearly demonstrated increasing recognition and international relevance of these journals in the last five years.

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**Session: Developing World Free Papers**

**Time: 10:30 - 12:00**

**Room: Meeting Room 9**

**Abstract no.: 54518**

**EXPERIENCE OF SIGN FIN NAIL FOR TREATING FEMORAL FRACTURES**

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The SIGN nail is a solid stainless steel nail, produced for austere environments such as ours in an LMIC. It does not require fluoroscopy or power tools and it has dynamic and static locking options with an external targeting jig. It has been shown to have good results in femoral fracture treatment. The Fin variant uses distal flanges in lieu of distal locking, this makes it more user friendly with a less steep learning curve and cuts surgical time. We treated 12 femoral fractures over 6 months using the Fin nail. Four (4) were antegrade for mid shaft fractures, and eight (8) were retrograde for distal third fractures of various configurations. The ages ranged from 12 to 51 years, and there were 4 female and 8 male patients. There were no complications within the cohort and all patients were fully weight bearing painlessly at 6 weeks follow-up with knee flexion greater than 90 degrees. Half the patients were able to perform "squat and smile" photos at 6 weeks follow up. Radiographically no patients showed loss of position, shortening or significant displacement at 6 weeks or 6 months follow-up. All patients with 6 month follow-up showed radiographic evidence of union. Conclusion: The SIGN Fin nail is a useful nail in resource limited settings for the treatment of stable and unstable femoral fractures, and in our hands has shown encouraging results. It cuts operating time and has a lower stress riser distally, with no apparent loss of stability or inferior fixation.