

Date: 2009-10-30
Session: Symposium: Arthroplasty: High Performance Knee
Time: 0800-0930
Room: Hall A1

Abstract number: 22773
CAOS KNEE ARTHROPLASTY

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Recently, in order to enhance the accuracy of total knee arthroplasty (TKA) and to obtain better results, computer assisted surgery (CAS) has been developed and used. Examples of CAS-TKA include CT-based/ image-free computer-assisted navigation systems and operations using a surgical robot and many studies with clinical results on these are being published. Furthermore, In the presence of extra-articular deformity, TKA is difficult to perform because of altered anatomical axis and landmarks. TKA using a CAS system is associated with greater accuracy of component position, higher frequency of normal limb alignment and fewer radiographic outliers and it also has been reported to be effective especially in patients with extra-articular deformity. The navigation systems offer intraoperative information that let the surgeon manage the intervention and perform TKA with anticipated favorable results. The current navigation systems help us in placement of the cutting jigs. The first surgical robot for total joint arthroplasty was developed in 1986. Since then, several models of robot have been developed and tested. To date, few clinical and research studies have been published. Regardless of the joint involved, surgical procedures for successful robot-assisted TKA can be divided into several distinct stages. These include preoperative planning, calibration of the robot, surgical exposure, fixing a bone to the robot, registration, milling, and implantation. To perform a successful TKA using a robot, all of these stages should be completed effectually. Although we cannot present our clinical data in its entirety, most of the surgeries we performed proceeded uneventfully. However, even when the surgery was well planned, we sometimes encountered unexpected obstacles during the robotic surgery. From minor problems to more serious ones, the impacts of these obstacles on the surgery were variable. Moreover soft tissue balancing cannot be done with a robot, meticulous surgical experience is mandatory to finish successful TKA.

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BICOMPARTMENTAL KNEE ARTHROPLASTY

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The presentation will review the early results of bicompartamental knee arthroplasty using a single piece femoral component for both a medial unicondylar and patellofemoral replacement. 40 patients with 42 knees underwent the replacement. They were chosen by history, physical examination, and x-rays. 38 patients were available for the 2 year follow up. There were 15 males and 23 females. Average age was 70 years (range 49-89). Average BMI was 30 (range 21-42). Average preoperative range of motion was 122 degrees and postoperative was 120. Knee Society score improved from 49 to 84 and the function score improved from 57 to 81. 3 patients have global knee pain and two have been revised to a TKA. One tibial tray has fractured and one has settled anteriorly. 10 patients have persistent anterior knee pain and one patient underwent a lateral release for patellar subluxation. 5 of the original 42 knees have either been revised or are pending revision (12 %) and 10 knees have persistent anterior knee pain (25 %). The surgical technique may need to be improved but the author cannot recommend the prosthesis for general use at the present time.

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HIGH FLEXION KNEE: CLINICAL OUTCOME AT 5- TO 6-YEAR FOLLOW UP

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PURPOSE: To evaluate the outcome TKA with the use of NexGen-Flex Legacy Posterior Stabilized (LPS) at 5- to 6-year follow up. **MATERIAL AND METHOD:** A consecutive series of 165 patients (189 knees) who underwent TKA using the NexGen-Flex LPS prosthesis were evaluated. Selection criteria included arc of motion $>120^\circ$, $<20^\circ$ of deformity in coronal plane, $<15^\circ$ of flexion contracture, and <30 of BMI. At a minimum 5-year FU, clinical results, functional outcomes and maximum knee flexion were assessed. The percentage of knees that were able to kneel, sit in Thai polite style and sit cross-legged was evaluated. Preoperatively, patients were divided into 2 groups; A: able to do heel to buttock bending, and B: unable to do. **RESULTS:** The mean FU was 64 months and 156 patients [group A: 51 patients (60 knees)]; [group B: 105 patients (118 knees)] were evaluated. There were no statistical differences in patient's age (70.5 and 69.8 yrs), preoperative knee deformity (4.7° and 5.1° of anatomical varus), BMI (25.7 and 26.4), preoperative KS clinical score (37.7 and 37.1), preoperative function score (31.5 and 30.9), postoperative KS clinical score (96.5 and 96.0) and postoperative function score (87.9 and 87.7). The average maximum flexion was significantly decreased from 146.2° to 135.0° in group A ($p, 0.012$). On the other hand, it was increased from 133.7° to 134.7° in group B without statistical significance. No significant difference between groups for kneeling (15.1% and 14.8%), sitting in Thai polite style (37.7% and 36.5%) and sitting cross-legged (42.1% and 42.5%). There was no early loosening related to implant. **CONCLUSION:** The NexGen-Flex LPS prosthesis provided favorable clinical outcomes at 5- to 6-year FU. However, it did not improve knee flexion when preoperative flexion was $>120^\circ$. Furthermore, it decreased knee flexion when preoperative heel to buttock flexion was possible.

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THE ROLE OF CERAMIC TOTAL HIP REPLACEMENT IN THE MANAGEMENT OF HIP ARTHRITIS IN THE YOUNG ADULT

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Hip arthritis in young adults causes significant disability. The use of hard bearing surfaces has provided an opportunity to use hip arthroplasty as a treatment for hip arthritis in the young adult as an alternative to osteotomy or arthrodesis. Metal-on-metal bearing surfaces have enjoyed considerable success both as conventional hip. Concerns have been raised regarding metal-metal arthroplasty with systemic increases in serum metal ion levels and specific local allergic reactions to metal wear debris resulting in significant soft tissue damage around the hip. Furthermore resurfacing appears to have a restricted role in many young patients as it may be contra-indicated in women of child bearing age, in patients with avascular necrosis and has a limited ability to correct significant deformity. Therefore many young adults have conditions that make them questionable candidates for resurfacing arthroplasty. The role of ceramic in total hip arthroplasty has evolved over the last 30years. Because of the hardness of ceramic and the ability to bring ceramic surfaces to a high polish wear rates of ceramic-on-polyethylene have been recognized as being superior to wear rates of conventional cobalt-chrome-on-polyethylene. The unfortunate experience of using zirconia-on-polyethylene led to an unwillingness to support the ceramic-on-polyethylene but with the advent of improved ceramic bearing surfaces and highly cross-linked polyethylene this will once again be a popular option for young patients with hip arthritis. Ceramic/ceramic articulation remains popular because a very low wear rate and excellent durability. Improved fracture toughness in the blended alumina/zirconia ceramic components will allow for an increased variety of head and liner options. We will detail our experiences with zirconia-on-polyethylene, alumina-on-polyethylene and alumina-alumina during this presentation.

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THIRD-GENERATION CERAMIC-ON-CERAMIC BEARINGS IN REVISION TOTAL HIP ARTHROPLASTY

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PURPOSE: With an increase of revision total hip arthroplasty (THA), the choice of bearing surface becomes more important. Wear debris by conventional metal-on-polyethylene articulations may cause extensive osteolysis, especially in young patients. The purpose of the study is to evaluate the outcomes after revision THA with use of third generation ceramic-on-ceramic bearing. **MATERIALS AND METHODS:** We analyzed the clinical and radiographic outcomes after revision THA using third-generation ceramic-on-ceramic bearing (BioloX Forte; CeramTec, Plochingen, Germany) in 42 hips (37 patients; 17 men and 20 women). Their mean age was 48.8 years (32 - 59 years), and their mean weight was 61.5 ± 5.8 kg (50 - 72 kg) and BMI was 23.8. The mean duration of follow-up monitoring was 5.4 years (3.2-8.0 years). **RESULTS:** At final follow-up evaluation after revision, the average Harris Hip Score was 91.3. There were no revised hips during follow-up period. In 6 hips (14.3%), minor complications were observed: 3 heterotopic ossifications, 2 dislocations, and 1 infection. There were no hips with radiolucent lines, vertical or horizontal acetabular cup migration or osteolysis during the follow-up period. In 21 hips with bone graft, incorporation of bone graft was observed radiographically at final follow-up examination. There were no re-revised cases. **CONCLUSION:** Our data show that clinical and radiographic outcomes after revision THA using third-generation ceramic-on-ceramic bearing surfaces are favorable. Ceramic-on-ceramic bearing surfaces can be preferentially considered for revision THA, especially in young patients. Further studies with long-term follow-up data are warranted.

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NINE YEARS FOLLOW UP OF 100 CERAMIC ON CERAMIC TOTAL HIP ARTHROPLASTY

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Alumina ceramic on ceramic (COC) is a common arthroplasty bearing material because of its efficacy in terms of wear and osteolysis. However, limited data are available concerning long term follow up. The aim of this study was to evaluate 100 cementless COC total hip arthroplasty (THA) with more than 9 years of follow up. First 100 COC THA for patients under 65 operated in our department were evaluated. Clinical evaluation was done with physical examination, Harris hip score, Postel Merle d'Aubigné score (PMA), pre operatively and post operatively. Radiological evaluation was performed by two surgeons, looking for osteolysis, implant loosening, ectopic bone. This was done with Delee - Charnley classification and Gruen Mc Niece and Amstutz classification. **RESULTS:** 20 patients were lost. 2 patients died. Harris Hip score was 42, 6 (29 - 55) preoperatively and 93, 9 (67 - 100) at last time follow up (9 years). PMA was 8 (5 - 11) preoperatively, and 16, 7 (9 - 18) postoperatively. One patient had a second surgery, at 5 years of follow up for cup loosening. We had 6 early luxations, 1 late and 2 subluxations. Radiological analysis found calcar osteolysis for 75 patients. Clinical and radiological results are in agreement with previous studies. High luxation rate could be explained by the high number of surgeons (8), with difference of experiment. Moreover, only 28 mm head diameter was used. **CONCLUSION:** Clinical and radiological data with 9 years of follow up are encouraging for the use of COC THA for patients under 65 years old.

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RESULTS OF 144 LARGE METAL-ON-METAL FEMORAL HEAD IN THA

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BACKGROUND: Development of MOM bearing led to thin metal cup with large femoral head. The authors report results of 144 Durom® prosthesis with follow-up of 3 years (2 to 5 years). **MATERIAL AND METHODS:** Durom cup is a 4mm implant in wrought Cr-Co high carbon alloy, covered by porous titanium spray. Femoral head use the same alloy with low clearance. From 2003 to 2005, 144 Durom THA were performed in a prospective study. Approach was posterior in all cases. **RESULTS:** We deplore 2 late dislocations after a traffic injury, with no recurrence after reduction. One cup was revised because of chronic psoas tendinitis. Results are very good, PMA score raising from 12 to 17 at revision, and Harris score raising from 49 to 92. These results demonstrated improvement in term of ROM and quality of walk. Radiographs demonstrated no migration, no radio-lucent or sclerotic lines, no osteolysis. **DISCUSSION:** Dislocation after THA ranges from 0,16% to 10 or even 15% in some studies. Most of dislocation occurs in first post-operative year. Thus, our results are significant in term of stability. This improvement is related to suppression of any impingement between neck and socket, and to the increased moment of dislocation. High head/neck ratio decrease wear for hard bearing and improve fonctionnal results. At mid-term follow-up, Durom fixation appears to be excellent. **CONCLUSION:** Large MOM femoral head in THA provides excellent mid-term results and suggest advantages over traditional implants with less dislocation and faster recovery.

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UNCEMENTED CUSTOM FEMORAL COMPONENTS IN PRIMARY TOTAL HIP REPLACEMENT: MEDIUM TERM RESULTS

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INTRODUCTION: Computer Assisted Design Computer Assisted Manufacture (CAD/CAM) total hip replacement has been used for over two decades. The philosophy of fit and fill has enabled design of custom implants where standard prostheses were unsuitable. **AIM:** To present the results of a single surgeon series of 126 patients in whom osteoarthritis was treated with CAD/CAM components. **METHOD:** A review of 126 consecutive patients who had custom uncemented CAD/CAM femoral components was carried out. Clinical and radiological and radiographic assessment were made at 1,3 and 12 months post-operatively and three yearly afterwards. Clinical and radiological assessments were made and the Harris, Oxford and WOMAC hip scores were calculated at each visit. **RESULTS:** No patients were lost to follow up. 63 males and 63 females were included. Mean age was 46.3 years and average follow up 84 months. There have been no failures and all stems were well fixed radiologically. All patients were pain free and had returned to normal levels of activity. Preoperative hip score were as follows; Oxford 43.1, Harris 42.5, WOMAC 56.2. Post operative scores were 18.1, 19.0 and 12.1 respectively. With revision for aseptic loosening as the end point survival at 7 years was 100%. These results compare favourably with the best medium term results for cemented or uncemented femoral components used in hip arthroplasty. **CONCLUSION:** These mid term results show that the uncemented CAD/CAM prosthesis to be a viable option for management of the difficult primary total hip replacement.

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TOTAL HIP REPLACEMENT SURGERY UTILIZING THE ECHELON PRIMARY FEMORAL STEM

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OBJECTIVES: While the durability of most uncemented femoral stems remains unknown, it is the aim of this study to demonstrate Echelon Primary femoral stem performance with regard patient outcome and overall implant survival. **MATERIALS AND METHODS:** Between February 1998 and March 2007 428 patients received the Echelon Primary stem. Of these 428 patients 392 were available for follow-up - 189 patients received a left total hip replacement, 189 patients a right total hip replacement and 14 patients underwent bilateral surgery for a total of 406 Echelon prostheses. The mean age of each patient was 58.1 (Range 20-87) with mean BMI 30.5 kg/m² (Range 17.7-58.2). **RESULTS:** Kaplan Meier survivorship for the Echelon stem with revision for aseptic loosening as end point at 100 months is 99.3% (95% CI 97.1-99.8). Taking revision for any reason as the end point the Kaplan Meier survivorship is 98.3% at 100 months (95% CI 95.9-99.3). A pre-operative WOMAC score was available for 345 of the 392 patients with mean score of 43.5 (95% CI 41.6-45.4). At three-months the mean WOMAC score was significantly increased to 74.54 (95% CI 72.7-76.3) ($p < 0.001$) and by 1 year to 84.3 (95% CI 80.5-88.1) with score remaining at a plateau of 80 in subsequent years. **CONCLUSION:** This large prospective review of the Echelon Primary femoral stems reveals an excellent survivorship. Patient outcome scores are significantly improved and subsequently maintained.

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SHORT TERM RESULTS OF CEMENTLESS TOTAL HIP ARTHROPLASTY WITH ACCOLADE TMZF FEMORAL STEM

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PURPOSE: To evaluate short term clinical, radiological results and complications of primary total hip arthroplasty using Accolade TMZF femoral stem. **MATERIALS AND METHODS:** 66 cases among 80 cases, operated with total hip arthroplasty by one surgeon using Accolade TMZF femur stem from January 2002 to August 2006 with minimum 30 months of follow-up, were evaluated retrospectively. **RESULTS:** Mean Harris Hip Score improved from 54 to 92 at last follow up. In last follow-up X-ray, all femoral stem (100%) showed stable fixation and there was no osteolysis or loosening but, there were 34 stress shields and 20 cortical hypertrophy. Acetabular component revealed stable fixation in 65 cases (98.5%) and loosening in one case (1.5%). There was no acetabular osteolysis, but 22 radiolucency were observed in Dee Lee and Charnley zone II. As complications, there were 5 heterotrophic ossifications, 1 greater trochanteric bursitis, 2 thigh pain and 1 squeaking sound. **CONCLUSION:** Primary total hip arthroplasty using cementless Accolade TMZF femoral stem showed good in short term, but long term follow up will be needed.

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ADVANTAGES AND DISADVANTAGES OF UNCEMENTED MONOBLOCK CUPS IN CASES WITH ACETABULUM POOR BONE STOCK

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AIMS: We evaluated long and middle-term clinical and radiological results of titanium coated cementless isoelastic RM cups implantation in patients with poor bone stock in acetabulum. **METHODS:** Between 1996 and 2006 were implanted 1856 RM cups (283 with metal-on-metal interface) in 1247 patients with bone insufficiency in acetabulum region. Average age of our patients was 53,9 years. The main indication for THR were hip dysplasia (896 patients - 48,3%), arthritis with acetabular protrusion (29,6%), posttraumatic acetabular deformities (16,4%) and revisions with bone defects type I-II (a, b) according to W. Paprosky. (6,7 %). In 1443 cases (77,7%) different variants of bone grafting were used. In 257 cases of type III acetabular dysplasia was used medial protrusion technique with additional medial bone grafting. **RESULTS:** We revised 43 (2,3%) cups only because of aseptic loosening (13), infection (16) and bad positioning (14). 87 (4,6%) cups showed radiolucent line less than 2 mm without clinical signs of instability. The mean Harris Hip Score was 48 points (21 -64) preoperatively and 95 points (78 - 99) at time of follow-up. **DISCUSSION.** The application for RM-cup fixation pegs and screws allows to obtain reliable primary stability even in cases of severe acetabular dysplasia. Good primary fixation of the cup decreased the risk of aseptic loosening of the autologous bone graft. But monoblock design makes difficult the subsequent revision operations and additional fixing features increase periacetabular bone loss.

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MANAGEMENT OF NON-DISPLACED ESTABLISHED SCAPHOID NON-UNIONS BY PERCUTANEOUS SCREW FIXATION. SHOULD SUBSTANTIAL GAPS BE BONE GRAFTED?

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PURPOSE: Scaphoid non-unions with extensive bone resorption at the non-union site were traditionally indicated for open bone grafting and internal fixation. The aim of this work is to study the feasibility of isolated percutaneous fixation of the scaphoid without bone grafting in a series of established non-displaced non-unions with substantial gaps. **METHODS:** A consecutive series of 15 patients with non-displaced established non-union of the scaphoid and extensive resorption at the non-union site were treated by rigid fixation alone (without bone grafting) with a headless cannulated screw inserted by a volar (retrograde) percutaneous technique. **RESULTS:** Clinical examination, standard radiographs and computed tomography scans confirmed union in all patients at an average of 11 weeks. According to the Mayo Modified Wrist Score, there were thirteen excellent and two good results. **CONCLUSIONS:** Selected non-displaced scaphoid non-unions with gaps require only rigid fixation to achieve healing provided that there is no carpal malalignment and good purchase could be achieved with headless screws. Extensive resorption and gapping at the fracture site is not an absolute indication for bone grafting and percutaneous fixation alone eventually ends in bone healing regardless of the size of the gap.

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ULTRASONOGRAPHIC AND SURGICAL CORRELATION IN DEQUERVAIN'S DISEASE

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Anatomical variations in the tendons of APL and EPB have been associated with deQuervain disease. Incomplete decompression due to this is a cause of recurrence. AIM: To analyse the first dorsal compartment with ultrasonography to identify various anomalies preoperatively. To correlate these findings intraoperatively. MATERIALS: After a preliminary cadaveric study, 43 patients were included in the clinical study. Ultrasound was done in all cases and findings were recorded. RESULTS: Mean age of presentation was 48.2 years (range: 19-74). Females were more commonly affected than males in the ratio of 7:3. Both hands were equally involved and 3 cases had bilateral involvement. Duration of symptoms ranged from 15 days to 3 yrs with a median of 5 months. Seventy two percent (28) of the cases had multiple tendons (2 tendons 37%, 3 tendons 23%, 4 tendons 5%). 18% of the cases showed EPB in a separate compartment. Other findings seen were synovial thickening (98%), peritendinous fluid (30%), bony spicule (7%), and muscle belly (2%). Surgical decompression was done in all cases and findings compared with ultrasound recordings. Ultrasound predicted multiple tendons in 98% of cases. Number of APL tendons was same as ultrasound in 60% cases. Ultrasound predicted more number of tendons in 11 cases and lesser number in 4 cases. Separate compartment for EPB was seen in all the USG reported cases. Additional findings during the surgery were presence of vessel in two cases. CONCLUSION: Pre operative ultrasound work-up are comparable with intra-operative findings aiding in adequate decompression to prevent recurrence.

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THE COMPARISON BETWEEN LIMITED OPEN CARPAL TUNNEL RELEASE USING DIRECT VISION AND TUNNELING TECHNIQUE AND TRADITIONAL OPEN CARPAL TUNNEL RELEASE - A RANDOMIZED CONTROLLED TRIAL STUDY

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BACKGROUND: The limited open carpal tunnel release technique had been reported to be safe, reliable, reduce recovery time and effective to decompress the carpal tunnel. **OBJECTIVE:** To compare the results between standard carpal tunnel release and limited open carpal tunnel release. **METHODS:** A prospective, randomized controlled trial was performed patients who diagnosed as carpal tunnel syndrome and failed nonoperative management. The patients were randomly assigned to limited open carpal tunnel release (15 hands, 14 patients), and traditional open carpal tunnel release (15 hands, 15 patients). Follow-up evaluations included average two point discrimination, carpal tunnel syndrome symptom severity score and functional status score, grip strength, pinch strength, length of the incision and operation time. **RESULTS:** There were no significant differences of average two-point discrimination, carpal tunnel syndrome symptom severity scores, functional status score, operation time between groups. However the limited open group was significantly greater grip strength, pinch strength and shorter scar length than the traditional open-release group ($P < 0.05$). There was no significant difference of complications between groups. **CONCLUSION:** Limited open carpal release is as safe and effective as traditional open-release method of treating carpal tunnel syndrome but postoperative recovery and cosmetic results are superior.

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PREOPERATIV PAIN-MANAGEMENT OF CARPAL TUNNEL SYNDROME WITH LASER-ACUPUNCTURE - A PROSPECTIVE RANDOMISED STUDY

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METHOD: In this prospective, randomised and single-blind study the authors investigated, whether a soft-laser acupuncture (application of a beam onto the acupuncture points) showed a benefit in the preoperative treatment of patients suffering from carpal-tunnel syndrome. In one group (n=13) acupuncture points (P 6, 7, 8, TB 5, SI 6, H7, all bilateral) were irradiated with soft-laser light (5 mW Helium-Neon laser for 15 s at each point) while in the other group (13) the same procedure was performed with a placebo laser. **RESULTS:** Significant improvement could be found in the pain during the night (study group: 6 patients pain-free and the other 7 less pain versus control group: 2 patients pain-free, 7 improved, 4 no change) while activity-associated pain and paresthesia were similar in both groups. **CONCLUSION:** Laser-acupuncture seems to have a positive effect on the alleviation of the pain suffered during the night in carpal-tunnel syndrome.

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NEEDLE FASCIOTOMY IS SAFE AND PROMISING IN MCP JOINT DUPUYTRENS DISEASE

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INTRODUCTION: Needle fasciotomy has been repopularised by French rheumatologists and commonly performed in the Europe. We present the results of the first UK based prospective series of patients with metacarpo phalangeal (MCP) joint Dupuytren's disease. **AIM:** The aim of our study was to evaluate the clinical outcome of percutaneous needle fasciotomy performed in MCP joints with Dupuytren's contracture. **PATIENTS AND METHODS:** Percutaneous needle fasciotomy was offered to patients who presented with a clearly defined cord and a contracture of at least 300 MCP joint diseases. We used 2% lignocaine as anaesthetic and fasciotomy was performed using a 14 gauge cannula needle. Patients were followed up for a mean period of 18 months. Final functional assessment was done using the DASH (disability of the arm, shoulder and hand) scores. **RESULTS:** Thirty five patients were included with disease of 36 hands, in which 43 rays were treated. Thirty were male and five were women. The mean age of the patients was 44 years. A full deformity correction was possible in all patients in the immediate post operative period. No complications was seen except for five (14%) who had recurrent contractures treated successfully by a repeat procedure. Only one needed surgical treatment. The average DASH score was 25. **CONCLUSION:** Percutaneous needle fasciotomy is a highly successful outpatient procedure for MCP joint Dupuytren's contracture with great patient satisfaction. We recommend that this technique can be safely and effectively carried out without significant complications.

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THE MALINGUE PROCEDURE: A NEW PLASTY FOR DUPUYTREN'S CONTRACTURE

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INTRODUCTION: The Malingue plasty is a modified Z plasty customized to treat Dupuytren's contracture. The goal of this study is to calculate theoretically the increased surface and to evaluate clinical results with a minimal follow-up of two years. **MATERIALS AND METHODS:** In Z plasty, exchanging surfaces are triangular. In Malingue plasty, they are trapezoidals. With a 45° angle incisions and a longitudinal one on the bride, new surface goes from $a^2\sqrt{2}$ to $a^2(3/4\sqrt{2} + 1)$ (a is the finger width). In a retrospective study, 27 patients has been examined by the author. Technique was always Malingue plasty on the finger with open palm procedure. The minimal follow-up is 2 years (mean 31 months). **RESULTS:** The theoretic gain is 58%. 10 patients were operated for the first time, 10 for recurrence, and seven for second recurrence. 23 patients left the hand center the day of operation. The finger healing was always complete before the end of the third week. There was no infection. The complications were: one digital nerve section, one complex regional pain syndrome, recurrence of contracture for 3 patients, and hypoesthesia of the base of the finger for 2 patients. The mean Tubiana score was 4 before surgery and 0.18 after surgery. Rate of satisfactory is 95%. **DISCUSSION AND CONCLUSION:** The Malingue plasty is easy and reproducible in any case of severity of Dupuytren's contracture. This procedure is safe for neurovascular pedicle. We did not use flaps or skin grafts anymore.

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THE COMPARISON BETWEEN PARATENDINOUS AND CONVENTIONAL TECHNIQUE OF CORTICOSTEROID INJECTION IN TRIGGER DIGITS (IN RAMATHIBODI HOSPITAL)

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BACKGROUND: The choice of corticosteroid injections in trigger digits were paratendinous and conventional techniques which were most popular injection techniques. **OBJECTIVE:** To compare the outcomes between paratendinous and conventional techniques of corticosteroid injections. **METHODS:** In a double-blind prospective study, 20 patients (20 trigger digits) were randomized a paratendinous techniques group (10 trigger digits) and a conventional techniques group (10 trigger digits) of corticosteroid injections. Functional pain score (visual analog pain scale), goniometer for total active range of motion of finger at postinjection, 2weeks were assessed. **RESULTS:** twenty trigger digits in 20 patients were included. The most commonly involved digits were middle finger (40%), thumb (30%), index finger (20%), and little finger (10%). According to the statistic analysis, there were no significant differences of functional pain score (visual analog pain scale), goniometer for total active range of motion of finger between groups at postinjection and 2 weeks. **CONCLUSIONS:** The paratendinous technique is as safe and effective as conventional technique.

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DISTRACTION APPARATUS FOR TREATMENT OF HOOK FINGER

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AIM: To improve the possibilities of treating hook fingers with three phalanges. MATERIALS AND METHODS: Distraction apparatus was used in 8 patients (5 men, 3 women). Extension of the fingers followed by mobilisation with adequate distraction was performed at one setting for 2 separate joints or one by one. Extension was given for 2 weeks. After this, mobilisation of joints was attained during the period of 2-3 weeks. The duration of treatment varied from 1 to 2.5 months, mainly depends on the time of preoperative contractures. RESULTS: All the patients attained full regression of contractures. Two patients had infection around the metal wires, which were treated by antibiotic ointment. In 2 patients, intensive pain syndrome was observed, which was relieved by decreasing distraction. During follow-up, in 2 patients we observed 2nd degree of contracture 6 months after surgery, which had limited restriction on grasp functions after rehabilitation. DISCUSSION: To compare with open surgical treatment for contractures, the apparatus method appears less traumatic to the joints.

Date: 2009-10-30
Session: Hand
Time: 1330-1500
Room: Hall A1

Abstract number: 21686

FUNCTIONING FREE-MUSCLE TRANSFER FOR DELAY PRESENTATION BRACHIAL PLEXUS INJURY PATIENTS: SIRIRAJ PROCEDURE

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Traumatic brachial plexus injury patients who came to seek medical treatment later than 12 month after injury is a great challenge to hand and upper extremity surgeon. The method of double free muscles transfer to restore the extremity function is the commonly used procedure. Several variations of double free muscle transfer have been performed with unsatisfactory results. The purpose of this paper is to report the result of a method of double free muscle transfer which was perform at the hand unit, Department of Orthopaedic Surgery Siriraj Hospital. Four brachial plexus injury patients with delayed presentation underwent a double free gracilis transfer for reconstruction of elbow and hand function at Siriraj Hospital. The first free gracilis transfer was performed to restore elbow flexion and finger extension. The second free gracilis transfer was performed to restore elbow extension and finger flexion. One patient had more than 2 years follow up period. The patient had recovered MRC III or better elbow flexion, finger flexion and extension. The elbow extensor had recovered to MRC II.

Date: 2009-10-30
Session: Total Hip Arthroplasty
Time: 1530-1730
Room: Hall A1

Abstract number: 22719

TOTAL HIP ARTHROPLASTY IN DEVELOPMENTAL DYSPLASIA OF THE HIP: THE CRANIAL SOCKET SYSTEM

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Developmental dysplasia of the hip (DDH) results in growth failure, joint deformities and early osteoarthritis. Because of deformities, pain, and diminished motion following arthritis, total hip arthroplasty (THA) often is indicated at early age. Placement of the acetabular component in its true anatomical location is the main goal for survival and functional results of THA. An implant which can comply with these requirements is the cementless ESKA cranial socket system. Clinical and radiological results of THA using the cranial socket in patients with DDH are presented. We performed a clinical trial that included a cohort of patients with developmental hip dysplasia who underwent primary total hip arthroplasty between 2000 and 2003 (mean age 62.6 years). Mean duration of follow-up was 6.1 years (minimum 3 years). Patients were followed with clinical examination, Harris-hip score and evaluation of radiographs. At the time of the last follow-up general health status was measured with the Short form 36 (SF-36) and compared to values of a representative German population. Hartofilakidis classification was used preoperatively to determine the degree of dislocation. Mean Harris hip score increased from 38 before the operation to 88 at final follow-up ($p < 0.001$). 10 of the cranial socket system group were classified as Hartofilakidis type I, 21 as type II and 0 as type III. There was no significant difference in functional outcome between type I or II. None of the 31 hips required revision because of aseptic loosening of the acetabular component. In 27 hips the anatomical center of rotation could be preserved. General health status measured by SF-36 was comparable to the age matched norm population. Physical and functional status in workaday life was excellent. We recommend the cranial socket system in patients with oval defects of the acetabulum, especially when high primary stability is required.

Date: 2009-10-30
Session: Total Hip Arthroplasty
Time: 1530-1730
Room: Hall A1

Abstract number: 21160

ANATOMIC-SPECIFIC PROXIMAL FEMORAL ALLOGRAFTS FOR BONE STOCK RECONSTRUCTION IN REVISION HIP ARTHROPLASTY

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We have followed a consecutive series of forty-nine revision hip arthroplasties, performed for severe femoral bone loss using anatomic specific proximal femoral allografts longer than five centimetres. The patients were followed for a mean of 10.4 year. The mean preoperative HHS improved from 42.9 points to 76.9 points postoperatively. Six hips (12.2%) were further revised, four for non-union and aseptic failure of the implant (8.2%), one for infection (2%), and one for host step-cut fracture (2%). Junctional union was observed in 44 hips (90%). Three hips underwent re-attachment of the greater trochanter for trochanteric escape (6.1%). Asymptomatic non-union of the greater trochanter were noticed in three hips (6.1%). Moderate allograft resorption was observed in five hips (10.2%). Two fractures of the host step-cut occurred (4.1%). There were four dislocations (8.2%), two of them developed in conjunction with trochanteric escape. By definition of success as increase of HHS by 20 points or more, and no need for any subsequent re-operation related to the allograft and /or the implant, a 75.5% rate of success was found. Kaplan-Meier survivorship analysis predicted 73% rate of survival at 12 years, with the need for further revision of the allograft and/or implant as the end point. We conclude that the good medium-term results with the use of large anatomic-specific femoral allografts justify their continued use in cases of revision hip arthroplasty with severe bone stock loss.

Date: 2009-10-30
Session: Total Hip Arthroplasty
Time: 1530-1730
Room: Hall A1

Abstract number: 22388

VIBRATION - GOOD OR BAD FOR THE IMPACTION BONE GRAFTING PROCEDURE?

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AIMS: Studies on soil mechanics have established that vibration applied to an aggregate, results in more efficient alignment of particles and reduces the energy required to impact the aggregate. Our aim was to develop a method of applying vibration to the bone impaction process and assess its impact on the mechanical properties of the impacted graft. METHODS: 80 bovine femoral heads were milled using the Noviomagnus bone mill. The graft was then washed using a pulsed lavage normal saline system over a sieve tower. A vibration impaction device was developed which housed two 15V DC motors with eccentric weights attached inside a metal cylinder. A weight was dropped onto this from a set height 72 times so as to replicate the bone impaction process. A range of frequencies of vibration were tested, as measured using an accelerometer housed in the vibration chamber. Each shear test was then repeated at four different normal loads so as to generate a family of stress-strain graphs. The Mohr-Coulomb failure envelope from which the shear strength and interlocking values are derived was plotted for each test. Tests were repeated under both dry and saturated conditions. RESULTS/CONCLUSION: Dry graft impacted with the addition of vibration at sixty Hz was significantly more resistant to shearing force than graft impacted without vibration. This trend was reversed under saturated conditions with the addition of vibration proving detrimental to the mechanical properties of the aggregate. This may be due to liquefaction of the particles.

Date: 2009-10-30
Session: Total Hip Arthroplasty
Time: 1530-1730
Room: Hall A1

Abstract number: 19910

A PROSPECTIVE STUDY OF HIP REVISION SURGERY USING THE EXETER LONG STEM PROSTHESIS: FUNCTION, SUBSIDIENCE AND COMPLICATIONS FOR 57 PATIENTS

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The long stem Exeter femoral component is commonly used in revision hip surgery. Subsidence of the femoral stem in primary hip arthroplasty has been studied extensively, but much less is known about its significance in revision surgery. This prospective study looks at the relationship between radiological subsidence, WOMAC score, patient satisfaction and complication rates for the long stem Exeter hip prosthesis. Data for 96 consecutive patients undergoing revision surgery was prospectively collected over a mean follow-up period of 36 months. WOMAC scores were recorded pre-operatively. Data from 57 patients were analysed. The mean rate of subsidence recorded was 0.61mm/year, with a mean total subsidence of 1.13mm at 36.3months. There was no correlation between subsidence and post-op WOMAC score, complication rate or patient satisfaction. There was a statistically significant reduction between the pre-operative and the post-operative WOMAC scores, with means of 33.5 and 10.7 respectively ($p < 0.001$, CI 18.93 to 26.12) and high patient satisfaction. Our subsidence rates for long stem revision femoral components are lower than the published data, but demonstrate the same plateau. Radiographic subsidence does not appear to relate to functional outcome or complication rates in our data.

Date: 2009-10-30
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Time: 1530-1730
Room: Hall A1

Abstract number: 20396

DISTALLY LOCKED STEM FOR COMPLEX FEMORAL REVISION

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BACKGROUND: Distally locked stem were developed to address complex femoral revision, involving severe bone loss, or femoral shaft fracture. These devices provide excellent stability and enhance bone reconstruction without graft. The goal of this retrospective multi-centric study was to assess the results of a large cohort and to determine prognostic factors. **MATERIAL AND METHODS:** 726 revisions were recorded from 14 centers, with follow-up of 54 months (180 to 12). 417 were aseptic loosening, 149 periprosthetic fractures, 93 septic loosening, 38 femoral deformities, 25 stem breakage and 8 dislocation needing stem removal. Transfemoral approach was used in 520 cases. 8 different devices were implanted with average length of 240 cm, locked with 3 screws (1 to 8). 498 stem were curved and 227 straight, 613 partially coated, 98 full coated and only 13 non coated. **RESULTS:** Harris score raised from 43 to 81. 637 implants were stable, 38 demonstrated subsidence. 30 were exchanged for a standard stem; 21 were revised. Bone reconstruction was assessed on improvement of cortico-medullary index in metaphysal area (36 to 45) and at mid-shaft (54 to 63). Survival rates were 96% at 10 years using as end point revision of the femoral component for loosening, and 93% using as end point revision of the femoral component for any reason. Prognostic factors are analysed from statistical studies. **CONCLUSION:** Use of distal locking stem achieves easy and strong initial fixation even with severe bone loss, and enhance bone growth and reconstruction. Subsequent secondary bone ongrowth is encouraged by transfemoral approach.

Date: 2009-10-30
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Time: 1530-1730
Room: Hall A1

Abstract number: 20963

AN ANALYSIS OF FACTORS SURROUNDING HIP REVISION SURGERY BETWEEN 2000 TO 2008

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INTRODUCTION: 35,000 total hip replacements are carried out in the NHS in England annually. Commonly due to aseptic loosening, degeneration from wear debris, septic loosening and poor surgical insertion. Our aim was to analyse the total number of primary leading to revision total hip replacements between 2000-2008. Revision total hip replacement surgery is costly, timely and causes significant morbidity. Every effort should be made to minimise premature revisions. **METHODS:** Observational longitudinal study with retrospective analysis of case notes. Selection included any patient on the clinical coding system, with a coded primary total hip replacement and revision done between April 2000 and Jan 2008. **RESULTS:** 61 revisions following 2134 primary total hip replacements. Age group greatest for revision 66 - 70 (n=19) P value<0.0001. Females greatest for revision (n=34) P value=0.1526. Time to revision greatest at less than 1 year following primary (n=38) P value<0.0001. Revision hips cemented (n=27) uncemented (n=34) P value=0.0017. Reason for revision: infection (n=27) dislocation (n=31) other (n=3) Pvalue<0.001. Approach for those with dislocations lateral (n=16), posterior (n=38), anterior (n=7) P value=0.003. **DISCUSSION:** The most common reason for revision was dislocation in the uncemented group, with a posterior approach and occurring with the first year of surgery. This analysis on this cohort would suggest moving away from the uncemented hip in the 66-70 age range and away from the posterior approach.

Date: 2009-10-30
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Room: Hall A1

Abstract number: 20718
TOTAL HIP ARTHROPLASTY IN SICKLE CELL DISEASE
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From 1980 to 2000, 312 THR were performed in 244 patients with sickle cell disease (SCD). 145 were homozygous for the sickle cell gene (hemoglobin SS), 87 had hemoglobin S/hemoglobin C and 12 had hemoglobin S associated with beta thalassemia. Medical complications were observed after 85 interventions (27 %). Twelve patients had posteroperatively painful sickling crises despite intra operation and postoperation transfusion. Minor complications of transfusions were observed in 62 cases. 9 patients developed massive intravascular haemolysis 7 days after transfusion and needed hospitalization in reanimation during 10 days. An acute chest syndrome was observed in 4 patients. 26 orthopedic complications were observed: Perforation of the femur was observed in 6 patients. Two patients had a postoperative transient (3 months) peroneal nerve palsy with footdrop. There were 6 early dislocations. Twelve hips had heterotopic ossification. Infection occurred in 10 hips (3 per cent). The average time to revision for infection was 11 years (range 7 to 15 years). Twenty-one acetabular components (7 per cent) and 17 femoral components (5 per cent) had been revised for loosening by the time of the latest follow-up (mean 13 years). Considering revisions for infections and aseptic loosening the probability of survival of both of the original components at 10 and 15 years was 91 per cent and 86 per cent, respectively. Hip arthroplasty in SCD involves a high complications rate and incidence of failure with revision. However, with one experienced surgical and medical team, the risk-to-benefit ratio appears reasonable for these patients.

Date: 2009-10-30
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Time: 1530-1730
Room: Hall A1

Abstract number: 21944

CEMENTLESS TOTAL HIP ARTHROPLASTY FOR POST-TRAUMATIC OSTEOARTHRITIS CAUSED BY ACETABULAR FRACTURE COMPARED WITH PRIMARY OSTEOARTHRITIS AND AVASCULAR NECROSIS OF THE HIP

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PURPOSE: To study a comparative analysis of the outcomes of cementless THA for post-traumatic osteoarthritis caused by acetabular fracture compared with primary osteoarthritis and avascular necrosis of the hip. **MATERIALS AND METHODS:** We have done 203 patients (221 hip) of cementless THA from March 1993 to May 2003 and selected 109 cases with at least more than 5 year follow-up. We classified degenerative arthritis, avascular necrosis and traumatic arthritis undergone THA into A, B and C, all of each group composed of 34, 42, 33 cases. Clinical outcomes of pre-operation and final follow-up were evaluated by Harris hip score. We applied decreased radiodensity, osteolysis and acetabulum loosening and femur area for radiographic evaluation. Replacement survival and revision arthroplasty among three groups were comparatively analyzed. **RESULTS:** Hip scores were 38.2, 41.2, 34.3 in pre-operation for group A, B, C each and 82.1, 91.2, 80.4 in final follow-up showing improvement. Osteolysis and acetabular loosening in group B were more frequent than in group A and C. Femur area loosening was more frequent in group B comparing to other groups but did not have statistic significance. The ten-year survival rate of group C with revision for any reason as the end point was 84 %. This rate compares favorably with the 85% (B) and 97% (C). **CONCLUSION:** Cementless THA for posttraumatic arthritis shows almost same clinical and radiological results of compared with the same age group of patients of idiopathic osteonecrosis of the femoral head and primary osteoarthritis.

Date: 2009-10-30
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Time: 1530-1730
Room: Hall A1

Abstract number: 20611

TOTAL HIP ARTHROPLASTY AFTER ACETABULAR FRACTURES

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During the last 7 years total hip arthroplasty (THA) has been done in 18 cases of old and nonunion acetabular fractures. Mostly surgery was performed due to the avascular necrosis of the femoral head, which happened in time period of 10 months up to 4 years after the primary acetabular reconstruction. Indications for THA were hip pain, limited range of motion and limping. Just in 3 cases we faced redisplacement of bone fragments with hip subluxation. In these cases cemented acetabular cups and reinforcement rings were used. These implants were placed above the acetabulum. Surgery was performed via the Kocher –Langenbeck's approach to hip joint. If the anatomical reconstruction of acetabulum was achieved and bone quality was satisfactory, large heads, metal-metal bearing THA was used. In other cases, traditional cementless cups with additional screw fixation were implanted. Three patients with old T-type acetabular fractures were operated on in 6 months up to 2 years after injury by using acetabular reconstruction and THA simultaneously. These operations were performed via two surgical approaches. It allowed us to expose fracture well, perform stabile osteosynthesis without devascularization of bone fragments and conclude the surgery with THA. Satisfactory results and implant stability were assessed in each case of THA at 1-5 year's follow up. To conclude, THA provides a possibility to use a new generation of implants in cases of posttraumatic hip arthritis after primary anatomical acetabular reconstruction. When old acetabular fractures are operated, simultaneous pelvis reconstruction and THA could be done.

Date: 2009-10-30
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Room: Hall A1

Abstract number: 20857

TOTAL HIP ARTHROPLASTY WITH BULK FEMORAL HEAD AUTOGRAFT FOR ACETABULAR RECONSTRUCTION IN DEVELOPMENTAL DYSPLASIA OF THE HIP: EIGHT YEAR RESULTS OF A NOVEL TECHNIQUE

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Bulk autogenous grafting using the femoral head during hip arthroplasty in patients with Developmental Hip Dysplasia (DDH) was first described by Harris in 1977. Early results were promising, however a high rate of graft collapse due to poor osteointegration was seen with longer follow-up. Previous authors identified the two most important factors in graft incorporation as host-graft bone contact and stability of the graft. We describe a novel technique combining bulk autograft with an iliac osteotomy to provide primary stability and direct cancellous-cancellous bone contact, optimising the biological environment for osteointegration. A three-sided chamfered osteotomy is performed at the base of the deficient superolateral portion of the acetabulum and the bone wedge removed. The resected femoral head is then split and the base of the neck cut into a wedge matching the chamfered iliac osteotomy. The graft is impacted into position before screw fixation and subsequent reaming. From 1996-2005 this technique was used in 129 hips in 112 patients with DDH. 26 hips in 25 patients with a minimum follow up of 7 years were reviewed. The mean pre-operative sharp angle was 49.6°. Post operatively the mean percentage graft coverage was 40.2% (range 24-60%). All grafts united radiographically by one year. At a mean follow up of 8.1 years (7-10.1 years), all implants were functioning well with no radiographic evidence of loosening. This technique provides early stability and incorporation of the graft in patients with DDH with satisfactory clinical and radiological outcomes in the medium term.

Date: 2009-10-30
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Time: 1530-1730
Room: Hall A1

Abstract number: 21924

TOTAL HIP ARTHROPLASTY AFTER ARTHRODESIS OF THE HIP JOINT

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We reported our experience concerning 33 conversions of a hip arthrodesis into a total hip arthroplasty (THA) performed in the years 1976-2005. **METHODS AND MATERIALS:** Fifteen patients (11 men, 22 women) underwent total hip arthroplasty years after spontaneous or operative fusion of a hip joint. The primary indications of the conversion were: malposition, non fusion, severe low-back or contra lateral knee pain. To analyze the improvement of their quality of life, we carried out a retrospective evaluation of hip pain, walking ability and patient satisfaction. **RESULTS:** At the mean follow-up of 7 years (1 -25 years), 79% of the patients were very satisfied or satisfied regarding the improvement of their hip function and their quality of life. At the last-follow-up, 28 hips (85%) were pain free and 15 patients (45%) needed a walking stick. Leg length discrepancy was 2, 3 cm on average. Seven major complications (15%) were noted during the postoperative period: one infection, one deep infection, two nerve damage, 3 dislocations and 3 implant loosening. The 10-years survivorship rate was 80%. **DISCUSSION AND CONCLUSION:** Revision total hip arthroplasty (THA) after hip arthrodesis is an uncommon and challenging operation. Good quality of the abductors muscles guarantee good implant stability and a better walk. The risk, morbidity and the results that can be attended must being explained to the patient. The success rates of this surgery are much lower than those of a primary THA even if the hip pain and the other joint pain are relieved.

Date: 2009-10-30
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Room: Hall A1

Abstract number: 20051

THE INFLUENCE OF LIMB-LENGTH DISCREPANCY ON FUNCTION, DISLOCATION, PAIN AND ACETABULAR WEAR AFTER BIPOLAR HEMIARTHROPLASTY FOR FEMUR NECK FRACTURES IN ELDERLY PATIENTS

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PURPOSE: To evaluate the influence of limb-lengthening on function, dislocation, pain and acetabular wear after bipolar hemiarthroplasty for femur neck fractures in elderly patients. MATERIALS AND METHODS: Between August 2004 and January 2007, 60 cases among 80 cases over 65 years that underwent cemented bipolar hemiarthroplasty for femur neck fractures with more than 2 years of follow-up were evaluated retrospectively by dividing two groups, more than 5mm and less than 5mm of limb-lengthening. For function by Harris hip score, Activity of Daily Living, dislocation by dislocation rate, pain by Visual analogue scale and acetabular wear by radiographic measurement were analyzed statistically by SPSS program. RESULTS: For each group, limb-lengthened more and less than 5mm, Harris hip scores was 80.0 and 76.2, postoperative activity of Daily Living was 56 and 52, Visual analogue scale was 3.53 and 2.22, and acetabular wear was 0.25 mm/yr and 0.21 mm/yr. Only VAS score was statistically significant ($P=0.002$). Acetabular wear and dislocation at 2 year follow-up showed no statistical significance ($P=0.08$). CONCLUSIONS: By limb-lengthening, we can expect pain, but long term follow up is need for evaluation of acetabular wear.

Date: 2009-10-30
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Time: 1530-1730
Room: Hall A1

Abstract number: 20392

BENEFITS OF MODULAR NECKS TO RESTORE FEMORAL OFFSET IN THA

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INTRODUCTION: Modular necks used during total hip arthroplasties permit to restore the femoral offset and arm of abductors muscles, to adjust leg length and to reduce impingement between the neck and the socket. MATERIALS AND METHODS: Modular necks are titanium implants manufactured with a double Morse taper, available in 2 lengths with 6 different geometries: straight (CCD:135°), anteverted, and varus (CCD: 127° and 120°), and a combination of anteverted and varus neck. 122 primary THA were performed with a minimal of 5 years follow-up in the Orthopaedic Department of Amiens University Hospital with modular necks. RESULTS: 7 patients died and none were lost of follow-up. None rupture was reported. Femoral offset was restored in 97% of these cases, and equalization of leg length was obtained in 98% of the patients. Residual Trendelenburg sign was noted in 3 patients, always after reduction of the offset. The rate of dislocation was low with 2% because of the absence of impingement. DISCUSSION: Because proximal femoral geometry is different for each patient and femoral offset independent from the IM canal diameter, modular neck is one easy solution to restore independent parameters. In addition, the per-operative trials permit to choose the best implant to avoid any impingement, reducing the risk of dislocation and increasing the range of motion. It is ideal now for the use of hard bearings. Laboratory analysis have demonstrated very good resistance in assembly-distraction, deep flexion and rupture tests. No corrosion was noted and retrieved weight loss was minimal.

Date: 2009-10-30
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Room: Hall A1

Abstract number: 22435

PREVENTION OF INSTABILITY WITH THE USE OF A DUAL MOBILITY IMPLANT FOR PRIMARY HIP ARTHROPLASTY IN PATIENTS AT HIGH RISK FOR DISLOCATION

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INTRODUCTION: The aim of the present study was to assess the effectiveness of a dual mobility cup (mobile polyethylene component between the prosthetic head and the outer metal shell) to prevent dislocation in primary hip replacements in selected patients at risk for instability. **MATERIALS AND METHODS:** A retrospective study including 167 consecutive primary total hip replacements (THR) in 163 patients (99 females, 64 males) at high risk of instability between January 2000 and December 2003 was performed at our institution. 84% of the patients had at least two commonly reported risk factors for dislocation. The mean age was 72 year old (range, 21 to 97) at the time of the arthroplasty. A dual mobility cup was used in all cases. **RESULTS:** 24 patients died: 21 of unrelated causes, 2 of pulmonary embolism, and one of deep infection. The mean follow-up was 40.2 months (range, 24 to 65). No dislocation was observed. Harris Hip Score improved from 39.6 to 83.4 ($p < 0.05$). Six hips were revised: one failure of the cup fixation because of a persistent traumatic pelvic discontinuity, one femoral component migration, one trochanteric nonunion, one periprosthetic fracture and two deep infections. No aseptic loosening of the cup was observed. **CONCLUSION:** The dual mobility implant was extremely successful in achieving stability. However, because of the current lack of data documenting the polyethylene wear, the use of such an implant should be considered in selected patients at high risk for dislocation.

Date: 2009-10-30
Session: Spine
Time: 0800-0930
Room: Hall A2

Abstract number: 22771

FENESTRATION FOR LUMBAR SPINAL CANAL STENOSIS

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For lumbar spinal canal stenosis (LSCS), extensive laminectomy has been a standard surgical procedure, which is frequently combined with spinal fusion and instrumentation in the Western nations. The combination is indicated for accompanying low back pain and radiological spinal instabilities, especially in patients engaged in hard labor, but it is much invasive and expensive. On the other hand, in 1980, Kida, H developed a laminotomy (fenestration) procedure, which provides a sufficient decompression of the dura and roots under the stenotic condition. The fenestration procedure was soon introduced to our area covering a population of approximately 4 million and was performed in about 9000 patients with LSCS for 20 years from 1988 to 2007 according to the Tohoku University Registry of Spinal Surgeries. It has been confirmed that symptoms are successfully relieved and the decompression effect is well maintained with reoperation rate of 1.5%. This surgery is less invasive and less expensive as its combination with spinal fusion can be avoided. Therefore, it is the procedure most recommended to the aged. In this lecture, indications, the extent of decompression, details of the procedure and outcome are described.

Date: 2009-10-30
Session: Spine
Time: 0800-0930
Room: Hall A2

Abstract number: 19832

DENS FRACTURES IN PATIENTS OVER 65 YEARS OF AGE: ANTERIOR SCREW FIXATION OF THE DENS VS. POSTERIOR FIXATION OF C1-C2

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PURPOSE OF THE STUDY: The aim of this study is a retrospective evaluation of dens fractures in patients over 65 years of age treated with anterior screw fixation of the dens or posterior atlantoaxial fixation and fusion. **MATERIAL AND METHODS:** We treated surgically 28 patients 65 years old and older with dens fractures. According to the type of treatment, anterior screw fixation or posterior C1-C2 fixation, the whole cohort was divided into 2 groups that were subdivided into two age groups of patients 65-74 years old and 75 years old and older. Final retrospective evaluation of the patients was carried out at the interval of 12 to 78 months after the primary surgery (mean 31.3 months). **RESULTS:** Comparison of the two age groups showed a statistically significant difference in the mortality ($p < 0.05$), with 0 % in the younger group and 40 % in the older group. Comparison of surgical techniques revealed 21.4% mortality after anterior screw fixation of the dens and 35.7% mortality after posterior instrumented fusion. The difference was statistically insignificant. **CONCLUSIONS:** Active surgical treatment conduces considerably to the improvement of the quality of life of elderly patients after dens fractures. Mortality is influenced by the patient's age rather than by the surgical technique used. Elderly patients with a neurological deficit mostly die of associated diseases regardless of the method of treatment.

Date: 2009-10-30
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Room: Hall A2

Abstract number: 20210

LATE ANTERIOR DECOMPRESSION IN SUB- AXIAL CERVICAL SPINAL CORD INJURIES:IS IT A RELEVANT MAJOR DECISION FACTOR FOR EFFECTIVE REHABILITATION OUTCOME?

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STUDY DESIGN: A retrospective analysis evaluating neurologic outcome after anterior decompressive surgery in late neglected cases of spinal cord injury presented to a tertiary teaching health care centre in India. OBJECTIVES: The study was conducted to determine whether neurologic and functional outcome is improved in cervical spinal cord-injured patients (C2-C7, American Spinal Injury Association grades B&D) who had late surgery (more than 5 days after spinal cord injury).SUMMARY: So many times patients with spinal cord injury report late due to various reasons. A considerable controversy exists as to the role of any surgical decompression in them. There are very few studies, which show the advantage of surgical decompression in cases with any evidence of preservation of neurological status (ASIA B, C, D) irrespective of how late the presentation is. 14 Patients meeting appropriate inclusion criteria were included, their clinical conditions were recorded with regards to duration of injury, neurological status (ASIA Score), and presence of complications (pressure sore, pneumonia, urinary tract infection). The neurologic and functional outcomes were recorded from the acute hospital admission to the most recent follow-up. Results were evaluated in terms of improvement in American Spinal Injury Association grade motor score and FIM score. CONCLUSIONS:The results of this study reveal significant neurologic benefit in ASIA B-D patients when anterior cervical decompression has been done, making it a relevant major decision factor for their effective rehabilitation.

Date: 2009-10-30
Session: Spine
Time: 0800-0930
Room: Hall A2

Abstract number: 22191

EFFECT OF LONG-LEVEL FUSION TO THE ADJACENT SEGMENT DEGENERATION IN ANTERIOR CERVICAL ARTHRODESIS FOR THE DEGENERATIVE CERVICAL DISEASES

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OBJECTIVES: The purpose of this study was to analyze the effect long level fusion to the adjacent segment degeneration, and to evaluate the correlation between adjacent degeneration and adjacent disease after anterior cervical arthrodesis in degenerative cervical disease. MATERIALS AND METHODS: We included 117 patients who had arthrodesis with PEEK cage and anterior stabilization for degenerative cervical disease. Their mean age was 54.4 years old and average follow-up period was 36.5 months. Fifty-five patients that underwent one level fusion were classified into group A, for 50 patients with two level fusion, group B and for 22 patients with more than three level fusion, group C. One way ANOVA test and Chi-Square test were used for the statistical analysis. RESULTS: The stage of osteophyte formation showed 3 points in group C, 1.6 points in group B and 1.1 points in group A ($P<0.01$) and grade of degenerative change showed 2.5 points in group C, 0.73 points in group B and 0.58 points in group A ($P<0.01$) at the last follow-up. The incidence of adjacent segment disease having radiculopathic and myelopathic symptoms showed 3.2% in group A, 3.4% in group B and 2.9% in group C, respectively. CONCLUSION: Long level fusion accelerated adjacent segment degeneration compared with short level fusion, but there was no correlation in symptomatic adjacent diseases with the numbers of fusion level after anterior cervical arthrodesis for the degenerative cervical diseases.

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Room: Hall A2

Abstract number: 21273

MORPHOLOGIC STUDY OF THE CERVICAL SPINE IN THAI POPULATION USING MULTI - DETECTOR COMPUTERIZED TOMOGRAPHY (CT) SCAN

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BACKGROUND: Surgical technique of pedicle screws fixation is more challenging and endanger greater risk to the vertebral artery and nerve root. **OBJECTIVES:** To determine the average pedicle diameter and pedicle angle of the cervical spine in a Thai population. **MATERIAL AND METHODS:** The seventy-four CT scans of the patients underwent navigator-assisted surgery or investigated for other conditions in Department of Radiology were included. The assessor (K.A.) measured the cervical spine by using the measurement tools of the workstation (version 2.1; efilm Medical). **RESULTS:** The average transverse diameters (OPW) of the cervical pedicle of C3, C4, C5, C6, and C7 in males were 5.18, 5.17, 5.71, 5.75, and 6.95 mm, respectively. The diameter of the pedicles ranged from 3 to 9 mm. From C3 to C7, the pedicle axis exhibits varying angles in the sagittal plane (PSA) from cephalad 10° to caudad 10°. The pedicles are directed slightly caudal (10° to 6° mean PSA) in C7 and C6 level, parallel or neutral to the lower endplate in C5, and cranial in C4 and C3 levels (5° to 10° mean PSA). **CONCLUSION:** Transpedicular screw fixation for the cervical spine can be performed in the Thai population with carefully. Prior to the operation, the exact pedicle diameters and morphology must be known.

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Room: Hall A2

Abstract number: 21313

ENDOSCOPIC SURGERY FOR THE CERVICAL SPINE DISEASES

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PURPOSE: To present our procedure of endoscopic surgery for the cervical myelopathy, and to clarify the indication and limitation of this procedure based on the analysis of surgical result and complications. **METHODS:** Endoscopic partial laminectomy (EndoPL) was indicated on patients with spondylosis and calcification of ligamentum flavum. Surgical results were analyzed on 41 patients with cervical myelopathy treated by EndoPL and followed up over one year. Average age was 62.6 years old. Twenty-nine cases of cervical myelopathy treated by open partial laminectomy were used as control. **RESULTS:** Average operative time was 2h37m, and average estimated blood loss was 86 ml. There were no intraoperative complications. Recurrence of myelopathy symptoms within 6 months after surgery was seen in 3 cases, and 2 cases were performed re-operation (laminoplasty). One was a case of multiple spinal cord compression. The other was a case of co-existing segmental OPLL. Pre-operative JOA score was 11.4 ± 2.8 in the endoscopic group and 10.9 ± 2.7 in the control group. Post-operative JOA score was 14.5 ± 3.3 in the endoscopic group and 13.5 ± 2.7 in the control group. Both groups showed significant improvement after surgery. There were no significant differences of pre- and post-operative JOA score between two groups. **DISCUSSION:** Based on our experiences, cervical myelopathy due to multiple spinal cord compression and segmental OPLL were not indication of endoscopic surgery. In conclusion, endoscopic surgery for cervical spine diseases is a less invasive surgery expected similar surgical result to open surgery.

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Abstract number: 20805

PERCUTANEOUS VERTEBROPLASTY (PVP): AN EFFECTIVE AND ECONOMICALLY VIABLE PERSPECTIVE FROM A DEVELOPING COUNTRY FOR VERTEBRAL COLLAPSE FRACTURES(VCF'S) OF VARIOUS ETIOLOGIES

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Approximately one third of patients who have clinical vertebral fractures develop chronic pain that does not respond to conservative therapy. One thoracic VCF is associated with a 9% reduction in forced vital capacity. PVP provides pain relief and minimally invasive mechanical stabilization within a vertebral body to prevent further vertebral body collapse. It is hypothesized that the exothermic reaction of cement polymerization may destroy the nociceptive receptors in the vertebra. In addition by affording strength to the VB, the biomechanics of axial loading is altered and this also contributes to the pain relief. Fractures of thoracolumbar junction (T11-L1), burst fractures, wedge anterior compression fractures with $>30^\circ$ of sagittal angulation, vacuum shadow in fractured body (ischemic necrosis of bone) and patients with progressive radiographic collapse are less likely to benefit from conservative treatment. PVP is only now beginning to gain widespread acceptance. Hence, a prospective clinico-radiological outcome study was conducted to better define the various indications, contra-indications, technique, complications, clinical outcomes and role of adjunctive imaging in PVP in a developing country set-up. There was a highly significant improvement in mean pain, analgesic & disability scores and mean kyphotic angles & VB compression ratios immediate post-procedure which was sustained at 2 years follow-up (p value < 0.01). Minor instances of cement leak were seen in a few patients without major clinical significance. There were no new adjacent level VB fractures seen after the 135 vertebroplasty procedures in 84 patients till the last mean follow-up of 2 years.

Date: 2009-10-30
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Room: Hall A2

Abstract number: 21416

BIOMECHANICS OF MRI-SIGNAL INDUCING BONE CEMENTS FOR VERTEBROPLASTY

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INTRODUCTION: We developed a signal inducing bone cement for vertebroplasty under MR guidance. This bone cement consists of conventional polymethylmethacrylate (PMMA), contrast agent (CA), and 0.9% saline solution (NaCl) or a hydroxyapatite bone substitute (HA). The goal was to determine if these signal inducing bone cements can restore the vertebral strength after vertebroplasty in a spine model. **MATERIALS & METHODS:** We tested 21 cadaveric vertebral bodies (VB) on a testing machine (Zwick, Germany) to failure. Then, we injected cements transpedicularly into the broken VB. The so treated VB were tested again in the testing machine. We injected three cements: a conventional PMMA cement (BonOs, aap, Germany, 12g PMMA, 5 ml MMA), an NaCl-PMMA compound (3 ml NaCl, 12g PMMA, 5 ml MMA) and a HA-PMMA compound (3 ml Ostim, aap, 12g PMMA, 5 ml MMA). As the CA amount is negligible (< 9µl), it was omitted. Each cement type was injected in 7 VB. We used a paired t-test for the statistic evaluation. **RESULTS:** The initial strength of the VB increased from 1226 N/mm (SD 637) to 2564 N/mm (SD 1130) in the conventional PMMA group, from 1140 N/mm (SD 466) to 2559 N/mm (SD 852) in the NaCl-PMMA group, and from 1513 N/mm (SD 844) to 2480 N/mm (SD 1215) in the HA-PMMA group. These results had a $p < 0.05$ (pPMMA=0.013, pNaCl-PMMA=0.002, and pHA-PMMA=0.006). **DISCUSSION:** The MRI-cements restored the initial strength of the VB.

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Room: Hall A2

Abstract number: 22740

POSTERIOR DECOMPRESSION FOR THORACIC OSSIFICATION OF POSTERIOR LONGITUDINAL LIGAMENT

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Among various types of the thoracic ossification of longitudinal ligament (OPLL), a continuous type of the thoracic OPLL is big challenge. Anterior decompression through thoracotomy has high risk for dural tear and spinal cord injury. In anterior decompression though posterolateral approach, OPLL is difficult to move because of its excess length. In most cases, posterior decompression is likely to be selected. Posterior decompression for thoracic continuous type OPLL was reviewed. Patients: A total of 20 patients at the mean age of 53 years had the posterior decompression surgery. All patients had thoracic myelopathy and walking difficulties. Mean preoperative Japanese Orthopedic Association (JOA) score was 3.7 out of 11 points. Mean duration from onset to surgery was 13 months. Mean vertebrae length of OPLL was 7.1 (3-11). In 19 cases, dural ossifications were observed. Mean spinal kyphosis between T3-10 was 26 (13 -52)°. Results: Laminectomy was performed in 6.8 vertebrae on average. In 15 cases, posterior instrumentations were added. Mean postoperative JOA score was 5.9 points and the mean recovery rate of Hirabayashi method was 34.5%. In 2 cases, neurological condition aggravated immediate after surgery without any obvious causes. Thoracic kyphosis was not related to postoperative JOA scores. Preoperative JOA scores were significantly related to the recovery rate. Discussion and Conclusions: Preoperative neurological condition significantly influences the surgical results. Because only partial decompression was achieved by laminectomy, the severe damaged spinal cord may not restore its function. Therefore, before having severe damage, the surgery is recommended as the most efficient way.

Date: 2009-10-30
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Time: 0930-1000
Room: Hall A2

Abstract number: 20315
EVOLUTION OF TRAUMA SURGERY
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The problem of fracture management commonly found in Asia during 70-80, was that the patients received treatment by bone setters. This caused great problems on management as deformity, poor function, nonunion and malunion. The operative treatment at that time usually resulted in complication. Due to the problems of instruments and implants and the inadequate comprehension on the biology, biomechanics as well as surgical technique. In former days internal fixation was prohibited for treating open fractures. The treatment for closed tibial fracture was to use the long leg cast and then change to PTB. In case of femoral fracture treated by intramedullary nailing there was only the open retrograde nailing technique with Kuntscher nail. In displaced articular fracture of distal humerus, the recommended treatment was the Bag of bone technique since there was neither implant nor surgical technique to fix the fracture. Since AO was founded in 1958 with the established principles that significantly effect the outcomes of operative treatment of fractures. As a trauma surgeon it is essential to select the appropriate biomechanical principle according to the type of fracture and degree of soft tissue injury. At present one of the recommended techniques for multifragmentary diaphyseal fractures is the MIPO. The concept refers basically to the conservation of bone vascularity during operative procedure to ensure the viability of individual fragments. As a learning surgeon we have to observe what is the state of the art today and improve our practice.

Date: 2009-10-30
Session: Spine
Time: 1030-1200
Room: Hall A2

Abstract number: 22723

CLASSIFICATIONS OF ADOLESCENT IDIOPATHIC SCOLIOSIS - HOW GOOD ARE THEY?

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An ideal classification for any disease should be able to facilitate communication between doctors with high reliability, simple to remember, prognosticate the natural history, and guide its treatment. There have been many classifications proposed for adolescent idiopathic scoliosis since the early 1900s. Most of them are based on the pattern of the deformity in the coronal, sagittal and horizontal planes. This lecture will discuss the pros and cons of the commonly used classifications and whether they could serve all the purposes of an ideal classification.

Date: 2009-10-30
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Room: Hall A2

Abstract number: 22764

STRATEGIC SURGICAL TREATMENT FOR CERVICAL SPINE LESIONS IN RHEUMATOID ARTHRITIS

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Rheumatoid arthritis (RA) is basically a progressive disease involving synovial joints of not only the extremities but also the spine. The cervical spine, especially the upper cervical spine, is most frequently involved in the spine. Spinal pathologies in general develop in patients with advanced stages of RA. Surgical treatment for them remains a serious challenge and needs to be addressed systematically. Its indications must be based on the severity of disabilities such as neck pain and myelopathy in addition to radiographic findings such as instability or malalignment or canal narrowing of the cervical spine. Pain from spinal lesions caused by RA responds well to surgery but myelopathy in general poorly improves. Experts treating patients with RA must know this rule. Earlier diagnosis of myelopathy and surgical intervention is the key to achieve better results. Only paresthesia and objective sensory disturbance may be neurologically reliable to detect myelopathy and localize the level of lesion because deep tendon reflexes and muscle power are difficult to evaluate because of damaged joints of the extremities. Surgery should be performed before patients become unable to walk. Almost patients are managed through a posterior approach. The following is our strategy of choosing surgical methods. Reducible atlanto-axial subluxation (AAS) is an indication for C1-2 fusion, preferably by a combination of Magerl and Brooks methods. Irreducible AAS needs resection of C1 posterior arch and enlargement of the foramen magnum for decompression of the medulla oblongata and spinal cord followed by occipito-cervical fusion (mostly, O-C3 fusion) with a rod and cables. Involvement of the whole cervical level, occipito-thoracic (O-T) fusion combined with localized laminoplasty or laminectomy at segments of the narrowed canal or subluxation.

Date: 2009-10-30
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Time: 1030-1200
Room: Hall A2

Abstract number: 21382

THE EVALUATION OF SHORT FUSION IN IDIOPATHIC SCOLIOSIS

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STUDY DESIGN: This is a prospective study of 48 consecutive cases of selective thoracic fusion and 18 cases of selective thoracolumbar fusion for idiopathic scoliosis with a minimum 2 year follow up. OBJECTIVE: It is our purpose to evaluate the result and complications of utilizing the end vertebra (EVB) to EVB fusion of the thoracic curve in King Type2 and 3 (Lenke 1a, 1b, and1c) and the thoracolumbar curve in Lenke 5 respectively. This strategy is to minimize fusion level to the shortest possible. RESULTS: The most common fusion levels in major thoracic curves were T6-T12 whereas the most common fusion levels in the thoraco-lumbar curves were T10-L3. The average long term curve correction for the thoracic curve was 56% (49.4 degrees vs 21.6 degrees) and the thoraco-lumbar curve was 59% (48.6 degrees vs 20.3 degrees) respectively. The risk factors responsible for poorer outcome were younger age at surgery (< 11 years or Risser 0), fusion at wrong levels (shorter than the measured EVB) and rigid curve identified by bending study. However all patients had significant improved trunk balance and coronal hump at the final assessment at maturity. Three patients underwent late extension fusion because of junctional scoliosis.

Date: 2009-10-30
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Abstract number: 22769

THE PATTERN OF CERVICAL DISC PROLAPSED IN THE SOUTH OF IRAK

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120 patients of cervical disc were admitted in Basrah University Teaching Hospital in a period of 18 years (1990 – 2008). Age range between 30 – 62 years 64 (53.3%) were male and 56 (46.7%) were female. 23 patients (19.16%) were diabetic and 41 patients (34.2%) were hypertensive. The level of herniation was 5 between C2 – C3, 10 between C3 – C4, 30 between C4 – C5, 35 between C5 – C6, and 40 between C6 – C7. In 21 (17.5%) patients neurological deficit was the primary presentation, while in 20 patients (16.7%) radicular pain was the reason for consultation associated degenerative changes were noticed in 56 (46.7%) patients. MRI was the best diagnostic method, while laboratory investigations were not helpful. All had a trial of conservative treatment that ranges from non steroidal, muscle relaxant, co-analgesia to traction and steroid injection. Surgery was the second choice provided that gross neurological deficit was not present. The site of disc herniation was the guide for choosing the proper surgical approach. The details of the outcome will be discussed in details.

Date: 2009-10-30

Session: Spine

Time: 1030-1200

Room: Hall A2

Abstract number: 21379

CLINICAL OUTCOME OF POSTERIOR SPINAL FUSION WITH RSS FIXATION FOR ADOLESCENT IDIOPATHIC SCOLIOSIS CURVE MORE THAN 90 DEGREE

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INTRODUCTION: Pedicle screws are now routinely regarded as a standard scoliosis fixation. However, in those with high curve scoliosis, the consensus to do anterior release is still controversial. **OBJECTIVE:** To determine the results of pedicular screws fixation in patients with high-curved idiopathic scoliosis. **METHODS:** This is a retrospective analysis of patients with idiopathic scoliosis with curve more than 90 degrees who came to Department of Orthopaedics, Ramathibodi Hospital from 2005-2008. All patients underwent posterior correction with pedicle screws fixation. Clinical data was recorded before and after surgery. Radiographic study was reviewed either preoperative curve, post operative curve, after correction or in serial follow up at OPD. The SRS-22 (Scoliosis Research Society) was recorded and compared between preoperatively and postoperatively. **RESULT:** Patient with large curve scoliosis were corrected by RSS fixation using posterior approach alone show significant improvement of Cobb angle(40%) and also show improvement in trunk balance in sagittal and coronal planes. The SRS 22 score showed satisfaction of the patient in daily living. **CONCLUSION:** Posterior pedicle screws fixation alone showed good efficacy in correction large curve of adolescent idiopathic scoliosis without major complications, and improved quality of life after surgery.

Date: 2009-10-30
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Time: 1030-1200
Room: Hall A2

Abstract number: 22282

RESULTS OF ATLANTOAXIAL FUSION FOR REDUCIBLE ATLANTOAXIAL SUBLUXATION IN RHEUMATOID ARTHRITIS

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PURPOSE: The purpose of this study is to evaluate the results of atlantoaxial fusion for reducible AAS in RA patients. **MATERIALS AND METHODS:** Sixty-seven patients who underwent atlantoaxial fusion from 1982 to 2005 were evaluated retrospectively. The average age at surgery was 59.5 years old (ranged from 31 to 76). Seventeen were male and 50 were female. Twenty-eight patients had myelopathy, 57 patients had neck or occipital pain and one patient was operated for asymptomatic subluxation. Thirty-seven patients underwent fusion with Brooks technique and 31 patients with combination of transarticular screwing (Magerl technique) and Brooks technique. Survival rate (Kaplan-Meier), improvement of pain and myelopathy (Ranawat grade), union rate, subaxial lesions developing after surgery and second operation for subaxial subluxation (SAS) were estimated. **RESULTS:** Fourteen patients died 74.1 months after surgery on average. Five-year survival rate was 89.5% and 10-year survival rate was 68.2%. Pain disappeared or reduced in 55 patients (96%). Seventeen (61%) patients demonstrated neurological improvement. Union rate were 86% in Brooks technique and 100% in Magerl and Brooks technique. Among 53 patients followed for more than 12 months (average 81 months), 10 patients (19%) developed SAS. Six patients (9.0%) underwent second surgery for SAS. **DISCUSSION:** SAS following atlantoaxial fusion is an unsolved problem in the management of AAS in RA patients. In current study the incidence of SAS could not be ignored but the rate of second surgery was limited to 9.0%. **CONCLUSION:** The results of atlantoaxial fusion were generally satisfactory.

Date: 2009-10-30
Session: Spine
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Room: Hall A2

Abstract number: 21270

INCIDENCE OF SPONDYLOLYSIS, SPONDYLOLISTHESIS AND DEGENERATIVE SCOLIOSIS OF THE LUMBAR SPINE IN PATIENTS WITH OSTEOARTHRITIS OF THE HIP

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Spondylolysis, spondylolisthesis and degenerative scoliosis of the lumbar spine are sometimes diagnosed in patients with osteoarthritis of the hip (hip OA). In this study, we determined the incidence of these lumbar conditions in patients with hip OA. **METHODS:** The subjects were 1101 patients with hip OA (986 females, 115 males, mean age: 56 years), who underwent surgery at our department. The lateral and frontal roentgenogram of the lumbar spine was assessed for the presence of spondylolysis, spondylolisthesis, and degenerative scoliosis in combination with hip OA. Patients with post-traumatic osteoarthritis or osteonecrosis of the femoral head were excluded. **RESULTS:** Among the 1101 patients, 47 (4.3%) had spondylolysis, and 25 (2.3%) of these 47 patients had isthmic spondylolisthesis. The proportion of patients with isthmicspondylolisthesis/spondylolysis was 53.2%. Furthermore, 153 (13.9%) had degenerative spondylolisthesis, 213 (19.3%) had degenerative scoliosis and 38 (3.4%) had both them. **DISCUSSION:** A previous health screening study reported that 3.8% of subjects had spondylolysis, while 3.7% had degenerative spondylolisthesis. Our results showed almost similar proportion for spondylolysis/osteoarthritis, but much higher rate for spondylolisthesis/osteoarthritis. Our results also showed higher proportion for degenerative lumbar scoliosis/osteoarthritis compared with another study with a reported rate of 12.8% for adult patients with LBP. Considered together, we propose that hip OA could affect the lumbar spine. **CONCLUSION:** In a study of 1101 patients with hip OA, we demonstrated high proportions of spondylolysis, spondylolisthesis and degenerative scoliosis of the lumbar spine.

Date: 2009-10-30

Session: Symposium: The Evidence Base of Spine Surgery – SICOT/IGASS

Time: 1330-1500

Room: Hall A2

Abstract number: 22733

MANAGEMENT OF PROLAPSE INTERVERTEBRAL DISC - A LITERATURE REVIEW

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A review of literature on this topic revealed 42 randomized controlled trials till January 1, 2007 in the Cochrane Review and 5 randomized controlled trials subsequently. There were major design weaknesses in many of these trials. The results have to be interpreted with caution but it is possible to draw a number of provisional conclusions. Most lumbar disc prolapses resolve naturally with conservative management and the passage of time, and without surgery. When conservative treatment fails, discectomy provides faster relief from the acute attack of sciatica, although any positive or negative effects on the long-term natural history of the underlying disc disease are unclear. Some conclusions can also be drawn with regard to indications / timing of surgery, indications for fusion / instrumented fusion and comparative assessment of various surgical techniques like conventional discectomy, micro-discectomy, endoscopic discectomy, APLD, laser and IDET. Epidural steroid injections are not as effective as discectomy but do have a role. The highest quality trials have been done for chemonucleolysis which has been proven to be more effective than placebo and less effective than discectomy. In cases of prolapse intervertebral disc with neurological deficit, there was no conclusive evidence for or against the duration of symptoms prior to surgery influencing the outcome. However the severity of neurological deficit / bladder dysfunction at the time of surgery appeared to be the dominant factor in recovery. Sequestrectomy had an equally good outcome with lower long-term complication rate as compared to micro-discectomy. Some conclusions could be also drawn regarding the role of MRI in management as well as the factors influencing outcome. However a number of questions remain unanswered leaving a lot of scope for conducting further studies in this field.

Date: 2009-10-30

Session: Symposium: The Evidence Base of Spine Surgery – SICOT/IGASS

Time: 1330-1500

Room: Hall A2

Abstract number: 22779

PERCUTANEOUS VERTEBROPLASTY AND KYPHOPLASTY WITH AN EVIDENCE BASED PERSPECTIVE

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BACKGROUND: Percutaneous vertebroplasty (PV) which has been presented to literature in 1987, has gained popularity at the end of millennium, mainly for treatment of osteoporotic vertebral compression fractures (VCF). Consecutively researchers have developed kyphoplasty (KP) technique in 2001 in the light of the idea "restoration of vertebral body height". **AIM:** To assess PV and KP in an evidence based perspective. **RESULTS:** Since those techniques have become popular on VCFs, several studies have been published including case studies, reviews, meta-analysis, retrospective studies, non-randomized control trials, randomized control trials(RCT). According to Cochrane Library and Pubmed, 74 studies reporting outcomes after PV and 35 studies reporting outcomes after KP for osteoporotic VCFs appeared in literature until 2008. Among those studies only 1 study has been categorized as Level 1 regarding PV. However 2 new RCTs regarding KP have been added to this number in 2009. Those studies have shown improved outcome scores for KP over conservative treatment, but no beneficial effect in comparison with PV. Moreover 2 new randomized, double blinded, control trial with a placebo group regarding PV have been published very recently. In conflict with previous randomized control trials both of those studies have referred similar improvement for vertebroplasty and placebo group. Eventhough burden of osteoporotic VCFs is very high to society, only 6 RCTs have been published until now. Both of those studies have some limitations like cross-over of patients, small sample size and lack of long-term follow-ups. **CONCLUSION:** Developments, modifications and focused interest on minimally invasive techniques such as PV and KP require new high-quality RCTs with long term follow-ups. However, those 2 recent studies with placebo group have questioned the belief and confidence on those minimally invasive interventions.

Date: 2009-10-30
Session: Spine
Time: 1530-1730
Room: Hall A2

Abstract number: 22767

POSTERIOR SPINAL SHORTENING FOR TARDY PARALYSIS FOLLOWING VERTEBRAL BODY COLLAPSE CAUSED BY OSTEOPOROSIS

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Osteoporotic vertebral collapse causing tardy paralysis generally happens at the thoracolumbar junction and is associated with severe local kyphosis. This kyphosis alters the physiological alignment, produces a large flexion force, causes low back pain in walking and new fractures in the adjacent vertebrae, as well as predisposes to neural tissue compression through posteriorly protruded bony fragments. As we are not intended to restore the height of the collapsed vertebral body; our posterior spinal shortening procedure has an advantage over the anterior surgeries for its easiness in correcting the kyphosis. Other advantages are little correction loss with time; short fusion required and direct body to body fusion. Surgical technique consists of excision of the posterior fragments of vertebral body and the adjacent intervertebral disc above; followed by correction of kyphosis with pedicle screws and laminar hooks. For a case with L1 vertebral fracture, posterior ligamentous complex between T12 and L1 is strictly preserved during the exposure, then the laminar hook insertion sites are prepared at the upper end of T12 and the lower end of L2 laminae respectively. Pedicle screws are inserted at T12 and L2. Lower half of T12 lamina, T12-L1 facet joints, all lamina of L1 are then removed. After resecting both pedicles of L1, the upper part of the L1 vertebral body, the intervertebral disc between T12 and L1, and posterior longitudinal ligament are removed. After resection or incision of the callus between T12 and L1, spinal shortening is performed under the guidance of a temporary rod between the screws until T12 vertebral body abuts onto the remaining lower part of the L1 body. Laminar hook and rod systems are inserted finally. Our method of spinal shortening can correct kyphotic deformity well, attain neural decompression, and provide enough improvement in low back pain, neurological impairments and gait disturbance.

Date: 2009-10-30
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Abstract number: 22717

SAGITTAL PLANE CORRECTION IN SEVERE KYPHOSIS OF TB SPINE

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Corrections of severe kyphosis in spinal surgery have been done since 1980's in our institution. In the beginning, we did osteotomy, shortening and instrumentation of the spine to correct deformity from posterior only. Since 4 years ago, we change our policy by doing sagittal correction of the severe kyphosis with osteotomy, distraction and instrumentation from posterior followed with augmentation of anterior column for anterior approach to correct the deformity. The lecture will review our cases, surgical technique and result of the procedure. **Keywords:** severe kyphosis, sagittal correction of the spine, TB Spine.

Date: 2009-10-30
Session: Spine
Time: 1530-1730
Room: Hall A2

Abstract number: 21074

TWO STAGED (POSTERIOR AND ANTERIOR) SURGICAL TREATMENT FOR PYOGENIC AND TUBERCULOTIC SPONDYLITIS

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Anterior debridement and bone grafting is the gold standard of surgery for primary infection of the spine. It is sometimes augmented with posterior instrumentation in the same day or in a secondary procedure. Recently, spinal infection occurs in immunocompromized hosts and in patients with poor general conditions (elderly, diabetic and hemodialytic). Most of the causative microorganisms are drug-resistant and therefore perisurgical antibiotics are ineffective. In consideration of the history of surgery and the era before antibiotics when palliative posterior spinal surgery was prevalent in fear of dissemination of microorganisms by debridement, we considered posterior stabilization as primary surgery. In 1997, we began to use a two-staged surgical treatment (first: posterior instrumentation; second: anterior debridement and bone graft). The advantages of this method are dual: 1) surgical morbidity is divided and 2) surgical effect is immediate. Additional advantage is that we could perform anterior debridement on an elective basis. After the first procedure (posterior instrumentation), the patient is entertained with decrease of pain immediately and is able to sit up from bed rest. Moreover, erythrocyte sedimentation rate (ESR) improves without drainage of infection. This method is especially effective for thoraco-lumbar spondylitis of the patients with poor general conditions (Spine 2003). It is effective for the treatment of spondylodiscitis due to methicillin-resistant *Staphylococcus aureus* (MRSA) (Arch Orthop Trauma Surg 2006) as well as atypical mycobacterial (Spine 2008) and tuberculous infections (J Spinal Disord Tech, in press).

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CLINICAL SIGNIFICANCE OF THE RADIOLUCENT ZONE AROUND THE PEDICLE SCREWS IN THE LUMBAR DEGENERATIVE DISEASE

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OBJECTIVE: To analyze the clinical significance of the radiolucent zones surrounding pedicle screws. **MATERIALS AND METHODS:** Plain films were evaluated 399 patients who could be followed up from 488 patients with pedicle screw fixation. When 1 mm or greater circumferential lucency was confirmed around a screw on film from 2 or more directions, the patient was judged as clear zone positive. The course of clear zones was investigated in relationships between age, number of levels fused, bone union, posterolateral fusion versus posterolateral fusion and posterior lumbar interbody fusion, reoperation. **RESULTS:** Clear zones were evaluated 399 patients with pedicle screw fixation after 6 month, 1 year, 2 year and 3 year. Clear zones were observed in 124 patients (31.1%) after 6 months, 89 patients (22.3%) after 1 year, 44 patients (11.0%) after 2 year and 41 patients (10.3%) after 3 year. At final follow-up, pseudoarthrosis was found in 12 patients (3.0%). Among them, 11 were clear zone-positive and 1 was clear zone-negative. There were significant differences in the clear zone-positive rate in the number of levels fused and the age older than 60 years. And there was a relatively low clear zone-positive rate in patients with PLF combined with PLIF but no significant statistical differences. **CONCLUSION:** Careful observation of follow-up plain films is required because a continuity of clear zones around pedicle screws is significant to evaluate bone union and decide reoperation.

Date: 2009-10-30
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Room: Hall A2

Abstract number: 22125

MRI STUDY DETERMINING CORD LEVEL AND CORD OCCUPANCY AT THORACOLUMBAR JUNCTION IN ACHONDROPLASIA - A PROSPECTIVE STUDY

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INTRODUCTION: Thoracolumbar stenosis in achondroplasia is much more frequently reported and tends to manifest clinically in adulthood. However, it is unclear what causes stenosis, narrowing of the central canal, kyphosis or other factors. **METHODS:** We prospectively studied MRI at thoracolumbar junctions in 19 (9 symptomatic and 10 asymptomatic) achondroplasia patients and compared with 11 non-achondroplasia subjects. Lowest cord level and cord occupancy were calculated on MRI and thoracolumbar kyphosis were measured on radiogram. **RESULTS:** Our results suggested that lowest level of spinal cord were at higher level in achondroplasia than non-achondroplasia patients ($p=0.003$); however there is no difference in cord level between symptomatic and asymptomatic group ($p=0.568$). Comparing cord occupancy, no difference found among all three groups ($p=0.20$) proving that cord occupancy is similar in achondroplasia or non-achondroplasia patients. However, kyphosis was increasing from non-achondroplasia, asymptomatic and symptomatic patient group ($p<0.001$). Average age was 22.4 ± 14.2 , 11.9 ± 6.5 and 36.2 ± 13.2 years in symptomatic, asymptomatic and non-achondroplasia groups respectively ($p<0.001$) which proves that in achondroplasia patients kyphosis increases with age that may develop symptoms later. **CONCLUSION:** High prevalence of thoracolumbar stenosis and neurological symptoms in this population is mainly due to high level of spinal cord and degenerative process with increasing age as well as kyphosis, not directly related with cord compression due to narrow canal.

Date: 2009-10-30
Session: Spine
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Room: Hall A2

Abstract number: 21562

PATHOANATOMICAL BASIS FOR STRETCH INDUCED NERVE ROOT INJURY: A REVIEW OF THE LITERATURE WITH CADAVERIC OBSERVATIONS

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INTRODUCTION: Persistent pain originating from a dysfunctional lumbar motion segment poses significant challenges in the clinical arena. While the predominance of existing spine literature has addressed nerve root compression as the principle etiologic factor it is equally likely to have been stretch induced. **METHODS:** The literature supporting the role of stretch damage as a primary etiology of nerve root injury related pain is reviewed and presented. Patho-anatomical observations from human cadaveric dissections are also presented. The pertinent anatomical relationships that lead to stretch-induced injury thus provide substantiating evidence to support the stretch induced injury theory. **RESULTS/DISCUSSION:** A dynamic lumbar functional spinal unit that encloses a tethered nerve root can create significant stretch and/or compression strains. Such is exaggerated in a variety of pathological conditions. These include anterior, posterior, and rotatoryolisthesis as well as degenerative conditions such as loss of disk interspace height. While numerous studies have demonstrated that stretch can result in nerve damage, the physiology and the association with chronic pain are yet to be determined. **CONCLUSION:** The conceptual framework described herein is based on the current knowledge base associated with stretch related injury to nerve roots. Regardless of the cause of altered neural/foraminal relationships, the pursuit of an enhanced knowledge-base regarding the dynamic biomechanical and functional inter-relationships between neural structures and their juxtaposed environment is particularly important in the modern era of motion segment preservation technologies.

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Abstract number: 21855

IN VITRO KINEMATICS STUDY OF HUMAN LUMBAR FACET JOINTS

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BACKGROUND: Facet joints are important in accommodating spinal motion and maintaining spinal integrity. It is believed that the anatomy and biomechanical behavior of the joints vary along the lumbar spine. The objective of current study is to develop an experimental method for tracking the in vitro facet joint motions with a motion analysis system. **METHODS:** Biomechanical tests were conducted on a human cadaveric lumbar spine specimen to study the facet joint kinematics. Pure moment of $\pm 7.5\text{Nm}$ was applied by MTS spine loading fixture to simulate the principal spinal motions. By using a commercial motion analysis system, the three-dimensional rotations and displacements of the facet joints at L3-L4 and L4-L5 levels were measured and calculated. **RESULTS:** Under flexion-extension, the L3-L4 and L4-L5 facet joint rotations and displacements had maximum values of 1.47° and 3.78° , and 0.88 mm and 1.27 mm , respectively. It was found that the two sides showed similar values in both parameters. Similar results in the motion pattern were obtained for lateral bending. However, under axial rotation, there was an asymmetric behavior in the facet joint motions between right and left sides at the two levels, showing larger rotations on the right facets. **DISCUSSIONS:** This pilot study demonstrates the in vitro kinematics study of the lumbar facet joints and further investigation will be conducted with larger sample size. To study the relationship between the joint bio mechanics and anatomical structures, facet joint orientation and geometry are to be correlated with the motion data at different spinal levels.

Date: 2009-10-30
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Room: Hall A3

Abstract number: 22755

MINIMAL INVASIVE FIXATION OF FRACTURES OF THE PROXIMAL HUMERUS

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INTRODUCTION: Treatment of proximal humeral fractures is still controversial. Conservative treatment may result in malunion and shoulder stiffness. We present our experience with displaced or comminuted fractures of the proximal humerus treated by closed or open 'minimal invasive osteosynthesis' or by open reduction and using of fixed plates or by hemiarthroplasty. PATIENTS & METHODS: This study consists of 189 Pts (18-89 year old, mean 58.5Y) followed for 2-10 years (mean 5.5Y), treated by closed reduction and percutaneous pinning (79), ORIF and minimal osteosynthesis (27), ORIF with rigid plates (17), ORIF by LCP plates (10), ORIF by proximal humeral nail (5) or by hemiarthroplasty (51). Patients were evaluated by the UCLH and by Constant's shoulder grading score systems and radiographs. RESULTS: Overall results were excellent and good in 85% of patients with 2 and 3 parts fractures of the proximal humerus treated by 'minimal osteosynthesis' techniques, with some better results in less comminuted fractures. 26/32 Pts with 4 part fractures treated surgically had good functional results. The other 8 had poor results and 4 of them developed AVN of the humeral head. 75% of the patients treated by hemiarthroplasty had satisfactory results. They were almost free of pain, but had only a moderate improvement in shoulder motion (active abduction or flexion of 30-90 degrees in 38/51). CONCLUSIONS: 'Minimal osteosynthesis' by K.W. techniques, lag screws, rush pins or proximal humeral nail, by closed or open reduction, remains as the first optional treatment of complex fractures of the shoulder, even in young patients with a 4 part fracture. ORIF by conventional plates may be used in young patients and by LCP (locked compression plates) in osteoporotic or comminuted fractures of older patients. In the elderly, hemiarthroplasty seems to be the treatment of choice.

Date: 2009-10-30
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Room: Hall A3

Abstract number: 22308

MANAGEMENT OF PROXIMAL HUMERUS FRACTURES USING SINGLE TINED PROXIMAL HUMERUS T PLATE (FIXED ANGLE)

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INTRODUCTION: Fractures of proximal humerus account for 4-5 % of all fractures, we have designed -SINGLE TINED PROXIMAL HUMERUS T PLATE (3.5 MM) (FIXED ANGLED) for these fractures. **METHODS:** 35 patients with proximal humerus fractures were treated and followed-up for average of 33 months. All displaced fractures of proximal humerus were classified according to Neers classification after obtaining Antero-posterior & Lateral radiographs. Neurostudies-EMG & NCV were done in all patients. ORIF was performed through delto-pectoral approach using Single tined proximal humerus plate (fixed angle). Bone-grafts were used in patients with bone defects and poor bone quality. Post-operative Sling & Bandage-2weeks, followed by gentle pendulum exercises. Active exercises after 8-10weeks. Evaluation was done using Neers criteria. **RESULTS:** We had 10 (28.57%) 2-part fractures, 11 (31.42%) 3-part fractures, 9 (25.71%) 4-part fractures, 4 (11.42%) fracture-dislocation, 1 (2.85%) articular-split fracture. According to Neers evaluation criteria we had 91.44% excellent to satisfactory results 5.71% unsatisfactory results. There were no failures. We had 1 case (2.85%) with AVN, 2 (5.7%) with shoulder stiffness and no (0%) loss of fracture position. Average time of union was 16 weeks. **CONCLUSION:** Accurate open reduction and stable internal fixation is necessary to achieve optimal result followed by vigorous physiotherapy of the shoulder. Complication of varus occurred in none of the cases, thus justifying the potential of the Fixed-angle T plate. Hence, ORIF should be considered first and knee-jerk response to place prosthesis is not warranted. **KEYWORDS:** proximal humerus fractures, single-tined T Plate (fixed-angle).

Date: 2009-10-30
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Abstract number: 21842

HUMERAL SHAFT FRACTURES TREATED WITH INTERLOCKING NAIL OR DYNAMIC COMPRESSION PLATING-A COMARATIVE STUDY

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In a prospective study 200 patients of simple humeral diaphyseal fracture with average age of 38 years were chosen randomly for operative treatment with dynamic compression plating (100 cases) or interlocking nailing (100 cases). Neutralisation of polytrauma was the indication in 107 and failure of the manipulative reduction in the rest. Fractures were classified by the AO classification. Clinical outcome measurements using American Shoulder and Elbow Surgeons score included fracture healing, radial nerve recovery, infection, shoulder and elbow functions. Radiographic outcomes included fracture alignment, time of healing, delayed union and non union. Follow up ranged from 2 to 8 (average 4) years. In the plating group the average time for union was 14.3 (11 to 44) weeks and for interlocking group it was 12.1 (10 to 22) weeks. There was more blood loss in the plating group (300 vs 100Gms). Implant failure like loosening of screws and breakage of implant was also higher in the plating group (13 vs 2). Infection was also more in plating group (8vs 2). Transient radial nerve palsy was seen in 6 cases of plating group and 1 case of interlocking nail group. Nonunion was seen in 8 cases of plating group and none in the interlocking nail group. Varus malunion was seen in 8 cases of plating group and none in interlocking nailing group. The complications were more severe and more common in the plating group. We conclude that in patients where either procedure can be done, we should prefer interlocking nailing.

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Abstract number: 21922

INTERLOCKING NAILING A BETTER ANSWER TO HUMERAL SHAFT FRACTURES

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INTRODUCTION: Although the DCP is gold standard for the treatment of humeral shaft fracture, but interlocking nailing has changed the management and result of humeral fracture. Close technique, better design for distal interlocking screw and modified implant and instrumental design and better knowledge of anatomy has given excellent result with little complication. **MATERIAL AND METHOD:** This work was done in PMCH a post graduate teaching institute. 156 cases were analyzed since 2002 to 2009. In all cases antigrade humerus interlocking was done. We used indigenous local made implant and zig. **RESULT:** The result was evaluated by combine scoring system and was found that the result was much better than other modalities of treatment. **CONCLUSION:** Humerus fracture can be treated conservatively or with DPC, but interlocking nailing will be superior in comminuted fracture, double fracture, fresh open fracture and in osteoporotic bones. It is a minimally invasive surgery.

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Abstract number: 22321

OPERATIVE TREATMENT OF HUMERAL SHAFT FRACTURES COMPLICATED BY RADIAL NERVE INJURY

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MATERIAL: For a period of 8 years, 225 patients with HSF were treated operatively, including 43 cases (19 %) with radial nerve injury. 33 (77 %) were high energy fractures in twenty women and 23 men. 17 fractures were opened. **METHOD:** In 19 (44%) cases intraoperative revision of the nerve was performed. In 3 (16%) cases the nerve was found between the bone fragments, in 13 (68%) cases there was only contusion of the nerve and in 3 (16%) cases there was a nerve lesion. In 6 cases (14%) of delayed exploration (3-6months), 4 neurolysis and 2 neurorrhaphies were performed. In the cases with late revision (6- 18 months) of the nerve we found: in 2 cases compression from scar tissue and in another two cases full anatomical lesion of the nerve which led to performing of neurolysis and repair with graft from n. suralis. **RESULTS:** Spontaneous recovery without operative exploration occurred in 18 (42%) cases. Full recovery of nerve function in the cases with early operative revision occurred in 15 (79%) patients between the 6th and the 12th month, in the 4 (67%) cases with delayed revision and in the 2 (50%) cases with late exploration up to the 24th month. Four (9%) patients had no recovery of nerve function. **CONCLUSIONS:** The open and high energy HSF in the middle and distal one third in polytrauma patients as well as in the cases with floating elbow, associated fractures and ipsilateral fractures of the extremity are indicated for early open exploration of the nerve.

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Room: Hall A3

Abstract number: 21544

CLOSED ANTEGRADE HUMERAL NAILING FOR DISTAL-THIRD HUMERAL SHAFT FRACTURE

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Antegrade nailing is found difficult for distal humeral shaft fractures. This paper presents a method to ease the procedure with satisfactory results. The patient is placed in beach chair position and the C-arm image intensifier is positioned at the contralateral side with the radiation source under the table. The entry point is perforated by a small curved awl reamer at the junction between the humeral head and greater tuberosity. A 6-7mm T-reamer is used for gentle reaming after manual reduction. The UHN of appropriate size and length is inserted manually and deep enough without protruding part outside the bone. Proximal locking is performed using the targeting device under fluoroscopic control. The distal locking screw is carried out using free-hand technique. Between 2001 and 2008, the authors have experienced with the method in 14 patients whose ages ranged from 15 to 66 years (average, 36 years) with non pathologic fractures. The mean operation time was 30 minutes (range, 15 to 45). The radiation exposure to the surgeon during the procedure measured in 7 cases averaged 6.5 micro-Sievert per procedure. There was one case that had cortical splitting of the distal fragment during nail insertion which required open reduction and cerclage wiring. Twelve patients could be follow-up with an average of 11 months (range, 6 to 38 months). The range of motion of the elbow and shoulder were satisfactory with almost full range of motion at the time of last follow-up. Only one case had delay union and need revision.

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Room: Hall A3

Abstract number: 21237

RETROGRADE HUMERAL NAILING: A PROSPECTIVE STUDY OF 58 PATIENTS

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PURPOSE OF THE STUDY: Use of retrograde nailing, which spares the rotator cuff, is more recent. This study report outcome in 58 humeral shaft fractures using the unreamed humeral nail (UHN, Synthes) between 2000 and 2003. **MATERIAL AND METHODS:** This work was limited to recent shaft fractures in adults with non-pathological bones. The series included 58 patients (58 fractures). All fractures were closed except four (Gustilo type I and II). Two patients presented preoperative radial paralysis. Osteosynthesis was performed without opening the fracture focus under fluoroscopic control using a static locking nail inserted retrograde in patients in the supine position. **RESULTS:** There were two early deaths unrelated to the method. Healing was obtained in the surviving patients within fifteen weeks on average. Bone healing was primary in 53 patients and after secondary compression in three. At last follow-up, shoulder motion was normal in 88% of patients and elbow motion in 91%. The Rommens functional score was good in 84%. Complications included three cases of spontaneously regressive postoperative radial paralysis, three cases of reflex dystrophy including two which regressed, and two cases of humeral palette fracture requiring surgical osteosynthesis. The proximal screws were removed in six patients because of pain or migration. There were no infections. **CONCLUSION:** Retrograde insertion of this nail allowed immediate shoulder motion and the advantages of closed reduction: no infection, no late bone healing requiring conversion to another method of fixation. The residual technical problems concern proximal screws and nail introduction.

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Abstract number: 22083

FUNCTIONAL OUTCOMES OF OPERATIVE TREATMENT OF DISTAL HUMERUS FRACTURES

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OBJECTIVE: The treatment of complex intra-articular multifragmentary fractures of distal humerus is controversy nowadays. The purpose of this study was to evaluate the results (AO/ASIF types 13B,C) of distal humerus fractures treated with locked plates. **METHODS:** This study analyses the functional outcomes after open reduction and internal fixation (ORIF) of distal humerus fractures with 2 locked pre-shaped plates in 20 patients. Mean follow-up time was of 30 months (range 24-48 months). All fractures were evaluated according AO/ASIF classification - types 13 B, C. The mean age was 56 years (range 18-82 years). In all cases we used posterior approach with olecranon 'chevron' osteotomy. The main thing was a full anatomically reconstruction of articular surface. All fractures were reduced under fluoroscopic control. Movements in elbow joint were allowed immediately after operation. **RESULTS:** The functional results were obtained using Broberg & Morrey scale. 14 patients (70%) have demonstrated excellent and good results, 5 patients (25%) - poor result and 1 patient (5%) - bad result. The mean range of motion (ROM) at elbow joint was 112° (range 85°-122°), pronation 75° (range 60°-82°), supination 76° (range 60°-80°). We also measured muscle strength of the upper limb using dynamometer. It was 15% lower than on non-operated site. 15 patients returned to previous daily and professional activity and were satisfied with result of treatment. **CONCLUSIONS:** The operative treatment of intra-articular distal humerus fractures using 2 locked plates is effective surgical way to achieve excellent and good functional results.

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Abstract number: 22531

RETROGRADE HUMERAL NAIL FOR TREATMENT OF EXTRAARTICULAR DISTAL HUMERAL FRACTURES

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INTRODUCTION: Displaced distal humerus fractures are difficult to treat. Numerous techniques have been developed for fixation. Conventional 'antigrade' nailing sometimes causes damage to the rotator cuff. This new nail is inserted by a closed retrograde technique using a special interlocking system to avoid axillary nerve and rotator cuff damage. It gives stable fixation due to its distal transverse plate, which gives better rotational stability. **MATERIALS AND METHODS:** Since 1997 we have treated 55 displaced extraarticular fractures of distal humerus using this device. 41 of them were widely displaced with butterfly segments, 10 of them are short spiral fractures and 4 were osteolytic lesions. The nail is inserted through the roof of the olecranon fossa leaving the rotator cuff of the shoulder free from iatrogenic injury. Proximal rotation stability is maintained by a unique 'Trio Wire', which passes through the nail itself and fans out in the head of humerus. Distal rotational stability is maintained by transverse plate, which was welded on the distal end of nail. **RESULTS:** In all the cases early pain relief was obtained with return of shoulder and elbow functions. By six weeks 95% of patients could perform the majority daily tasks. No significant complications except three nonunions, which united with revision surgery. There was average loss of extension of the elbow by 10-15 degrees. **CONCLUSION:** This new nail provides stable fixation of difficult humeral fractures. Early pain relief and rapid return of shoulder and elbow functions denote a successful outcome.

Date: 2009-10-30
Session: Knee Trauma & Knee Osteotomy
Time: 1030-1200
Room: Hall A3

Abstract number: 22758

SURGICAL TREATMENT OF TIBIAL PLATEAU FRACTURES - LONG-TERM FOLLOW-UP

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INTRODUCTION: Displaced tibial plateau fractures are commonly managed by various surgical reduction and fixation methods, minimizing articular defects and misalignments. Through a retrospective study, we aim at determining the indications and the best procedure to apply. Long term results are evaluated. **MATERIAL AND METHOD:** 170 cases were reviewed with average follow-up of 14.2 years. The A.O. classification shows in the partial articular fractures: splits (B1): 13.5 % (n23), depressions (B2): 27.1% (n46), split-depressions (B3): 35.3% (n60) and total articular fractures: 24.1% (n41). Fractures were located mainly in the lateral condyle: 59.4% (n101), medial condyle: 15.9% (n27) and in both: 24.7% (n42). C.T. scan is very beneficial to evaluate the depression. Arthroscopy is most useful to check the joint before or during reduction and fixation. Surgery was performed in displacements and in long epiphyso-diaphyseal fractures. Internal fixation was made by buttress plates or screws. We added bone grafting to elevate depressions. **RESULTS:** Global anatomical and functional results look quite satisfying: 71.8% (n122) good and very good, 20% fair (n34) and 8.2% poor (n14). Time passing, the good and very good results, which were standing at 80.5% about 10 years ago, slightly decreased by 8.7 % (vs. last year). **CONCLUSIONS:** Surgery should address only displaced fractures and some associated lesions. Our surgical indications are: - articular step-off exceeds 3 mm, - condylar widening is more than 5 mm, - varus or pathological valgus exceed 5°. Results can be improved by treating meniscal and ligament lesions to avoid instability and further knee arthritis. Mal-unions prevention requires exact reduction and may need long buttress plating. Percutaneous intervention seems to be a good alternative to the open treatment in case the conditions are provided. Intensive rehabilitation is strongly recommended in all cases.

Date: 2009-10-30
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Time: 1030-1200
Room: Hall A3

Abstract number: 22206

LCP PLATE, VERSUS CONVENTIONAL T PLATE, CLINICAL OUTCOME FOR INTERNAL FIXATION OF PROXIMAL TIBIAL FRACTURES

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BACKGROUND: Proximal tibial fractures are complex injuries and historically associated with high complication rates. The purpose of this study was: 1) to evaluate the clinical use LC-LCP system for stabilization of proximal tibial fractures. 2) to compare this plating system with T-plate construct. **METHODS AND MATERIAL:** Sixty two patients with a closed proximal tibial fracture underwent open reduction and internal fixation with T plate (35 patients) or LCP (27 patients) at our trauma center. The duration of follow-up was 15 months averagely. **RESULTS:** The mean age of patients was 37 years old with 51 males & 11 females. Significant loss of knee range of motion in 3 (13%) vs 4 (11.4%), malunion in 1 (4.3%) vs 6 (17.1%), nonunion in (0%) vs 1 (2.9%) case, infection in 1 (4.3%) vs 4 (11.4%) in LCP and T plate respectively resulted. There was not a significant difference between 2 groups in post-operative knee stiffness, but for nonunion and post-operative infection. There were significant differences. **CONCLUSION:** The LCP plating system seems to provide stable fixation of proximal tibial fractures comparing with conventional T-plating and allowing early range of knee motion with favorable clinical results and probably less complications. **KEYWORDS:** Fracture, Proximal, Tibial fracture, LCP

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Time: 1030-1200
Room: Hall A3

Abstract number: 21849

LOW-PROFILE PERI-ARTICULAR LOCKING PLATES IN THE MANAGEMENT OF TYPE V AND VI TIBIAL CONDYLE FRACTURES - A CLINICAL STUDY

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Bicondylar tibial plateau fractures are complex injuries associated with high complication rates. The purpose of this study was to evaluate the clinical performance of low profile locking plate in management of tibial condyle fractures. Between Jan 2006 and Aug 2008, 30 patients were treated with a low profile locked-plate fixation system (Zimmer, Warsaw, Indiana). There were 22 male and 8 female patients with a mean age of forty years. Fractures were classified according to schatzker classification. Clinical and radiographic data were retrospectively reviewed. Function was assessed with use of the Knee Society scores. Patients were followed up for average 22 months. There were 14 type V and 16 type VI fractures according to Schatzker classification. Twenty eight fractures united by an average of 14 weeks. There were no mechanical complications. Postoperative fracture alignment was satisfactory in 28 of the 30 cases but was maintained in 24 patients at union. Most importantly, there was evidence of varus collapse in 4 out of 6 patients with posteromedial fragment. The mean time for allowance of full weight bearing was 14 weeks, and the mean range knee motion was 120°. There was one deep infection and one aseptic nonunion which united after bone-grafting. Low profile locking plates offer a raft supports to proximal subchondral bone, more fixation versatility without an apparent increase in mechanical complications or loss of reduction. However evidence of varus collapse was seen where in associated posteromedial fragment was present and this we feel requires a medial buttress plate.

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MICROFRACTURING OF THE KNEE: THE IMPACT OF SCORES AND RATING SYSTEMS ON THE CLINICAL OUTCOME

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PURPOSE: This retrospective study was designed to evaluate the comparability and transferability of six clinical scores (Lysholm, modified Lysholm, modified Cincinnati, IKDC Score, KOOS, WOMAC), two rating systems (ICRS Score, Cincinnati Knee Rating System) and the Tegner Activity Scale. **METHODS:** These classification schemes were used to assess the functional outcome of 26 patients with a full-thickness chondral defect (average size 216 [39-589] mm²) treated with microfracturing by two experienced surgeons at a university hospital between 2001 and 2005. For comparison with the clinical scores the non-numeric results of the rating systems were transformed to a scale of 100 points maximum. On the basis of the distribution of values the coefficient of Pearson or Spearman was calculated. **RESULTS:** Between every two clinical scores except for the WOMAC at least a high correlation was detected for the basic population. Nevertheless the individual results diverged even between excellent and poor. Between the two rating systems no correlation could be found, whereas the ICRS score gave better results than the Cincinnati Knee Rating System in most cases. Compared to the six scores correlations were found only between the Cincinnati Knee Rating System and the WOMAC. Regarding the Tegner Activity Scale a Pearson coefficient of at least 0.6 was detected in comparison to the clinical scores. **CONCLUSION:** The clinical outcome is notably influenced by the selection of the classification scheme. Considering the patients' medical condition and physical strain on the treated knee, score selection for adequate evaluation of the postoperative situation is crucial.

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Abstract number: 20437

ROLE OF PATELLOPLASTY IN MANAGEMENT OF COMMUNATED FRACTURE OF PATELLA

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BACKGROUND: A displaced comminuted fracture of patella is treated by interfragmentary fixation and circlage wiring, failing which partial or total patellectomy has been the treatment of choice. They have their problems of reduced power of extensor mechanism or osseous vascularity giving suboptimal results. **MATERIAL AND METHODS:** 263 Comminuted patella fractures had been repaired over a period of 14 years by braided-polyester wire in a cruciate anterior tension band manner repairing the extensor mechanism, thereby indirectly reducing the patellar fragments. Complete clinicoradiological data was available for 214 cases at a minimum of 2.5 years and a mean of 6.8 years postoperatively. Of which 58 cases were Open type, Gustilo grade 1 and 2. Whole of patella was preserved in every case. **RESULT:** Range of movement was <100° in 26, 100 -120° in 158 and bilaterally equal in 30 cases. 150 cases were painless even after strenuous activity, in 49 there was occasional mild to moderate pain not hampering normal activity and 15 had persistent pain. There was no extensor lag in 190. Skin necrosis and superficial infection and granuloma occurred in 9 cases. Radiological union was seen at a mean interval of 12 weeks. Incongruity of articular surface was <2mm in 51, 2to5mm in 132 & >5mm in 30 cases. Lengthening of patella was seen in 26 cases. **CONCLUSION:** After patellectomy the quadriceps power rarely approaches normal hence the patella should be preserved. By this method even a grossly displaced fractured patella is repairable giving a better functional knee.

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AFGHAN EXTERNAL FIXATOR FOR THE TREATMENT OF PATELLA AND OLECRANON FRACTURES

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PURPOSE: To evaluate a form of treatment for patella and olecranon fractures using a novel compressive external fixation device. Our hypothesis is that the CEF technique is a safe and effective method with advantages over traditional forms of fixation. **METHODS:** From Feb 1999 to May 2006, 126 patients presented to our facility with 84 displaced fractures of the patella and 42 displaced fractures of the olecranon. These fractures were treated by a new method of compressive external fixation devised by the authors. Patient follow-up was performed at an average of 4 years post-operatively four cases were lost to follow up. **RESULTS:** All fractures healed with clinical and radiographic union of fractures at an average of 41 days. Patients were discharged within first three days of surgery. 117 patients (96%) regained the same motion as their unaffected limb within one week after removal of the device. The mean Insall knee score for patient function obtained on 61 patients was 97 points. Complications included two wire site infections, 9 cases of wire site reaction and 3 cases with temporary synovial fluid leakage from a wire site. **CONCLUSION:** This simple technique of treatment produces very stable fixation as well as rapid bone healing and rehabilitation.

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A MODIFIED THOMPSON QUADRICEPSPLASTY, FOR EXTENSION CONTRACTURE OF THE KNEE, VARIABLES AND THEIR EFFECTS ON CLINICAL OUTCOMES

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BACKGROUND: The lack of knee flexion is an increasingly recognized complication of femoral and priarticular knee fractures. This is a big challenge for both surgeon and patients. **MATERIAL AND METHODS:** This paper reports the clinical outcomes of 40 knees in 40 patients who have undergone modified Thompson quadricepsplasty. They were 36 men and 4 women. We did a modified Thompson quadricepsplasty for all patients without excision of vastus intermedius even in scarred cases. The definitive flexion gain was classified recording to Judet; excellent when > 100 degrees, good when > 80 < 99 degrees, fair when > 50 degrees < 79 degrees, poor when < 50 degrees. **RESULTS:** patients were operated averagely 6.9 ± 3.6 months (range; 4 to 24 months) post first initial surgery. Average of follow-up was 17.5 months (range; 12-24 months). Recording to Judet criteria; 9 patients (22.5%) achieved excellent, 27 patients (67.5%) good, 2 patients (5%) fair and 2 patients (5%) poor. Final average flexion arch improvement was 650 ± 25.99 with a range between 50 to 1000. Our complications were including 2 cases (5%) of superficial infection and one case (2.5%) with patellar fracture. In patients who had pre operative extension lag, we didn't achieve a significant improvement of the extension lag. ($P=0.062$). **CONCLUSION:** modified Thompson quadricepsplasty is a promising procedure with satisfactory results. It provides significantly results if it is done earlier and in more sever extension contracture.

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OPENING WEDGE HIGH TIBIAL OSTEOTOMY WITHOUT BONE GRAFT UP TO 14MM

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INTRODUCTION: Autogenous iliac bone graft is the gold standard in medial opening wedge high tibial osteotomy (OW HTO), however there are drawbacks of increased operative time, risk and morbidity associated with its harvesting. The need for bone grafts in open wedge HTO has been questioned. METHODS: A total of 58 consecutive patients underwent HTO with internal fixation by wedge plate and screws without bone grafts, between April 2004 and April 2008. The age ranged from 24 to 65 years. There were 37 males and 21 females. The osteotomy opening size ranged from 8-14 mm. Thirty eight knees (65.5 %) had openings \leq 10mm and 20 knees (34.5 %) had $>$ 10mm. The mean follow-up was 22 months. RESULTS: The osteotomy united in all patients between 8-16 weeks (av 12.4). Healing was delayed in twelve osteotomies to 4 months. There was no fixation loss in any of the cases. Full weight bearing was achieved at a mean of 6 weeks (4-10 weeks) postoperatively. CONCLUSION: Despite the routine addition of bone graft as a part of the HTO procedure, this study supports medial opening-wedge HTO up to 14mm without bone grafts, which shortens the operative time and avoids unnecessary morbidity.

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EVALUATION OF ARTICULAR CARTILAGE AFTER HIGH TIBIAL OSTEOTOMY USING DELAYED GADOLINIUM ENHANCED MR IMAGING OF CARTILAGE

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AIMS: The aim of this study were to evaluate the time course change of glycosaminoglycan (GAG) content after high tibial osteotomy using delayed gadolinium enhanced MR imaging of cartilage (dGEMRIC). METHODS: Fifty year old man who had HTO due to secondary osteoarthritis was examined using 1.5T MRI. Before the operation, femorotibial angle was 186 degree. Gadlinium was injected two hours prior to MRI and appropriate walking was ordered. T1 values which represent GAG content were calculated as dGEMRIC index and color image of articular cartilage layer according to GAG concentration was made. ICRS grading of the articular cartilage was performed arthroscopically at the time of opening wedge HTO using TomoFix system. RESULTS: The post operative femorotibial angle was 165 degree. The cartilage was divided into two layers; low GAG content superficial layer and high GAG content deep layer. dGEMRIC index was 431ms. Arthroscopic findings revealed ICRS grading of medial compartment to be grade IV and lateral compartment to be grade II and III, which were observed in MRI in the same way according to the GAG content. dGEMRIC index decreased to 389ms and 385ms at one and three months after the operation, and recovered to 427ms at 6 months. CONCLUSIONS: dGEMRIC had the potential to evaluate the extracellular matrix of articular cartilage after high tibial osteotomy non invasively. Reversible change of GAG content was observed after surgery using dGEMRIC, which indicates extracellular matrix may have self remodeling process after biomechanical changes.

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TREATMENT OF RECURRENT VARUS GONARTHROSIS BY REPEATED PROXIMAL TIBIAL VALGUS OSTEOTOMY

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INTRODUCTION: Regarding proximal tibial osteotomy, it is generally believed that after failure of knee osteotomy or recurrent varus gonarthrosis second osteotomy cannot be performed and only total knee arthroplasty can restore painless knee motion. **PURPOSE:** To evaluate the quality of the results of the repeated proximal tibial valgus osteotomy. **METHODS:** Sixteen knees in sixteen patients, who had repeated proximal tibial valgus osteotomies, were reviewed. The mean age of the patients at the time of the repeated osteotomy was 65.9 years. The mean follow-up period was 39.4 months. The mean preoperative femorotibial angle was 4.1 degrees varus. Infratubercle osteotomy was performed in fifteen knees (six closed wedge and nine displacement osteotomies) and supratubercle open wedge osteotomy in one. In all knees no bone graft or bone substitute was used. **RESULTS:** All the osteotomy healed. Using modified American knee society clinical rating system, twelve knees (75%) had excellent and four (25%) good results. Overall the average knee score improved from 46.5 points to 89.3 points. The pain was improved from 15.6 points preoperatively to 44.7 points at the final follow-up study. At the final follow-up study the average femorotibial angle significantly increased from 4.1 degrees varus preoperatively to 9.4 degrees valgus at the last follow-up ($p < 0.001$). **CONCLUSION:** Recurrent varus osteoarthritis could be successfully treated with revised proximal tibial valgus osteotomy, even with severe osteoarthritic change or age more than sixty years, if valgus knee alignment has been restored.

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MEDIAL PATELLO FEMORAL LIGAMENT - FRIEND OR FOE?

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MPFL - a friend if it works, but enemy if not. We present strategy for establishing Friendship. Single subluxations / dislocations should be treated symptomatically unless there is major trauma (bloody effusion, ROM, 4+ apprehension test). With major trauma, use, CAT and MRI for cartilage fragments and loose bodies. More than one P-F dislocation or three P-F subluxations. Minimal Problem 1 of 3 Magnitude dysplasia - normal Q + Normal TT/TG (Tibial tubercle/trochlear groove < 20 based on CAT Rx: Advance MPFL (94% healed) Advance laterally vastus Medialis Lateral patellar retinacular release. Moderate Problem 2 of 3 magnitude dysplasia TT/TG > 20, Q > 12 Rx: Graft MPFL Advance VMO laterally TT transfer LPRR Severe Problem-3/3 magnitude dysplasia TT/TG > 24 CFS--2Q > 14 Rx: Advance VMO laterally TT transfer Graft MPFL LPRR. Consider Patello Femoral joint replacement with incongruity. RESULTS: I. Single subluxations:-25/75 Single subluxations Rx symptomatically-20/25 No recurrence 5-8 yrs. (5.6)-4/26 Rx minimal problem protocol No recurrence 6.5-9 years-2/26-Major trauma single subluxation Arthroscopy ½ loose cartilage 2/2 Second surgery minimal protocol II. Single Dislocations: 3/75 Rx symptomatically 3/3 require surgery-3.2, 4.1 & 5.0 years III.> 1P-F Dislocation 20/75 Rx minimal protocol 4/20 2nd surgery 6-9.5 (7.2) Rx moderate protocol 16/20 No 2nd surgery 5.2-8.6 (6.9) IV.3 or > PF Subluxation-26/75 Rx minimal protocol CFS--3 5/25 No second surgery: 5.1-7.5 (6.4) Rx moderate protocol 21/26 No second surgery: 5.4-8.2 (6.6) This study is based on 75 acute subluxations or dislocations with five year minimal follow-up. Patella alta, patella baja and patellar tilt must also be corrected. Worst results are generalized loose jointedness and familial recurrent subluxation of patellae.

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Abstract number: 21942

PATELLOFEMORAL INSTABILITY TREATMENT WITH MEDIAL PATELLOFEMORAL LIGAMENT RECONSTRUCTION USING A SEMITENDINOSUS TENDON

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Treatment for acute patellofemoral dislocation is conservative. After field conservative treatment surgical treatment is indicated for patellofemoral instability and recurrent and chronic patellar dislocation. During patellofemoral dislocation the medial patellofemoral ligament (MPFL) in the majority patients is disrupted. According literature reconstruction of the MPFL is recommended. METHOD: It is described few method of MPFL reconstruction. We used autologus semitendinosus tendon with two tunnels in patella and fixation in the femoral tunnel by interferent screw. This procedure we used single or with lateral patellar release, Elmslie Trillat procedure and longitudinal patellar osteotomy. Patellar tracking postoperatively was controlled arthroscopically. MATERIAL: We studied retrospectively 18 (M2, 16F) patients, age 17.8 y (12-43y), with reconstruction of the MPFL. Procedure was performed for recurrent dislocation and subluxation of the patella at 14 and at 4 for chronic patellar dislocation. Follow up was 14 (6-18 months). In the 12 cases MPFL was single surgery, in 4 cases associated with Elmslie Trillat procedure and twice with longitudinal patellar osteotomy. RESULT: The patients were evaluated preoperatively and et list 3 and 6 months postoperatively. No patient experienced patellar dislocation after surgery. Axial X-ray et 30° and 60°, congruence angle, tilting angle, lateral shift ratio, lateral apprehension test demonstrated to be within normal angles. CONCLUSION: MPFL reconstruction method with semitendinosus tendon graft as single or associated surgical procedure is recommended for the treatment of the chronic, recurrent patellar dislocation as well for unstable patella.

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CONTROLLED ACL REMNANT PRESERVATION AND OVERLAY, A NEW TECHNIQUE

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Interest in ACL (Anterior Cruciate Ligament) remnant preservation at Hamstrings ACL reconstruction is growing within the soft tissue knee community. Thus far the techniques described have relied upon accurate and central Tibial remnant penetration, while minimising stump trauma, thus forming a cuff of native tissue around the graft. This can be very difficult when there is a large unstable stump. The preservation of the ACL remnant, especially at the Tibial attachment, has a number of theoretical mechanical and biological advantages; Mechanically the cuff may contribute to earlier and stronger graft healing, taking advantage of the native ligamento-osseous attachment, once the remnant heals to the graft. The cuff of tissue forms a tight seal, and one way valve, around the graft. Thereby limiting the influx and efflux of fluid into the graft / tunnel interface and reducing the propensity to late tunnel widening. Biologically the remnants may improve the degree of proprioceptive function, by both the preservation of its own proprioceptive fibres, and potentially promoting in-growth of proprioceptive fibres into the graft. The overlaid tissue may also promote neo-angiogenesis of the graft material, and increase the proportion of Graft that is vascularised. Here we describe a new technique for the overlay, stabilisation, fixation and tensioning of the Tibial remnant, that is especially applicable to large unstable remnant stumps.

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FEMORAL TUNNEL-SCREW DIVERSION ANGLE IN ANTERIOR CRUCIATE LIGAMENT FIXATION USING TWO DIFFERENT PORTALS: A COMPARATIVE STUDY

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INTRODUCTION: Anterior cruciate ligament (ACL) fixation in bone-patellar tendon-bone graft (B-PT-B) on the femoral side is frequently done by interference screw. The screw should sit parallel or near parallel to the tunnel for the optimal fixation of the graft. This ensures strong ultimate failure strength of graft. Tunnel-screw diversion is acceptable till 15 degrees. Beyond that, it leads to improper fixation, failure of graft and hence poor results. We did a comparative study of femoral tunnel-screw divergence using central patellar and anteromedial portals. The objective of the study is to find out that by using which portal, the chance of tunnel-screw divergence can be minimized. **MATERIAL AND METHOD:** Data of 69 patients was analyzed who underwent ACL reconstruction using B-PT-B graft. 41 patients underwent femoral tunnel fixation by interference screw using anteromedial portal and 28 patients using central patellar portal. Postoperatively, X-ray of knee was taken in 90degree flexion in lateral and tunnel-screw angles were measured using software in GE-PACS. Data was systematically entered and analyzed using SPSS 13. **RESULT:** Tunnel divergence is less when central patellar portal is used (Mean: 7.63; -95%CI: 6.31- 8.96) as compared to anteromedial portal (Mean angle divergence: 13.38; 95% CI: 12.31-14.41) $p<0.000$. **CONCLUSION:** Central patellar portal is better alternative to femoral side B-PT-B graft fixation to avoid excess tunnel divergence. Use of correct portal helps in placing screw parallel to graft which ensures better graft bone synthesis.

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A NEW SURGICAL INSTRUMENTARIUM FOR ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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INTRODUCTION: In this report, we are going to present results of newly developed surgical instrumentarium that uses hamstring technique to treat LCA lesions and evaluated after 16 months of operations. **METHODS:** A new arthroscopic surgical instrumentarium for LCA reconstruction uses basics of hitherto approaches and technically improves and modifies current technique of hamstring fixation. We used this new technique in 32 operations during 18 months. We evaluated clinical conditions of 26 patients 3-16 months after the surgery. Our evaluation follows new standards (ISAKOS/ESSKA STANDARD TERMINOLOGY 2007). **RESULTS:** We observed complete recovery in stability and function of the knee joint in all 26 patients. Our subjective evaluation which followed the International Knee documentation Committee (IKDC) form reached 95-100 points, and we observed a significant improvement in 95% of all studied cases followig evaluation by Tegner and Lysholm. **CONCLUSIONS:** Our clinical tests of a new instrumentarium are very positive. Practical experiences with our first 32 patients prove that this instrumentarium is very easy to use. Subjective and objective evaluation of 26 observed patients showed important improvement of their pre-surgical condition.

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INTRAOPERATIVE COMPLICATIONS USING THE BIO-TRANSFIX FEMORAL FIXATION IMPLANT IN ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION – ETIOLOGY AND PREVENTION

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The use of biodegradable Transfix femoral fixation technique is a safe and well-accepted method when performing anterior cruciate ligament reconstruction. We report on 3 cases of deformation and back out of the bio-transfix implant over the lateral, distal femoral cortex, with failure of the passing wire when advancing the graft into the femoral tunnel in one of these patients. Two of the patients presented with symptoms of iliotibial band friction syndrome while the third patient was asymptomatic. The graft had clinically integrated demonstrating AP and rotational stability. The symptoms relieved after removal of the failed Bio-Transfix implants in the symptomatic patients. The aetiology of the implant failure and the alternative methods to avoid such complications are discussed.

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THE EFFECTS OF THE ANATOMICAL DOUBLE-BUNDLE RECONSTRUCTION OF THE ANTERIOR CRUCIATE LIGAMENT ON THE CONTACT CHARACTERISTICS OF THE PATELLO-FEMORAL JOINT

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INTRODUCTION: Abnormal loading of the patello-femoral (PF) joint resulting from abnormal kinematics of the joint can cause PF disorders. We investigated the effects of ACL deficiency, single-bundle and anatomical double-bundle (DB) ACL reconstruction on the contact characteristics of the PF joint. **MATERIALS AND METHODS:** Seven fresh frozen human cadaveric knees were tested with ACL intact, deficient, single-bundle and anatomical double-bundle reconstructions. Hamstring auto-grafts were used. Patello-femoral contact pressures and areas were measured using a pressure sensitive film at 30°, 60° and 90° knee flexion under quadriceps muscle loads of 100N. **RESULTS:** ACL deficient knees significantly decreased in the total contact area by 67.5% and 80.2%, in the medial contact area by 52.0% and 60.8% at 30° and 60° of knee flexion, when compared with the intact knee. The deficient knees significantly increased in the lateral facet peak pressure by 165.0% at 90° of knee flexion. The conventional SB ACL reconstructed knee also significantly decreased in total contact area by 71.8% at 30° of knee flexion, significantly increased in the lateral facet average pressure by 168.1% at 30° of knee flexion, in the lateral facet peak pressures by 130.1% and 179.6% at 60° and 90° of knee flexion. Double-bundle reconstruction restored the contact pressure and areas to values similar to the intact knee (with no significant difference). **CONCLUSION:** Anatomical DB ACL more closely restored the normal PF contact area and pressures.

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THE TUNNEL PLACEMENTS IN THE ANATOMICAL DOUBLE BUNDLE ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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OBJECTIVE: To investigate the accurate antero-medial (AM) and postero-lateral (PL) tunnel position in an anatomical double bundle ACL reconstruction. **MATERIALS AND METHODS:** 15 Fresh-frozen non-paired adult human knees were used. AM and PL bundles were identified by the difference in tension patterns. The center of femoral AM and PL bundles were marked with K-wire and cut from the insertion site. Each bundle was divided at the tibia side, and the center of each AM and PL tibial insertion was again marked with a K-wire. Tunnel placement was evaluated using C-arm X-ray device. For the femoral side assessment, Bernard and Hertel technique was used. For the tibial side assessment, Staubli and Rauschnig technique was used. After x-ray evaluation, all soft tissues were removed by 10% NaOH, and then using the tibial bone specimens, the distance between each tunnel and posterior inter condylar fossa of the tibia was measured directly. **RESULTS:** The center of the femoral AM tunnel was placed at 15 % in a shallow-deep direction and at 26.2% in a high-low direction. The Center of the PL tunnel of the femur was found at 31.8% in a shallow-deep direction, and 51.6% in a high-low direction. On the tibial side, the center of the AM tunnel was placed at 30.9% from the anterior edge of the Staubli and Rauschnig line, and the PL tunnel at 49.7%. The distance between the center of AM or PL bundle and posterior intercondylar fossa was 23.2 mm, 11.8 mm respectively.

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NATURAL DEVELOPMENT OF THE TIBIAL ACL INSERTION IN RAT KNEE

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Following ACL reconstruction, achieving bone-grafted tendon integration with sufficient strength can accelerate rehabilitation and improve clinical outcome. For bone-grafted tendon integration, it is thought that reproduction of four-layer structure involving cartilage tissue would be ideal. However, it is well known that the structure between bone and grafted tendon after ACL reconstruction differs from the normal structure. On the other hand, to evaluate natural ACL development between bone and tendon can provide effective information to reproduce more accurate histological structure, but few reports examined. In this study, we evaluated natural histological development in the native ACL insertion. During gestation, spindle-shaped cell aggregation and irregular alignment were seen in the ACL insertion, but fibroblasts and extracellular matrix became organized after birth. Besides, some hypertrophic cartilage-like cells were seen in the ACL insertion. Up to the second week, the ligament was directly attached to the epiphyseal nucleus. However, from the third week after birth, as ossification of the epiphyseal nucleus ceased, anchoring of fibers consisting of type 1 collagen and four-layer structure-like tissue, resembling normal adult ligament, became to be seen. These results suggest normal four-layer structure can form not only ossification of the epiphyseal nucleus, but attachment of the ligament itself to bone. We thought that biphasic attachment mechanism appears to be occurred in the bone-tendon development. In the future, to enhance and accelerate bone-grafted tendon integration, techniques would be insufficient only to attach grafted tendon to bone mechanically, so biological enhancement would be needed between bone and grafted tendon.

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Abstract number: 22506
NEW SURGICAL PROCEDURE FOR LATERAL INSTABILITY OF ANKLE

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New surgical procedure for lateral instability has been designed by 1st author. Comes from Brostrom, allowed better tonisation and large healing field of tensioned scarf. 45 patients, follow up minimally 2 years, show excellent result and minimal complications.

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Abstract number: 21980

OUTCOME OF OPERATIVE STABILISATION OF UNSTABLE ANKLE FRACTURES IN PATIENTS AGED OVER EIGHTY YEARS

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Controversy exists in the surgical treatment of unstable ankle fractures in the very elderly due to higher postoperative mortality and morbidity. Very few studies look at the prognosis of surgery in this group. The aim of our study was to look at the outcome of operative fixation for unstable ankle fractures in patients aged over 80 years. Ninety-two consecutive patients aged above eighty years who had open reduction and internal fixation for unstable ankle fractures, between January 1998 and August 2007 were studied. Data was collected retrospectively from the case records and radiographs. A standard postoperative rehabilitation programme was followed. Average age was 85.2 yrs (80.1-95.1), 87% were women. Minimum duration of follow up was 9 months. The most common fracture pattern was pronation external rotation type. Superficial wound infection was 7% and there was deep infection in 4.6% The 30 day postoperative mortality was 5.4%. At last follow up 86% were able to return to their pre injury level of mobility. Diabetes, dementia, peripheral vascular disease and smoking were found to be statistically significant risk factors associated with wound complications. Patient with 2 or more risk factors were 5 times more likely to have a wound infection. The results of operative fixation of unstable ankle fractures are very encouraging with good functional recovery and return to pre injury mobility status in most cases. The surgical fixation is technically challenging and careful attention must be given to the osteopenia and soft tissue factors.

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SURGICAL VS. NON-SURGICAL TREATMENT OF SE4 EQUIVALENT ANKLE FRACTURES

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This is an IRB approved retrospective study from a Level I Trauma Center comparing the clinical outcomes of non-operative vs. open management of SE4-Equivalent (SE4-E) ankle fractures. 1008 ankle fractures treated between 1998 and 2003 were reviewed. 43 patients with SE4-E ankle fractures were identified. Olerud Molander ankle scores were recorded. The average age of the patient is 42. Average follow-up is 20 months. 26 patients were treated non-operatively with an average ankle score of 84+/-4. Seventeen patients surgically treated had an average ankle score of 63+/-5. The difference is statistically significant (P=0.0035). We compared open vs. closed treatment in maintaining a reduction. We found that the ankle score correlated with x-ray grading. We sought for an association of functional ankle score and its common co-variables and found that age is an important variable for ankle score. Patients younger than 30 years old had average ankle score of 85, whereas those over 50 had an average score of 61 (P<0.001). In addition to age, fracture pattern is also an important determinant. Type 1 fractures (medial clear space (MCS) >5mm on stress view only) had an average ankle score of 89, Type 2, (MCS>5mm but <10 mm) 76, and Type3 (MCS>10 mm or presented with fracture dislocation) 61. Further analysis demonstrated that older patients tend to sustain a type 3 injury and were treated surgically. Our data support that type 1 and 2 fractures can effectively be treated non-operatively.

Date: 2009-10-30
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ANKLE SYNDESMOTIC INJURY - AN ANATOMIC FIXATION

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INTRODUCTION: Treatment of syndesmotic ankle injury remains controversial. The goal of the treatment is reduction and operative stabilization. Conventional rigid screw fixation interferes with the normal motion at the distal tibiofibular joint. The ideal implant should stabilize the syndesmosis and allow physiologic micromotion and early mobilization. The purpose of our study was to review the early results of ankle syndesmotic fixation using the Tightrope Syndesmosis Device. **MATERIALS AND METHODS:** From April to September 2006, 59 patients had open reduction and internal fixation of ankle fractures in our department. 16 out of the 59 patients had a syndesmotic injury, which was fixed using the Tightrope syndesmosis device. All patients were immobilised in a below knee backslab for two weeks and allowed to weight bear as comfortable once the wound healed. All patients were assessed postoperatively using the American Orthopaedic Foot and Ankle Society hindfoot scoring system. **RESULTS:** The average age of the 16 patients in our study was 37 years. Mean follow up was 24 months. Mean AOFAS score was 86. Mean time to full weight bearing was 4.5 weeks. Two patients had postoperative superficial wound infection, which was treated with oral antibiotics. One patient had the tightrope removed due to irritation from the knot. There was no failure of fixation with the implant remaining intact, despite being allowed to weight-bear at an early stage. **CONCLUSION:** In this initial series, the results of the Tightrope syndesmosis fixation are promising with high patient satisfaction and a satisfactory outcome.

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ANKLE ARTHRODESIS USING AN EXTERNAL FIXATOR - STILL UP TO DATE?

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There are different techniques for arthrodesis of end-stage arthrosis of the ankle-joint. Internal fixation is the favoured method in many institutions. We retrospectively examined the technique and results of external fixation in a triangular frame. PATIENTS / METHODS: From 1994 to 2001 a consecutive series of 95 patients with end-stage arthritis of the ankle joint was treated. Mean age at the index-procedure was 45.4 years, 67 patients were male (70.5%). Via bilateral approach the malleoli and joint-surfaces were resected. An AO-fixator was applied with Steinmann-nails. Follow-up-examination at mean 4.4 years included a questionnaire and a clinical examination including the criteria of the AOFAS-Score and radiographs. RESULTS: In 2 cases, due to contracture, a pes equinus position had to be accepted. In 2 cases a further bone transplant was performed at 6 and 9 weeks for unsatisfactory bony union. After mean 12.3 weeks, radiographs confirmed satisfactory union and the fixator was removed. In 4 patients a non-union of the ankle-arthrodesis developed (4.5%). The mean AOFAS score improved from 20.8 to 69.3 points. Statistical analysis of the insurance status showed that patients insured under a workers-injury compensation-scheme had a mean score of 63.6 compared to 75.1 ($p=0,027$). DISCUSSION: Non-union rates and clinical results of arthrodesis by triangular external fixation of the ankle joint do not differ to internal fixation methods in literature comparison. The complications and the reduced patient comfort reserve this method mainly for infected arthritis and complicated soft tissue situations.

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PERCUTANEUS SCREW FIXATION OF THE DISPLACED CALCANEAL FRACTURE

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The treatment of intraarticular calcaneal fractures is controversial. The recent reported data of large series recommended open reduction and internal fixation (ORIF). However the extended lateral approach for the ORIF is often associated with partial flap necrosis. To evaluate the advantages of the percutaneous technique a series of patients was treated prospectively with this technique. MATERIAL AND METHODS: 60 consecutive patients with displaced intraarticular calcaneus fractures were treated with the technique of closed reduction and percutaneous cannulated screw fixation. Depending on their associated injuries and local soft tissue condition most patients were operated either within 24 hours following their injuries. Ambulation using crutches without weight bearing was allowed after the second postoperative day and passive physiotherapy and active exercises in the ankle joint was started in all patients. Partial weight bearing was allowed after four weeks and full weight bearing after eight weeks. RESULTS: The average follow-up period was 4 years. The functional evaluation performed according the Maryland Foot Score. Patients with fractures of Sanders Type II had considerably better outcomes (90% excellent / good) than individuals suffering dislocated fractures with severe damage of the articulating surface (Sanders Type III) with 70% good results. CONCLUSION: Displaced intraarticular fractures of the calcaneus require anatomic reduction with stable internal fixation to minimize the chances for good joint function. The percutaneous approach decreases the surgical risk and may minimizing scar formation, possibly leading to improved outcome. Comparing the recent literature the technique of closed reduction and percutaneous screw fixation is even good as ORIF.

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MALUNITED OS CALCIS FRACTURES: TREATMENT BY A COMBINED SALVAGE TECHNIQUE

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BACKGROUND: Displaced intra-articular calcaneal fractures are not uncommon. If treated conservatively, a malunion of the os calcis fracture can result. These patients later develop a painful foot due to secondary subtalar arthrosis and find it difficult to wear shoes. Many salvage techniques have been described including sliding osteotomy and fusion and distraction subtalar arthrodesis. **PATIENTS AND METHODS:** Six cases met the inclusion criteria for this study. A combined technique was used, including three steps: lateral osteotomy, calcaneal osteotomy and then subtalar fusion. There were four males and two females. Average age was 28.5 years (22-36), and average follow-up was 12.33 months (6-24 months). Patients were assessed using the AOFAS score pre and postoperatively. Each patient was examined clinically and radiographs taken at each visit. **RESULTS:** The osteotomy site united in all patients. Sound subtalar fusion was attained in all patients. The overall appearance of the foot improved in five out of six patients. Lateral pains were abolished in all, and hindfoot broadening improved in five out of six patients. All except one patient were satisfied with the technique. All patients could go back to work. **CONCLUSION:** This combined technique can be used to salvage a malunited calcaneal fracture. Proper patient selection is mandatory to ensure patient satisfaction and improve the functional outcome.

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LATERAL TRANSMALLEOLAR APPROACH IN TALAR FRACTURES: PRELIMINARY STUDY

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Osteochondral lesions of the talus are rare but can cause side effects, as they affect young and frequently pass unnoticed. This work focuses on fresh fractures, sitting at the lateral part of the talus dome, treated with a lateral transmalleolar approach. This is a retrospective study of six talus osteochondral fractures in five patients. In three cases, there was a fracture of the lateral malleolus associated, which allowed access to osteochondral lesions, and in three cases an original osteotomy of lateral malleolus was performed, with two cuts, witch cross each other just above the level of the talocrural joint, preserving the syndesmosis. Osteochondral lesions were treated by resorbable pins or biological glue. Four patients had good or very good subjective result and one patient a medium result, after a median of 20 months. Articular mobility were good in all patients, there was a radiological osteoarthritis in a patient on six. The interest of this osteotomy is the respect of soft tissues, especially the tibiofibular interosseous ligament and the anterior tibiofibular ligament. The posterior tibiofibular ligament can be cut, if absolutely necessary, to obtain good exposure. The reconstruction is easy, with one or two lag screws and a plate, with better bone-healing than a diaphyseal osteotomy. There is no syndesmosis instability. Osteotomy of the lateral malleolus may also be used in future for mosaicplasty in chronic lesions of the lateral part of the talus.

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METHOD OF TIBIO-CALCANEO-NAVICULO ARTHRODESIS AFTER COMMUNATED FRACTURE AND DISEASES OF THE TALUS

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12 patients with comminuted fracture and diseases of the talus have been observed within 10 years. The age of patients was between 7 and 75 years. All patients underwent astrogalectomy with tibiocalcaneal arthrodesis. After surgery the in 7 patients had shortening of the lower extremity from 4 till 8cm. We used a new method of tibio-calcaneo-naviculo arthrodesis in 5 patients. Operation is performed from two sides with resection of medial and lateral malleolus at the joint level. After astrogalectomy and debridement in patients with osteomyelitis the damaged cartilage of tibia, calcaneo and naviculo bones was removed. The resection of articular cartilage in tibia front and back edges was performed in patients with comminuted fracture -dislocation of talus. At the edge of the navicular bone a slot was made. The second slot was towards made through facies articularis talaris posterior. Thus, the back edge of tibia was inserted into the slot in the heel area and the front one into the slot of the navicular bone. The fixation was performed by the Ilizarov device. 3-4 months later the fixator was removed. Our 4 year studies have shown that all patients had no pain. The method permits early weight bearing. The described method permits to considerably reduce shortening and deformity in the arthrodesis area. Patients can use usual footwear with an arch supporter and with a heel compensating shortening.

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TAILOR-MADE SURGICAL GUIDES FOR ORTHOPEDIC APPLICATIONS

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The quality of medical diagnosis and surgical treatment related to joint pathologies has improved significantly by exploiting computer-aided intervention and biomedical simulations for accurate diagnosis and surgical planning. Computer-assisted techniques for knee surgery have previously been shown to provide increased accuracy and/or precision. However, because of the additional technical challenges and major investment costs, these computer-assisted surgical techniques are not widely available for clinical use. This paper describes the use of individual templates as an easy-to-use and cost-effective alternative to virtual planning and computer-aided applications in orthopedics. Human joint simulations usually start by reconstructing three-dimensional (3D) meshes of the joint tissues (bones, cartilages, etc.) from CT or MRI images. The principle of individual templates is to customize surgical templates based on these 3D reconstructions of patient-specific morphology. After a virtual plan is made in a patient's specific 3D environment, the surgical plan can be transferred into the operating theatre by means of a surface-matched drilling template, created using rapid prototyping technology. A number of surgical examples are presented: total knee arthroplasty, hip resurfacing, corrective osteotomies of the knee and applications in hand surgery.

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SAW CUT ACCURACY IN KNEE ARTHROPLASTY: AN EXPERIMENTAL CASE CONTROL STUDY

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INTRODUCTION: The correlation of limb mal-alignment to early aseptic loosening in total knee arthroplasty (TKA) is well established. Navigated TKA has heightened awareness of mal-alignment in conventional TKA, as well as providing an accurate means of measuring alignment per-operatively. **AIM:** To assess cutting error, and examine the Hypotheses: 1. Slotted osteotomies are more accurate than Un-Slotted. 2. Second pass of the saw blade improves the accuracy in TKA. **METHOD:** A total of 96 osteotomies were performed in 3 pairs of fresh frozen human knees, and the accuracy of these was measured using a clinical navigation system. The error (Difference between the achieved resection, and the planned resection) in each osteotomy was measured. **RESULTS:** Slotted Tibial osteotomies are more accurate in the sagittal ($p=0.01$) and coronal ($p=0.04$) planes. Second pass osteotomy reduced variability in Femoral ($p=0.07$) and Tibial ($p=0.17$) osteotomies. Second pass osteotomy reduced variability in Femoral ($p=0.07$) and Tibial ($p=0.17$) osteotomies. **DISCUSSION:** The bone cutting process is prone to high levels of random error that can result in implant mal-alignment, and thus predispose to aseptic loosening. Navigated TKA gives the operating surgeon the opportunity to check each osteotomy, and correct any error where necessary. In conventional TKA, the authors recommend the use of dual pass slotted osteotomies, for optimum accuracy.

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CONTINUOUS MONITORING AND FEED BACK OF PARTIAL WEIGHT BEARING WITH A NEW TELEMETRIC GAIT ANALYSIS DEVICE

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INTRODUCTION: Patients going through a rehabilitation period after joint or bone surgery can be mobilized with partial weight bearing (PWB) of the affected lower extremity. The aim is to restrict weight bearing when indicated by the treating surgeon. PWB is commonly performed by the use of forearm crutches. In today's clinical practice, the patient is learned by therapists under static conditions to put weight on his leg, gradually to a target load. Previous authors described this training as insufficient. A device to provide concurrent and postresponse feedback was investigated. **METHODS:** We constructed a forearm crutch designed to measure all relevant loads, computing the data according to a special algorithm and immediately feed back the result to the patient acoustically. Additionally a vibration alarm is harboured by the handles. Both an upper and a lower load bearing limit can be predefined. To investigate the patients ability to perform PWB we evaluated patients immediately after primary knee arthroplasty with switched off feed back alarms. All patients were mobilized with PWB of half body weight. **RESULTS:** We investigated 16 Patients, 12 males and 4 females. The mean body weight was 85 kg (53-101 kg). The forearm crutches were in continuous use for 3 days (2-7). In total, 6.160 gait cycles were performed (56-1078, mean 385). Overloading was measured in 331 gait cycles per patient (9-1022) and broken down in steps of 5 kg. **CONCLUSION:** Following our results, even hospitalized patients under physiotherapeutic training are not able to perform prescribed PWB.

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SERUM IL-6, C-REACTIVE PROTEIN, ERYTHROCYTE SEDIMENTATION RATE, AND KNEE SKIN TEMPERATURE AFTER TOTAL KNEE ARTHROPLASTY

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OBJECTIVES: Knee osteoarthritis is a common cause of severe pain and functional limitation. Total knee arthroplasty is an effective procedure to relieve pain, restore knee function, and improve quality of life for patients with end stage knee arthritis. The aim of this study was to investigate the inflammatory process in patients with severe osteoarthritis before surgery and in subsequent periods following total knee arthroplasty. **METHODS:** A prospective study of forty-nine patients undergoing primary total knee replacements was conducted. The patients was evaluated by monitoring serum interleukin-6 (IL-6), C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), knee skin temperature, and clinical status. Measurements were carried out preoperatively and postoperatively at 2, 6, 12, and 24 weeks during follow up review in the knee clinic. **RESULTS AND CONCLUSIONS:** The serum IL-6 and CRP elevate in the first postoperative week but fall to pre-operative values at 2 weeks. Both remain within normal limits at 12 weeks. In addition, the ESR rises postoperatively and remains elevated up to 24 weeks. The difference in skin temperature between operated and contralateral knees had a mean value of +4.5 °C at 2 weeks. The mean value decreased to +3.5 °C at 6 weeks, +2.5 °C at 12 weeks, and +1.0 °C at 24 weeks. The difference in skin temperature decreases gradually but remains statistically significant up to 24 weeks after surgery. A sustained elevation in serum IL-6, CRP, ESR, and skin temperature must raise the concern of early complication.

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ELEVATED TEMPERATURE TRENDS AFTER TOTAL KNEE ARTHROPLASTY

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The purpose of this study was to define the trend of postoperative body temperature in patient undergoing total knee arthroplasty. We reviewed the charts of 186 clinically uncomplicated patients to record the changes of body temperature in the first 5 days after the operation and search the factors affecting it. The average peak temperature was 37.9°C, a 3.3% increase from the preoperative baseline, 36.7°C. The patients with lower hemoglobin loss showed higher peak temperature. The temperature elevation was most remarkable on postoperative day 1 and 2, but only 4 patients experienced fever up to 39°C. Our study illustrated the elevated pattern of the body temperature after uncomplicated total knee arthroplasty and disclosed the loss of hemoglobin might be the affecting factor.

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DECREASE IN PARTICLE-INDUCED OSTEOLYSIS IN OVARIECTOMIZED MICE.

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Post-menopausal osteoporosis is a common disorder that results from increased osteoclastic activity caused by estrogen deficiency. Whether post-menopausal bone remodeling can alter the response to particulate debris is not known. The purpose of this study was to evaluate the bone response to polyethylene particles in an estrogen deficient murine model. PE particles were implanted onto the calvaria of seven wild-type mice and seven ovariectomized (OVX) mice. Calvaria from unimplanted wild-type and OVX mice served as controls. Calvaria were harvested after 14 days. Skulls were analyzed with a high-resolution micro-CT and by histomorphometry after staining with Stevenel blue and picrofuschine, and for tartrate-specific alkaline phosphatase. As assessed on micro-CT evaluation, particles induced significant decrease of bone thickness in wild-type mice ($p=0.04$), while bone thickness was stable in OVX mice with particles ($p=0.40$). The osteoclast number per mm total bone perimeter was in wild-type animals with particles 2.84 ± 1.6 and 1.74 ± 1.3 in OVX animals with particles ($p=0.004$). Mean bone loss in wild-type mice was $-12\pm 10\%$ while mean bone loss was $-4.7\pm 0.9\%$ in OVX animals with particles ($p=0.004$). Particles induced a diminished osteolytic response in OVX mice, suggesting that estrogen deficiency may have a protective role against particle-induced bone resorption. These important new findings may help to stimulate clinical studies which may define criteria to better identify patients at risk to develop particle-induced osteolysis.

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EXPERIMENTAL MODEL OF PARTICLE-INDUCED PERIPROSTHETIC OSTEOLYSIS - MICRO-SCANNER EVALUATION

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Our objective was to evaluate particle-induced osteolysis both histologically and with the use of a microscanner in a murine model. Commercially pure polyethylene (PE) particles were implanted onto seven C57BL/J6 mice calvaria after EtO sterilization. Seven mice were operated without particle implantation (sham group). After one week, animals were sacrificed. Skulls were analyzed with a high-resolution micro-CT to evaluate bone volume (BV) and tissue volume. The undecalcified calvariae were embedded in methylmethacrylate and sections were obtained. Sections were stained with Stevenel Blue and picrofuschine and a serial section stained for tartrate-specific acid phosphatase-positive osteoclasts. Mean bone thickness (ratio bone thickness/tissue thickness), sagittal suture area and osteoclasts number were measured. As assessed on micro-CT, particles induced a significant decrease in bone volume in PE-treated mice, in comparison with sham animals ($p < 0.05$). Fibrous and granulomatous scar tissue overlying the calvariae was observed on histological sections. Quantitatively, the mean bone thickness was $60 \pm 9.5\%$ (range, 42-80%) in PE-treated mice, in comparison with $48 \pm 10\%$ (range, 23-73%) ($p < 0.0001$) in sham mice. The sagittal suture area and the osteoclasts number both considerably increased after particles implantation. MicroCT data significantly correlated with histomorphometry. By implanting PE-particles onto mice calvaria, we experimentally modeled a bone reaction very similar to the one observed in peri-prosthetic osteolysis. Both microCT and histological tools allowed us to accurately evaluate particle-induced bone resorption.

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DECALCIFICATION OF RAT TIBIA ON BENDING STRENGTH AND FAILURE MODE

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The aim of this study was to examine the relationship between amount of decalcification and bone strength and the different modes of failure that occur. 40 rat tibias were harvested and split into 4 groups, each containing 10 tibias. Group A, the control group, underwent no decalcification. Group B, C and D underwent 7, 14 and 21 hours of sonification in 10% ethylene diamine tetra-acetic acid (EDTA) respectively. The tibias were loaded in four-point bending at a rate of 1N per second till failure. After structural testing, the ash weight of half the tibias was calculated. The following failure stresses and ash weights were found [mean \pm SD]. Group A (control): Stress 243.5MPa \pm 59.70. Ash Weight 0.5154g \pm 0.0768. Group B (7 hours): Stress 55.48MPa \pm 22.56. Ash Weight 0.1902g \pm 0.0284. Group C (14 hours): Stress 39.13MPa \pm 21.18. Ash Weight 0.1536g \pm 0.0551. Group D (21 hours): Stress 12.15MPa \pm 12.79. Ash Weight 0.1140g \pm 0.0616. It was noted that different modes of failure occurred in the groups. Group A failed on the tension side resulting in a full thickness fracture. Group B failed on the tension side resulting in partial fracture. Group C failed on compression side with tearing on tension side. Group D suffered local buckling. In addition to the well known relationship between bone strength and mineral content there is also a clearly observed relationship between mineral content and mode of failure.

Date: 2009-10-30
Session: Symposium: Vascularized Composite Tissue Allotransplantation
Time: 1030-1200
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Abstract number: 22747

VASCULARISED BONE ALLOTRANSPLANTATION

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Transplantation of vascularized bones and joints is a novel approach in composite tissue allotransplantation (CTA). From 1995 to 2004 our group performed three vascularised femur diaphysal and six knee joint allotransplantations. Indication for knee transplantation was a combined injury consisting of massive cartilage and bone loss, deficient extensor mechanism and soft tissue defects in a young patient. Knee joints were harvested from multi-organ donors (MOD). The surgical procedure included dissection of the femoral artery and vein, transection of muscles and osteotomy of femur, tibia and fibula. The graft was inserted at the recipient site and fixed by intramedullary nails. Next, vessels were anastomosed and tendons reconstructed. Immunosuppressive medication consisted of antithymocyte globulin (ATG), Methylprednisolone, Azathioprine and Cyclosporin A, or Tacrolimus and Mycophenolate Mofetil (MMF), respectively. One graft was lost due to surgical site infection at five weeks, another because of non-compliance of the patient, who discontinued his immunosuppressive medication. In four cases late rejections lead to necrosis and graft dysfunction after 15, 16, 24 and 46 month, respectively. Exit-strategies were arthrodeses in two and above knee amputation in four patients. Vascularized bone and joint allotransplantation is technically feasible, but many unsolved questions remain. Outcome of knee grafts was inferior to that of hand transplants. One explanation could be that the graft was not visible and so rejection episodes were not detected and treated by adjusting immunosuppression. Non-compliance of one patient lead to graft rejection after 2.5 years. This illustrates that life-long immunosuppression with all its risks and complications is mandatory at the moment. The ultimate goal in CTA-research is to achieve tolerance. By tolerance, immunosuppression can be ceased after a short episode post surgery. One way to induce tolerance is by macrochimerism, which has so far only been shown in a rodent model.

Date: 2009-10-30

Session: Symposium: Vascularized Composite Tissue Allotransplantation

Time: 1030-1200

Room: Pattaya 11

Abstract number: 22748

RISKS OF LONG-TERM IMMUNOSUPPRESSION AND NEW PERSPECTIVES IN VASCULARIZED COMPOSITE TISSUE ALLOTRANSPLANTATION

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Vascularized composite tissue allotransplantations have many potential indications in Orthopaedics and Traumatology. The current need for immunosuppression to prevent rejection keeps most surgeons from performing such interventions. However, the true long-term risks of immunosuppression, as used in hand transplantation, are unknown. Three categories of side effects have been identified: metabolic side effects, opportunistic infections and malignancy. There is also a significant risk of non-compliance, especially in young patients. Tolerance (indefinite donor-specific allograft acceptance without the need for chronic immunosuppression) induction, although achieved in rats and mice, has not yet been obtained clinically. When a protocol for the induction of tolerance becomes a clinical reality, composite tissue allografts will certainly become a therapeutic option for multiple indications in a greater number of patients. Tolerance can be attained by exposing the immature immune system of the recipient to donor cells. Such an approach could potentially allow composite tissue allografts for certain congenital conditions. Several strategies have been developed for tolerance induction in adult animals and possibly humans, and the role of vascularised bone transplantation seems crucial, in combination with various immunological manipulations. There are other possible methods to reduce the risks of immunosuppression, including tacrolimus monotherapy as used in the last American hand transplantations and in laryngeal transplantation.

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FOOT BONES TUBERCULOSIS

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50 cases of foot bones tuberculosis are presented to show different patterns of clinical & radiological presentations. Varying patterns can be mild spontaneous inflammation as small isect bite to multiple sinuses, rheumatoid type, sequestrum, erosion or simple thickening or tenosynovitis or cold abcess without obvious bony involvement. In presence of sinuses even histology will be misleading. This foot bones tuberculosis is mostly seen in poor people as compared to other regions of body. This may be because of poor hygiene of foot & repeated foot trauma in poor people. All patients respond well to anti TB drugs. No one required major surgery except fnac, open biopsy & curettage etc. CT scan, mri, bone scan can help but poor people may not afford & in poor countries it may not be available in periphery. Strong clinical suspicion is primary. In multiple non healing sinuses in pyogenic infection one must give a course of anti tubercular drugs, as it may be mixed infection, even histology may be misleading & if it is tuberculosis with superadded secondary pyogenic infection, the response can be amazing & sinuses can heal & amputation may be avoided. Response to chemotherapy for tuberculosis is much better than pyogenic infection. The diagnosis of this entity is missed initially in more than 90% because of variable clinical presentation routinely, which the treating doctor may not be accustomed even in countries where it is endemic. Various patterns of foot bones tuberculosis are presented to impress that if diagnosed in pre-destructive stage a near normal foot can be restored.

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SKELETAL TUBERCULOSIS AT LOCAL SITE FOLLOWING FRACTURE FIXATION WITH IMPLANT

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Instances of prosthetic joint infection due to Mycobacterium Tuberculosis have been reported in the literature, but none around fracture fixation implants, following fixation of closed/open fractures. We report six such cases. MATERIAL AND METHODS: Six cases (age range 25-65 years) of long bones fractures all operatively stabilised. Two patients showed gradual loosening of implants with osteolysis without any external discharge 4-6 months after surgery. Four patients developed discharging sinus(es) and induration after 4-12 months of surgery. None had fever. Diagnosis was established by tissue diagnosis (n=2) and PCR for mycobacterial tuberculosis (n=4). RESULTS: All patients put on anti tubercular chemotherapy for 18 months. Secondary procedures were done in 5 cases. Clinical improvement was observed within three months in all cases. In all patients fractures united. No recurrence of infection in any case in follow up 2-14 years. CONCLUSION: In endemic zones of tuberculosis, about 85% of individuals harbor dormant Mycobacterium Tuberculosis. We speculate that decreased immunity in response to trauma, allowed reactivation of latent bacteria at distant focus, with subsequent seedling at the implant site because of decreased host tissue response at local site secondary to trauma/surgery in these patients. We suggest that tuberculosis should be kept in mind as a possible cause of deep infection following implant surgery, in endemic zones for TB. In zones where tuberculosis is not endemic, patients with persistent, recalcitrant, or atypical infection, following implant surgery, should undergo laboratory investigations for local Mycobacterium Tuberculosis infection.

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TREATMENT OF NEUROLOGICAL COMPLICATIONS IN TUBERCULOSIS OF THE SPINE

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STUDY DESIGN: Role of anterior decompression and stabilization of the spinal column in advance spinal tuberculosis. **OBJECTIVES:** (1) to evaluate the role of surgical debridement and decompression of the spinal cord and neural elements. (2) To evaluate the stabilization of spinal column by autologous bone graft and anterior-lateral instrumentation. **METHOD:** Total sixty seven patients were admitted with active tuberculosis of the spine with neurological deficit between 2000 and 2005. Thirty eight cases with advanced neurological damage were treated surgically by anterior debridement and decompression of the spinal cord and inter-body fusion by autologous bone graft. The rest of the patients were treated only by anti-TB chemotherapy, spinal brace, and rest. **RESULTS:** These thirty eight patients had a mean follow up of 49 months. At the final follow up 89.4% patients had complete neurological recovery and 4 complete paraplegia (ASIA-A) cases recovered to functionally useful neurological stages. All but one case have significant neurological recovery with stable spinal column with to some degree of kyphosis deformity. There were no major complications or instances of graft resorption and failure except one graft slippage. **CONCLUSION:** The results of our series are very encouraging. We believe decompression and stabilization of spinal column with chemotherapy has a better neurological outcome and less chance of residual kyphosis.

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HYDATID DISEASE OF THE CERVICAL SPINE: A REPORT ON 8 CASES
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Hydatid disease (echinococcus granulosus) rarely affects the musculoskeletal system, the reported incidence is 1%. It is benign parasitic infestation but it behaves like a malignant lesion when involving the Spine. The least part affected in the Spine is the cervical region. We present 8 cases involving the cervical spine with a variable degree of damage and destruction. Age range between 16-67 years neurological deficit was a constant findings, MRI was very useful tool for the diagnosis. All had surgical treatment in addition to albendazole for several months; the outcome of treatment depends on the primary damage and the duration of the disease.

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OUTCOME OF TWO-STAGE REVISION FOR PERIPROSTHETIC INFECTION OF TOTAL KNEE ARTHROPLASTY

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Total knee arthroplasty has greatly improved the quality of life for many individuals and is one of the most successful operations currently available. Although the prevalence of infection after total knee arthroplasty has decreased during time the economic impact, the morbidity, and emotional trauma of prosthetic joint infection is immense and devastating to the patient and society. This study retrospectively reviewed 350 consecutive patients with periprosthetic knee infections treated with a two stage revision protocol over a seven year period at Mayo Clinic, Rochester. The initial treatment plan was a two-stage revision followed by replantation if clinically indicated. Outcome indices analyzed were reinfection after replantation, amputation/arthrodesis, and permanent resection. Of the 350 patients 58 had reinfection after replantation, 9 patients had permanent resections or an arthrodesis, 11 patients had an amputation and 47 patients were treated with chronic long-term antibiotic suppression after the replantation surgery. We retrospectively correlated 35 patient variables with outcome parameters and tried to define risk factors for reinfection after a 2 stage revision for infected total knee arthroplasty. Among several variables that were associated with an increased risk for reinfection BMI and previous surgery for infection were the two most important predictors of reinfection after replantation. These results should be of help on counseling patients regarding their prognosis when faced with 2stage exchange for infected total knee arthroplasty and provide a basis for future comparisons.

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TAUROLIN-GEL FOR DEAD SPACE FILLING IN INFECTED TOTAL JOINT REVISIONS

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The aim of this study is analyze of different methods of dead space reduction in treatment of infected complications of total joint replacement. METHODS: Follow-up results of 249 operations for treatment of infected hip and knee joints have been studied. Patients were observed from 3 to 12 years. 3 groups have been allocated. The first (87 patients) has been formed by patients with early infection after total joint arthroplastics. In this group only debridement of necrotic tissues were performed. The second group (53 persons) consists of patients with chronic infection. All these patients carried out the one-stage revision. The third group included 119 patients with two stage revision and articulating spacer using. In each group two variants of dead space reduction- muscular tissue tamponade or filling of articular cavity by Taurolin-Gel 4% were performed. RESULTS: In all groups the infection recurrence was observed at 21 patients (8,43 %). The best results in patients with early infection and in cases of two stage revisions were noted. Filling of the joint cavity by Taurolin-Gel in difference from it muscular tissue tamponade reduced frequency of repeated infected complications in 1,6 times. DISCUSSION: Taurolin-Gel is not only a haematoma displacer, but it also a good antibacterial agent. It creates antimicrobial depot directly in the pathological center. Besides, Taurolin-Gel reduces postoperative blood loss for approximately 30%, causing mechanical haemostasis by the tamponade. In difference from filling of a joint cavity with muscular tissue, using Taurolin Gel are much easier technically and more effective biologicly.

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PREVENTION OF STAPHYLOCOCCAL BIOFILM MEDIATED ORTHOPAEDIC IMPLANT INFECTION - A NEW ROLE FOR BETADINE (POVIDONE-IODINE)

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Despite the improvement in the surgical practice, prosthetic infection rates continue to rise. More than 50% of these infections are caused by staphylococcal biofilm mediated infection. The current study determined the minimum inhibitory concentration (MIC) of betadine and investigated its effect on biofilm formation and the encoding genes. It also investigated whether bacterial adherence and biofilm formation can be prevented by coating implant surface with betadine. **METHODS:** Biofilm assay was performed in 96-well polystyrene plates. Total RNA for cDNA synthesis was isolated from bacterial at different twofold dilutions of betadine concentrations. Real time polymerase chain reaction was used to quantify effects of betadine on gene expression pattern of the *icaADBC* operon. Bacterial was cultivated on prosthesis coated with different sub-inhibitory doses of betadine to assess surface adherence. **RESULTS:** The MIC of betadine was 1.4% for all bacterial strains. A step-wise reduction of biofilm was observed at increasing sub-inhibitory doses of betadine ($p < 0.0001$). Decrease in *icaA* expression was strongly associated with an increase in expression of the biofilm repressor gene, *icaR* ($p < 0.001$). There was no biofilm formation on implants surfaces coated with MIC dose of betadine. **CONCLUSION:** This study shows that *icaR* is a potential therapeutic target through which the ability of Staphylococcal bacterial to form biofilm may be reduced. The current clinical in use dose of betadine should be reviewed. Prevention of bacterial surface attachment as demonstrated by this study is suggestive that these compounds could be developed as a surface coating agents for orthopaedic implants.

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ARTHROSCOPIC DIAGNOSIS AND TREATMENT OF SEPTIC ARTHRITIS OF THE HIP

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Arthrotomy is considered the standard treatment for septic arthritis of the hip. This may be complicated by AVN or postoperative hip instability. Arthroscopic treatment of this condition is still not an established technique despite its minimally invasive nature and being associated with low morbidity. A three portal arthroscopic technique was used for drainage, debridement and irrigation in 13 patients with septic coxarthrosis. Continuous intraarticular irrigation was not performed, nor was decompression drains used. All patients were treated with intravenous antibiotics for three weeks, followed with oral antibiotics for an additional minimum of three weeks. The patients were followed for 1-7 years. Staphylococcus aureus was identified in four of the six patients. All patients had a rapid postoperative recovery. The mean Harris Hip Score at the last review was 97.5 points. All patients had a full range of motion of the affected hip. No complications occurred with this group of patients. Three directional arthroscopic surgery combined with large volume irrigation is an effective treatment modality in cases of septic arthritis of the hip. It is less invasive than arthrotomy, and offers low post surgical morbidity.

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LIMB TO LIFE THREATENING DIABETIC FOOT: COMPARATIVE SEMIOLOGY, MANAGEMENT, CASE-AMPUTATION AND CASE-FATALITY RATE IN LOW INCOME COMMUNITIES

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Limb to life threatening diabetic extremities are frequently misdiagnosed with subsequent wrong treatment. The aim of this paper was to report and discuss a comparative imaged semiology of these lesions with their case-amputation and case-fatality rates. We undertook a prospective study and management of severe diabetic feet. Our criteria for gangrene were circumferential discoloured to darkish lesion with intense pain and distal impure palsy. Gangrenes were qualified as dry if the lesion was dehydrated; as wet if it was oedematous with no crepitation and as gaseous, if both last signs were present. Necrosing soft tissue infections were defined as an island discoloured to darkish painful lesions, with a conserved distal sensitivo-motor testing. It was differentiated as necrosing fasciitis, if the necrosis was deep to the fascia; or as necrosing cellulites, if it was limited to the skin or sub-cutaneous tissue. Acute extensive osteomyelites was defined as diffuse but non necrotic infection with an exposed bone or a positive probe-to-bone test. A standard work-up was undertaken. Emergency multiple stages amputation was indicated in cases of gangrenes, advanced or failed debrided necrosing fasciitis, and acute extensive osteomyelites. Debridement was indicated in cases of necrosing soft tissue infections. The wound assessment and dressing were done daily; the end point of the follow up was the wound healing or the death of the patient. Fifty-six patients were observed with various rates of the 7 types of lesions; the diagnosis, the treatment as well as the case-amputation and case-fatality rates are discussed.

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ANTIBIOTIC IMPREGNATED DECALCIFIED BONE MATRIX CHIPS AS LOCAL ANTIBIOTIC DELIVERY VEHICLE IN PYOGENIC OSTEOMYELITIS - AN EXPERIMENTAL STUDY

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INTRODUCTION: Development of a grafting material which also provides a high, effective concentration of desired antibiotics at the site of the wound with no systemic side effect is the ideal mode of treatment in chronic osteomyelitis with bony defects. We studied the effectiveness of the antibiotic impregnated decalcified bone matrix chips in an experimental model of MRSA osteomyelitis in rabbits. **MATERIALS & METHODS:** A unicortical 6mm diameter defect was created in the distal femur metaphysis of 18 rabbits bilaterally. After contaminating the wound with an infective dose of MRSA, rabbits were divided into three groups. The group I rabbits received no graft. The group II rabbits were grafted with plain DBM chips and group III rabbits were implanted with antibiotic impregnated decalcified bone matrix chips. All the rabbits were assessed by clinical, radiological, histological, gross autopsy examination, and bacterial load assay. **RESULTS:** Group 1 rabbits developed pyogenic osteomyelitis in 4 weeks. Group II rabbits showed persistent infection at grafted site and DBM chips were not incorporated. Group III rabbits showed vancomycin concentration above minimum inhibitory concentration for MRSA strains upto 4 week. The antibiotic impregnated DBM chips were eventually incorporated and new bone was formed in all rabbits of group III without infection. **CONCLUSION:** The antibiotic impregnated DBM chips were effective as local antibiotic delivery vehicle in preventing intramedullary MRSA infection in rabbit pyogenic osteomyelitis model. These DBM chips eluted vancomycin locally upto four weeks above minimum inhibitory concentration and graft uptake was 100% in all group III rabbits.

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AUTOLOGOUS CHONDROCYTE TRANSPLANTATION WITH COLLAGEN TYPE I HYDROGELS FOR ARTICULAR CARTILAGE REPAIR

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Autologous chondrocyte transplantation (ACT) has become an established method for the reconstruction of defined articular cartilage defects. A variety of matrix-based technologies using different scaffold materials is currently available. Since 2003, more than 1200 patients have been treated with a collagen type I hydrogel (CaReS® technology) as a cell carrier. In a prospective multicenter study the outcome of the CaReS® technology was investigated. Between 2003 and 2008 116 patients have been recruited. The inclusion criteria were based on the ICRS (International Cartilage Repair Society) criteria. The International knee documentation score (IKDC) as well as the general patient and doctor judgement have been analyzed before, 3, 6, 12, 24, 36, 48, and 60 months after surgery. The mean follow-up in the 116 patients was 30.7 months with an IKDC of 70.5. Over the 60 month follow up period the IKDC score was 42.4 (before surgery), 47.3 (3 months), 59.3 (6 months), 68.7 (12 months), 70.4 (24 months), 70.7 (36 months), 68.8 (48 months) and 73.2 (60 months). Patients with an osteochondral defect showed better results (IKDC 80.4) compared to patients with chondral lesions (IKDC 68.2). Patients with defects bigger than 4 cm² showed an IKDC of 72.8 while patients with defects smaller than 4 cm² showed an IKDC of 69.6. Concerning the defect site best results were found for defects of the condyle (IKDC 66.7) compared to defects of the patella (IKDC 61.7). The general patient and doctor judgment showed in 79.4% and 85.3% very good and good results, respectively. In summary, the results are comparable with those which have been archived with the classical technique or matrix-based technologies using collagen or hyaluronic acid sponges.

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REPAIR ARTICULAR DEFECT WITH TISSUE-ENGINEERED CARTILAGE - A CLINICAL TRAIL ON HUMAN

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Allogeneous osteochondral transplantation has been used, especially for sports injury, and 60%-88% good/ excellent results have been reported at 4.5-7.8 years of follow-up. Transmission of diseases and immune rejection are pitfalls of the technique. Autogenous osteochondral transplantation was used by Hangody et al. to treat focal osteochondral defects. Among patients, 91% good to excellent results were noted after 3 years of follow-up. The disadvantage of this technique is poor integration of cartilage between the recipient site and chondral graft and hypertrophy of the chondral graft, which resulted in an irregular joint surface. Since 2005, we have been cultivating mesenchymal stem cells (MSCs) in atelocollagen with or without transforming growth factor beta (TGF β) for repairing full-thickness cartilage defects in animals. The MSCs were size-sieved from bone marrow and proved to be multipotent. Preliminary results showed that the cartilaginous tissue induced from MSC by TGF- β could certainly repair full-thickness cartilage defects, as did the pure MSCs, although subchondral bone could not be restored by MSCs. We are fortunate to have a good tissue practice (GTP) cell manufacturing facility at the Biomedical Engineering Research Laboratories in the Industrial Technology Research Institute, Shinchu, Taiwan. We have had ten patients with chondromal defects on the femur treated with cartilage tissue induced from autologous MSCs. This might be the first trial using tissue-engineered cartilage to treat chondral defect. We expect that the results will be as good as those of mosaicplasty.

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AUGMENTED AUTOLOGOUS CHONDROCYTES IMPLANTATION WITH BONE MARROW MESENCHYMAL STEM CELLS

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INTRODUCTION: Autologous chondrocytes implantation (ACI) is the treatment to restore hyaline cartilage. However, ACI is limited in large defects due to the capability of matrices synthesis. The stem cell has the potential in cartilage repair. This study aimed to evaluate the effects of BMSCs in co-culture with chondrocytes in cell proliferation and matrices synthesis. MATERIALS AND METHODS: The BMSCs and chondrocytes were isolated and co-cultured in media at 37° C, 5% CO2 in air. The number and cell morphology were evaluated at 3, 7 days comparing to the control. The RT-PCR was done to evaluate the chondrocytes markers (collagen type I, II, X, Aggrecan, SOX-9) at 3, 7 days. The BMSCs and chondrocytes were co-cultured and seeded into the collagen scaffold, and evaluated for chondrocytes markers. RESULTS: The co-culture showed better cell differentiation. The number of cells increases 40% more comparing to the control. The RT-PCR of chondrocytes from co-culture showed tremendous increasing of collagen type II, X, Aggrecan, SOX-9 at 3, 7 days. The BMSCs from the co-culture showed tremendous increasing of Aggrecan, SOX-9 at 3, 7 days. The significant increasing of collagen type II, X was showed at 7 days. The collagen type I synthesis decrease significantly in both BMSCs and chondrocytes. The same results were showed in the cells seeded with scaffold. CONCLUSION: BMSCs can be the chondrocytes progenitor cells. BMSCs have the potential to enhance chondrocytes proliferation, differentiation, and matrices synthesis. The increasing in cells and matrices can provide the better hyaline cartilage for large defects.

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CULTIVATED AUTOLOGOUS CHONDROCYTE IMPLANTATION OF THE ANKLE AND KNEE JOINTS

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INTRODUCTION: The deep defects of hyaline cartilage of the knee and ankle joints were treated by autologous chondrocyte implantation (ACI) using solid chondrografts that were fixed in place by fibrin glue. **MATERIAL AND METHODS:** 95 patients were operated from June 2003 to January 2009. The surgery was performed on patients with hyaline cartilage injuries, chondropathie grade III and IV according to Outerbridge, patients with unicompartmental osteoarthritis grade II to III and osteochondritis dissecans (OCD). Clinical tests and MRI controls were scheduled: immediately before the operation; two months after the operation; and one, three and five years after the operation. We cultivated autologous chondrocyte implants from 28 to 42 days. Chondrografts were implanted and fixed in place by fibrin glue. **RESULTS:** Patients showed a significant improvement of their clinical condition six months after the surgery ($p < 0,001$). Additional improvement was detected second year after the surgery ($p \ll 0,1$ following Lysholm, Tegner, and Meyers scores), but later during the third year no more improvement was detected ($p \gg 0,1$). Evaluation of autologous chondrocyte implantations in ankle and knee joints showed that more than 75% of cases improved on the scale from excellent to very good and no worsening of the condition was found. **CONCLUSIONS:** Autologous chondrocyte implantations of the ankle and knee cartilage in most cases yielded significant improvement of patient clinical condition. MRI evaluation confirmed good to excellent integration of the chondrograft in the place of the original defect.

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ASSOCIATION OF IL-6 (-174) G/C GENE POLYMORPHISM WITH KNEE OSTEOARTHRITIS

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OBJECTIVES: Osteoarthritis is characterized by degeneration of cartilage. A single nucleotide polymorphism has been described at position -174 of IL-6 promoter region, leading to three possible genotypes, GG, GC, and CC. This polymorphism has been associated with incidence and/or prognosis of a variety of diseases including chronic inflammatory disorders. The purpose of this research was to study the association between IL-6 (-174) G/C polymorphism and susceptibility to and severity of knee osteoarthritis in a Thai population. **METHODS:** Genomic DNA was obtained from 44 patients with knee osteoarthritis and 100 ethnically matched healthy controls. Polymerase chain reaction-restriction fragment length analysis was used to identify G/C polymorphism at position -174 in the promoter region. Genotype distributions and allelic frequencies of IL-6 (-174) G/C polymorphism were compared between osteoarthritis patients and healthy controls. In addition, the standard Kellgren-Lawrence grading score were used to determine the radiological severity of the disease and their relationship with the IL-6 (-174) gene polymorphism was investigated. **RESULTS AND CONCLUSIONS:** Genotype distribution and allelic frequencies of (-174) G/C polymorphism in the IL-6 gene differed significantly between patients with knee osteoarthritis and controls ($p < 0.05$). The (-174) G/C polymorphism in the IL-6 gene may contribute to susceptibility to or severity of knee osteoarthritis in the Thai population. These findings support the notion that variations of genes encoding for cytokines, such as IL-6, could play a critical role in the series of events responsible for the pathogenesis of osteoarthritis.

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IRAK-4-SPECIFIC siRNA INHIBITS THE EXPRESSION OF MMPs IN IL-1BETA-INDUCED HUMAN OSTEOARTHRITIC CHONDROCYTES

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OBJECTIVE: Interleukin-1β (IL-1b) was the main cytokine responsible for the signs and symptoms in osteoarthritis (OA) patients. IRAK-4 is essential in mediating IL-1 receptor signaling. This study was to use IRAK-4-specific siRNA to inhibit the expression of MMPs in IL-1b induced human OA chondrocytes, and therefore to explore a new gene therapy for OA. **METHODS:** Human OA cartilage was obtained from patients with OA receiving the knee arthroplasty. Chondrocytes were released by collagenase II. siRNA was transfected by Lipofectamine. Total RNA and protein were extracted from the cells or supernatant, and RT-PCR and western blot were performed to detect the content of IRAK-4 mRNA and protein. **RESULTS:** After 48 h of RNAi with siRNA, the mRNA expression of MMP-1, 3, 9, 13 induced by IL-1b for 24 h was down-regulated in OA chondrocytes treated with siRNA88-106, siRNA631-649, siRNA733-751 or siRNA904-922, among which siRNA904-922 exhibited the strongest suppression effect. MMP-9 protein increased with time after treated with siRNA904-922 for 48 to 168 h and IL-1b for 24 h. MMP-1 protein maintained the same level from 48 to 120 h, and increased slightly at 144 and 168 h. 25 nmol/L siRNA904-922 began to suppress MMP-3 protein, the concentration of 50, 75 or 100 nmol/L inhibited MMP-3 protein apparently, but showed no obvious differences between three concentrations. **CONCLUSIONS:** IRAK-4-specific siRNA904-922 can inhibit the expression of MMP-1, 3, 9, 13 in IL-1b-induced human OA chondrocytes. This suggests that IRAK-4-specific siRNA904-922 has potential to be a useful therapeutic agent for human OA.

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THE RELATIONSHIP BETWEEN THE IN VIVO MEASURED STIFFNESS AND THE HISTOLOGICAL STAGE OF DEGENERATION OF HUMAN KNEE ARTICULAR CARTILAGE

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PURPOSE: To determine the relationship between the in vivo indentation stiffness and histopathological degeneration of human knee cartilage. **MATERIALS AND METHODS:** Cartilage compressive stiffness was measured in 98 patients during in vivo knee arthroscopies. The age of the patients ranged from 21 to 63 years. The measurements were performed at eight standard sites. No chondropathic or grade I. chondropathic surfaces were measured. Artscan 1000 was used for in vivo measurements. Four plugs were harvested from each knee for histological analysis. The stage of cartilage degeneration was assessed according to Mankin score. **RESULTS:** Lateral femoral condyle stiffness (mean + SD; 5.12 +,-1.02N) was greater than all other sites and was significantly greater than mean values obtained for medial femoral condyle (4.8+,-1.22N); medial and lateral trochlea (4.2 +,-0.92, 4.6 +,-1.27N), medial (3.1 +,- 0.66N) and lateral patella (3.3 +,- 1.01N); and medial and lateral tibial condyle for all subjects (2.4 +,- 1.17N and 3.2 +,- 1.16N). The dynamic modulus of the normal or mildly degenerated cartilage correlated negatively with the Mankin score: r (Spearman) = -0.823, n = 348. **CONCLUSION:** The high negative correlation between stiffness and the Mankin score suggests that the stage of cartilage degeneration can be quantitatively and indirectly assessed with a hand-held instrument during arthroscopy.

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REPEATED CYCLES OF INTRA-ARTICULAR SODIUM HYALURONATE (500-730 KDA) IN FAILED CONSERVATIVE TREATMENT OF KNEE OSTEOARTHRITIS: A 54-MONTH FOLLOW-UP

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BACKGROUND: Results Intra-Articular Sodium Hyaluronate showed that repeated cycles of IA-HA (500-730 Kilodalton, Hyalgan) within 2-years follow-up improved symptoms and delayed surgery oa knee knee. This was a continued study to follow-up responded patients. **PURPOSE:** To evaluate the incidence of TKR in OA knee intra-articular sodium hyaluronate treatment during a 54-month follow-up period. **METHODS:** This was a prospective cohort study. All patients received. The incidence of TKR was recorded. The Kaplan-Meier survival analysis was performed. **RESULTS:** 183 patients were recruited during March 2001-2004 and f/u until October 2008. Patients were classified into three groups according to radiographic assessment. There were 46 patients in group 1 (narrowing joint space), 70 patients in group 2 (bony attrition) and 67 patients in group 3 (lateral subluxation). Number of patients who not required TKR in group 1, 2 and 3 were 37 (80.4%), 45 (64.3%) and 49 (73.1%). The overall incidence of TKR was 28.4% with mean time to TKR of 15.4 months (range 0.7-51.7 months). The rest of patients who had not performed TKR during study period, the mean follow-up time was 45.6 months (range 19.0-53.1 months). According to the survival analysis, mean survival time was 42.1 months (95% confidence interval, 39.4-44.9 months). **CONCLUSION:** The results of this study exhibited efficacy of repeated cycles of intra-articular sodium hyaluronate treatment in delay time to TKR in patients with knee osteoarthritis who failed conservative treatment over a 54-month follow-up period.

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EFFECTIVENESS OF INJECTABLE HIGH VISCOSITY CROSS-LINKED POLYMER (NOLTREX) FOR TREATMENT OF OA KNEE

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AIM: To confirm the effectiveness and safety of intraarticular injection of sinovial fluid with new 100% synthetic polymer material ('Noltrex') for osteoarthritis treatment (OA). MATERIALS AND METHODS: Study included 512 patients, predominately female (3:1 ratio), with a mean age of 57.2 years. Patients assessed by Kellgren and Lawrence radiological grading system are the following: grade I -17% (70 patients), II - 37% (151 patients), III - 38% (155 patients) and IV - 8% (32 patients). All the patients met at least four of the six Altman criteria for the diagnosis of knee OA. Noltrex was administered as a course of three 2,5 ml injections weekly. Assessments were performed at screening, at baseline (prior to the first injection), and at 3, 6.9, 12, 18, and 24 months after the initial injection. Only acetaminophen was permitted for rescue analgesia, up to 4 g daily. Only 408 of 512 (77%) completed follow-up, and two patients discontinued because of an adverse effect (effusion in the injected knee, possibly treatment related). RESULTLS: All groups experienced statistically significant and clinically important improvements from baseline ($P<0.0001$). Despite the fact that the condition of patients in 104 week was the same or close to the condition before treatment, approximately 92% of patients reported some degree of satisfaction with treatment and approximately 80% reported being either satisfied or very satisfied in all study groups.

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Session: Research Tissue Engineering
Time: 1530-1730
Room: Pattaya 11

Abstract number: 22455

INFLUENCE OF RESVERATROL ON INTERLEUKIN 1 β STIMULATED HUMAN SYNOVIOCYTES

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INTRODUCTION: Resveratrol is an antioxidant with antiinflammatory potency. Interleukins (IL), Tumor Necrosis Factor alpha (TNF alpha) or Colony Stimulating Factors (CSF) have influence on cells of the immune-system but also on Fibroblasts and Chondrocytes. Especially IL1 beta and TNF alpha play a pivotal role in pathogenesis of Osteoarthritis (OA) and Rheumatoid Arthritis (RA). This study shows the influence of Resveratrol on IL1 beta stimulated Synoviocytes of OA and RA patients. **METHODS:** Random biopsies of synovial membrane were obtained aseptically from joints of OA and RA patients. The cells were treated with 0 μ M, 50 μ M, 100 μ M and 200 μ M of Resveratrol. After stimulation with IL1 beta immunoassays were performed to measure the influence of Resveratrol on IL 6, IL 17, GM-CSF and VEGF. After 24 hours incubation cell proliferation assays were done. Additionally photographic documentation of resettlement of synovial cells was accomplished. **RESULTS:** The treatment with Resveratrol showed a high significant reduction of synovial cells proliferation rate. In OA Synoviocytes 200 μ M of Resveratrol evoked a proliferation rate decrease of 72,3 \pm 1,7% (***) . In RA cultures 200 μ M of Resveratrol evoked a decrease of 77,7 \pm 1,8% (***) . The results of photographic documentation correlated with cell experiments. The immunoassays showed an inhibition of proinflammatory factors. **DISCUSSION:** Resveratrol evokes a growth rate decrease and inhibition of proinflammatory factors in synovial cells. In OA and RA pharmacologic treatment with these antioxidants may be a therapeutic approach.

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NOVEL FACTORS WHICH PROMOTE PROLIFERATION AND CHONDROGENESIS OF ADULT MESENCHYMAL STEM CELLS AND THEIR APPLICATION TO THE TREATMENT OF DEGENERATIVE MUSCULOSKELETAL DISEASES

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Adult mesenchymal stem cells are an abundant source of self renewing, multipotent undifferentiated cells which can be readily isolated from bone marrow, adipose tissue, muscle, etc and expanded in culture. The ability of these cells to differentiate into bone, cartilage, tendon and other cells of the mesenchymal lineage under appropriate environmental stimuli offers the potential for the regeneration and repair of the musculoskeletal system. Using human allogeneic immunoselected mesenchymal precursor stem cells (MPC) we have identified novel factors which enhance their proliferation and differentiation into chondrocytes. Bone marrow derived immuno-selected Stro-3+ allogeneic MPC were prepared using a method we described previously and established in micromass cultures in DMEM containing 10% FBS and maintained at 37 degrees C in 95% air/5% CO₂ for 2 days. Thereafter, media containing 0, 0.1, 0.5, 1.0, 2.5, 5.0, 10.0, 20.0 micrograms Pentosan Polysulfate (PPS), Hyaluronic acid (HA) or Dextran sulfate (DS) was cultured with the cells. Experiments were terminated 2, 6 and 8 days later. Replication of cells was determined by incorporation of ³H-Thymidine into DNA, Proteoglycan (PG) synthesis by incorporation of ³⁵S into PGs, type II collagen by immunostaining and HA synthesis by an ELISIA. Although HA mildly stimulated PG synthesis at <1 microgram/mL, PPS exhibited a strong dose dependent increase in DNA, PG, Coll-II and HA levels up to 10 micrograms/mL. DS was inactive. The combination of PPS and MPC is now under study for the treatment of OA and degenerative disc disease.

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TRANSPLANTATION OF AUTOLOGOUS MESENCHYMAL STEM CELLS (MSC) IN TREATMENT OF NON-UNIONS

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The prolongation of fixation in these cases depends on the efficacy of osteogenesis and reconstruction in the area of the graft. A new method of treatment of non-unions (Patent # 2006117605) using biograft with autologous MSC was devised. After resection of fragments and open reduction into prepared groove were placed the grafts, which covered the area of non-union. This method is used in treatment of 9 patients (10 segments) from 25 till 59 y.o. with non-unions of tibia and femur. X-ray and computer tomography were made in dynamic. For comparison was examined the group of patients that underwent grafting of non-union by demineralised bone graft without MSC. Of all the cases of grafting using MSC the thickness of bone tissue in implant went progressively on. Consolidation developed mainly through the bone graft in which development of compact bone went usually quicker than in cases of grafting without MSC, in which consolidation went mainly through strong periosteal callus. External fixation time constraints after bone grafting with MSC varied from 3 till 5 months with full recovering of weight-bearing. These time constraints are the same as those of the fractures of the same localization, while in auto- and allografting they are higher in 1.5-2 times. The preliminary results allow us to suppose not only osteoinductive influence but also osteoconductive purpose in recovering of bone integrity.

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Room: Pattaya 11

Abstract number: 20720

GROWTH PROMOTING IN VITRO EFFECT OF SYNTHETIC CYCLIC RGD-PEPTIDES ON HUMAN OSTEOBLAST-LIKE CELLS ATTACHED TO CANCELLOUS BONE

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In tissue engineering, the application of biofunctional compounds on biomaterials such as integrin binding RGD-peptides has gained growing interest. Anchorage-dependent cells like osteoblasts bind to these peptides thus ameliorating the integration of a synthetic implant. In case sterilized bone grafts are used as substitutes for reconstruction of bone defects, the ingrowth of the implanted bone is often disturbed because of severe pretreatment such as irradiation or autoclaving, impairing the biological and mechanical properties of the bone. Here, we report for the first time on the in vitro coating of the surface of freshly resected, cleaned bone discs with synthetic, cyclic RGD-peptides. For this approach, two different RGD-peptides were used, one containing two phosphonate anchors, the other peptide four of these binding moieties to allow efficient association of these reactive RGD-peptides to the inorganic bone matrix. Human osteoblast-like cells were cultured on RGD-coated bone discs and adherence and growth of the cells analyzed. Coating of bone discs with RGD-peptides did not improve the adhesion rate of osteoblast-like cells to the discs but significantly (up to 40 %) accelerated growth of these cells within 8 days after attachment. This effect points to pretreatment of bone implants, especially at the critical interface area between the implanted bone and the nonresected residual bone structure, before re-implantation in order to stimulate and enhance osteointegration of a bone implant.

Date: 2009-10-31
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Time: 0800-0930
Room: Hall A1

Abstract number: 21530

THE SAFETY AND EFFICACY OF ROUTINE PERI-OPERATIVE NSAIDS PROPHYLAXIS FOR ECTOPIC BONE FORMATION AFTER HIP REPLACEMENT SURGERY [HIPAID] - A RANDOMISED CLINICAL TRIAL

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A double-blind randomised placebo-controlled Clinical Trial, stratified by treatment site and surgery [primary or revision] was conducted in 20 Orthopaedic centres in Australasia. 902 patients undergoing elective primary or revision THJR were randomly allocated to 14 days treatment with Ibuprofen [1200 mg daily] or matching placebo commenced within 24 hrs of Surgery. Outcomes were assessed 6-12 months after surgery and included self-reported hip pain and physical function [WOMAC], Physical performance measures and radiographic evidence of Ectopic Bone Formation. RESULTS: Six to 12 months post-op there were no significant differences between the Ibuprofen or Placebo groups for hip pain or physical function, despite a much reduced risk of ectopic bone formation associated with Ibuprofen [relative risk 0.69,95% confidence interval 0.56 to 0.83]. There was a significantly increased risk of major bleeding complications in the Ibuprofen group. CONCLUSIONS: These data, from the largest ever trial of prophylaxis against ectopic bone formation, do not support the routine use of NSAIDS after THJR.

Date: 2009-10-31
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Room: Hall A1

Abstract number: 22728
SOFT TISSUE BALANCING IN TOTAL HIP ARTHROPLASTY

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Inadequate soft tissue balancing is a major but not emphasized cause of failure in total hip arthroplasty with significant clinical implications ranging from limping to instability. There are three major issues interrelated in the concept of tissue balancing. There are biomechanical considerations, muscle damage and denervation (damage to the inferior branch of superior gluteal nerve) and pre-existing soft tissue contractures not attended properly. The biomechanical parameters of a successful total hip arthroplasty require the restoration of anatomic hip geometry and include the center of rotation the correct leg length, the offset of the prosthesis and the combined antersion of appropriate both the femoral and the ace tabular components. The center of rotation is of paramount importance and it should be always in its anatomical place. The tissue tension should be regulated with the restoration of the appropriate femoral offset through a combination of preoperative planning all intraoperative technical details. Decreased offset leads to compromised abduction function and increased resultant force of the hip with deleterious effect a cup wear rates. Increased offset moves that femur away from the pelvis, improves the soft tissue tensioning but increases the bending moment on the prosthesis in combination with increased femoral cement strains. Weakness of hip abduction can be attributed to muscle injury, damage to the inferior branch of the superior gluteal nerve or failure to establish good reattachment of the muscle flap where the lateral approach is used. Care should be taken to avoid both occurrences. The release of contractures around the hip decreases knee pain, eliminates groin pain and increases the rouge of movement. Further reduces functional leg-length discrepancy which is of major concern for the patient.

Date: 2009-10-31
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Room: Hall A1

Abstract number: 22433

AN ORIGINAL HIP NAVIGATION SYSTEM TO CONTROL LEG LENGTHENING, OFFSET AND STABILITY WITHOUT THE USE OF THE PELVIC ANTERIOR PLANE

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INTRODUCTION: Despite improvements in prosthetic design, the clinical outcome of total hip arthroplasty still has 10% failure rate after 10 years. Component malpositioning can lead to instability, impingement, excessive wear and loosening. Computer-assisted procedures are expected to improve the accuracy of component positioning, and therefore the long-term outcome. We present a hip navigation system that allows to control leg lengthening, offset and stability. **MATERIAL AND METHODS:** Because the reliability of the pelvic anterior plane (Lewinnek plane) remains discussed, we present a computer-assisted hip replacement using a functional femoral reference plane. Direction and depth of the acetabular reaming and progression of the femoral rasp are calculated by a sophisticated algorithm, as well as the components final position, in order to control leg lengthening and offset. In addition, the ROM to impingement (and therefore the stability) is continuously displayed relative to the position of the components. Simple graphical and numerical data in addition to virtual instruments displayed on the screen aid the surgeon during the entire procedure. **RESULTS:** We report cases of hip replacements performed using the subscribed navigation system in patients with preoperative leg length discrepancy and abnormal hip morphology to emphasize the value of navigation in such cases. **CONCLUSION:** The navigation system used allows accurate positioning of the components during total hip arthroplasty and enables the surgeon to control leg lengthening, offset and stability. Therefore, improved long term outcome can be expected. Longer clinical follow-up is required to confirm this assumption.

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Abstract number: 21279

ACCURACY OF ACETABULAR CUP POSITIONING USING IMAGELESS NAVIGATION

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INTRODUCTION: Correct placement of the acetabular cup is a crucial step in total hip replacement to achieve a satisfactory result and remains a challenge with free hand techniques. Imageless navigation may provide a viable alternative to freehand technique and improve placement significantly. The purpose of this study therefore was to assess and validate intra-operative placement values as displayed by the navigation unit to postoperative measurement of cup position using high resolution CT scans. **METHODS:** 32 patients underwent primary hip joint replacement using imageless navigation. The average age was 66.5 years (range 32-87). 23 non-cemented and 9 cemented acetabular cups were implanted. During surgery we aimed for 45 degrees of inversion and 15 degrees of anteversion. A pelvic CT scan using a multi-slice CT was used to assess the position of the cup radiographically. **RESULTS:** 2 patients were excluded because of dislodgement of the tracking pin. Pearson correlation revealed a strong significant correlation ($r=0.68$; $p<0.006$), for cup inclination and a moderate non-significant correlation ($r=0.53$; $p=0.45$) between intra-operative readings and cup placement. **DISCUSSION:** These findings can be explained with possible introduction of systematic error. Even though the acquisition of anatomic landmarks are simple they must be acquired with great precision. An error of 1 cm can result in a mean anteversion error of 6 degrees and inclination error of 2.5 degrees. Whilst navigation results in highly accurate cup placements in relation to inclination, anteversion of the cup can not be determined accurately.

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THR SIMULATOR - THE SOFTWARE FOR GENERATING RADIOGRAPHS OF THR PROSTHESIS

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Measuring the orientation of acetabular cup after total hip arthroplasty is important for prognosis. The verification of these measurement methods will be easier and more feasible if we can synthesize prosthesis radiographs in each simulated condition. One reported method used an expensive mechanical device with an indeterminable precision. We thus develop a program, THR Simulator, to directly synthesize digital radiographs of prostheses for further analysis. Under Windows platform and using Borland C++ Builder programming tool, we developed the THR Simulator. We built a mathematical model of acetabulum and femoral head. The data of the real dimension of prosthesis was adopted to generate the radiograph of hip prosthesis. With the ray tracing algorithm, we calculated the thickness each X-ray beam passed, then transformed to grey scale by mapping function which was derived by fitting the exponential function from the phantom image. Finally we could generate a simulated radiograph for further analysis. Using THR Simulator, users can incorporate many parameters together for radiograph synthesis. These parameters include thickness, film size, tube distance, film distance, anteversion, abduction, upper wear, medial wear, and posterior wear. These parameters are adequate for any radiographic measurement research. This THR Simulator has been used in two studies, and the errors are within 2° for anteversion and 0.2mm for wearing measurement. CONCLUSIONS: We design a program, THR Simulator that can synthesize prosthesis radiographs. Such a program can be applied in future studies for further analysis and validation of measurement of various parameters of pelvis after total hip arthroplasty.

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Abstract number: 20921

PREDICTION OF SAGITTAL PELVIC ROTATION ON PLAIN PELVIC RADIOGRAPH: A COMPARISON OF 3 METHODS IN CADAVERIC PELVIS

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INTRODUCTION: Accurate preoperative prediction of sagittal pelvic rotation could minimize errors in acetabular cup positioning when hip arthroplasty is performed. Different methods had been described by three groups of authors (Tang et al, Katada et al, and Nishihara et al) to predict sagittal pelvic rotation by parameters on a plain pelvic anteroposterior radiograph. This study compares the three described methods with the aim of providing surgeon with a better tool to predict sagittal pelvic rotation. **MATERIALS AND METHODS:** Plain pelvic anteroposterior radiographs were taken in 13 cadaveric pelves in different degrees of sagittal pelvic rotation. Measurements in radiograph according to the three described methods were performed by two orthopaedic surgeons on two occasions. Relationships between the values measured and the degrees of sagittal pelvic rotation were studied by regression analysis. The intra-observer and the inter-observer errors, and the dispersions of the values measured were also calculated and compared. **RESULTS:** The values measured according to Tang et al and Nishihara et al showed higher correlations with the degrees of pelvic rotation (Pearson coefficient $p < 0.001$: Tang = 0.88 ; Nishihara = -0.87), There were also insignificant intra-observer or inter-observer errors, and narrower dispersion with the values measured according to Tang et al (Repeated measures ANOVA > 0.05 , Standard Deviation 0.74). **DISCUSSION AND CONCLUSION:** Sagittal pelvic rotation could be predicted on plain pelvic radiograph. Among the three methods, the method described by Tang et al could best predict the sagittal pelvic rotation.

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Abstract number: 19340

PROSPECTIVE STUDY OF RED BLOOD CELL TRANSFUSION FOLLOWING UNILATERAL PRIMARY HIP ARTHROPLASTY USING POST-OPERATIVE AUTOLOGOUS BLOOD SALVAGE

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AIM: The aim of the study was to determine whether post-operative autologous salvage system affects post-operative haemoglobin (Hb) levels and reduces the need for homologous blood transfusion (HBT). METHODS: A prospective study of 211 patients who had undergone unilateral primary THR with their preoperative, post-operative Hb levels and requirement of homologous banked blood recorded. Cell Saver 5 was used post-operatively for autologous blood transfusion. RESULTS: A total 211 patients with mean age of 70 years was enrolled to the study and complete data were obtained perioperatively. The mean pre-operative and post-operative Hb levels were 137.1g/L and 105.1g/L, respectively. Twenty-four units of homologous red blood were transfused to twelve (5.4%) patients, with a mean of 0.109 units per case. There were 65 patients (29.4%) older than 75 years, with 9 patients having pre-operative Hb less than 120 g/L. Patients older than 75 years were associated with a greater use of homologous blood with those equal or under the age of 75 years (chi-squared test, $p = 0.001$). Mean of in-hospital stay was 6 days. No transfusion-related and wound-related complications were reported. DISCUSSION: Primary THR can be safely performed without requiring HBT in patients without pre-existing haematological disorder using autologous retransfusion system. This study has shown that use of an autologous retransfusion system for primary THR reduces the necessity for HBT. Post-operative blood salvage also results in lesser patients dropping their post-operative Hb level below 9.0 g/L (15.8%).

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Abstract number: 21600

EVALUATION OF SOLUBLE FIBRIN AND D-DIMER IN THE DIAGNOSIS OF VENOUS THROMBOEMBOLISM

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BACKGROUND: Fibrin-related markers such as soluble fibrin (SF) and D-dimer, are useful for the diagnosis of deep vein thrombosis (DVT). However, the evidence for using fibrin-related markers and their optimal timing to diagnose postoperative DVT are unclear. **OBJECTIVE:** To evaluate the usefulness of SF and D-dimer using the Latex Agglutination Immunoassay (LAI) for the diagnosis of postoperative DVT. **DESIGN:** Prospective cohort study. **SETTING:** Single university hospital. **PATIENTS:** A total of 207 patients (78 men and 129 women) who had total hip arthroplasty or total knee arthroplasty. **INTERVENTIONS:** DVT was diagnosed with compression ultrasonography preoperatively and on postoperative day 4. SF and D-dimer were measured preoperatively and on postoperative days 1 and 7. **MEASUREMENTS:** The sensitivity and specificity, as well as the positive and negative predictive values, of the LAI tests were calculated using the receiver operating curve (ROC). **RESULTS:** Postoperative DVT was diagnosed in 104 (50.2%) patients. The plasma SF level on postoperative day 1 was the most useful for the diagnosis of DVT, though D-dimer on postoperative days 1 and 7 was also useful. Using an SF cut-off of more than 4.00µg/ml, the sensitivity was 90.4%, the specificity was 33.0%, the positive predictive value was 57.7%, and the negative predictive value was 77.3%. **CONCLUSIONS:** SF and D-dimer are valuable screening tools for the early diagnosis of DVT after total hip or knee arthroplasty.

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Abstract number: 21764

A POOLED ANALYSIS OF FOUR PIVOTAL STUDIES OF RIVAROXABAN FOR THE PREVENTION OF VENOUS THROMBOEMBOLISM AFTER ORTHOPAEDIC SURGERY: EFFECT ON SYMPTOMATIC VENOUS THROMBOEMBOLISM AND DEATH, AND BLEEDING

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Rivaroxaban is an oral, direct Factor Xa inhibitor for the prevention of venous thromboembolism (VTE) after total hip or knee replacement (THR/TKR). In four randomized, double-blind, phase III studies, 12,729 patients received either rivaroxaban 10 mg once daily (od), subcutaneous enoxaparin 40 mg od (RECORD1-3; plus placebo in RECORD2) or 30 mg twice daily (RECORD4) after THR/TKR. Prespecified analysis of pooled RECORD data evaluated the effects of rivaroxaban on symptomatic VTE and death (composite endpoint), and bleeding, in the total treatment duration pool (planned treatment period), the total study duration pool (treatment and follow-up) and at day 12±2 (enoxaparin-controlled period) allowing unbiased assessments compared with enoxaparin regimens. Rivaroxaban significantly reduced the incidence of symptomatic VTE and death versus enoxaparin regimens in the total treatment duration pool ($p<0.001$), the total study duration pool ($p<0.001$) and at day 12±2 ($p=0.001$), and significantly reduced the composite of pulmonary embolism and all-cause death in the total study duration pool ($p=0.039$). Major bleeding rates were similar between regimens in all study pools; this was true for the composite of major and clinically relevant non-major bleeding, except in the total treatment duration pool ($p=0.039$). Rivaroxaban significantly reduced the composite of symptomatic VTE, cardiovascular events, death and major bleeding versus enoxaparin regimens (post-hoc analysis; $p=0.004$). This analysis showed that rivaroxaban significantly reduced the incidence of symptomatic events after THR/TKR, with similar rates of major bleeding to enoxaparin regimens.

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Abstract number: 22263

USE OF THROMBIN FIBRO-SEALANT IN REDUCING BLOOD LOSS IN REVISION TOTAL HIP ARTHROPLASTY

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INTRODUCTION: We undertook a retrospective audit to assess effectiveness of use of Quixil in reducing the amount of blood transfusion requirements following revision THR. **METHOD AND MATERIALS:** Quixil was used in 44 revision THR patients while it was not used in 45 revision THR patients the year before. In the quixil group, M: F = 18:26 and mean age 75.3 (range: 63 - 88 yrs). In non-quixil group, M: F = 17:28 and mean age 71.3 (range: 47 - 85 yrs). **RESULTS:** The average blood loss was 1010 mls in the quixil group vs. 1021 mls in the non-quixil group. The mean pre-op Hb in quixil vs. non-quixil group was 13.0 g/dl (range: 9.7- 16.2) vs. 12.4 g/dl (range: 8.8 - 16.2). The mean post-op Hb in quixil group vs. non-quixil group was 10.2 g/dl (range: 6.4 - 13.2) vs. 9.1 g/dl (range: 5.3 - 12.9) - a difference of 1.1 g/dl. There was a difference in the blood transfused post-operatively between the two groups 21 vs. 29 patients. Total units of blood transfused in quixil vs. non-quixil group were 60 vs. 86 (a difference of 26 units) and total units of intra-op blood transfused in quixil vs. non-quixil group were 16 vs. 23 (a difference of 7 units). **DISCUSSION:** The use of fibrin tissue adhesive in revision THR seems to be one of effective and safe means to reduce blood loss and blood-transfusion requirements.

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Room: Hall A1

Abstract number: 19896

MIS THR MINI DIRECT LATERAL APPROACH – MINIMAL OR MINIMALISED PROCEDURE?

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PURPOSE: Authors introduce their results with the one incision mini direct lateral approach to the hip discussing how minimal invasive is this method. MATERIAL AND METHODS: There were 114 one incision mini direct lateral approach performed to the hip in their department from 01.06.2003 to 31.12.2007. The average age of the patients was 57,7 (31-78) years and the male female ratio was 55/59. The average follow-up time was 44,2 (1-54) months. RESULTS: The average skin incision was 8 (6,5-9) cm. The average hospitalisation time was 3,5 (3-11) days. The average postoperative blood loss in the cases with capsular reconstruction using one drain was: 420 (150-960) ml and in the cases with capsular resection using two drains was: 790 (450-1300) ml. In the control group the postoperative blood loss was 822 (350-1250) ml. The postoperative pain was 55% less intensive in that 31 cases where patients had contralateral standard lateral approach earlier. The early rehabilitation period was lasting for 3 days in average in the MIS group. DISCUSSION: The postoperative blood loss was much less and the postoperative pain mainly due to the size of the approach was diminished, the hospitalisation time and the rehabilitation period was definitely less as well. Concerning to the final outcome of our MIS THR cases all the advantages were present as it has been reported in any other cases with one incision and two incision MIS methods.

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FEMORAL HEAD VASCULARITY AFTER SURFACE ARTHROPLASTY OF THE HIP

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OBJECTIVES: Iatrogenic devascularisation of the femoral head is as an area of concern following hip resurfacing arthroplasty, with probable implications on short-term failure and the long-term survival of the implant. Our aim was to assess the vascularity of resurfaced femoral heads using Tc-99m MDP bone scintigraphy. **MATERIALS AND METHODS:** We assessed the vascularity of 25 resurfaced femoral heads in 20 patients by comparison of pre-operative and post-operative scintigraphy images, the post-operative scans being done 9 months after the surgery. The attenuation produced by the implant in the scintigraphy images was estimated by an in-vitro study and was accounted for while assessing the post-operative scintigraphy images. **RESULTS:** Eight out of 25 hips (32%) showed less than 55% of their pre-operative uptake at a mean of 9 months after surgery and were categorized as showing reduced vascularity. The rest of the hips showed more than 70% of the preoperative uptake and were categorized as showing preserved vascularity. **CONCLUSION:** Our study reveals reduction in vascularity of the femoral head remnant as a frequent occurrence after hip resurfacing. The clinical implications of this reduction in vascularity need to be assessed at a longer follow up. Our study also highlights the role of bone scintigraphy as tool in assessing the vascularity of resurfaced femoral heads.

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Session: Total Hip Arthroplasty
Time: 1030-1200
Room: Hall A1

Abstract number: 21072

REVISION OF THE WELL FIXED BIRMINGHAM HIP RESURFACING ACETABULAR COMPONENT: RESULTS USING A NOVEL DEVICE

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The explant device has made revision of uncemented acetabular components technically easier. The design of the Birmingham Hip Resurfacing (BHR) acetabular component precludes the use of the standard explant extractor. The dual radius geometry of this socket causes impingement and damage to the curved blade of this device. A novel adaptor was designed to correct for the differential radii and enable removal of the well fixed BHR socket with the explant. We present the results of our initial experience with this device. **METHOD:** A prospective study was performed to evaluate the effectiveness of this device for revising the well fixed BHR socket. All cases were performed by a single surgeon via a posterior approach. The explant cup extractor was used with its standard centering head and curved blades. The size of the explanted cup, last reamer size and size of the implanted component were recorded. **RESULTS:** Three males and 7 females were included. Their average age was 58.1 years. Average time to revision of the BHR sockets was 24.2 months. Average explanted cup size was 51mm and final reamer size 53.8mm. Average final socket size was 54.8. Overall there was a mean 2.8mm size difference between the explanted cup and the final reamer. **DISCUSSION:** The thickness of the blade of the explant was 2mm therefore only 0.8 mm of bone was lost on average. The device enables reproducible removal of the well fixed BHR acetabular components with preservation of acetabular bone stock.

Date: 2009-10-31
Session: Total Hip Arthroplasty
Time: 1030-1200
Room: Hall A1

Abstract number: 22447

HIP RESURFACING - BONE CONSERVING SURGERY?

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PURPOSE: To compare the quantity of bone removed from the acetabulum during resurfacing hip arthroplasty versus uncemented total hip arthroplasty (THA). **METHODS:** 62 consecutive patients with osteoarthritis of the hip were prospectively studied. 24 men and 7 women aged 40 to 86 (mean, 59) years underwent Birmingham hip resurfacing. 13 men and 18 women aged 34 to 88 (mean, 61) years underwent uncemented THA using the trident acetabular cup. Obese elderly women at risk of femoral neck fracture and patients with large subchondral pseudocysts or a history of avascular necrosis of the femoral head were assigned to uncemented THA. Acetabular reamings were collected; marginal osteophytes were not included. The reamings were dehydrated, defatted, and weighed. **RESULTS:** The mean weight of acetabular reamings was not significantly different between patients undergoing hip resurfacing and uncemented THA ($p=0.57$). **CONCLUSION:** In hip resurfacing, accurate and reproducible preparation of the femoral head and neck enables the use of an appropriately small femoral component and avoids oversizing the acetabular component and removal of excessive bone stock.

Date: 2009-10-31
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Room: Hall A1

Abstract number: 21642
ANTERIOR SUPINE INTER MUSCULAR (ASI) APPROACH TO THA

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INTRODUCTION: ASI was developed, to minimize the surgical trauma and speed up recovery from the surgical procedure. MATERIAL AND METHODS: Approach to the hip is obtained through a true inter muscular, inter nervous plane between Musculus Sartorius and Musculus Tensor Fascia Latae. The first 19 cases were compared with the following 18 cases, in order to describe the learning curve. RESULTS: Mean operating time declined from 71 minutes to 60 minutes and bleeding declined from 620 ml to 350 ml. In a modified Harris Hip score first group scored 97,3% and for the second group 95,7%. In the first group 4 complications were observed: One femoral revision in a severe osteoporotic patient, one partial fracture of the trochanter major, one dislocation, one palsy of the lateral coetaneous nerve of the thigh. In the second group we had 2 complications. One patient with thigh pain, One cup revision due to failure of a press fit cup. CONCLUSION: With the anterior approach the learning curve seems to be acceptable with clinical results and an acceptable rate of complications. The effect of anterior approach to THA on rehabilitation is being investigated in a multicenter study.

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Abstract number: 21928

EARLY RECOVERY AFTER TOTAL HIP ARTHROPLASTY IMPLANTED BY MINI INVASIVE DIRECT ANTERIOR APPROACH: ISOKINETIC AND ISOMETRIC MUSCLE STRENGTH ANALYZE.

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Direct anterior approach (DAA) for total hip arthroplasty (THA) is a muscle-sparing procedure which theoretically ensures fast recovery. This preliminary study aims to evaluate recovery after THA implanted by DAA. Twelve patients classified as Charnley class A have undergone primary total hip replacement by DAA. Patients have been prospectively followed-up to evaluate early functional recovery by the Harris Hip Score (HHS) and the WOMAC questionnaire. Complementarily, periarticular muscles performances were assessed by an isokinetic system and a mechanical dynamometer. Results were compared to those of the nonoperated hips and those of a control group of 12 healthy adults. The mean HHS improved from 61/100 to 97/100 at six month while the mean WOMAC improved from 42 to 5,3. Preoperatively, no difference in muscle strength was observed between the healthy hip and the affected side. Comparing to the control group, exclusively the abduction strength was significantly reduced for both hips in the patients group. Postoperatively, as early as three months, muscle strength performances were equivalent for operated and nonoperated hips and comparable to those of the control group. Improvements of functional scores (HHS, WOMAC) after THA implanted by DAA are similar to those obtained by other approaches, but seem to be obtained earlier. Moreover, in comparison to same designed studies of THA after posterior and particularly lateral approach, muscle strength recovery seems to be faster and more complete with anterior approach. In conclusion, this preliminary study confirms the early functional recovery obtained after THA implanted by DAA.

Date: 2009-10-31
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Abstract number: 22503
COMPARISON OF MINIMAL INVASIVE APPROACHES TO HIP JOINT

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In Orthopaedic clinic, 2nd Medical school are used several MIS approaches to hip joint by 3 surgical teams. To choose the best of is very subjective and under influence of special factors. We try to compare anterior, anterolateral, lateral and posterolateral MIS approach from the view of surgical team, operating theatre team (nurses and helpers), physical therapists and patients. Results were interesting, no bigger advantage brings any approach. The most important seems to be physiological surgery, bleeding control, painmanagement and education of theatre team than length of scar. From the surgeon and patients point of view the most effective are anterior approach and posterolateral approach. Comparison in tabs is very well overlooked and understandable.

Date: 2009-10-31
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Room: Hall A1

Abstract number: 20059

BALANCE IMPROVEMENTS DURING STANCE AND GAIT FOLLOWING TOTAL HIP REPLACEMENT

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This study investigated if balance control is improved during stance and gait and sit-to-stand following unilateral total hip replacement (THR) due to osteoarthritis (OA). We examined 25 patients (mean age 67 years) before surgery and 4 and 12 postoperative. At all time points balance control for several tasks was compared with 50 healthy age-matched controls. Walking 3m, walking over low barriers, and up-and-down stairs as well as standing with eyes open, and with eyes closed on foam was tested. Before surgery, balance control during gait and sit-to-stand tasks was abnormal in all persons with severe OA of the hip, while balance during stance was similar to that of healthy controls. After THR, there was a progressive improvement at 4 and 12 months regarding most balance measurements and time needed to complete the task. Values approached those of normal controls at 12 months. However, trunk pitch and roll velocities ($p < 0.05$) were greater than controls and roll for the sit-to-stand task was also more unstable ($p < 0.05$), both indicating a remaining balance deficit. Our data suggest that persons with symptomatic hip OA have marked balance deficits in gait tasks, which may explain their increased risk of falling observed in epidemiological studies. However, THR may help these patients regain close to normal balance control for some gait tasks, as found in this study. Despite improvement, the deficit in trunk velocity control during gait may suggest that a cautious follow-up is required after THR regarding fall risk, especially in the elderly.

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Time: 1330-1500
Room: Hall A1

Abstract number: 20947

POLYAXIAL LOCKED IMPLANTS IN THE TREATMENT OF PERIPROSTHETIC FRACTURES OF THE FEMUR

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Implants with multidirectional locked screws have theoretical advantages in the treatment of periprosthetic-fractures. In osteoporotic bone they provide a high stability. We concluded a retrospective study of a consecutive series of the outcome of Vancouver B1/C femoral injuries using two specific locked-implants. From 1996-2004 we treated 58 patients with a periprosthetic fracture of the femur with a locked plate. The mean age at the index procedure was 72.4 years, 40 patients were female (69%). In 32 cases (55.2%) we saw a hip-endoprosthesis, in 21 cases (36.2%) a knee-endoprosthesis and in 5 cases both (8.6%). Outcome measures were intra- and postoperative complications, bony-union, degree of mobility and social status, Barthel-mobility-index and stand-up&go test. Union occurred in 56 cases (96.5%), twice the implant failed. We saw 4 general complications. The mean duration until full weight bearing status in these patients was 8.6 weeks. At follow-up 46 patients (78%) had maintained the same social status as before injury. Regarding the mobility status 52 patients (89%) had regained their previous level, 4 patients walking without aid before now required a cane and two patients a walking frame. The mean Barthel-Index was 85 points of 100. The mean stand-up&go time was measured as 22 seconds. CONCLUSION: Overall failure rates of osteosynthesis after periprosthetic fractures of up to 35% are reported (20). With 3.5% implant related failures and 7% general complications, the presented methods achieve bony union and mobility in a high percentage of cases.

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Abstract number: 21535

ALLOGRAFT RECONSTRUCTION IN REVISION TKA

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During 2000-2005 the 55 patients were diagnosed as a loosening TKA. The causes of loosening have been analyzed. About 60% of the patients have been diagnosed instability and infection. The 20 patients had severe bone loss (Anderson II). Allografts have been used to reconstructed femoral condyle in all 20 cases and Allograft have been reconstructed 3 cases of proximal tibia. At minimal 4 year follow up, All TKA patients have good functional and knee score. We did not find any case of infection. There were patients with allograft at femoral condyle showed partly resorption but TKA prosthesis were still well fixed. Mostly allograft reconstruction patients had larger defect than 3 cm from joint line or Anderson II or III. Only Metal wedge can not fill the defect. Allograft can contour to fit the defect and use combine with Metal wedge.

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Abstract number: 22155

REVISION WITHIN THE FIRST 5 YEARS AFTER PRIMARY TOTAL KNEE ARTHROPLASTY

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PURPOSE: The purpose of our research was to investigate the cause for revision and postoperative outcomes. **MATERIALS AND METHODS:** The subjects were composed of 18 revisions (M5/F13, mean 72years) within 5 years after primary TKA (544 knees; 3%) since 1995. Intervals from primary to revision surgery averaged 31.2 months. We examined the causes of revision, JOA (Japanese Orthopaedic Association) scores clinically and FTA radiographically. **RESULTS:** The causes of revisions were as follows; a) loosening: 10, b) malposition of components: 4, c) ligamentous instability: 2, d) infection: 1, e) unknown (pain): 1. Revised parts were as follows; 1) All components: 2, 2) Both Femoral and Tibial components: 6, 3) Femoral component alone: 2, 4) Tibial component alone: 6, 5) Patellar component alone: 1, 6) Tibial insert alone: 1. JOA scores improved from 48 to 78 points and FTA proved to be 176 degree postoperatively, respectively. **DISCUSSION:** Revision seems to be necessary by some causes such as loosening, inadequate position and abrasion of components. In our study, 8 out of 18 knees were thought to depend on surgical technique. In the case of poor bony quality, we routinely use stemmed components to prevent from sinking and loosening, and, if necessary, use metal augmentation for bony defect. The position of components and soft tissue balance were important in the primary TKA. We concluded that postoperative outcomes of revisions were almost equal to those of primary TKA and that revision surgery should be recommended in an earlier stage when symptoms occurred.

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Abstract number: 21824

EXTRA-ARTICULAR STRESS FRACTURES OF PROXIMAL TIBIA AND TOTAL KNEE REPLACEMENT

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Stress fractures may occur in patients with severe varus or valgus deformities secondary to osteoarthritis or rheumatoid arthritis; obesity, osteoporosis, knee stiffness and surgical delays further predispose stress fractures. These may be intra-articular or extra-articular distally in tibia and fibula; knee arthroplasty (TKA) in such patients requires careful planning to assess angular deformity. 6 female patients with extra-articular tibial stress fractures underwent TKA with standard cruciate substituting implants. 4 were fixed with stem extenders across fracture, 1 underwent TKA along with plating, while plate and stem extender was used in 6th case. 4 of 6 cases were overweight, with significant osteoporosis and varus deformity. All 6 fractures united subsequently; one patient with a combination of plate and stem extender had union delays as plate did not allow longitudinal subsidence at the fracture site. A stress fracture with knee OA is produced by gradually increasing varus in overweight, osteoporotic female patients. Stress reactions may be masked in the pain symptoms of OA and once a malunited or mobile fracture develops, the use of extramedullary jigs for tibial cut alignment may become a problem. Issues may arise with implant choice, but we feel that a single stage procedure to address both the knee osteoarthritis and the stress fracture is the method of choice. Stem extenders, in addition to maintaining fracture alignment, provide enough rigidity at the fracture site to allow union. The combination of a stem extender with a plate probably delays union.

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Abstract number: 21643

REVISION TOTAL KNEE ARTHROPLASTY: CLINICAL RESULTS AND PATIENTS SATISFACTION

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Revision total knee arthroplasty (RTKA) is a challenge procedure and patients' satisfaction does not always rely with clinical results. Aim of the study is to evaluate clinical results and satisfaction in patients which have had RTKA. From January 2005 to December 2007 at the Fondazione San Raffaele Giglio, Cefalù - Italy, 22 patients have had a RTKA. The three steps technique was utilised for surgery: establish tibial platform, stabilise knee in flexion, and stabilise knee in extension. We have measured function, pain, ROM, and patient satisfaction one, six and twelve months after surgery. Five patients treated for septic loosening have been excluded from the study. Seventeen patients have been evaluated. Postero-Stabilized prosthesis with intramedullary stem (CCK Nexgen, Zimmer-Warsaw) were implanted in 7 cases, and 10 were semi-constrained prosthesis (Endomodel, Link-Hamburg). One month after surgery 14 patients have had knee pain, 13 patients have bent the knee more than 90°, and 9 patients have been satisfied. Six months after surgery 10 patients have had pain, 13 patients have bent the knee more than 90°, and 12 patients have been satisfied. Twelve months after surgery 6 patients have had pain, 13 patients have bent the knee more than 90°, and 13 patients have been satisfied. Clinical and functional results in revision total knee replacement surgery evolve during the first twelve months after surgery. Knee pain has significantly decreased from 6 months to one year since surgery. Patient satisfaction is strictly related to pain and less with range of motion.

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Abstract number: 22461

COMPUTER ASSISTED SURGERY: INTEREST ON TKR - PROSPECTIVE AND COMPARATIVE STUDY

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INTRODUCTION: The goal of this study is to compare the results of total knee arthroplasty (TKA) implanted with or without computer assistance. **METHODS AND MATERIALS:** We present a prospective study, 105 patients (mean 71.5 years) divided into two groups: TKA computer assisted surgery (n=55) and classic (n=50). All the patients were operated by the same surgeon and had the same implant design. The clinical and radiographic parameters were analysed preoperatively and postoperatively (2, 6, 12 months) by one observer. A statistically analysed was done with a $p < 0.05$ as significance level. **RESULTS:** Both groups were comparable (age, sex and IMC); the computer assisted had a bigger flexion (5.32° versus 4.15° ; $p = 0.04$) and valgus (4.19° versus 3.98° ; $p = 0.04$). The surgical duration was sensibly but no statistically longer in the computer assisted surgery group (90.4 versus 95.9 min). No statistically differences according the complications and the length of hospital stay were noted ($p > 0.05$). The implant positioning was comparable (angle computer surgery HKA = $179 \pm 1.58^\circ$ versus $176 \pm 3.6^\circ$). The flexion, at 6 months was significantly better in the classic TKR (107° versus 101° , $p = 0.016$). **DISCUSSION AND CONCLUSION:** This study did not show a difference between the TKR performed with or without computer. This technique allows a better positioning of the implants and improves the reproducibility of the technique, but when the surgeon has a skilled experience the difference between those techniques isn't significant.

Date: 2009-10-31
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Abstract number: 22411

THE LEARNING CURVE IN USING IMAGE FREE NAVIGATION SYSTEM IN TOTAL KNEE ARTHROPLASTY

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Forty seven posterior stabilized total knee prostheses implanted using a computed tomography-free navigation system were compared to a control group of 47 matched total knee prostheses of the same type implanted via a classical, surgeon-controlled technique. This study examined the time needed to adopt this system. Results, including operation time, radiographic alignment of the prosthesis and complications, for the two groups were compared. The accuracy of the implantations in relation to the mechanical axis in the navigation group was superior to that of the manual group. Results show an average of 12 minutes more for the navigated surgeries. The alignment was within 3 degrees varus/valgus postoperatively, and the mean Knee Society Score improved from 27 points preoperatively to 86 points 6 weeks postoperatively. This image free navigation system has a short learning curve, and requires an additional operation time of less than 10 minutes. Precise alignment can be achieved with the aid of navigation in most cases.

Date: 2009-10-31
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Room: Hall A1

Abstract number: 21759

COMPARING RESULTS OF MINIMALLY INVASIVE TOTAL KNEE ARTHROPLASTY PERFORMED WITH AND WITHOUT COMPUTER-ASSISTED NAVIGATION

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PURPOSE: To compare minimum 1-year results between MIS TKA performed with and without electromagnetic (EM) computer-assisted navigation (CAS). **METHOD:** A consecutive series of 120 patients, of whom 60 patients, Group I, had combined MIS TKA & EM CAS and 60 patients, Group II, had MIS TKA alone were prospectively evaluated. All surgeries were performed by a single surgeon using the same MIS surgical technique, pain management and ambulation protocol. Patients' demographics, perioperative data, clinical results and radiographic evaluation were compared between both groups. **RESULTS:** The mean follow-up was 21 months. There were no differences in all preoperative variables. Group I had longer mean surgical time (113 vs 95 min, $p < 0.001$) and less mean blood in the drain (235 vs 350 ml, $p < 0.001$) than those of Group II. There were no differences in early pain scores, ambulation, serial ROMs, and KSS & functional scores at the final follow-up. There were no significant radiographic differences in the accepted coronal tibiofemoral angle (90% vs 83.3%, $p = 0.42$), accepted coronal femoral angle (93.3% vs 85%, $p = 0.24$) and accepted coronal tibial angle (86.7% vs 81.7%, $p = 0.62$). There was no major complication, or reoperation. **DISCUSSION AND CONCLUSION:** MIS TKA performed with or without CAS provided similar results. Although Group I had less radiographic component outliers than those of Group II, they were not significantly different. A significant reduction of the blood loss was only the difference found in MIS TKA & CAS group.

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Room: Hall A1

Abstract number: 21282

ALIGNMENTS OF COMPONENT IN COMPUTER ASSISTED TOTAL KNEE ARTHROPLASTY: EARLY EXPERIENCE

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BACKGROUND: Proper alignment of the prosthesis is critical in total knee arthroplasty (TKA) to minimize long-term wear, risk of osteolysis, and loosening of the prosthesis. This study examined the accuracy of lower limb alignment obtained using a computer assisted total knee arthroplasty (TKA). **METHODS:** From February 2004 to June 2007, 38 patients with knee osteoarthritis underwent 53 primary TKA operations by the same surgeon. Twenty-four of these operations were performed with the computer assisted navigation system, and the remaining 29 were performed with conventional manual methods. Radiographic alignments of the prosthesis for the two groups were compared. **RESULTS:** Patients in the computer assisted group achieved better accuracy in the coronal plane than the conventional group in terms of postoperative mechanical axis angle (1.58o vs. 3.86o). The significant results were mechanical axis deviation, tibiofemoral angle, medial proximal tibial angle and posterior slope better in computer assisted group than conventional group. The other (medial distal femoral angle and femoral flexion) were improved, non-significantly. **CONCLUSION:** In our experience, use of a computer navigation system in TKA provides better accuracy than conventional manual methods. Precise alignment can be achieved with the aid of navigation in most cases.

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Room: Hall A1

Abstract number: 21457

QUADRICEPS-SPARING, MINIMAL-INCISION TOTAL KNEE ARTHROPLASTY AT 2-YEAR FOLLOW-UP - A COMPARATIVE STUDY

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BACKGROUND: Minimal-incision total knee arthroplasty (TKA) has gained attention in recent years. Our study was conducted to compare radiologic alignment and functional outcomes with two approaches to minimal-incision TKA: the minimal-incision medial parapatellar (MP) approach with downsized instruments and the quadriceps-sparing (QS) approach with side-cutting instruments. **METHODS:** In this prospective comparative study, 60 patients (80 knees) with primary osteoarthritis were randomly assigned to receive MP or QS TKA. Radiologic alignment, surgical time, postoperative pain (scores on the visual analog scale), functional outcomes (Hospital for Special Surgery knee scores), and patient satisfaction were assessed. Isokinetic peak muscle torque was measured before, 2 months and 2 years after surgery. **RESULTS:** The preoperative, 2-month and 2-year post-operative clinical results were comparable in both groups. Postoperative alignment of the femoral component was significantly less valgus and postoperative alignment of the tibial component was significantly more varus with the QS approach than with the MP approach. One tibial outlier and three femoral outliers ($\geq 4^\circ$ deviation) were observed with QS TKA. The overall postoperative hip-knee-ankle axis was more varus and surgical time was longer with QS TKA than with MP TKA. Postoperative pain, functional outcomes, and patient satisfaction were comparable. Isokinetic peak muscle torque did not differ between the techniques. **DISCUSSION & CONCLUSION:** We demonstrated a relatively varus mechanical axis after minimal-incision TKA with the QS approach and side-cutting instruments. Postoperative pain and isokinetic peak muscle torque did not differ between the approaches at 2-month and 2-year follow-up.

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Abstract number: 22264

TOTAL KNEE ARTHROPLASTY WITH AND WITHOUT PATELLA IMPLANT - PRELIMINARY RESULTS

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INTRODUCTION: Patellar resurfacing in total knee arthroplasty remains controversial. We aim to evaluate the morbidity of the patellar resurfacing and to analyse the clinical and radiographic results of total knee arthroplasty (TKA) with or without this procedure. **METHOD AND MATERIALS:** We conducted a prospective and comparative study: 350 primary TKA, for tricompartmental osteoarthritis, divided into 2 distinct and comparable groups (140 with patellar resurfacing and 210 without) were enrolled between 2001 and 2006. The election of replace or not the patella was taken during the surgery, after checking the patella articular surface and under the surgeon point of view. Clinical and radiographic evaluation was carried 3, 6, 12, 24 and 48 months after operation. Statistical analysis was performed and a p value < 0.05 was considered significant. **RESULTS:** There were no differences between the numbers of complications after surgery (12.5% versus 12%). Length of hospital stay (11 days versus 13 days, p= 0.034) and number of blood transfusions (25.2% versus 29%, p= 0.02) were lower in patients with a patella implant. With an average follow-up of 19.9 months (12-65), the two groups were comparable according range of motion, knee pain, walking ability and radiologic data. **DISCUSSION AND CONCLUSION:** We do not defend a systematic patellar resurfacing in TKA. When there is a symptomatic femoro-patellar syndrome, a patella implant should be placed to reduce the risk of chronic knee pain even if resulting well-known complications of the implant (failure, wear, loosening) exist.

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Abstract number: 20154

CHANGE IN THE LENGTH OF THE PATELLAR TENDON; A METHOD OF ASSESSMENT WHICH CAN BE APPLIED IN PATELLO-FEMORAL JOINT REPLACEMENT

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The study aimed to establish an accurate method of assessing patella tendon length change, the method was then applied to patello-femoral replacement (PFR) patients. The shape of the patella is changed by PFR; previously described methods are flawed as they rely on the patella length as part of a ratio. We rendered radiographs to digital format with a radiograph scanner. By altering the scale of the image with image manipulation software such that two fixed bone landmarks were the same distance apart on both radiographs we corrected for differential magnification. The method was validated by adjusting and examining two lateral knee radiographs of patients taken within 6 months of one another. The method proved reproducible with mean shortening of 0.6% (range; 6% shortening to 3% lengthening). We conducted a retrospective analysis of two groups of forty patients, PFR patients and total knee replacement (TKR) patients. Immediate preoperative radiographs were compared with those one year postoperatively. Mean change in length of the tendon after PFR surgery was 0.1 % of shortening (range; 14% shortening to 11% lengthening). Only one case showed shortening over 10%. Mean shortening in TKR was 7.14% (range; 25% shortening to 7% lengthening). There was a statistically significant difference between the unoperated, PFR and TKR groups ($P < 0.001$). This method enables accurate assessment of tendon length change. This method has not been previously described, it has further potential applications. Shortening of the patellar tendon occurs less frequently after PFR than after TKR.

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FEMORO-PATELLAR PROSTHESIS FOR ISOLATED PATELLO-FEMORAL ARTHRITIS : STUDY OF 60 CONSECUTIVE CASES WITH 10 YEARS FOLLOW-UP

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BACKGROUND: Femoro-patellar arthritis (FPA) is a challenging problem. Several treatments have been described from lateral retinaculum release to TKR, with special features to patellar prosthesis. The purpose of this study was to evaluate a consecutive serie of femoro-patellar prosthesis (FPP), to learn about the late outcome, complications and performance. **MATERIAL AND METHODS:** Between 1992 and 2004, 60 prosthesis were performed in 55 patients with a mean age of 59 years; 44 were femal and 13 male, 5 had bilateral prosthesis. 62% had essential arthritis with trochlear dysplasia. 78% were graded Iwano III or IV. Resurfacing cemented Themis® prosthesis was used in all cases, with a lateral approach associated with tibial tubercle osteotomy to achieve correct alignment of extensor mechanism. None patient was lost to follow-up. **RESULTS:** Mean follow-up was 10 years (46-218 months). During study, 12 prosthesis were converted to TKR because of femoro-tibial arthritis; the mean delay between FPP and TKR was 12 years. At revision, 48 FPP were evaluated by independent examiner. IKS score raised from 106 to 157, knee score from 57 to 89 and function score from 49 to 78. Pain, ability to walk and to climb stairs were improved. Radiography did not demonstrate radio-lucent lines, wear or loosening. 95% had correct alignment of patellar button, without tilting. Survival rates of FPP were 89% at 10 years and 82% at 15 years. **CONCLUSION:** FPP is a reliable procedure. The authors recommend the use of FPP for isolated FPA, without knee diformity, with tibial tubercle osteotomy.

Date: 2009-10-31
Session: Total Knee Arthroplasty
Time: 1600-1730
Room: Hall A1

Abstract number: 20150

A NEW METHOD OF SETTING ROTATION OF THE FEMORAL COMPONENT IN PATELLO-FEMORAL REPLACEMENT SURGERY; REFERENCING THE MEDIAL MALLEOLUS OF THE ANKLE

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The study aimed to establish an accurate method of setting rotation of the femoral component in patello-femoral replacement (PFR) surgery; between 3 and 6 degrees. Rotation in PFR can be difficult to gauge due to limited exposure, the consequences of incorrect rotation include maltracking and pain. The technique involves dropping a rod through the femoral jig and then pressing its tip against the medial malleolus. The technique is based on the hypothesis that, in the presence of a normal tibio-femoral articulation, rotation of the femoral component can be reproducibly referenced from the medial malleolus. It relies on a constant relationship between the anatomical axis and length of the tibia and the transverse distance from the apex of the medial malleolus to the centre of the ankle. One hundred radiographs of tibiae (mean age 51, range 16 to 98) were examined. Both the medial malleolar bone apex and the overlying skin were used as points of reference. We there was a linear relationship between tibial length and ankle width. The angle of rotation remained between 3 and 6 degrees when measured against bone (bone: mean 4.3, range 3.4 to 5.4). When measured against skin, on only two occasions did the angle exceed 6 degrees (skin: mean 4.9, range 3.8 to 8), these elderly patients had severe ankle oedema who would not usually be candidates for PFR surgery. The dimension of the tibia are conducive to use of this method, we present examples from our cadaveric work.

Date: 2009-10-31
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Time: 1600-1730
Room: Hall A1

Abstract number: 21252

PATELLA RESURFACING DURING TOTAL KNEE REPLACEMENT: HAVE WE GOT THE ISSUE COVERED?

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INTRODUCTION: Patella Resurfacing during total knee replacement (TKR) is a controversial issue. Existing studies provide evidence supporting both resurfacing and not resurfacing during primary total knee arthroplasty. No study has established a consensus from practicing surgeons on this issue. **METHODS:** A questionnaire was developed and sent out to all registered members of the British Orthopaedic Association in an attempt to elicit their views on patella resurfacing during TKR. Results were recorded and tabulated using MS Excel. **RESULTS:** One thousand six hundred and one questionnaires were distributed. There were 760 respondents. Six hundred and nineteen respondents were included in this study. 67.3% of these were knee surgeons who performed > 50 TKRs/year. 30% of respondents had < 15 yrs experience at consultant level. Overall 28% always resurfaced the patella while 24% never resurfaced and 48% sometimes resurfaced. The patella was only sometimes resurfaced by all groups of surgeons. The highest rates of resurfacing were performed by the most experienced and high volume surgeons. **DISCUSSION:** The majority of orthopaedic surgeons occasionally resurface the patella. This is true irrespective of specialisation or experience. There is a trend for high volume knee surgeons and those with greatest experience to resurface the patella.

Date: 2009-10-31
Session: Total Knee Arthroplasty
Time: 1600-1730
Room: Hall A1

Abstract number: 21659

PATIENT SPECIFIC TEMPLATING WITH SIGNATURE SYSTEM: EARLY EXPERIENCE

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The pros and cons of navigation are well known. Results of our first 50 total knee arthroplasties with the Signature System are presented. MRI of hip, knee and ankle is performed. Mechanical axis and rotational landmarks are decided. Alignment, rotation, slope, size, positioning and gaps are planned with software. On this templating a femoral and tibial guide are custom made (Materialise) for each patient that will allow only one unique fit and position. From that stage on Vanguard Total Knee is implanted applying conventional surgical technique. Preoperative alignment measured on standing full leg X-rays. Rotational alignment set according to the epicondylar axis. Slope fixed at 3° posterior slope. Sizing done with system. Tourniquet time, blood loss, mean Hb drop, lateral release rate and hospital stay were analyzed. Postoperative full leg X-rays were analyzed. Preoperative alignment between 11° varus and 14° valgus. Sizing was accurate in 100%. Postoperative alignment accurate in 98% of cases. Malalignment was induced during cementing of the tibia, so cut was accurate. Tourniquet time 25 minutes shorter. Blood loss reduced since no medullary canals were violated. Mean Hb drop was 1,2 g/dl. No lateral releases. Hospital stay was 5 days. Extra cost for MRI and guides was 500 euros. Patient specific templating gives excellent results both clinically and radiographically. OR time reduced resulting in cost reduction. Avoiding IM rods will reduce blood loss and possible bone marrow embolisation. Especially in valgus knees this system is advantageous, helping in femoral rotational and tibial alignment.

Date: 2009-10-31
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Time: 1600-1730
Room: Hall A1

Abstract number: 19534

ANTHROPOMETRIC MEASUREMENTS OF KNEE JOINT IN INDIAN POPULATION: CO-RELATION WITH CURRENT KNEE ARTHROPLASTY SYSTEMS

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There is no data concerning morphological dimensions of distal femur, proximal tibia and patella in Indian population. The objective was to analyse the anthropometric data in Indian knees and to co-relate them with existing knee arthroplasty systems. MRI scans of 25 patients who underwent bilateral knee scans for ligament injuries were collected. Patients with arthritis, bone loss, deformity of >15 degrees & with immature skeleton were excluded. The mean age was 32 yrs. Three surgeons independently measured medio-lateral (ML), antero-posterior (AP) dimensions & aspect ratio (AR) of distal femur & proximal tibia on three occasions one week apart to account for intra & inter-observer variability. The resultant data of 50 knees was analysed using SPSS v14.0 and compared with five prosthesis knee systems (PFC sigma, NexGen, Scorpio, IB-II & Gender specific knee). The mean ML & AP for proximal tibia was 73.3±5.3 & 47.8±4.3 mm. The mean ML & AP (lateral condyle) for distal femur was 74.3±5.9 & 65.4±5.0 mm. The ML & AP showed a statistically significant positive correlation with the height of the person (ML r=0.55; AP r=0.50 & p=0.01). The tibial and femoral AR showed higher ratio for smaller knees & smaller ratio for larger knees i.e. decline in AR for increasing AP dimension. None of the prosthesis designs mimicked this decrease in AR and NexGen prosthesis in fact showed an increase in AR. These data provides the basis for designing optimal prosthesis for people of Indian/Asian origin.

Date: 2009-10-31
Session: Ankle
Time: 0800-0930
Room: Hall A2

Abstract number: 21794

MANAGEMENT OF BIMALLEOLAR FRACTURES IN YOUNG ELDERLY AGE GROUP USING MINIMAL INVASIVE TECHNIQUE

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INTRODUCTION: Ankle fractures are common in elderly age group following trivial injury and management and early mobilisation is advised so as to prevent other systemic complications. **MATERIAL AND METHODS:** Study was carried out on 40 patients with mean age of 70 yrs who under went surgical treatment for ankle fracture. The mean follow up was of 24 months. Mechanism of injury was classified according to Lauge Hansen classification, it was SER in 18 cases, PER in 12 cases, SA in 9 cases and PA in 1. ORIF with recon plate was used to fix lateral malleolus first and ORIF with 3 K-wires were used to fix medial malleolus and fragment was punched to achieve complete reduction. Post operative cast was given and patient advised non weight bearing mobilisation till radiological signs of union is seen. Robert Braid criteria were used for evaluation. **RESULTS:** Union was achieved in all. Out of the 40 cases, on basis of Roberts score 30 had excellent to good results and 10 cases had fair outcome. Commonest complication was restriction of motion and patient were put on active physiotherapy and motion improved in all. No case had any kind of infection or loss of fixation. **CONCLUSSION:** Medial malleolus fixation using K-wires have helped in fixing small fragments which are more common in elderly osteoprotic. Even problem of rotation of fragment while passing a drill bit or screws have also been solved effectively. Regaining fibular length before fixing and checking of instability is of prime importance in ankle injuries.

Date: 2009-10-31
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Time: 0800-0930
Room: Hall A2

Abstract number: 21171

OUTCOMES OF THE MODIFIED-BROSTROM PROCEDURE FOR CHRONIC LATERAL ANKLE INSTABILITY USING SUTURE ANCHOR-A PROSPECTIVE, RANDOMIZED COMPARISON WITH THE BONE TUNNEL TECHNIQUE

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PURPOSE: Prospectively and randomly to compare the clinical outcomes of modified-Brostrom procedures using the suture anchor and the bone tunnel for chronic lateral ankle instability. **MATERIALS AND METHODS:** Thirty patients were followed up for more than 1 year after modified-Brostrom procedures for chronic lateral ankle instability. Fifteen modified-Brostrom procedures with suture anchor and 15 with bone tunnel technique randomly assigned were performed by one surgeon. The clinical evaluation was performed according to the Karlsson scale and Sefton grading system. The talar tilt and anterior talar translation were measured through anterior and varus stress radiographs. **RESULTS:** At last follow-up, the Karlsson scale had improved significantly ($p < 0.01$) from preoperative average 45.2 points to 90.1 points in suture anchor group, from 44.6 to 88.3 in bone tunnel group. There were 7 excellent, 6 good, and 2 fair results according to the Sefton grading system in suture anchor group, and 6 excellent, 6 good, 3 fair results in bone tunnel group. Therefore, 13 cases (86.7%) in suture anchor group and 12 cases (80%) in bone tunnel group achieved satisfactory results. Talar tilt angle had improved significantly ($p < 0.01$) from preoperative average 17.2° to 6.3° in suture anchor group, from 15.8° to 5.4° in bone tunnel group. **CONCLUSION:** Significant differences in clinical and functional outcomes were not found between 2 techniques for ligament reattachment. Modified-Brostrom procedure using the suture anchor seems to be one of effective treatment methods for chronic lateral ankle instability.

Date: 2009-10-31
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Room: Hall A2

Abstract number: 21520

ARTHROSCOPIC AND MRI APPEARANCE AND RECONSTRUCTION OF THE ANTERIOR TALOFIBULAR LIGAMENT IN CASES OF APPARENT FUNCTIONAL ANKLE INSTABILITY

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In patients with functional instability (FI) after ankle sprain, many feel ankle instability despite their having no demonstrable lateral instability. We investigate the arthroscopic and MRI assessment of the ATFL in cases which feel FI, and to clarify the clinical results after surgical treatment. **MATERIALS AND METHODS:** 14 feet of 14 patients were included. The patients included 7 males and 7 females. The mean age at the time of surgery was 31 years. All subjects underwent MRI and ankle arthroscopy for morphologic evaluation of the ATFL. The cases which showed abnormality of the ATFL in ankle arthroscopy were treated with resection of any identified abnormal ATFL fiber and reconstruction of the ATFL with autologous gracilis tendon using the interference-fit anchoring system. **RESULTS:** Arthroscopic assessment revealed 3 cases with no ligamentous structure with scar tissue, 9 cases with partial ligament tears and scar tissue on the disrupted ATFL fiber, and 2 cases of abnormal course of the ligament at the fibular or talar attachment. MRI revealed 2 cases of false negative in comparison of ankle arthroscopy. The mean AOFAS scale score was 66.2 ± 3.2 points at pre-operation, and 92.3 ± 4.4 points at 2 years after surgery ($p < 0.0001$). **CONCLUSION:** Ankle arthroscopy and MRI are useful for assessment of the ligament condition as well for functionally assessing lateral stability of the ankle in cases of FI. Anatomical reconstruction of the ATFL is one recommendable choice for treating FI in cases with morphologic ligamentous abnormality.

Date: 2009-10-31
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Room: Hall A2

Abstract number: 21223

PERCUTANEOUS REPAIR OF ACUTE ACHILLES TENDON RUPTURE

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INTRODUCTION: Achille tendon rupture can be treated by cast but re-rupture occurs, or by open surgery, but infection is frequent. Is Percutaneous suture able to avoid these complications? MATERIAL AND METHODS: A prospective study of 60 cases of percutaneous suture for Achille tendon rupture was done from January 2001 to September 2006. Suture technic was close to the Ma and Griffith one. Local anesthesia only was enough in 48 cases (80%). Non resorbable thread was used first (18 cases), then replace until now by resorbable vicryl® (42 cases). Twenty- Eight patients practiced sport, three with high competitor level. RESULTS: Mean follow-up was 13 months (6-58). Eighty-nine percent patients return to sport activities at mean 5.2 months (3-12) at the same level in 68%. Return to work was mean 85days (15-270). One leg hop was possible in 90%, ankle was never stiffer than the other site. The repair tendon was always bigger than the other, and in all cases a lighth amyotrophy of the gastrocnemius was noted. There was no sural nerve complication. Five minor and three major complications occurred (one painful subcutaneous knot, oneAchille tendinosis, one algodystrophy and two vein thrombosis; two secondary ruptures and one deep infection). CONCLUSION: The technique is simple, reliable, cheap and gives better results than a classic open surgical procedure.

Date: 2009-10-31
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Room: Hall A2

Abstract number: 19955

SUTURE ANCHOR REPAIR OF DISTAL TENDOACHILLES RUPTURE IN THE PRESENCE OF HUGOLAND DEFORMITY

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Much research has been performed to elucidate the etiology of a rupture of the Achilles tendon, but its true nature remains unclear. Also, the best method of treatment is still fiercely debated. Some surgeons advocate operative repair, whereas others insist that an operation is unnecessary and poses an unacceptable risk. Rupture of tendoachilles in presence of Hugoland deformity has not been described in literature. **PATIENTS AND METHODS:** We had performed surgical repair of acute distal end rupture of tendoachilles in 12 patients. All patients had evident Hugoland deformity in preoperative X-ray. The surgical procedure included repair of the distal stump by transosseus suture anchors and removal of the calcanean hump. **RESULTS:** All patients achieved clinical healing of their tendons at the end of follow-up period. One case had superficial wound infection which was treated with repeated dressing and systemic antibiotic. **CONCLUSION:** Presence of Hugoland deformity in the preoperative plain X-ray of patient with clinically diagnosed rupture of tendoachilles is associated with distal level of rupture that gives good results with suture anchors repair.

Date: 2009-10-31
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Time: 0800-0930
Room: Hall A2

Abstract number: 21087

TREATMENT OF ACHILLES TENDON RUPTURE: LONG-TERM EVALUATION

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INTRODUCTION: We have a 26-year long experience and good results in the treatment of a large number of patients with Achilles tendon ruptures. We also introduced modifications to the percutaneous reconstruction of the ruptured Achilles tendon, which yielded better results, extremely low medical costs and shortened hospital stay. **PATIENTS AND METHODS:** From 1982 to 2008, a total of 1,377 patients with Achilles tendon ruptures were treated. 1,255 patients were treated operatively: 1,020 by plastic reconstruction surgery with triceps surae tip over graft. 235 patients were treated using our modified method of percutaneous procedures under local anesthesia introduced in 2001. 122 patients were treated non-operatively. There were 125 females and 1,252 males ranging in age from 18 - 65 years. The follow-up ranged from 1 to 15 years. **RESULTS:** 122 patients were treated non-operatively due to high anesthesia-related risk. After mobilization in the cast these patients had muscle atrophy, long-term weakness, joint stiffness, DVT. Patients treated with open surgery returned to previous work after 4 - 6 months and had few complications. The percutaneous surgery group recovered after 3 months and had no complications. **CONCLUSION:** Rare complications and reruptures were rare in the open surgery group were related to the surgical technique. Patients treated by our modified percutaneous method developed no complications and had no reruptures or sural nerve injury. The recovery was quick (3 months) and uneventful as compared to the open and non-operative method. The conservative method yielded poor results due to long period of immobilization.

Date: 2009-10-31
Session: Ankle
Time: 0800-0930
Room: Hall A2

Abstract number: 22186

ACHILLES TENDINOSIS RUPTURE: RESULTS OF TREATMENT WITH DEBRIDEMENT AND FLEXOR HALLUCIS LONGUS TRANSFER

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OBJECTIVE: To evaluate the functional outcomes of debridement and flexor hallucis longus tendon transfer for treatment of Achilles tendinosis rupture and postoperative morbidity of the hallux after loss of flexor hallucis longus tendon. **MATERIAL AND METHOD:** A prospective study was performed in the patients presenting with ruptures of Achilles tendinosis from January 2001 to December 2007. All of them were treated by flexor hallucis longus tendon transfer. The clinical outcomes and patient satisfaction were observed. The pre-operative and post-operative AOFAS scale for ankle-hindfoot and hallux metatarsophalangeal-interphalangeal were compared and analyzed. **RESULTS:** There were 12 patients with ruptures of Achilles tendinosis that were treated by flexor hallucis longus tendon transfer. The average age of these patient was 53.8 years (range: 45 to 65 years) and the average duration of follow-up was 13.5 months (range: 12 months to 18 months). All patients were satisfied with the clinical outcome and the AOFAS scale for ankle-hindfoot was improved significantly whereas the AOFAS scale for hallux metatarsophalangeal-interphalangeal was not affected. **CONCLUSION:** The good functional outcomes of the ankle and less morbidity of the hallux could be achieved with the use of debridement and flexor hallucis longus tendon transfer for treatment of Achilles tendinosis rupture.

Date: 2009-10-31
Session: Ankle
Time: 0800-0930
Room: Hall A2

Abstract number: 20058

THE USE OF PLATELET GROWING FACTORS IN THE TREATMENT OF CHRONIC ACHILLEUS TENDONITIS

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OBJECTIVE: The chronic tendonitis of the achilleus tendon is the most frequent of overuse syndrome of the lower limb. **MATERIALS AND METHODS:** We have used the GPF (platelet growing factors) for the treatment of this pathology to improve the inflammation, the pain and to have quicker return to sports activities. Platelet concentrate produced by the GPS® II system is derived from the patients own blood. This technology uses a centrifuge to separate out the patients own blood components by their various densities. The red blood cells (RBCs) are denser and will move to the bottom. The plasma fraction is the least dense and will float on the top layer. The buffy coat which contains the majority of platelets will be sandwiched between the plasma and above the RBCs. Platelets contain various growth factors (also called cytokines). Platelet-derived growth factor (PDGF), transforming growth factor-beta (TGF-B), insulin like growth factor (IGF), and vascular endothelial growth factor (VEGF) are several that are contained within the platelets. Platelet concentrate is obtained by the process of spinning down the patients own blood and collecting the buffy coat which contains the concentrated platelets and white blood cells. We have applied this system on 30 young sports men (football, tennis, volley, basket. etc) with chronic achilleus tendonitis. The GPF are injected in local anesthesia previous same scarification attended by needle. **CONCLUSIONS:** The results are very encouraging.

Date: 2009-10-31
Session: Ankle
Time: 0800-0930
Room: Hall A2

Abstract number: 21173

CORRECTION OF ANKLE & FOOT DEFORMITIES BY ILIZAROV METHOD

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In this study we evaluate the results of Ilizarov external fixation system without osteotomy for treatment of complex foot deformity. We managed 12 patients with 14 feet with complex deformities by Ilizarov Method. The duration of study was 02 years from April 2005 to May 2007. The range of age was 08 to 25 years. The aetiological factors were neglected or relapsed club foot (03 patients), poliomyelitis (02 patients), post traumatic (06 patients) and post operative (01 patient). A limited soft tissue dissection, percutaneous Achilles sheath tenotomy and plantar fasciotomy were done. Progressive correction of the deformities was achieved through the standard setting of the Ilizarov external fixator. The mean duration of fixator application was 4.5 months (range 03-06 months). The mean follow up period was one year. At the time of removal of fixator a plantigrade foot was achieved in 12 feet, gait was improved in all patients. There was residual varus hind foot deformity in two patients. A superficial pin tract infection was observed in all patients. No recurrence of the deformity has occurred so far. The device was used for 16 weeks on average and after removal of a short leg walking cast was used for an additional 06 weeks, followed by an ankle foot arthrodesis (AFO) for 03 months.

Date: 2009-10-31
Session: Ankle
Time: 0800-0930
Room: Hall A2

Abstract number: 21939

EARLY RESULTS OF POSTERIOR ANKLE ARTHROSCOPY FOR HINDFOOT IMPINGEMENT

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INTRODUCTION: Posterior ankle impingement syndrome (PAIS) occurs in up to 18% of the athletic population. Treatment of this condition arthroscopically has been reported from several specialist centres. Little information is available from general orthopaedic centres where the majority of the general population is seen. **AIM:** To present the early results of our initial series of patients treated with hindfoot arthroscopy for PAIS and study potential complications which can occur early in the learning curve. **PATIENTS AND METHODS:** Twenty procedures were performed on 19 patients (12 males, 7 females) between January 2006 and September 2008. Patients were followed up at an average of 7.9 months. Return to sport, patient satisfaction, relief of symptoms and the American Orthopaedic Foot and Ankle Society (AOFAS) hindfoot score were all assessed. **RESULTS:** Procedures performed include excision of os trigonum, flexor hallucis longus decompression, and microfracture of the posterior talus. The average age of our cohort was 35 years. Return to activity occurred at an average of 4 weeks. Four patients were unsatisfied due to post operative pain, 1 was unsure and all others were satisfied with their outcome. Average pre and post operative AOFAS scores were 73.8 and 84.5 respectively. No neurovascular injuries occurred. **CONCLUSION:** These results reflect the variety of conditions which can be treated using this technique. There was a significant incidence of dissatisfied patients in the absence of major complications. This might reflect technical difficulties early in the early learning curve of this procedure.

Date: 2009-10-31
Session: Plenary Lecture
Time: 0930-1000
Room: Hall A2

Abstract number: 22726

SPINE SURGERIES IN THE AGING SOCIETY

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INTRODUCTION: In Japan as an aging society, the aged have recently increased their claim for their active life of high quality. As consequence, spine surgery for them grows in number. This paper describes a recent dramatic increase of surgeries for degenerative spinal diseases and a strategy for them. **MATERIALS AND METHODS:** Tohoku University and its affiliated hospitals covering a population of about four million started registering all spinal surgeries in 1988. The total number of surgeries was 38,908 for 20 years to 2007. Degenerative spine diseases accounted for 86% of the whole series: cervical myelopathy for 21%, lumbar disc herniation for 30% and lumbar spinal stenosis for 31%. **RESULTS:** In the 20 years, the annual number of surgeries increased from 892 to 2,941, i.e., by 3.3 times. Cervical myelopathy increased by 3.1 times, lumbar disc herniation by 2.3 times and lumbar spinal stenosis by 6.6 times. As a result, the numbers of these diseases in 2007 were 572, 669 and 1,238, respectively. In the same period, the annual number of surgeries for patients aged 70 or older increased from 76 (8.5% of the whole surgeries in 1988) to 1,084 (36.9%), i.e., by 14.3 times in number and 4.3 times in percentage. Cervical myelopathy and lumbar spinal stenosis increased by 7.4 times and 24.0 times in number, respectively, and 2.4 times and 3.7 times in percentage, respectively. In contrast, patients aged 15 years or younger stayed around 30 in number. **CONCLUSION:** With the advance of the aging society, cervical myelopathy and lumbar spinal stenosis have become key diseases leading to surgery, especially for the aged over 70. Surgical procedures for degenerative diseases need to be reasonable in term of effects, invasiveness and cost.

Date: 2009-10-31
Session: Degenerative diseases-Spine
Time: 1030-1200
Room: Hall A2

Abstract number: 19854

REFINEMENT OF THE CLINICAL INDICATIONS FOR DYNAMIC NEUTRALISATION SYSTEM FOR THE SPINE FOR THE TREATMENT OF BACKPAIN

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INTRODUCTION: In this study we report the clinical outcome following Dynesys. Our objectives were to revalidate the most suitable clinical indication(s) of Dynesys. **METHOD:** A cohort study on 374 patients who had Dynesys for backpain from Septmber 2000-September 2008. Average age of patients was 57 years. Male to female ratio were (40%:60%). Preoperative assessment involved ODI, SF36, VAS for leg and backpain. The diagnosis was confirmed with radiology and spinal probe. Regular follow up was arranged at 3, 6 and 12 months then on annual intervals. In our cohort, clinical indications were: Degenerative Disc Disease (DDD) – 271 patients Spondylolisthesis - 55 patients Adjacent segment disease (ASD) - 30 patients Spinal canal stenosis - 18 patients Paired t-test was used for comparison between preoperative and postoperative scores and p-value was used to show the significance. **RESULTS:** Outcome assessment revealed significant improvement in ODI, SF36 and VAS in comparison with preoperative status (p-value < 0.05). Improvement was greatest in DDD group and average for ASD. Patients with stenosis performed better when the procedure involved adjunct decompression. Results of decompression and fusion were better than Dynesys alone in patients with spondylolisthesis. **DISCUSSION AND CONCLUSION:** 1. Dynesys was successfully controlled symptoms of DDD. 2. Dynesys can be used as surgical treatment for symptomatic ASD. 3. Dynesys alone in the treatment of spondylolisthesis resulted in a 45% re-operation rate, and we believe it should not be recommended as an indication. 4. Dynesys alone is not recommended as a treatment for symptomatic spinal stenosis.

Date: 2009-10-31
Session: Degenerative diseases-Spine
Time: 1030-1200
Room: Hall A2

Abstract number: 21275

CLINICAL OUTCOME OF LUMBAR DISC HERNIATION IN YOUNG PATIENTS (UP TO 25 YEARS OF AGE)

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Young patients with lumbar disc herniation (LDH) usually exhibit good outcome after surgery. However, some patients develop complications (e.g., progression of disc degeneration). The purpose of this study was to investigate the clinical outcome and risk factors for poor outcome in patients aged less than 25 years who underwent surgery for LDH. **METHODS:** We studied 28 patients (9 females, 19 males) who underwent discectomy for LDH. Two patients with recurrent LDH were excluded from the study. The mean age at surgery was 20.6 years, and the mean follow-up period was 43 months. We determined the pre- and post-operative JOA score and VAS score for low back and leg pain, and analyzed the clinical outcome in relation to the following risk factors: gender, level and type of disc herniation, instability, disc height, and number(s) of degenerated discs. **RESULTS:** The mean JOA score improved from 15.6 to 26.0 points, with a recovery rate of 75.1%. Based on the recovery rate, patients were divided into two groups (more than or equal to 60%: 22 cases, less than 60%: 6 cases), to compare the risk factors. There were significant differences between them with regard to gender (females, $p=0.041$) and presence of multiple degenerated discs ($p=0.041$). **DISCUSSION:** A previous study identified the level and type of LDH as risk factors for poor outcome in young patients with LDH. Our study found these factors to be less important than gender and number of degenerated discs.

Date: 2009-10-31
Session: Degenerative diseases-Spine
Time: 1030-1200
Room: Hall A2

Abstract number: 22300

RECURRENT DISC HERNIATION AND MEDICAL OUTCOMES AFTER PRIMARY LUMBAR DISCECTOMY - MINIMUM FOUR YEARS FOLLOW UP

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STUDY DESIGN: Prospective cohort study **OBJECTIVE:** A prospective cohort study, with standardized pre-operative and post-operative lumbar imaging and clinical evaluation, started six years ago in five different European countries. We collected data from all centers for first two years and only from University Medical Centre Ljubljana, for the last four years. **METHODS:** 108 patients undergoing first-time lumbar discectomy for refractory radiculopathy were enrolled. Lumbar CT, MRI, back (BP-VAS) and leg (LP-VAS) pain scores, and health-related quality of life measures (Medical Outcomes Short Form-36 (SF-36) and Oswestry Disability Index (ODI)) were assessed pre-operatively, 6 weeks, 3, 6, 9, 12 months, and every year after surgery. **RESULTS:** We found recurrent disc herniation, confirmed with MRI, in nineteen patients in first two years and eleven of them required revision discectomy at a mean of 10.5 months after primary discectomy. All recurrent disc herniation in a first six months after primary surgery were symptomatic requiring revision surgery. An improvement in outcome measures observed by 6-weeks post-operatively maintained through 48 months. **CONCLUSIONS:** Annular incision performed at surgery makes the operated disc more susceptible to sudden prolapse and recurrent disc herniation. Size of the annular defect is one of the most important risk factors for recurrent disk herniation.

Date: 2009-10-31
Session: Degenerative diseases-Spine
Time: 1030-1200
Room: Hall A2

Abstract number: 22304

IMPLANTATION OF CULTIVATED ELASTIC CHONDROCYTES AS REPLACEMENT FOR NUCLEUS PULPOSUS

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Our experiment was part of an investigation in order to find suitable tissue engineered replacement for nucleus pulposus, which would be feasible, cost effective and competent to prevent or at least delay intervertebral disc degeneration and narrowing of intervertebral disc space after discus hernia evacuation. We tested, on rabbit model, the effect of implantation of cultivated elastic cartilage derived chondrocytes on regeneration of tissue in previously evacuated nucleus pulposus. We took a small piece of rabbit ear cartilage, which was minced and chemically disintegrated. Cells were harvested and tissue engineered constructs of rabbit elastic cartilage derived chondrocytes implanted in site of previously evacuated nucleus pulposus of rabbit lumbar vertebrae. We transplanted cultured chondrocytes as well as chondrocytes harvested after tissue disintegration alone. Some transplantations were performed with cells labeled with fluorescent marker to trace them after implantation. We also tested suitable biomaterials out of which plasma - trombine gel was chosen as a cell carrier. Cells were implanted as cell suspension or on the carrier. Rabbits were sacrificed 14 days, 1 month, 3 months, and 6 months after implantation and effect of cell construct implantation in place of previously evacuated nucleus pulposus evaluated, using histological, molecular-biological and morphological investigations. We are able to confirm our hypothesis that implanted chondrocytes in site of nucleus pulposus survive and produce matrix capable of at least sustaining disc space if not even preventing degeneration of evacuated intervertebral disc.

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Abstract number: 21700

IN-VIVO KINEMATICS OF THE IVD ALLOGRAFT TRANSPLANTATION

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In a recent clinical trial of the Intervertebral disc (IVD) allograft transplantation, Ruan et al. (2007) observed remodelling of the allograft with good preservation of motion and stability of the spinal segment. It is hypothesized that remodelling of the allograft implant can restore the kinematics of the functional spinal unit. This study aims at studying the in-vivo kinematics of the patients that underwent IVD allograft transplantation. Five patients, average age 47 yrs, with cervical disc herniation underwent transplantation of fresh-frozen disc allografts after disc excision. Dynamic active flexion-extension radiographs were taken 2 months after surgery, and every 3 months thereafter to a minimum follow-up of 5 yrs. Measurement of the Center of Rotation (COR) was analyzed using an image analysis program developed in MATLAB. The results were compared to the data found in literature. Studies of the position of the COR following the operation showed that the COR position have initially deviated to the very posterior position in the early stages following surgery. However, at the final follow up all patients showed that the COR position have been restored close to the physiological position. Changes in the position of the COR at different stages following the transplantation were observed as opposed to artificial disc implants in which the position of the COR had deviated from the physiological position permanently. These changes in the position of the COR may suggest that the remodelling of the allograft may play a part in restoring the natural kinematics of the spine in the long term.

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Abstract number: 21210

ENDOSCOPY AND PERCUTANEOUS ARTHRODESIS IN RELAPSED DISCAL HERNIAS

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Relapsed lombosciaticas provoked by recurrence of a discal hernia previously operated on are the most worrying for the patient and the surgeon together. The rate is from 5 to 16%. The aim of this study is to show the updated indications of secondary surgery, by endoscopic transforaminal discectomy (ETD), by percutaneous intersomatic arthrodesis by percutaneous cages (Europa) under local anesthesia and sedation, and by open posterolateral arthrodesis (PLIF). The story of several series amongst our patients is complex: 52 at the same level, 2 at another level, 8 on a hinge, and associated with a central stenosis. In all cases, there is often an associated foraminal stenosis or a flare of the end plates of Modic type, symptomatic or predominant. The outcomes were measured with VAS and Oswestry scale. The best follow-ups were noticed with all percutaneous procedures. Percutaneous endoscopic arthrodesis is well compared with open procedures. Our indications are: -if the disc is little degenerated (less than one third of loss of intersomatic height): ETD, rarely conventional open surgery; -if the disc is degenerated, as it is most often the case: if there is an associated foraminal stenosis, or if there is a Modic 1 and/or 2, and without important radicular adhesions, indication of percutaneous arthrodesis by Europa cages; if a surgical exposure with exploration is necessary, PLIF, keeping in mind that our previous series of terminal PLIF has only 62,8% of good results after two years on 36 personal cases operated on between 1999 and 2003

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CORRELATION BETWEEN THE NANO-STRUCTURE AND MACRO-MECHANICS OF HUMAN NUCLEUS PULPOSUS

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Collagen fibrils are the main structural components of the intervertebral discs. The role played by the morphology of collagen fibrils in maintaining the mechanical integrity of the nucleus pulposus is not clear. This study aimed at quantifying the diameter of the individual collagen fibrils of the nucleus pulposus and evaluating its correlation with the bulk mechanical properties of the nucleus pulposus. Collagen fibrils were extracted from the nucleus pulposus of discs (n=7) retrieved from adolescents during scoliosis correction surgery and the extracts were confirmed by SDS-PAGE. The diameter of the individual collagen fibrils were measured through Atomic Force Microscope imaging and the compressive mechanical properties of the tissues were evaluated by confined compression. The correlations between the morphology of the collagen fibrils and the mechanical properties of the tissues were evaluated. The SDS-PAGE results showed that the collagen extracts were composed of collagen II. The mean diameter of the collagen fibrils was 92.09±26.5 nm; the mean swelling pressure and compressive modulus of the tissues were 6.15±4.3 KPa and 1.23±0.7 MPa respectively. The mean fibril diameter had no linear correlation ($R^2 = 0.295$) with the swelling pressure of the tissues. However, it had a significant linear correlation with the compressive modulus ($p=0.023$, $R^2=0.676$). This is the first study, to our knowledge, to evaluate the nano-scale properties of the individual collagen fibrils of the disc and their relationship with macro-scale mechanical properties of the disc tissues.

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Abstract number: 21346

SELF-ASSEMBLY OF CO-POLYMERIC MEMBRANES ON 3-D POROUS BIODEGRADABLE POLYMERS TO PROMOTE TISSUE-ENGINEERED BONE

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INTRODUCTION: Tissue engineering strategies that combine porous biomaterial scaffolds with cells capable of osteogenesis have shown promise as effective bone graft substitutes. However, a critical barrier to this approach is the limited transport of nutrients and metabolites within the construct interior. The aim of the study was to improve mass transport throughout 3-D constructs and modulate cell viability at the interior of the construct by self-assembly of co-polymeric membranes consisting of hyaluronan, methylated collagen and terpolymer (HEMA-MAA-MMA) on the porous biodegradable polymer scaffold. **MATERIAL AND METHODS:** Polycaprolactone (PCL) scaffolds were plotted using rapid prototyping providing a uniform and ordered microarchitecture throughout a cylindrical scaffold with $\varnothing = 10$ mm and $h = 5$ mm. hMSCs-TERT were seeded into the PCL scaffolds and encapsulated by the co-polymeric membranes. Cell/scaffold constructs were cultured for up to 21 days. **RESULTS:** The cell seeding efficiency of hMSCs-TERT in the PCL scaffold was improved significantly (t-test, $p < 0.05$) by self-assembly co-polymeric membranes within the scaffolds. Confocal microscopy showed an increasing level of cell death within the uncoated PCL scaffolds. Toluidine blue and Hoechst staining showed a highly increased cellular penetration depth (> 2 mm) and a more homogeneous cellular distribution in the coated scaffolds. The results of DNA quantification, alkaline phosphatase (ALP) activity and calcium amount are included in the study. **CONCLUSIONS:** The present in vitro study provides evidence for the effectiveness of copolymeric membranes on improving cellular seeding efficiency, increasing cellular penetration depth and improving cellular distribution in 3D scaffolds.

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Abstract number: 21882

OSTEOPOROTIC FRACTURES - THE INDIAN SCENARIO

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Today osteoporosis is the bug bear of the society. Almost 6% of the Indian population suffer from the disease. 1 in every 4 women above the age of 65yrs in India sustains a insufficiency fracture as a result of trivial fall. We present the epidemiology of the disease in Indian perspective and the treatment modalities used in our centre for individual fracture patterns, by studying 750 subjects (in total). Investigative modalities like DEXA have been used to prognosticate and evaluate the treatment efficacy, by taking pre op and follow up scans. The use of locking compression plates has led to a revolutionary change in the functional outcome of these problem fractures. In this paper we are trying to outline the use of these devices in conjunction with medical treatment in each part of the body. Ample clinical material in each part of the body has been studied over the past 3 years with evolution of the treatment protocol. Early mobilization along with stable fixation has been followed in all fracture patterns where these devices were used. Today we have 92% mean excellent to good functional outcome in each of these cases and the osteoporosis grade has also been reduced by supportive treatment. In comparison, conservative modalities of treatment have shown poorer results. The rate of implant failure in our study was found to be less than 3%. So we suggest the use of locking plates in indicated cases and all osteoporotic patients should be receive supplementary therapy.

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SURGICAL TREATMENT OF PELVIC FRACTURES

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INTRODUCTION: Unsatisfactory results of conservative treatment, prolonged bed-rest, and inadequate anatomies function rehabilitation of injured pelvic areas force traumatologists to resort to a more active surgical tactics. The aim of the work is to reduce fatality, improve functional results of the patients with severe multiple injuries. **MATERIALS AND METHODS:** 112 patients with type-B and type-C fractures were operated on. Surgical treatment was used in the following cases: rupture of pubis and sacroiliac symphysis, unstable fractures of anterior and posterior semiring, hip joint dislocation fractures, concomitant injures of lower extremity. In a combined injury EF was used as antishock and non-traumatic method at the initial stage of polytrauma treatment. EF was substituted by ORIF after state stabilization. Osteosynthesis with reconstructive plates and cannulated screws was used. Extended trans-ilioinguinal approach with the excision of iliac spine in 46 cases led to the reduction of the operation time. This approach is a modification of E Letournel type ilioinguinal approach. In cases of share-bone fractures or pubic symphysis ruptures the incision widened in mesial direction occupying the opposite side, i.e. got combined with the suprapubic approach by Pfannenstiel. **RESULTS:** In the post-surgical period 2 patients died (multiorgan failure and tromboembolism of pulmonary artery). Deep infection was present in 2 observations, superficial infection in three others. The follow-up of 77 observed patients showed 66 good results. **CONCLUSION:** To receive better results in pelvic injury treatment, it is advisable to return patients to more active surgical treatment. Expanded ilioinguinal approach allows getting anatomic reposition.

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THE RESULTS OF OPERATIVE TREATMENT OF ACETABULAR FRACTURES

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We observed the results of operative treatment in 217 patients with acetabular fractures between 1990 and 2008. Road-traffic accidents were the major causes of these traumas (86%). According to Letournel and Judet, almost half the injuries (49.5%) included fractures of the posterior wall and column, transverse type in 36.4% and both columns fractures in 10.8% patients occurred. In the majority of cases we performed ORIF from the lateral approach with greater trochanter osteotomy, while in monofragmentary marginal fractures, ORIF without osteotomy is possible. Transverse type fractures were operated from the postero-lateral approach in posterior displacement and from extended ilioinguinal approach to both columns. In transverse fractures with anterior displacement, ileofemoral approach was used. Both column fractures were operated from the lateral transtrochanteric or ileofemoral approach depending on whether the displacement was in the anterior or posterior part of the hip joint. The analysis of the results has shown that complete restoration of the acetabulum anatomy was possible in 84% of patients. We observed avascular necrosis of the femoral head in 16.7% of patients; 6% of patients had sciatic nerve injuries. In 4 cases superficial infection occurred, however it did not influence the results of treatment. Follow-up was evaluated in 198 patients from 9 months to 12 years according to the Harris Hip Score. Excellent and good results were achieved in 71% of the patients.

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AN AIMING DEVICE FOR PIN FIXATION AT THE ILIAC CREST FOR EXTERNAL FIXATION IN UNSTABLE PELVIC FRACTURE

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AIMS OF INVESTIGATION: To improve accuracy of pinning at the iliac crest and anterior inferior iliac spine during external fixation of unstable pelvic fractures, aiming devices have been designed and used in the clinic. **MATERIALS AND METHODS:** The devices consisted of 3 parts; a sleeve which could accommodate a 5.0 Shanz pin, a handle and guide points. The first aiming device was designed to fix at the iliac crest. Its guide that grasped the outer table of iliac crest was long and curved along the bone and the guide point that grasped the inner table of iliac crest was shorter and straight. The second device was designed to fix at anterior inferior iliac. Its two guide-points were equal in length. The device has so far been used in two plan external fixation in 35 patients, 26 male and 11 female, who had unstable pelvic fractures. Their ages ranged between 20 and 56 years. **RESULTS:** All patients survived. Twenty one patients underwent open reduction and internal fixation of fractures of the pelvis or acetabulum. External fixation was used as definitive treatment in the rest 14 patients. Operating time could be reduced and all pins were in the proper positions. No pin loosening was found at the time the pins removal. **CONCLUSION:** The use of these aiming devices for pinning in external fixation of unstable pelvic fractures has given encouraging results.

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Abstract number: 20894

MANAGEMENT OF NEGLECTED ACETABULAR FRACTURES IN INDIAN SENARIO

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INTRODUCTION: This is a prospective analysis of a series of displaced acetabular fractures presenting more than 14 days after sustaining the trauma. METHODS: Thirty five displaced acetabular fractures reporting >14 days after initial trauma were included in this series. These cases were initially either treated with traction or neglected. All cases were subjected to open reduction and internal fixation. The mean age of the patients was 42 years (range 23-57 years). Tri-radiate/Marylands surgical approach was employed in all cases. Trochanteric osteotomy was done if required. RESULTS: Reduction leaving displacement of <4 mm was achieved in 10 hips (29%). Good functional results were obtained in 12 patients (34%). Early complication of wound infection occurred in two cases both of which were earlier kept on skeletal traction in the femoral neck. Total hip arthroplasty was performed in 6 patients (17%) who had late symptomatic degenerative changes. CONCLUSION: Displaced acetabular fractures are complex problems. They are uncommon, and often associated with musculo-skeletal, neurologic, and multi-organ injuries. It is difficult to achieve an anatomical reduction if surgery is performed after 14 days of initial trauma. And even if near anatomical reduction is achieved an excellent/good functional outcome is unlikely. Failure to obtain accurate reduction was the most important factor leading to a poor result, but heterotopic calcification and avascular necrosis also contributes to poor results even in cases in which an anatomical reduction is achieved. However the results of surgical fixation are better than those which are managed conservatively.

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Room: Hall A2

Abstract number: 20589

RANDOMISED CONTROLLED TRIAL TO COMPARE THE UNION RATES IN TRAUMATIC FRESH INTRACAPSULAR FEMORAL NECK FRACTURES AFTER OSTEOSYNTHESIS WITH AND WITHOUT PRIMARY VALGUS OSTEOTOMY IN YOUNG ADULTS (20-50 YEARS)

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INTRODUCTION: In young adults, widely practiced method of fixation of femoral neck fractures is 3 cannulated cancellous screws. Some workers have advocated primary valgus osteotomy to decrease the rate of non-union. No randomized controlled trial is reported which compares union rates with these two methods. **MATERIAL AND METHOD:** RCT on 40 patients; age range 20-50 years, with fresh displaced Garden type III and IV, Pauwels type II and III intracapsular fracture neck femur and randomized into two groups: Osteosynthesis with 3 cannulated cancellous screws alone and Osteosynthesis with Primary Valgus Osteotomy. In PVO group, a lateral closing wedge intertrochanteric osteotomy was made. The fracture was fixed with the screws passed through a contoured and moulded broad DCP which fixed the osteotomy as well. **RESULTS:** In CCS Group average time of union was 16 weeks. 3 cases had non-union and 3 had delayed union. All these cases had posterior comminution and belonged to Pauwels type III fracture. In PVO Group the fracture united in 20/20 cases in average time of 14 weeks. Two cases had delayed union. Using Multiple Logistic forward stepwise regression Gardens alignment index, screw purchase within 5 mm of subchondral bone and screw back out more than 10 mm were found to be significant predictors of union. **CONCLUSION:** Osteosynthesis with primary intertrochanteric valgus osteotomy in displaced Garden III, IV fresh femoral neck fractures, with posterior comminution and high inclination (Pauwels III) may be regarded as better than simple osteosynthesis, with better union rates and predictability.

Date: 2009-10-31
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Room: Hall A2

Abstract number: 21496

BONE GRAFTING AND INTERNAL FIXATION OF INTRACAPSULAR FEMORAL NECK FRACTURES USING THE WAIS-FIX 100 I DEVICE

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BACKGROUND: Half of hip fractures are intracapsular fractures (displaced and non displaced). The preferred surgical treatment, internal fixation, hemiarthroplasty, or hip replacement, has long been debated in the literature. Patient age, medical condition, anatomical features, and fracture classification should be considered. **MATERIALS AND METHODS:** Five women with Garden I-III type intracapsular femoral fracture underwent internal fixation and bone graft with the WaisFix 100 i device. The operations were performed 8 to 26 hours following the traumatic event. **RESULTS:** In all cases the hospital rehabilitation time was 2 weeks. Walker aid was required during 3-4 weeks. No cases of nonunion, AVN, mechanical device failure, infection, or indication for hip replacement were observed at one- year follow up. Clinical and radiological bone union (8 to 10 weeks) and optimal alignment were achieved in all cases. **CONCLUSIONS:** At one-year follow-up, the WaisFix100 i internal fixation device and bone graft for intracapsular fractures demonstrated safety, assessed by lack of complications; and efficacy, assessed by rigid and stable fixation and short healing time.

Date: 2009-10-31
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Abstract number: 21189

THE IMPORTANCE OF EARLY SURGICAL TREATMENT OF GERIATRIC PATIENTS WITH HIP FRACTURES

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INTRODUCTION: The independence and quality of life of the aged individual is adversely affected following femoral neck fractures. Various authors have suggested that the treatment of choice for such fractures in the elderly is an immediate surgical fixation. Other authors did not find any difference in the mortality and other complication between surgically and conservatively treated patients. **MATERIALS AND METHODS:** This study reviews and analyzes the outcome of treatment in 517 elderly patients for subcapital, intertrochanteric and subtrochanteric fractures of the femur. 474 patients underwent reconstructive surgical procedure within the first 24 hours or up to week following injury. Correlation were done between patients' age, sex, type of fracture, presence of associated diseases and length of interval from injury to surgery, with the immediate outcome and mortality of these patients. **RESULTS:** Of those, 80% were surgically treated within 48 hours following injury and the remaining within 2-7 days. The postoperative result of the patients who underwent reconstructive surgery within 48 hours were significantly better than those treated later. The overall immediate postoperative mortality in these surgically treated patients was 6%, whereas in 42 other patients who were treated conservatively the mortality rate was 25%. **CONCLUSIONS:** These findings suggest that early reconstructive surgery of femoral neck fractures in the elderly is the preferred choice of treatment, even in the presence of various associated disease. Conservative treatment in such patients is associated with significant high mortality risk in geriatric patients.

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THE SECOND HIP FRACTURE IN THE ELDERLY

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INTRODUCTION: In recent years there has been a significant increase in the frequency of hip fractures in the elderly. We examined the frequency, the underlying medical disorders and characteristics of patients with a second fracture in the other hip. **PATIENTS:** This study consists of 132/1208 Pts with a second hip fracture 1-9 years following the first hip fracture. We examined the most common related illnesses and complications following surgery of these fractures and the influence of post-surgical rehabilitation on the patients return to daily functioning. **RESULTS:** 82% of these patients had chronic associated disorders as heart problems, dementia, old CVA, sight problems and renal failure. 6.8% had the second hip fracture within the first year following the first hip fracture, 26.5% after 2 years and the remaining 66.7% after 3-6 years. 70.8% were of the same type and location of the first fracture. 65% of the single hip-fracture patients and only 52% returned to the same type of activity that they had had prior to injury. **DISCUSSION:** The frequency of a second fracture was 10.9%; a third of them within the first 2 years and two thirds of them after 3-6 years. Age and medical status of the patient are important predictors of a second hip fracture. It is therefore imperative to improve bone quality, medical and functional status of the patients following the first hip fractures in order to reduce the risk of the second hip fractures.

Date: 2009-10-31
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Room: Hall A2

Abstract number: 20706

A PROVINCIAL INTEGRATED MODEL TO IMPROVE CARE FOR PATIENTS FOLLOWING HIP FRACTURE

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INTRODUCTION & OBJECTIVES: Fractures of the proximal femur are increasing in incidence as the population ages. In order to address this problem the Province of Ontario, Canada (population 14 million) has advocated an integrated model of care. **METHODS:** A policy to improve the outcome for patients sustaining hip fractures has been developed. It has been implemented in the 14 health regions of the province. The objectives are: 1). All surgical procedures to be performed within 48 hours of patients' admission to hospital. 2). Surgical treatment of hip fractures must permit unrestricted weight bearing. 3). A structured acute care post-operative course followed by admission to progressive rehabilitation. **RESULTS:** Since the implementation of this policy 90% of all hip fracture patients are receiving definitive surgical treatment within 48 hours of admission. Site variations are identified and remedial actions implemented for those hospitals which fail to meet this target. Acute care length of stay following hip fracture has declined from a mean of 17 days to a mean of 8 days. The number of patients with hip fractures returning to their pre-injury residence has increased significantly from approximately 35% to 70% at 3 months post-fracture. **CONCLUSIONS:** A structured program for hip fracture care can be developed in large population areas and has been implemented for the approximate 10,000 patients sustaining hip fractures annually within our jurisdiction. This model should be broadly applicable to other health regions.

Date: 2009-10-31
Session: Plenary Lecture
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Room: Hall A2

Abstract number: 22641

PEDIATRIC PELVIC OSTEOTOMIES: INDICATIONS, CONTRAINDICATIONS AND TECHNIQUES

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Pelvic osteotomies are common procedures in pediatric orthopaedics. They are used to correct acetabular deficiency, improve femoral head coverage, stimulate normal acetabular growth and development, and decrease high contact stresses between the femoral and acetabulum. They can be classified as redirection, reshaping and salvage/augmentation procedures. Redirectional osteotomies change the orientation of the acetabulum. These include the Salter, Sutherland, Dega and periacetabular osteotomies (Steel, Tonnis and Ganz). Reshaping osteotomies reduce the volume and shape of the acetabulum. They include the Pemberton, PemberSal and San Diego osteotomies. Salvage/augmentation osteotomies, such as the Chiari osteotomy and shelf procedure, improve the coverage of deformed femoral heads. Redirectional and reshaping osteotomies are physiologic procedures as they maintain normal contact between the hyaline cartilage at the femoral head and acetabulum. The salvage/augmentation osteotomies are non-physiologic as they depend on fibrocartilagenous metaplasia of the interposed capsule to provide a stable weight bearing surface. These can be effective in stabilizing a deformed, dysplastic hip but will not permanently arrest the development of degenerative osteochondritis. The common indications for these procedures include developmental dysplasia of the hip (acetabular dysplasia, subluxation and dislocation), avascular necrosis of the capital femoral epiphysis (LCPD), and neuromuscular/syndromic hip instability. There are no definite criteria for each osteotomy. However, as a general guideline the Salter, Sutherland, Dega and Pemberton are used for mild to moderate acetabular dysplasia while the Steel (triple) and Tonnis osteotomies are for more severe dysplasia. The Ganz osteotomy is for residual dysplasia after skeletal maturity. The Dega, Chiari, and San Diego osteotomies and shelf procedures are primarily for neuromuscular hip instability. Understanding the indications and contraindications are important. Most pediatric orthopaedic surgeons should become expert in performing one or two of the osteotomies from each of the three categories.

Date: 2009-10-31
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Room: Hall A2

Abstract number: 21204

RESULTS OF USING RECONSTRUCTION NAIL IN THE TREATMENT OF FIBROUS DYSPLASIA

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BACKGROUND: Fibrous dysplasia is a developmental anomaly of bone formation that may exist in a monostotic or polystotic form. Surgical treatment is considered advisable only with presence of significant or progressive deformity or persistent pain. Early surgery is indicated before the tumor expands or fracture occurs. **METHODS:** We reviewed a series of 21 patients, during the last 10 years, 14 had monostotic whereas 7 had polystotic fibrous dysplasia. There was no case of Mc Cune Albright. We treated all of these patients with curettage and corticocancellous bone graft. Six of this cases had multifocal lesion of fibrodysplasia in femoral neck and shaft, we performed fixation with reconstruction nails. Functional and radiographic outcomes were scored. **RESULTS:** Russel Taylor IM nail and Gamma nail were used in 6 patients. Their mean age at the time of diagnosis was 28 years for monostotic and 20 years for polystotic ones. Postoperatively, all patients had good bone healing and complete incorporation of the implanted graft, although it last longer in the case of corrective osteotomy for severe varus. Using of Gamma nail was easier for us in addition to shorter operation time. Up to now, no case of recurrency or pathologic fracture has been seen in our patients. Chronic hip pain was the most common problem in these patients but they reported no restriction of activity of daily living. **CONCLUSION:** Clinical results of reconstruction nails were safe and satisfactory in patients with fibrous dysplasia of proximal femur. **KEYWORDS:** Reconstruction, Proximal Femur, Outcome, Fibrous Dysplasia.

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Abstract number: 21620

GOTFRIED PERCUTANEOUS COMPRESSION PLATING COMPARED TO SLIDING HIP SCREW FIXATION OF PERTROCHANTERIC HIP FRACTURES; A PROSPECTIVE RANDOMIZED STUDY

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We conducted a prospective randomized study to determine whether the Gotfried Percutaneous Compression Plating system (PCCP) had any advantages over the Sliding hip screw (SHS). All consenting patients with pertrochanteric hip fractures were randomized to a SHS or PCCP. Follow-up included clinical findings, radiographs until healing was confirmed, functional and pain assessment scores and completion of the SF-36. Sixty-eight patients, 49 females and 19 males with a mean age of 77 years were entered into the study. The treatment groups were similar with respect to study variables ($p > .05$). Operative times (48 vs 77 minutes) and blood loss (40 vs 101 ml) statistically favored the PCCP ($p < .001$). There were no lateral wall fractures either intra or post-op in the PCCP group. The groups were similar immediately post-op but by discharge, fewer PCCP patients required walking aids (42% vs 58%). This trend continued throughout the study. The SF-36 showed favorable differences in the physical function scores at 2 weeks (30 vs 17) and this advantage continued through 12 months (72 vs 60). There was also an advantage in general health perception favoring the PCCP. Pain at rest was slightly better at 3 and 6 months and pain with activity was lower from 3-12 months. Pain with activity was consistently lower and multiple scales of the SF-36 confirmed improved quality of life. These findings suggest greater functional independence, reduced OR times, less blood loss and higher quality of life.

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CLINICAL AND EXPERIMENTAL COMPARISON OF EXTERNAL FIXATION DEVICES ON THE BASE OF COMPUTER NAVIGATION

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AIM: To compare reduction opportunities, rigidity of osteosynthesis and comfort using of original Ilizarov device, SUV-Frame, Taylor Spatial Frame (TSF) and Ilizarov Hexapod Apparatus (IHA). METHODS: The opportunities of maximal translations, angulations in all planes and rotational movements of bone fragments were experimentally investigated. The rigidity of osteosynthesis was determined using Standard Method of External Fixation Construct Rigidity Test (<http://rniito.org/solomin>). Besides, the comfort of the hardware and software use was analyzed. RESULTS: Best reduction capabilities were observed in Ilizarov device (but results can be achieved in few stages using nodes change). Among computer-assisted devices best results were observed in SUV-Frame; TSF (using all sizes of struts) took the second place. When taking the rigidity test the Ilizarov device is turned out to have no backlashes. All the computer-assisted devices have the backlashes of 0.32-2.5 N*mm/degree. After backlashes have been eliminated the rigidity of osteosynthesis in computer-assisted devices in all planes is no less than in the Ilizarov device. To determine comfort of the hardware use frame construct features, features of support assembling, features of frame use after assembling and opportunity of dynamization were analyzed. All the computer-assisted devices have specific advantages and disadvantages. But SUV-Frame has more advantages in comparison with other hexapods. The best software application has SUV-Frame: it has working opportunities with visual application; only 12 measurements are to be input by hand. CONCLUSIONS: Everyone who uses frame on the base of computer navigation should have full command of Ilizarov method.

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UNLOCKED NAILS A SOLUTION TO DISTAL FEMORAL FRACTURES IN ELDERLY

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BACKGROUND: The distal femoral fractures are on increase with increasing life expectancy. The comminution, osteoporosis, marked bowing of shaft, wide medullary canal & associated co morbidities makes rigid fixation difficult. In the osteoporotic and medically unhealthy elderly patients complication with larger diameter nail, locking bolts ,angled blade /screw devices with ipsilateral hip, knee pathology make these fixations technically& mechanically difficult task. **MATERIALS AND METHODS:** We present a series of 20 cases of age gr 56yrs to 85 yrs with supracondylar fracture femur A2 = 9; A3 = 11 cases. It included 3 pathological fractures, associated co morbid 11 cases. They were fixed with multiple Ender nails, 3 to 5 in numbers from distal medial & lateral; & trochanteric entry points. All these cases were supported by long knee brace. Weight bearing programme depend on fracture pattern & tolerance of patient with aggressive management of osteoporosis. **RESULT:** Fracture went on to union in all cases in 3 to 8 months. Nail backing out was major problem in 6 cases which was pulled out depending on union. **CONCLUSION:** The ender nails provide option of easy insertion with variable entry points with less or no morbidity. Three point fixation with variable length avoids all complication of rigid locked nails& plate. This is a friendly solution to osteoporotic fracture of distal femur can be done very quickly with very little blood loss and essentially percutaneously and they act as a nice internal splint for early mobilisation in very osteoporotic and medically fragile patients.

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SUPINE WITH FLEXED HIP POSITION FOR ANTEGRADE FEMORAL NAILING: AN ALTERNATIVE POSITION FOR OBESE PATIENTS OR PROXIMAL FEMORAL FRACTURES

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The 3-D reconstruction with reverse engineering method of the hip, femur and pelvis in 50 cases were investigated for the space available without abutment problem during the use of long rigid femoral nailing device. It was found that the space available is bigger with hip flexion. There will have no abutment effect at all when hip flexions were over 25 to 30 degrees. With these findings, we therefore propose an alternative position for antegrade femoral nailing. The method includes the position of the patient in supine position on a fracture table with the traction applied via foot-piece, the patients' hip being in 25-35 degrees hip flexion position with 5 degree adduction. The contra-lateral leg is placed in hemi-lithotomy position. This position will enable the surgeon to obtain the entry point as easy as that obtain in the lateral position while the fracture reduction and the locking screw insertion can be performed easily similar to that of the conventional supine position. This method has been applied successfully in 50 cases of which the ordinary supine position may have difficulty. There were 22 large or obese patients and 28 proximal femoral fractures whose ages ranged from 25 to 89 years (average, 64 years). Closed antegrade locked nailing was applied in all cases included; 8 long gamma nails, 14 TGN, 23 G-K nails and 5 AO femoral nails. With this method, the average hip flexion was 28 degree (range; 25-35 degree). There was no any complication occurred in this study group.

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Abstract number: 21091

PLATE AUGMENTATION AND BONE GRAFTING LEAVING NAIL INSITU: TREATMENT OF ASEPTIC NONUNIONS OF FEMUR FOLLOWING INTRAMEDULLARY NAILING

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Variable rate of union has been reported after exchange nailing for primary treatment of femoral diaphyseal nonunions. Intramedullary nails in distal shaft or comminuted fractures are not canal filling, which reduces stability in bending and rotation thus resulting in unpredictable mechanical strength. 55 patients of aseptic nonunion of femoral diaphysis following intramedullary nailing treated by plate augmentation and bone grafting leaving nail insitu, were followed for at least one year. The previous surgery included closed nailing in 41 patients and open nailing in 14 patients, and the patients had undergone kuntscher nailing, standard interlocking nailing, trochanteric entry nailing or supracondylar nailing. Posterolateral approach was used to expose the nonunion site and plate augmentation using DCP or LCDCP was done. In all patients the visible motion present at the nonunion site disappeared after plate augmentation. Autogenous bone graft obtained for iliac crest was added. The patients were encouraged to start the movements immediately. The patients were followed regularly to monitor the progress of union radiographically and clinically. Union was achieved in 54 cases at an average of 6.8 months. The results of plate augmentation and bone grafting leaving nail in situ for nonunions of comminuted fractures and distal third fractures following intramedullary nailing, are encouraging. In nonunions of femoral shaft associated with proximal fractures, this technique leaves the proximal fracture undisturbed. The results of this procedure in nonunions associated with minimal or no comminution are equal to exchange nailing.

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EXPANDABLE SELF- LOCKING NAIL IN THE MANAGEMENT OF CLOSED DIAPHYSEAL FRACTURES OF FEMUR AND TIBIA - OUR EXPERIENCE

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INTRODUCTION: Intramedullary fixation is the treatment of choice for closed diaphyseal fractures of Femur and Tibia. Conventional interlocking nails depend primarily on locking screws for axial and rotational stability. We used an expandable intramedullary nail which does not rely on interlocking screws, and achieves axial & rotational stability on hydraulic expansion of the nail. It was less time consuming, with minimal radiation exposure. **METHODS:** We prospectively studied 32 patients of closed diaphyseal fractures of tibia and femur treated with this self locking, expandable nail. Closed or open reduction and internal fixation with expandable nail was done. Early mobilisation and weight bearing was started depending on fracture personality and evidences of healing. Patients were followed till clinical and radiological union. **RESULTS:** The average operative time was 90 minutes for femoral fractures and 53 mins for tibial fractures. Radiation exposure was minimum, average being 84 seconds for femoral fractures and 54 seconds for tibial fractures. All fractures healed with few complications. Mean time of union was 5.1 months for femoral fractures and 4.8 months for tibial fractures. We had one case of infection, one case of bent femoral nail with malunion and three cases of delayed union. **CONCLUSION:** We found the nail very easy to use with effective fixation in our setting. The surgical time was less with minimum complications. The main advantage of the expandable nail is satisfactory axial, rotatory and bending stability with decreased radiation exposure to operating staff and the patient.

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Abstract number: 21870

ROLE OF LCP IN THE MANAGEMENT OF DISTAL FEMORAL FRACTURES - A PROSPECTIVE COMPARATIVE STUDY

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Options for operative treatment of distal femoral fractures are traditional plating techniques requiring compression of the implant to femoral shaft, retrograde nailing, sub muscular locked fixation etc. Locking condylar plate is a single beam, toggle free, fixed angle construct where the strength of its fixation is equal to the sum of all screw-bone interfaces rather than single screws axial stiffness or pullout resistance as seen in unlocked plates. Its unique biomechanical function is based on splinting rather than compression. The purpose of this study was to evaluate the outcome of LCP in treatment of distal femur fractures in terms of rate of union, time till union, rate of infection, malalignment, fixation failure rate. Between December 2006 and December 2007, 74 patients with distal femur fracture were admitted to emergency surgical OPD of PGIMER, Chandigarh. 18 patients, who satisfied the inclusion criteria, were included in the study. A standard lateral surgical approach was used. Patients were followed up for at least 6 months. Functional outcome of the patient was assessed using standardized scales taking into account knee ROM, pain, walking ability, and return to the previous level of activity. Clinically union was found in all the 19 fractures by the end of 6 months. Grading of the Sanders score showed that three patients had a fair outcome, eleven patients had a good outcome and five patients had an excellent outcome. Results of the present study indicate that Locking Condylar Plate for distal femur can be used as an optimal tool.

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MINIMAL INVASIVE PLATE OSTEOSYNTHESIS - THE INDIAN PERSPECTIVE

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Minimal Invasive Plate osteosynthesis, MIPO in short has come to be the fashion of the day. Trauma management has come a long way from simple splints and plasters to present day complex implants. Locking compression plate has provided a new outlook in the treatment of many fracture patterns. It has proved its mettle in articular, osteoporotic and complex fracture patterns. The use of locking plates in MIPO technique has decreased the surgical morbidity and promoted the new philosophy of biological healing. 45 fractures of various long bones in 36 young individuals were treated using locking plates in MIPO technique between January 2007 and September 2007. All were closed injuries, and diaphysis-metaphysis region fractures. Lower limb fractures accounted for almost 80%, and 35% of all fractures were subtype C (comminuted) AO classification (AO classification was used in this study). Union rate was 100%, mean time for union was 41/2 months. Functional recovery was achieved in mean of 61/2 months. All patients were able to return to their occupations within a mean of 8 months. These results show that MIPO, if done with proper technique in indicated cases have excellent results. The union rate is as good as any intramedullary device, whereas the blood loss is minimal. The stability of fixation is good, as locking plates have been used as per described procedure. Early mobilization is possible as no splinting is required. Hence in situations where intramedullary devices have significant problems, MIPO with locking plates is a good option.

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MANAGEMENT OF INFECTED NONUNION FEMORAL SHAFT AFTER INTRAMEDULLARY NAILING USING BONE CEMENT WITH ANTIBIOTICS ROD

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Medullary canal infection (Cierny type 1 osteomyelitis) following intramedullary nailing is not rare. Eradication of infection requires removal of the nail implant, and delivery of sufficient concentration of antibiotics to the infection site. The use of intramedullary rods prepared from bone cement impregnated with antibiotics can help in such situation by providing a high dose of local antibiotics to the whole medullary canal, meanwhile, acting as an internal splint to the fracture. This stage should take 4-6 weeks till eradication of infection then internal fixation in the form of another intramedullary nail can be used. This technique follows the same principals of 2 stage techniques used in treatment of infected arthroplasty cases. In such cases radical debridment then cement with antibiotics spacer is used for 4-6 weeks till eradication of infection followed by reinsertion of arthroplasty. The aim of this study is to present our technique and review the results of treatment of infected nonunion shaft femur after intramedullary nail with no bone loss or sequestration less than 2 cm. the treatment was by radical debridment and removal of the internal fixation and insertion of antibiotic with cement rod in the medulla. The rod is left for 4-6 weeks till eradication of infection as shown by quantitative CRP, then re-internal fixation using IM nail followed by rehabilitation and follow-up till full union. 14 patients were managed with complete healing & eradication of infection. This is an effective technique in the properly selected patients.

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Abstract number: 22777
CORRECTION OF STIFF CLUB FOOT DEFORMITY WITH ILIZAROV METHOD

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Stiff club foot deformity can be seen in patients with syndromic conditions or underlying neuromuscular problems. They may present later with foot pain on walking but many are referred for gait problems which may not be contributed by the foot. Careful evaluation and communication with the family members is very important to ensure realistic expectation of potential treatment outcome. Soft tissue generally would not be helpful especially those who have undergone previous surgeries. Bony procedures generally target the more healthy components of the foot and they could not be repeated in case of recurrence following further growth of the child. Triple arthrodesis can only be offered near to skeletal maturity and it is a salvage procedure that requires removal of some of the major joints in the foot. Gradual stretching of the soft tissues with external fixator to correct the foot deformity has been popular since it involves a complicated construct and frequent frequent frame adjustments. Most of the early literatures reported treatment that includes osteotomy and distraction osteogenesis. There are always risks of permanent interference of growth potential of the bone in younger children and repeated surgery may not be advisable. Soft tissue distraction without bone procedure allows reconstruction of a plantigrade foot with minimal loss of growth potential. Recurrence of deformity is still possible especially in younger children since the underlying pathology persists despite surgery and it may be difficult for these children to wear foot orthosis strictly. Our limited experience with using a standard frame design for a group of children with stiff club foot deformities allows us to predictably correct these deformities. There are cases that relapsed following correction but repeated correction can be performed with no additional morbidity to the treated foot.

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Abstract number: 20498

ARTHRODIASTASIS IN TREATMENT OF LEGG-CALVE'-PERTHES' DISEASE

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PATIENTS & METHODS: This study included 20 patients diagnosed with Perthes' disease, with age of onset above 8 years. Arthrodiastasis with Ilizarov was used to achieve containment of the femoral head and enhance remodeling as evaluated clinically using the Harris hip score, radiologically by evaluation of femoral head containment and the Stulberg classification, arthrograms for half the patient population were evaluated regarding the value of acetabular coverage and the caput index. **RESULTS:** The Harris Hip Score improved in 80% of patients. Hip range of motion improved in 70% of patients. The Stulberg classification improved in 70% of patients. The height of the lateral pillar of the femoral head improved in 60 % of patients in the final follow up A-P radiographs. Arthrography was done in 10 patients preoperatively and after removal of the frame: the acetabular coverage improved in 5 patients, and the caput index improved in 8 patients (out of ten) and this parameter was statistically significant, yet it was noticed that all the patients who showed improvement in the Caput index, also improved in the Stulberg classification in the final follow up, so the authors concluded that use of arthrography would give no added value. Lateral subluxation of the femoral head was found in 20% of patients at final follow up in comparison to 60% preoperatively. Monoplaner hinge use solved the lateral subluxation problem. Two hinges gave more stability than one. **CONCLUSION:** Arthrodiastasis is a good contribution to the lines of treatment of Legg-Calve'-Perthes' disease.

Date: 2009-10-31
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Room: Hall A3

Abstract number: 22028

TRIPLE PELVIC OSTEOTOMYS EFFECT ON INDICATORS OF THE FEMORAL HEADS COVERING AT PERTHES DISEASE

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Already at early stages at diseases unfavorable course there appear abnormalities in hip anatomic relations which leads to hips subluxation. Its degree can be defined by acetabular angle of Sharp (AS) and acetabulum-head index (AHI). We performed 41 triple pelvic osteotomy (TPO) for 40 patients to restore the anatomy of the hip. We supervised 20 children with unfavorable signs of disease and who were not involved in operative measures by different reasons. Groups are statistically comparable by key indicators. When disease has been diagnosed and the treatment has began AS was $49\pm 3,49^\circ$ in the first group and $48\pm 2,9^\circ$ in the second group (Mann-Whitney test $p=0,67$). TPO improved the position of the acetabulum and three years after the operation AS became $34\pm 5^\circ$. In second group AS was $47\pm 3,4^\circ$ and showed a disorientation of the acetabulum what was not observed in first patients group ($p=0$). AHI was below the norm in both groups when the treatment began, and in operated patients group it was initially less, than in second group: $68\pm 9,8\%$ against $78\pm 10,3\%$ ($p=0,001$). TPO normalized the given indicator to $100\pm 7,4\%$, and at the same time AHI in second group steadily decreased and 3 years after showed $74\pm 5,7\%$ ($p=0$). TPO can not only eliminate a hip subluxation at once, but also to make conditions to turn on the gears for subsequent proceeding physiological self-correcting.

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FALSE ACETABULUM OSTEOTOMY FOR NEGLECTED DISLOCATION HIP IN OLDER CHILDREN

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Management of neglected congenital dislocation of the hip in older children is a challenging orthopedic problem. This presentation describes the technique and results of a new osteotomy in which we used the already formed cartilage of false acetabulum to complete the defect in the dysplastic true acetabulum at its most defective part where dislocation occurred. This osteotomy was performed in 29 hips in older children, having congenital dislocation hips and false acetabuli. The mean age at operation was 5.1 years (range 4-8). The patients were followed post-operatively clinically and radiologically at a mean of 7.1 years (range 5-12). Of the 29 hips, 28 had excellent results. One hip had fair result due to avascular necrosis of the femoral head. The CE angles and acetabular roof obliquity (ARO) of all cases improved from means of -15.9 ± 12.8 standard deviation (SD) and 42.6 ± 8.5 SD, pre-operatively, to post-operative means of 29.5 ± 13.2 SD and 11.9 ± 9.3 SD, respectively. The osteotomy technique is not complex, and stable without internal fixation. It provides a nearly normal acetabulum that requires relatively minimal remodeling and allows early mobilization. N.B.: This paper had been published in JBJS (Br) 2007, 89-B (3): 372-74. But not presented before. The presentation will contain video clips for operative technique, in addition; the NUMBER OF PATIENTS increased AND FOLLOW UP became longer.

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LONG TERM OUTCOME IN CHILDHOOD FEMORAL NECK FRACTURES: THE LESSONS LEARNT.

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INTRODUCTION: Childhood femoral neck fractures are known for their sinister nature. We studied their long term behavior and remodeling; with special reference to early anticipation of AVN on plain x-rays, behavior of AVN in surgically intervened and non-intervened cases, optimum treatment of AVN, long term remodeling of coxa vara, relation of implant penetration of physis and premature epiphyseal fusion, various surgical procedures for complications, and effect of add on defunctioning osteotomy as a primary treatment. **MATERIAL AND METHODS:** 76 children (<17 years) treated between 1975 and 2004. 63 treated surgically while 13 managed conservatively. A primary defunctioning osteotomy was added in 21 patients in order to eliminate flexor-adductor pull and in attempt to improve proximal femoral vascularity. Muscle pedicle bone grafting, fibular grafting, cheilectomy, valgus osteotomy done for complications. Follow up ranges 2-24 years. **RESULTS:** Complications: AVN (n=21); Coxa vara (n=18); Coxa Valga (n=2); Delayed Union (n=7); Nonunion (n=4); Premature Epiphyseal Fusion (n=23). Overall results as per Ratliffs Criterion are Good-44, Fair-21, Poor-11. **CONCLUSIONS:** Children with these fractures can not be treated as small adults. Preferably fix ALL Transcervical, and displaced Basal fractures. Intertrochanteric fractures give excellent results with conservative treatment and shows remarkable remodeling, on long term, even after malunion. Open reduction did not increase the rate of AVN. Avoid superolateral sector of head for fixation. No delayed union or nonunion was observed in osteotomy group (P=0.05) but results did not improve to a statistically significant level (P=0.139).

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THE ROLE OF HIP ARTHROSCOPY IN THE TREATMENT OF SEPTIC HIP IN CHILDREN

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INTRODUCTION: The use of arthroscopic techniques to diagnose and treat hip disorders in children provides the potential to limit the morbidity of current techniques. PURPOSE: To report the technique of Arthroscopic irrigation in the management of septic arthritis of the hip in children, and to analyze the short term results of this technique. MATERIALS AND METHODS: 7 cases, 8 hips, Mean age at the operation: 4.4 y, (11m~10y). Mean follow up period: 1 year (6m~1.5y). All patients had high fever, CRP raised, underwent USG evaluation and Aspiration. 2.8mm to 3.5 mm Arthroscope were used and step up cannulation done. Irrigation and drainage performed after visualization and confirmation. RESULTS: All 8 hips showed complete resolution of infection and at about 1 year follow up were clinically and radiologically normal. CONCLUSION: Hip arthroscopy is feasible and a very useful minimal invasive modality for management of septic hip in children and does not result in short-term complications, although the portal locations and traction techniques must be modified from the standard positions.

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Room: Hall A3

Abstract number: 22207

TIBIA LENGTHENING IN THE CASES OF LIMB LENGTH DISCREPANCY DUE TO SEVERE HIP JOINT PATHOLOGY

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OBJECTIVES: There is an essential risk of hip joint defeat in the cases of femur lengthening in patients with limb length discrepancy caused by severe hip joint pathology. The aim of the present work is the clinical and biomechanical substantiation of tibia lengthening in patients with shortened femur due to severe hip joint pathology. **METHODS:** Mathematical modelling of human gait parameters in the case of modified femur and tibia length proportions was carried out. The clinical and biomechanical results of tibia lengthening in 56 patients aged from 7 to 23 years with congenital and pathological hip dislocation, SCFE, Perthes disease were investigated. The range of lengthening was from 3 to 11,5 cm with the average of 5,25 cm. **RESULTS:** The mathematical modelling of the most power-intensive phases of gate toe-off and heel-strike showed that the values of hip, knee and ankle moments on the site of elongated tibia and simultaneously shortened femur within 10 cm are not exceeding the high levels of the physiological range. The gate analysis in patients with modified proportions of femur and tibia lengths revealed the absence of the significant changes in hip, knee and ankle moments. The gate of the patients after tibia lengthening significantly improved. Long term follow up (10 years) showed no considerable changes in the hip, knee and ankle joints which may be caused by tibia lengthening. **CONCLUSION:** The elimination of LLD caused by severe hip pathology by means of tibia lengthening may be considered preferable in many patients.

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Abstract number: 20259
TIBIAL NON-UNION IN CHILDREN

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Traumatic Tibial nonunion in children is rare. We report single stage treatment of this challenging problem using Ilizarov method. METHODS: From 1993 till 2006, 36 cases of post traumatic Tibial nonunion were referend to our center. Age of patients ranged from 1y 5m to 15 y 6m with an average of 10y3m. There were 22 septic nonunion and 14 aseptic nonunion. There Lt Side was affected in 21 cases. There were 19 males. Number of previous operation ranged from 1-7. Pre-operative shortening was evident in 29 patients (1-13.5cm). Ankle or knee stiffness or both were present in 19 cases preoperatively. Rotational flap was performed in 6 cases concomitant with the index procedure. The nonunion site was used in lengthening in 6 cases, corticotomy and distraction in 21 cases and physical distraction in 2 cases. Evaluation parameters were union, functional activities, ROM, axis deviation, limb length discrepancy and satisfaction of the patients. RESULTS: Union occurred in all cases except 2. Time in the fixator ranged from 2.5 months to 12.5 months. The follow up period ranged from (1 year-9 year). Complications included some sort of pin track infection in all cases refracture in 3 cases, delayed ossification of the regenerate in 6 cases. CONCLUSION: Radical resection of the nonunion site is not mandatory. There was no need for staged treatment. Ilizarov method seems to be the treatment of choice for this complicated problem. It can also treat associated deformity and limb length discrepancy.

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LENGHTENNING OF BONE ON AN INTRAMEDULLARY ROD - 15 YEARS EXPERIENCES

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Lengthenning of long bone by step by step calotassis brings high frequency of complications depending on length of lengthenning. Method of lengthenning on intramedular rod extremelly minimalised this frequency. Author presents his experiencies with this method which brings better stabilization of newly developed bone, less frequency of complications and speeder recovery and better compliance of patients. Results of 47 lengthenning of femur and 18 lengthenning of tibia by this method are presented.

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CROSS VERSUS LATERAL PINNING IN SUPRACONDYLAR FRACTURE OF THE HUMERUS IN CHILDREN: SYSTEMATIC REVIEW AND META-ANALYSIS

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BACKGROUND: Cross pinning was more preferable than lateral pinning fixation because the biomechanical study has shown more stability. However, its drawback was iatrogenic ulnar nerve injury. **OBJECTIVE:** To perform a systematic review aim to compare the outcome of both pinning techniques in supracondylar fracture of the humerus and to update the review. **RESULTS:** Nineteen studies were included in the review with 1646 supracondylar fractures (859 and 787 children with cross and lateral pinning). The average age was 6.1 + 0.9 years, and 53% of children were males. There was no evidence of heterogeneity. The risk of iatrogenic ulnar nerve injury was 3.3 (95% confidence interval = 1.5 to 7.5) times in cross pinning compared with lateral pinning. There was no significant different for loss of fixation, late deformity and Flynn criteria between both types of pinning. **CONCLUSION:** Lateral pinning should be the effective technique for a fixation of a stable supracondylar fracture of the humerus in children, and care should be taken while performing cross pins.

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SUPRACONDYLAR HUMERAL FRACTURE IN CHILDREN: MANAGEMENT BY PERCUTANEOUS LATERAL-ENTRY PIN FIXATION

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OBJECTIVE: To assess the efficacy of percutaneous lateral-entry pins in the operative management of supracondylar humeral fractures in a consecutive series of children in which lateral-entry pins were used regardless of fracture stability. **MATERIAL AND METHODS:** Displaced supracondylar humeral fractures were fixed with lateral-entry pins in Two Hundred and Eleven consecutive patients. They were treated for Modified Gartland Type II and Type III supracondylar humeral fracture at Orthopedic and Traumatology Department, Post Graduate Medical Institute: Lady Reading Hospital from January 2007 to June 2008 with follow-up of six months. **RESULTS:** Sixty-six children had Type II fracture and One Hundred and Forty-five children presented with Type III fracture according to Wilkings modification of Gartlands classification system. A comparison of perioperative and final radiographs showed no loss of reduction of any fracture. There was also no hyperextension, loss of motion, cubitus varus, iatrogenic nerve palsies and no patient required additional surgery. Six patients had pin tract infection. One Hundred and Ninety-nine (86%) patients had completed their follow-up. Results were evaluated by Flynns Criteria, 93.3% Excellent/good results were obtained. **CONCLUSION:** In this large, consecutive series without selection bias, the use of lateral-entry pins alone was effective for most unstable supracondylar fractures of humerus. This method provides the greatest skeletal stability and prevents neuro-vascular complications in children, as in other techniques, hence giving excellent results. **Keywords:** Supracondylar Humeral Fracture, Lateral-Entry Pinning.

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LATERAL CONDYLAR PROMINENCE POST CORRECTIVE OSTEOTOMY OF CUBITUS VARUS: A STUDY USING 3-DIMENSIONAL REVERSE ENGINEERING TECHNIQUE

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Lateral condylar prominence is a common problem after corrective osteotomy of cubitus varus which is believed to be resulted from unequal opposing cut surfaces of lateral-based wedge osteotomy using a medial hinge. This study investigated on this issue using the 3-dimensional CT data set of the deformed and the normal elbows of two patients with cubitus varus deformity who were scheduled for corrective osteotomy. The CT scan was performed with 3 mm slice thickness and reconstructed was done with 1 mm interporated slice thickness in both sides of humerus. The CT-data set was then manipulated in reverse engineering software. The 3-dimensional models of both deformed and normal humeri were studied. Several locations and degree of tilting of wedge osteotomies were then virtually performed. The degree of correction was considered from the varus angle plus normal carrying angle of the normal side. From the study of these two patients, it was found that the level of the medial hinge from the joint line is a consistent factor with directly proportionate to the amount of the lateral condylar prominence. The different of the osteotomy surfaces have no any effect for the condylar prominence but only the step off phenomenon. Lowering the level of the medial hinge with some tilting of 10 degrees of the distal osteotomy cut surface just above the olecranon fossa will provide the best configuration after osteotomy in term of lateral condylar prominence, the step-off of the cut surfaces and the similar appearance to the normal humerus.

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LATERAL CONDYLAR FRACTURES OF THE HUMERUS IN CHILDREN - A 13 YEAR FOLLOW UP STUDY

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The lateral condylar fractures of the humerus are the second most common injury around the elbow in children. Treatment of patients presenting late is controversial. We report our experience of treatment of these fractures over last thirteen years in 78 children seen between 1993 and 2006. Average age- 5.2 years; 53 patients presented early and 25 patients presented more than 3 weeks after injury. In latter, 11 patients were treated conservatively and rest by internal fixation. Pseudovarus was observed in 30% cases on long term followup. Of 25 patients presenting late, open reduction, internal fixation with bone grafting was carried out in eight cases (those who presented between 3-6 weeks) and rest of the 17 cases were kept under observation on regular follow up. At final follow up, the cases operated late (n= 8) had preservation of 70-80% of Flexion Extension Arc. Of the 17 cases kept under observation, 8 (showing non union) developed cubitus valgus. 9 cases (showing malunion) continue to have stiff elbow. The elbow function was better in the former group. We suggest that every effort should be made to fix the lateral condylar fragment in patients presenting even more than 3 weeks especially if the metaphyseal chunk is large, the fragment is not widely displaced and rotated and the fracture is type II Milch in a very young child (as those patients rapidly develop very severe cubitus valgus deformity with translocation of ulna).

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MANAGEMENT OF PEDIATRIC SCAPHOID NONUNIONS WITH BONE GRAFTING AND INTERNAL FIXATION

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PURPOSE: Scaphoid nonunions are extremely uncommon injuries in children. Because of the rarity of the injury, there is no agreement about the standard method of treatment. The purpose of this study is to evaluate the clinical and radiological outcomes after surgical treatment with bone grafting and internal fixation. **METHODS:** We evaluated 23 patients with unstable scaphoid nonunions treated from January 1990 to January 2007. There were 18 males and 5 females. Mean age was 15 years and average follow-up was 5.2 years. The average time from injury to surgery was 6.3 months. Radiographic evaluation included the preoperative and postoperative scapholunate angle (SLA), radiolunate angle (RLA) and the scaphoid length (SLe). Clinical evaluation was performed according to Scaphoid Outcome Score. **RESULTS:** Twenty-two out of 23 patients (95.6%) achieved clinical and radiographic union in an average time of 10.3 weeks (8–14 weeks). The average SLA was 53.4° preoperatively and 51.2° at the final follow-up. The mean RLA was 7.4° preoperatively and 4.9° at the final follow-up. SLe increased from 21.9 mm to 23.1 mm. Functional outcomes were excellent in 17 cases, good in 5 and poor in 1. **CONCLUSIONS:** This study is a large case series of a rare problem in skeletally immature patients. The compression screw fixation prevents carpal collapse and provides compression at the fracture site, while iliac-crest bone grafting aids bone healing. Clinical and radiological outcomes are encouraging to recommend this method for unstable scaphoid nonunions in children.

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SURGICAL TREATMENT FOR BIFID THUMB IN CHILDREN

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Duplication of digits, or polydactyly, is a common and conspicuous hand anomaly. **PURPOSE:** (1) Remark clinical syndrom, Xray; and (2) Evaluating surgical techniques. **MATERIAL AND METHODS:** From 2001 to December 2007, there were 216 children (148 female, 68 male); Age from 6 months old to 13 years old with Congenital bifid thumb. We measured the abduction and adduction of the thumb. All patients had been operated according to Bilhaut-Cloquet technique or transferring abductor pollicis brevis tendon inserts into the distal phalanx of the ulna almost thumb in type IV. **RESULTS:** The mean age of patients at the time of operation was 2.6 years (range, 6 months - 13 years old). Unilateral hand in 6.9%; According to the Wassel classification, type II: 36 (15.6%), type III: 5 (2.2%), type IV: 178 (77.0%), type V: 6 (2.6%), and type VII: 6 (2.6%). The mean follow-up period was 38 months (range, 6 months - 60 months). More than 91.7% of the patients were satisfied or very satisfied with functional and cosmetic outcomes. Postoperative complications such as wound infections, car hypertrophy, pulp atrophy, joint deformity, and instability were common but minor. **CONCLUSIONS:** This technique produced a relatively satisfactory long-term functional outcome and should be considered in the management of congenital thumb polydactyly. **Keywords:** Polydactyly, Bifid thumb, congenital thumb polydactyly, Preaxial polydactyl.

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OUTCOME OF THE SCARF OSTEOTOMY IN ADOLESCENT HALLUX VALGUS

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Scarf osteotomies are commonly performed in adults with symptomatic bunions. We have reported the radiological and clinical outcome of this procedure in the treatment of moderate to severe hallux valgus among adolescent children. Data was collected retrospectively from a tertiary referral children hospital between April 2001 and June 2006. The pre and postoperative intermetatarsal angle (IMA), hallux valgus angle (HVA) and distal metatarsal articular angle (DMAA) were determined. Patients were followed up for a mean of 37.6 months (12.5 to 76.3). 13 patients with 19 operated feet were available at the time of the latest follow up. There was significant improvement in the mean postoperative IMA, which was maintained to the last follow up. There was statistically significant improvement in the postoperative HVA and DMAA, which deteriorated to the last follow. The difference between the pre-operative and last measurements of HVA and DMAA were not statistically significant. The results show that improvement in the IMA is maintained whereas any improvement in HVA and DMAA is quickly lost. The mean AOFAS score for the whole group was 80 (54 -100). This study indicates that Scarf osteotomy for Hallux-Valgus in adolescent feet has good initial results but at medium term review there is a high recurrence rate and a significant degree of dissatisfaction among patients.

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PRIMARY SURGICAL TREATMENT OF ARTHROGRYPOTIC FOOT: SYSTEMATIC REVIEW AND META-ANALYSIS

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PURPOSE: A systematic review and meta-analysis, in order to determine the best primary surgical technique for the treatment of arthrogryptic foot, and the treatment with the lowest recurrence risk. **METHODS:** Studies published between 1966 and 2007 which examined patients with arthrogryptic feet submitted to primary surgical correction of the deformity and reported recurrences or absence of recurrence during the follow-up period, were included in this review. The main electronic databases were searched, and non-published studies were also included, by manual retrieval of reference lists or through contact with other researchers. The relative risk and confidence intervals of each study were calculated in the meta-analysis, and the results were expressed as forest plots. **RESULTS:** Of the 52 articles retrieved for further analysis, 5 were included in this review. All the studies were retrospective, with case series descriptions and no control group. The mean relative risk in the meta-analysis on talectomy was 0.17, and in the meta-analysis on posteromedial release, 0.56. The data on confidence intervals also indicated that talectomy was the most beneficial technique. Examination of the heterogeneity of the clinical results was not possible, and the statistical heterogeneity examination showed that studies on posteromedial release were homogeneous and that talectomy studies were heterogeneous. **CONCLUSIONS:** Talectomy is the primary surgery which has the lowest recurrence of risk for the treatment of arthrogryptic foot. It was not possible to determine the best age to perform the surgery, in relation to the risk of recurrence and ideal follow-up time.

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PELVIC SUPPORT OSTEOTOMY

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Subtrochanteric valgus osteotomy to support the pelvis was suggested in 1838. The aim of the study is to evaluate the results of the operation highlighting the predictability of results. MATERIAL & METHODS: From 1993-2005, 35 cases with unilateral hip instability were treated in our institution. The aetiology was: paralytic hip dislocation in 9 cases, Septic arthritis in 10 cases, Osteoarthritis in 2 cases, Neglected fracture neck femur in 2 cases, TB in one case, PFFD in 3 cases. Age of patients ranged from 10-26. All patients had a positive Trendelenburg test and 31 had hip pain exacerbated by ambulation. 2 patients needed a walking aid preoperatively. Evaluation parameters: Pain, Trendelenburg sign, limp, walking distance, ROM, L.L. Discrepancy and satisfaction of the patients. Results: At an average follow up 7.2 years [2-13.5y] there were 6 excellent, 23 good & 5 poor results. Trendelenburg gait disappeared in 20 patients. Pain disappeared in all patients except three. Progressive loss of angulation at the subtrochanteric level developed in 3 cases, Lengthening ranged from 3.5-12 cm. External fixation time 4-12 months (average 6.5 months). Complications: There was some sort of pin tract infection in all cases, fracture of the regenerate in 3 cases, knee stiffness in 3 cases. Conclusions, early results of Ilizarov modification of pelvic support osteotomy are encouraging. Pain relief or improvement is expected. However, the possibility of deterioration with time & unpredictability of improvement of Trendelenburg gait should be considered.

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ASSOCIATION OF SUBTALAR AND CALCANEONAVICULAR COALITIONS IN THE SAME FOOT

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BACKGROUND: Tarsal coalition represents abnormal fusion between two or more tarsal bones and is a frequent cause of foot and ankle pain. The coexistence of calcaneonavicular and talocalcaneal coalitions in the same foot has been barely cited in the literature. **METHODS:** We report three cases of spastic flatfoot associated to a double coalition in the same foot. Routine CT scan helped to delineate the joint space narrowing and bony bridges for preoperative planning. Cases were treated surgically with lateral and medial approach, bar resection and extensor digitorum brevis interposition. Resection of such coalitions produced variable clinical and radiographic results. The authors discuss the frequency of multiple tarsal bars and the importance of CT in preoperative planning. **DISCUSSION:** Multiple tarsal coalitions in the same foot are probably not rare. Surgical outcomes can be jeopardized if are not recognized previously. The detection, localisation, and characterisation of this entity with routine CT-Scan is mandatory in patients undergoing surgery.

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COMPARISON OF POSTEROMEDIAL RELEASE AND COMPLETE SUBTALAR RELEASE IN RESISTANT CONGENITAL TALIPES EQUINO VARUS: A RANDOMIZED CONTROLLED TRIAL

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AIM: To compare the result of Posteromedial Release and Complete Subtalar Release in Resistant Congenital Talipes Equino Varus in a Randomized Controlled Trial. MATERIALS AND METHODS: Twenty-seven children with 44 clubfeet in the age group of 1-2 years were included in the study. They were randomized into two groups. In Group I, the Posteromedial release as described by Turco, was performed on 14 children with 22 clubfeet. In Group II, the Complete subtalar release as described by Simons was performed on 13 children with 22 clubfeet. The mean follow up time was 24 months in both the groups. A new scoring system as described by Magone that weights clinical, radiological and functional parameters was used to compare results. RESULTS: At the end of follow up, Although Simons technique was found to be more superior when only radiological parameters were compared, there was no difference in two surgical procedures when clinical and functional parameters were also taken in to consideration. Scores were higher in the complete subtalar release as compared with posteromedial release (75.23 vs. 74.95) but were not statistically significantly different ($p=0.905$). CONCLUSION: In our opinion, the degree of correction determined by radiological parameters was obviously higher in-group II as compared to group I. Besides its superiority in the radiological improvement, when the clinical appearance and the functional status were also taken into consideration, there was found no difference between the two techniques.

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THE PONSETI METHOD IN A DISTRICT GENERAL HOSPITAL? YES WE CAN!

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The Incidence of clubfoot in Northampton is 1.2 cases every 1000 live births with a 50% incidence of bilateral cases. We treat 8-10 feet every year. We reviewed 56 consecutive children with 84 idiopathic clubfeet in whom the Ponseti technique was used over eight years. Serial weekly plasters were followed with a tenotomy. Patients were then protected in a cast for four weeks before being fitted with a Dennis Brown splint. All patients were treated by a single surgeon. The mean duration of follow-up following tenotomy was 24 months (6-54). Full correction with at least 10 degrees of passive dorsiflexion was achieved in all cases at the time of DB splint application. Correction was well maintained in 92% of the feet at the time of last assessment. The deformity relapsed in 8% of feet. Difficulty in retention of cast/splint was encountered in 7 children (5 bilaterally affected). Of these, 4 children needed complete subtalar release. Four feet in two babies needed repeat TA tenotomy. The Ponseti method is a labour intensive process and requires cooperation between parents and doctors. The district general hospital faces particular challenges such as a lack of dedicated resources, specialist paediatric physiotherapists and technicians. Our results, covering an eight year period, are the longest reported case series of this type in the UK. The feasibility of offering this technique for the treatment of club foot deformities in the district general hospital, by a single orthopaedic surgeon with minimum material and logistical support, is demonstrated.

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BOTULINUM TOXIN A TREATMENT FOR OPISTHOTONUS IN CHILDREN WITH CEREBRAL PALSY

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PURPOSE: Botulinum toxin A (BTX-A) was used in cerebral palsy children for opisthotonus in our hospital, and the efficacy of this treatment will be reported. **MATERIALS & METHODS:** Sixteen children were included and all of them were quadriplegia. The mean age at the time of first injection was 6.8 years (range, 2.8 yr to 15.9 yr). They were all classified as GMFCS level \square . As a treatment for neck and trunk muscle spasticity, BTX-A injections were administered with a total dose below 10 units per kilogram of body weight. To investigate the efficacy of BTX-A, the Modified Ashworth Scale and Aid Difficulty Scale were used to evaluate the patients before and at regular monthly follow-ups after their injections. **RESULTS:** We found significant improvement in both of the Modified Ashworth Scale scores and Aid Difficulty Scale scores at 1 month after initial injection and also found the same difference at the subsequent injections. **DISCUSSION AND CONCLUSION:** There are many methods for treating opisthotonus, such like medicine, rehabilitation, intrathecal baclofen, selective dorsal rhizotomy and orthopedic surgery. We found that BTX-A has a useful place in the management of the opisthotonus that is seen in children with cerebral palsy. **Keywords:** Cerebral palsy, botulinum toxin A, opisthotonus, modified ashworth scale, aid difficulty scale

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MULTIPLE TENDON RELEASE OF LOWER EXTREMITY FOR CEREBRAL PALSY PATIENTS

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AIM: The long term results were evaluated to control for the success of simultaneous multiple releases of lower extremities of patients with spastic cerebral palsy. Special attention was given to flexion deformity of the knee. **MATERIAL & METHOD:** We performed multiple level lower extremity lengthening for 6 CP patients with a mean age of 9.1 (5 to 15 years) between 2001 and 2005. The average follow up was 57.3 months. Hamstring, rectus femoris, iliopsoas and adductor tenotomies & tenolysis for both lower extremities were released simultaneously. Gross Motor Function Measurement Score (GMFMS) and pre versus post operative popliteal angles were used for evaluation. **RESULTS:** GMFMS values for patients: preoperatively 1 patient was level 5, 1 patient was level 2, and 4 patients were level 3; postoperatively 1 patient was level 3, 3 patients were level 2, 2 patients were level 1. Post versus pre operative popliteal angles measurement decreased from a mean pre-op angle of 59 degrees (70-45 degrees) to post-op popliteal mean angle of 45 degrees (65-20 degrees). **DISCUSSION:** Today, physiotherapy is the first choice for cerebral palsy treatment. Yet, for selected cases of cerebral palsy, surgery is also an option. GMFM scoring shows multiple tendon release of lower extremities of cerebral palsy patients benefited from the surgery. With regards to flexion deformity of the knee, the changes in the popliteal angle were positive. We think that the most important factor to prevent knee flexion deformity after surgery is appropriate physical therapy and bracing.

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ONE-STAGE RECONSTRUCTION VERSUS FEMORAL OSTEOTOMY (VDRO) ALONE IN THE TREATMENT OF HIP SUBLUXATION AND DISLOCATION IN CEREBRAL PALSY

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PURPOSE: Although evidence is increasing that the most effective treatment for the severely subluxated or dislocated hips is a one-stage comprehensive approach there are few studies that compare the results with the traditional approach (varus derotational osteotomy VDRO). The purpose of this study is to evaluate the clinical and radiological outcome after one-stage reconstruction versus VDRO alone. **METHODS:** We evaluated 52 hips in 39 consecutive patients with spastic cerebral palsy treated from January 1997 to January 2007. Group A (36 hips) were treated with a VDRO and San Diego osteotomy and group B (16 hips) with VDRO alone. Mean age was 8.1+/-3.6 years. Mean follow-up was 4.4 years. Evaluation was performed according to clinical criteria (hip range of motion, pain and sitting comfort) and radiographic parameters (center-edge angle [CEA], acetabular index [AI], neckshaft angle [NSA], and Reimer's Index [MI]). **RESULTS:** There were significant differences in pain and radiographic parameters (CEA and AI) between the groups. 25% of patients who had VDRO alone needed revision procedures and none of the combined group needed other procedures. **CONCLUSIONS:** The clinical and radiological results obtained by the one-stage procedure were far better than doing VDRO alone to justify its increased morbidity. Consideration should be given to doing the combined procedure in cerebral palsy patients with hip subluxation or dislocation.

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CHIARI OSTEOTOMY IN SUBLUXATED HIPS OF CEREBRAL PALSY

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PURPOSE: Retrospective study. **MATERIAL AND METHODS:** Between August 1988 and July 2007, 15 spastic Cerebral Palsy patients with and painful subluxated hips were treated with Chiari osteotomy only or associated with femoral varus derotation and shortening osteotomy and adductors release. The mean-age at surgical procedure was sixteen years and three months. There were 8 diplegic, 6 tetraplegic and 1 hemiplegic. Functionally 5 were community, 2 household and 8 non-ambulators. The indications were functional impairment, limitation of daily living activities, and pain. All patients were evaluated pre and postoperatively with radiographic measurements of acetabular index (AI), Reimers migration percentage (RMP) and femoral neck-shaft angle (NSA). The satisfactory result was considered the patient with no pain clinically with or without normal radiographic parameters. The average follow-up period was five years and six months. **RESULTS:** Radiographically: Mean AI preoperative was 51,4° and postoperative 42,6°. Mean RMP preoperative 63% and postoperative 12,2%. The mean NSA preoperative was 145,2° and postoperative 138,5°. No correlation between signs of osteoarthritis and the final result. **CLINICAL:** 11 patients (73%) of pain remission, 2 (13%) with partial pain relief, 1 (7%) with persistence of the pain due to a symptomatic pseudoarthrosis being re-operated ant post-operative 5 years and 4 months, 1 (7%) with painless hip subluxation. **CONCLUSION:** The Chiari osteotomy is a salvage procedure to painful subluxated hips of adolescents and adults Cerebral Palsy patients whenever more anatomic reconstructive procedures are longer not indicated.

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A NEW SIMPLE METHOD OF FIXATION OF VARUS DEROTATION OSTEOTOMY OF THE PROXIMAL FEMUR IN CEREBRAL PALSY CHILDREN WITH HIP DISLOCATION USING MULTIPLE K-WIRES: THE REVERSED WAGNER TECHNIQUE

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This study describes a new technique for fixing varus osteotomies of the proximal femur in CP children using Multiple K wires based on the technique described by Wagner for Coxa Vara (hence we called it the reversed Wagner technique) and reports its results. In our study we performed 15 Varus osteotomies and fixation using our technique on 15 CP children with hip dislocation/subluxation. There were 6 males and 9 females; their age ranged from 4.0- 9.0 years. In all cases the surgery was combined with adductor tenotomies, in some cases it was combined with other procedures as open reduction, pelvic osteotomy. The follow up period ranged from 6-24 months. The technique implies using multiple K-wires driven through the femoral neck stopping short of the physis and tailored to a 90° blade plate and fixed to the femoral shaft by 3 rows of tensioned cerclage wires, fixation is further augmented by an interfragmentary derotation wire included in the cerclage wiring. A hip spica is then applied. Femoral shaft medialization is an aim during the procedure. In all our cases we were able to achieve the desired correction intra operatively, and this correction was maintained throughout healing of the osteotomy in all cases. We found that the Reversed Wagner technique creates a custom Varus implant which is suitable for small & soft bone segments. The construct is simple, stable, inexpensive, maintains correction through osteotomy healing and carries low risk regarding both the proximal femoral & the greater trochanteric growth plates.

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MEDIAL COLUMN ARTHRODESIS IN SPASTIC PLANOVALGUS FOOT

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The treatment of spastic plano-valgus feet is challenging especially in adolescents and young adults, due to severe and rigid deformities. The purpose of this study is to present the results of the surgical treatment of this deformity by arthrodesis of the foot medial column. **METHODS:** Between March 2003 and March 2008 21 patients (35 feet) with mean age was 16 years and 1 month with spastic Cerebral Palsy and planovalgus feet were treated with arthrodesis of the foot medial column addressing the talonavicular, navicular-medial cuneiform and medial cuneiform-first metatarsal joints, and internal fixation with a plate. 11 diplegic, 9 tetraplegic and 1 hemiplegic. 9 patients community ambulators, 7 household ambulators and 5 non ambulators. The surgical indications were severe deformity, gait dysfunction and pain. The mean follow-up period was 3 years and 4 months. **RESULTS:** Radiographically: the angle of the inclination of the calcaneus had an average improvement of 14.48° (mean of -1.97° pre-operatively to mean of 12.51° post-operatively). The talocalcaneal angle ranged from a mean of 34.31° pre-operatively to a mean of 36.0° post-operatively. Clinically: 7 feet needed further procedures to achieve correction and no pain. No change on the functional status. Patients presented improvement of deformity, no pain or shoe wear difficulties with good results in 32 feet. Three patients with persistent pain. **CONCLUSION:** The stabilization of the foot medial column is an option in the treatment of the severe and rigid spastic plano-valgus feet in adolescent and young adults.

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ANTERIOR CORRECTION OF ADOLESCENT IDIOPATHIC SCOLIOSIS: A CLINICAL STUDY OF THORACIC AND THORACOLUMBAR CURVES

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INTRODUCTION: Thoracic Scoliosis surgery is usually performed through posterior approach, but anterior correction is more physiological. Some authors reported anterior correction is kyphogenic and may lead to implant failure and loss of correction and pseudoarthrosis. **METHODS:** 20 patients with adolescent idiopathic scoliosis with an average 75° Cobb angle and an average age 14.5 yrs were operated. Average follow up was 3 years. In 5 patients distal end vertebra were excluded. It evaluated the sagittal and coronal alignments of the spine. Modified SRS instrument chart were used. **RESULTS:** The average correction rate of scoliosis was 80%. Over the instrumented level the correction rate was 90%. The average preoperative kyphosis over the thoraco lumbar junction was 70°, which was corrected to 90° of lordosis. Compensatory curves spontaneously improved by an average of 42% for the upper curves and 60% for the lower curves. Fusion could be achieved in all patients. The SRS satisfaction score revealed 4.2 out of 5, and self-image score of 4.5 out of 5 with an average 80% overall score. Lumbar lordosis improved by an average of 50° to 30° after surgery. Lateral trunk shift improved from 50 mm to 10 mm on an average. **CONCLUSION:** Single rigid anterior rod gives excellent results with 100% fusion rate. It gives perfect sagittal and coronal plane correction with good rotary correction. There is no evidence of implant failure, pseudoarthrosis or loss of correction at latest follow up.

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ADOLESCENT IDIOPATHIC SCOLIOSIS RELATIONSHIP TO OSTEOPOROSIS

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PURPOSE: Our research aimed to examine bone mineral densitometry in adolescent idiopathic scoliosis patients. The dual-energy x-ray (DEXA) method was used to measure the bone density. **MATERIALS AND METHODS:** 45 patients were evaluated. We separated them into two groups, normal and osteopenia+osteoporosis. Normal patients were 22, average mean age was 14.18, heights were 161.55 cm, weights were 51.82 kg, BMI were 19.63 ± 2.55 kg/m. Osteopenia and Osteoporosis groups were 23, heights were 156.74 cm, weights were 43.35 kg, BMI were 17.43 ± 3.25 kg/m. Lumbar vertebra total BMD, Z-Score were measured both two groups. **RESULT:** The average weight, BMI, BMD, Z-Score of osteoporosis and osteopenia groups were statistically significant from the normal group, lower ($p < 0.5$). The average height between Normal, Osteoporosis and Osteopenia groups statistically significant difference was observed at ($p = 0.017$). The average weight between Normal and Osteopenia and Osteoporosis groups statistically significant difference was observed ($p = 0.002$). The average BMI between Normal and Osteopenia and Osteoporosis groups statistically significant difference was observed ($p = 0.019$). The average of the BMD and Z-Score between Normal Osteopenia and Osteoporosis groups are statistically significant differences was observed ($p = 0.0001$). **CONCLUSION:** In patients with adolescent idiopathic scoliosis if patients have osteoporosis and osteopenia their weight and height were found to be significantly lower according to normal bone density Scoliotic patients. Adolescent age group in scoliosis patients, BMD, BMI, Z-score, weight, length values should be checked.

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CAPASSOS METHOD REVISITED: VALIDATION AGAINST CONVENTIONAL MEASUREMENT TOOLS IN EVALUATION OF COBB ANGLE FOR SCOLIOSIS

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Capassos method (CM) is described in textbooks to be the most sensitive tool for measuring Cobb angle in scoliosis. This method based on bi-univocal principles; views the scoliosis curve to be an arc of circumference of a circle, to be a true reflection of angular values and hence geometrically more valid. However there is no comparative study between the established measurement tools i.e. Oxford cobbometer (OC) & Traditional protractor (TP) vs. CM. Our objectives were to evaluate the sensitivity of CM against OC & TP and to determine intra & inter-observer reliability of the three methods. Three independent blinded observers measured 24 digital AP radiographs of idiopathic scoliosis on three separate occasions one week apart by CM, OC & TP. The three sets of readings obtained were statistically analysed for intra-observer (Cronbachs alpha) & inter-observer [Inter-class correlation coefficient (ICC)] reliability. The mean Cobb angle measured by OC was 42.4 (r13-91), by TP was 45.1(r16-89) and by CM was 70.4 (r 20-148). The cronbachs; was 0.94 for OC, 0.91 for TP & 0.88 for CM. The ICC was 0.96 for OC, 0.90 for TP & 0.71 for CM. The measurements obtained by CM were higher than the other two methods for all magnitudes of the curves. CM had reasonable correlation with cobb angle (Pearsons@=0.74). However CM overestimated the magnitude of scoliosis as compared to other standard measurement tools. Management decisions based on CM would be inappropriate by current guidelines.

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CORRELATION AND COMPARISON OF RISSER SIGN VERSUS BONE AGE DETERMINATION (TW3) BETWEEN CHILDREN WITH AND WITHOUT SCOLIOSIS IN KOREAN POPULATION

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INTRODUCTION: There is no study available that compares the Risser sign and bone age correlation between patients with idiopathic scoliosis and patients without scoliosis. OBJECTIVES: To establish the skeletal age, both in male and females that correlates with the Risser sign the most. In addition we also compared this correlation between the patients with idiopathic scoliosis and without scoliosis to find out if there is any difference exists. METHODS: A cross-sectional study was done in 418 scoliosis (untreated) and 256 non-scoliosis children of Korean origin. Relationship was found in both groups using Pearson correlation test. RESULTS: In scoliosis group, Pearson correlation exhibited strong correlation between Risser sign and chronological age ($r^2=0.97$ for girls, 0.96 for boys) and Risser sign and TW3 age ($r^2=0.96$ for girls, 0.93 for boys). Non-scoliosis group also showed strong relationship between Risser sign and chronological age ($r^2=0.99$ for girls, 0.96 for boys) and Risser sign and TW3 age ($r^2=0.97$ for girls, 0.94 for boys). Similarly, comparing Cobb angles of each patient according to their Risser staging, exhibited that if scoliosis remains untreated Cobb angle will increase with the increase in their Risser staging ($r^2=0.73$ for girls, 0.69 for boys). CONCLUSION: Our results would provide important information regarding the skeletal maturity in Korean children with and without scoliosis, which is different than American and European ethnicity for the decision making.

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SPINAL INJURIES IN CHILDREN AND ADOLESCENTS

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PURPOSE OF THE STUDY: In this retrospective study, the effectiveness of conservative and surgical treatment of injured spines in children is evaluated in a 10-year period. **METHODS:** During 1996 through 2005, we treated a total of 15 646 patients with injury to the skeleton, aged 0 to 18 years. The spine was affected in 571 cases, which is 3.6 %. We used conservative treatment in 528 (92.5 %) and surgery in 43 (7.5 %) children. The period between surgery and evaluation ranged from 6 to 120 months (average, 46.3 months) in the patients treated conservatively, and from 6 to 66 months (average, 27 months) in the surgically treated patients. **RESULTS and CONCLUSIONS:** Childhood spinal injuries account for only 2 to 5 % of all spinal injuries and for 3.6 % of all skeletal injuries in children. Particularly at the age of 11 to 12 years, they differ significantly from spinal injuries in adults and therefore require different therapeutic approaches. The cervical spine is affected most often in younger children, while the thoracolumbar spine in older children. Multi-segment injuries are typical in the childhood spine, particularly in smaller children. Typically, children show SCIWORA and a more rapid improvement of neurological deficit than adults. Conservative treatment is preferred; surgery before 12 years of age is strictly individual, while after 12 years therapy is similar to that used in adults.

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SINGLE STAGE FRONT AND BACK RESECTION TO CORRECT NEGLECTED CONGENITAL ANGULAR DEFORMITIES

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STUDY DESIGN: A retrospective series. **Summary of Background Data:** Spinal osteotomies have been the cornerstone of surgical treatment of congenital spinal deformities with several hazards and complications reported with these major techniques. Front and back resections were usually performed at 2 separate sessions. **OBJECTIVE:** To evaluate the efficacy of performing both anterior and posterior resections at a single stage; analyzing the amount of correction achieved and the incidence of complications. **METHODS:** The study included 22 patients with neglected congenital spinal deformities. The average age was 19 years (range 15 to 26y) with no history of surgical intervention. All patients had a fully segmented hemivertebra and no associated intraspinal anomalies. Total resection was performed using an anterior approach followed simultaneously by completion of the resection posteriorly, correction and long segment instrumentation. **RESULTS:** The average operative time was 8.15h (range 7.30 - 11.15h), the average blood loss was 890cc (range 750 - 1250cc) and the average hospital stay was 7 days (range 5 - 10days). Patients were followed-up for an average of 4 years (range 3 - 7y). The average Cobb angle of the main scoliotic curve was 75° corrected to 29° and the main kyphotic angle had an average of 64° corrected to 17° at the last follow-up. Overall, there were no persistent postoperative neurological deficits and no metal failures. **CONCLUSION:** This technique is a safe and promising procedure and performing both approaches at a single stage allowed early patient ambulation and a short operative stay.

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ACUTE SEPTIC ARTHRITIS REVISITED: A PROSPECTIVE STUDY IN 93 PATIENTS CORRELATING C REACTIVE PROTEIN LEVELS WITH DURATION OF INTRAVENOUS ANTIBIOTIC THERAPY, CLINICAL AND RADIOLOGICAL OUTCOMES.

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Septic arthritis is the most dreaded affection of the joints in children. Early diagnosis, urgent arthrotomy and intravenous antibiotic therapy, however are essential factors in treatment of septic arthritis to prevent devastating complications. However, the optimal duration of intravenous antibiotic therapy for acute septic arthritis after surgical drainage is not well define. We performed a prospective study in ninety three patients with age less than 5 years who presented with acute septic arthritis and treated with arthrotomy and sequential antibiotic therapy based on determination of serial quantitative CRP levels correlating radiological and clinical outcome. Majority of the subjects (84%) had CRP values more than or equal to 96 mg/dl at the time of presentation. More than half of the subjects had CRP values reverted to normal by the seventh day of treatment. By the twenty first day of treatment, all the subjects had CRP values at baseline levels. 'The clinical and radiological outcome was excellent in 85% of the cases where the CRP normalized by 7 days compared to 25% where the CRP had not normalized by 21 days.' The difference was found to be statistically significant. We conclude from our study that CRP levels decreases consistently during the antibiotic therapy and patients in whom CRP values return to normal earlier have good clinical and radiological outcomes. We also conclude that intravenous antibiotics should be stopped and switched over to oral therapy once CRP levels return to normal in cases of acute septic arthritis.

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ORTHOPAEDIC PROBLEMS IN THAI OBESE CHILDREN

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OBJECTIVES: To describe the prevalence and characteristic of orthopaedic problems in obese children. **MATERIALS & METHODS:** A cross-sectional study was conducted at the Department of Orthopaedics, Ramathibodi Hospital. Obese children (BMI \geq 95th percentile for age) aged 2-15 years who were enrolled at the obesity clinic, Ramathibodi Hospital during 2007-2008 were included. The children who had endocrine abnormality from any causes were excluded. All eligible children who met inclusion and exclusion had orthopaedic examination, radiography for deformity and for bone age, blood and urine testing for bone marker, and dual-energy x-ray absorptiometry scans for bone mineral density. **RESULTS:** A total of 95 obese children were studied. Most of them were male (61.1%). The mean age of these children was 9.7 ± 3.7 years. The mean BMI was 31.7 kg/m^2 ; more than 50% of children have BMI above 200th percentile. The prevalence of any orthopaedic problems; i.e. pain, deformities, or injuries, was found in 60% of these children. The most common musculoskeletal problem was knee pain and deformities. Mean BMD Z-score was 2.36 ± 1.2 and mean bone age was 11.7 ± 4.4 years. **CONCLUSION:** The prevalence of orthopaedic problems in obese children is high. Obese children also had higher BMD when compared to normal value and advanced bone age when compared to their chronological age. Efforts should be made to encourage health care providers' recognition of the orthopaedic complications of excess weight so that interventions can be initiated.

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HUMERAL LENGTHENING

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Early reports of upper limb lengthening revealed a high rate of complications including functional impairment. We report our results of Humeral lengthening & management of associated Humeral & Elbow deformities. **METHODS:** From 1990 till 2006, 32 cases with humeral shortening were treated in our center. 12 cases were bilateral (44 segments) .Average age at operation was 13.5 years [range 8.5 years to 20 years]. The aetiology was Erbs palsy 8 cases, epiphyseal injury 7 cases, infection 5 cases and achondroplasia 12 cases (24 humeri). There were associated problems in 8 cases: [2 patients with stiff Elbow & 6 with Humeral deformities [angulation or internal rotation]].The patients were evaluated according to the magnitude of lengthening achieved, axial deviation, ROM, Functional activities and patients' satisfaction. **RESULTS:** The extent of lengthening achieved ranged from 5.5 cm to 15 cm (115% of the original length).The followup period ranged from 1 to 8 years with an average of 3.2 years. Time in the fixator ranged from 4.5 to 14 months. The average healing index was 27 days/cm. There was marked improvement of Elbow stiffness. Complications included: some sort of pin tract infection in all cases, fracture of the regenerate in 4 cases and radial nerve palsy in 2 cases. **CONCLUSIONS:** Through a single osteotomy lengthening up to 115% of the original bone length can be performed without increasing the possibility of shoulder instability. Humeral deformities & Elbow stiffnes can be treated cncomitantly with Humeral lengthening.

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MANAGEMENT OF SACRAL AND PELVIC TUMORS AT SIRIRAJ HOSPITAL

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OBJECTIVE: The study was carried out to analyze the results of surgical management of sacral and pelvic tumors in our department. **MATERIALS AND METHODS:** There were 46 patients, 20 males and 26 females with their ages ranged between 25 and 75 years who were treated during 1989 to 2008. All patients presented with large tumor mass and pain. Most common tumors were chordoma (25) and chondrosarcoma (15). Giant cell tumor was also found in 2 patients. Wide resection was carried in all patients except 2 giant cell tumors which intra lesional curettage. **RESULTS:** All patients survived after the operation except the one who had lymphoma. Operative time ranged between 5 and 9 hours, with an average of 6.4 hours. All patients needed blood transfusion and ranged between 6 and 16 units with an average of 8.7 units. In 11 patients who underwent total sacrectomy bone stabilization was performed.

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TOTAL EN BLOC SPONDYLECTOMY FOR ANGIOSARCOMA OF THE SPINE – REPORT OF TWO CASES

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PURPOSE: To report two cases of angiosarcoma developed in vertebrae which were treated successfully by total en bloc spondylectomy (TES). **CASE:** First case was a 50 year-old female complaining of low back pain. Imaging study revealed osteolytic change of L1 vertebra. Second case was a 53 year-old male with back pain who was referred to our institute for the treatment of T6 vertebral tumor. CT scan and MR imaging showed that tumor involved posterior half of vertebral body extending to left pedicle. Further imaging study suggested no lesion in another bony structure and organs in both patients. TES, which was introduced by Tomita, was applied to these cases to achieve curable resection. The first case underwent systemic administration of Interleukin-2 additionally. Postoperative course was unremarkable except for temporal paraparesis which completely recovered shortly after surgery in first case. Histopathological findings of specimens from removed vertebrae were compatible with angiosarcoma in both cases. Five years after surgery, there was no sign of recurrence or metastasis. **DISCUSSION and CONCLUSION:** Angiosarcoma is an extremely rare condition as primary malignant tumor of spine and has a poor prognosis. On the other hand, complete resection of vertebral tumor with a wide margin is basically impossible due to anatomical limitations. Although TES has the disadvantage of potential tumor cell dissemination at the cutting point of the involved pedicle, it is one of the most intensive and curative methods for vertebral tumors like current cases from the aspect of the surgical approach.

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EN BLOC VERSUS INTRALESIONAL RESECTION OF PRIMARY EXTRADURAL TUMORS OF THE SPINE

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INTRODUCTION: The impact of operation was investigated, performed on primary tumor in spine using en bloc resection technique or intralesional resection on perioperative morbidity, reoperation rate, neurological recovery and survival. **MATERIAL AND METHODS:** 35 patients were undertaken with primary extradural bone or neural derived spine tumour, operated during 1992-2008, median age 35 (4 - 84) years. For en bloc resection we use combined anterior and posterior approach often with resection of chest wall without transection of tumour. The intralesional group received major intralesional dissection. In both groups spinal collums and chest wall were reconstructed. **RESULTS:** No difference in morbidity and hospital stay between the groups. All patients with neurological deficit recovered and mobilized within few days. The life expectancy was not only related surgical technique but also to primary tumour classification. The selection of intralesional surgery resulted in higher reoperation rates, but since it was applied mostly to more benign tumours letality was not affected. Early death (<2 years) was seen in PNET, Ewings and low grade chondrosarcomas. The pre and post operative chemotherapy is essential for surgical control in sensitive tumours. Long term survival in highly malignant spine tumours was found only in few patients following en bloc resection. **CONCLUSION:** The primary extradural spine tumours must be referred early for biopsy and tumour classification. The treatment of highly malignant spine tumours is not only surgical. Based on the present and larger studies it can be concluded that extralesional en bloc resection results in the longest disease free survival.

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ESTIMATING RISK OF PULMONARY NEOPLASTIC EMBOLISM DURING VERTEBROPLASTY

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AIM: Patients suffering from metastatic lesions of the spine have been successfully treated with vertebroplasty. Most feared is cement migration to the lungs resulting in embolism. The aim was to estimate the risk of neoplastic tissue migration into the lungs during vertebroplasty in an experimental pig model. MATERIALS AND METHODS: We used a cancer simulation model in 11 Landrace pigs with injection of ^{99m}Tc labeled albumin macro aggregates, into the center of L5 and L6 prior to vertebroplasty. We surveyed free TcO_4^- in thyroid. Twenty minutes after the ^{99m}Tc injection, two-level vertebroplasty was performed at L5 and L6 with 3 Jamshidi needles in each vertebra, and PMMA cement (Depuy) was injected. Quantitative scintigrams were obtained within 90 minutes after vertebroplasty. Conventional X-rays and qCT scans quantified cement distribution. Means of ^{99m}Tc activity before and after vertebroplasty were compared in a paired T-test. RESULTS: We found an 80% risk of tissue migration to the lungs. In average the study showed a significant amount of Macroaggregate migration of 1.87% total range from 0-8% (CI 0.05% - 3.37%) with $p = 0.045$. There was no free TcO_4^- in the thyroid. Despite the standardized procedure, we found a large interindividual variation of pulmonary embolism. CONCLUSION: This study underlines that inherent in vertebroplasty lies a significant risk of exporting neoplastic disease to the lungs and other extravertebral locations. So far vertebroplasty should only be applied to patients with multiple metastasis and short survival due to the risk of iatrogenic induction of pulmonary metastasis.

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INJURY TO MAJOR BLOOD VESSELS IN ANTERIOR THORACIC AND LUMBAR SPINAL SURGERY

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PURPOSE OF THE STUDY: The aim of this study was to evaluate vascular complications in patients who underwent anterior spinal surgery of the thoracic and lumbar spine. **METHODS:** We performed a total of 531 operations of the thoracolumbar spine from the anterior approach. In 12 cases, after exposure of the body of the first or second thoracic vertebrae, we employed the Smith-Robinson technique to expose the cervical spine. We used sternotomy in six, posterolateral thoracotomy in 209, pararectal retroperitoneal approach in 239, anterolateral lumbotomy in 58 and the transperitoneal approach in seven patients. The aim of surgery was somatectomy in 190 patients and discectomy in 341 patients. **RESULTS:** We found injury to major blood vessels in three patients in the group treated by the pararectal retroperitoneal procedure. In the total of 531 anterior spinal surgery procedures this accounts for 0.56%; of the 304 lumbar operations and 239 pararectal retroperitoneal operations it is 0.99% and 1.26%, respectively. **CONCLUSIONS:** The technique of anterior approach is safe only in the hands of experienced spinal surgeons with long experience. In institutions where anterior spinal surgery is not a routine method it is advisable to involve a vascular or cardiac surgeon. However, the most important point is to know when not to operate.

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POSTERIOR EXCISION OF SPINAL METASTASIS AND COMPOSITE FIXATION

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Spinal metastases are the commonest type of spinal tumors. These usually cause significant morbidity and mortality and frequently are the first presentation of many hidden tumors. Patients usually suffer from severe pain and sometimes neurological deterioration. This is a prospective analysis of 29 patients who presented with spinal metastases of the dorsal and/or lumbar spine during the period between March 2001 and February 2009. There were 19 females and 10 males (mean age 69.2 years, range 41 - 89 years). Twenty-one patients had single level metastasis, while eight had multiple metastases. Surgery was primarily indicated for pain relief, spinal stabilization, neural decompression and to take confirmatory biopsy. All patients were operated through a single stage posterior surgery, where spinal fixation system was applied and then the involved vertebral body with the adjacent discs was excised in a piecemeal fashion. The defect was then filled with bone cement paste over 2-3 K-wires. After complete hardening of the cement, the posterior fixation system was compressed to load the anterior column to increase the construct stability. All patients received postoperative radiotherapy. All patients showed marked relief of pain (mean pain score (VAS) decreased from 8.9 preoperatively to 2.4 postoperatively). Immediate mobilization was allowed to all patients. Neurological recovery was observed in 10 out of 17 with neurological affection. The remaining 7 patients had complete paralysis (Frankel A) preoperatively.

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CORE NEEDLE BIOPSY IS ACCURATE IN DIAGNOSING BONE AND SOFT-TISSUE LESIONS

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PURPOSE: Core needle biopsy is increasingly accepted for the diagnosis of bone and soft-tissue tumours. Advantages over open biopsy include reduced morbidity, time and cost; however diagnostic accuracy remains a concern. Our objective was to assess and compare the diagnostic accuracy of core needle, open, and fine needle biopsies. **METHODS:** We reviewed 286 cases collected in a prospective database between 2004 and 2007. Of these, 229 had core needle, 32 open, and 25 fine needle biopsies. 230 had soft-tissue lesions, 56 had bone lesions. The results of these biopsies were compared to the final resection diagnosis for accuracy and, where inaccurate, any effects on management. **RESULTS:** Ninety-two percent of the core needle, 100% of the open and 72% of the fine needle biopsies had adequate tissue to make a diagnosis. Of the adequate specimens, the accuracy of core/open/fine needle biopsy was 96%, 97% and 94% for determining malignant versus benign; of the correctly identified malignant lesions 97%, 100% and 80% were accurate for histological grade; and 79%, 84%, 59% for histological subtype. **CONCLUSIONS:** Core needle biopsy yields diagnostic results comparable to open biopsy for determining malignancy and grade in bone and soft-tissue tumours. Fine needle biopsy has a high inadequate sampling rate and should not be used for diagnosing bone and soft-tissue tumours. Given the reduced cost and morbidity associated with core needle biopsies, they should be used routinely for diagnosis where possible, and open biopsy reserved for situations when core biopsy is not feasible.

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PHOSPHATURIC MESENCHYMAL TUMOR REMOVAL USING HANDHELD GAMMA PROBE

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PURPOSE: Oncogenic osteomalacia is a rare disease characterized by a mesenchymal tumor which secretes phosphaturic protein. The treatment is tumor removal, but usually the lesion is small and difficult to locate. We present two cases with oncogenic osteomalacia, treated by gamma probe guided surgical removal. **MATERIALS AND METHODS:** Both patients presented with long duration of bone pain. Radiographic finding showed marked osteoporosis and pseudofracture. Blood chemistry revealed normal serum calcium and low level of phosphate. Bone scan showed multiple increase uptakes. Biopsy was performed on suspected bone lesions and the pathological section showed osteoporosis. Octreotide scan demonstrated small mass on right distal femur in the first patient and mass on right groin in the other. The diagnosis was confirmed as oncogenic osteomalacia or phosphaturic mesenchymal tumor. Both patients were treated by surgical removal assisted with gamma probe. **RESULTS:** Serum phosphate reduced to normal level within one to three days postoperative. Pathological tissues were confirmed as hamangiopericytomas. Pain was decreased. Subsequent radiographic findings revealed bony recovery for both patients. **CONCLUSION:** Phosphaturic mesenchymal tumor is a rare musculoskeletal disorder. History, laboratory and radionuclide study are required to establish diagnosis. Handheld gamma probe can be used to locate the lesion and avoid wrong tissue excision. Limitations occur when tumor is located near urinary bladder or major blood vessels because it can produce stronger signal mimicking tumor.

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WARM RINGER LACTATE SOLUTION AS A LOCAL TREATMENT IN GIANT CELL TUMOR OF BONE

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OBJECTIVES: To find out efficacy and safety of warm RLS as a local treatment in advance giant cell tumor of bone, the study was performed. **MATERIALS AND METHODS:** There were 20 patients, 11 males and 9 females, who had advance lesion of giant cell tumor of their extremities. Their ages ranged between 28 and 50 years old. Giant cell tumor was found at humeral condyle in 8, radius in 6, humerus in 3, femoral condyle in 1, tibial condyle in 1 and sacrum in 1 patient. The tumor invaded surrounding soft tissues including neurovascular bundles in all patients. Wide resection could not be carried out in these patients. After convention curettage and high speed blurring at the tumor bony wall, warm sterile RLS with the temperature of 50 degrees Celsius was used to irrigate in the tumor lesion for 20 minutes. Bone cement or bone grafting were then carried out. **RESULTS:** Three patients who had large tumor mass at upper humerus and 1 patient with tumor at his sacrum had neurological deficit that partially recovered at 2 year follow up. The rest 16 patients had no neurological deficit and all healed up completely without evidence of tumor recurrent at the 2 year follow up. Motion of the nearby joints of the patients could be preserved. **CONCLUSION:** Use of warm RLS for local treatment in advance giant cell tumor gave good results and limb sparing could be done in the patients who had extensive soft tissue invasion by the tumor.

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Abstract number: 22564

NEUROLOGICAL IMPROVEMENT AND SURVIVAL AFTER SURGICAL TREATMENT IN PATIENTS WITH METASTASES ACCORDING TO SUBGROUPS OF PRIMARY CANCER

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BACKGROUND: Breast cancer e.g. is a common disease, but life expectancy varies a lot due to the tumor subgroup. Existing surgical scores do not pay attention to tumor subgroups. Hence surgical decision-making is not influenced on an evidence-based way and, to a wide extent, depends on the experience and knowledge of the attending surgeon. **AIM:** To inform the decision-process of how to choose the best surgical therapy for the affected individual with metastases. **MATERIALS AND METHODS:** 474 patients in Aarhus Metastases-Database from 1997 till 2008 with a histological confirmed diagnosis of spinal metastases and surgical intervention were included. The average age was 61 years (27-87 years), M:F =6:4, 20.6% suffered from prostate-, 19.6% suffered from breast cancer metastases. More than 20% had unknown primary cancer. These findings will be related to age, gender, the affected spinal region, primary tumour and tumour subgroup. Survival will be examined using survival analysis, including life-tables and Kaplan-Meier-curves. **RESULTS:** The patients with prostate-cancer survived 186 median days, breast-c 534, lung-c 89, kidney-c 237 and cancer coli 173 median days. Tokuhashi score was most effective in the estimation of short life expectancy. **PERSPECTIVES:** Life expectancy of cancer patients depend on the different tumor subgroups and extend of metastatic spread, we expect that, surgical intervention should be modified according to cancer subgroups. Decision-making could be improved and surgical treatment could be better adapted to patients needs. Novel treatment modalities such as embolization or targeted chemotherapy shall also rely on primary cancer subgroups.

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Room: Pattaya 11

Abstract number: 22586

RECONSTRUCTION OF THE UPPER PART OF THE FEMUR WITH MEGAHIP PROSTHESIS SURROUNDED BY ALLOGRAFTS

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We have elected since 1981 to use deep-frozen allogenic grafts to rebuilt the skeleton eventually surrounding a massive metallic prosthesis if we think that the osteochondral part of the graft will collapse. COMPUTERIZED, CUSTOM-MADE MEGA HIP PROSTHESIS Shape: The prosthesis has to have the same anatomical shape as the medullar bone. The form which has been given by CAO is an italic S with a long inferior curve. Straight stem cannot be used for these reasons. Fixation: We think that the best utilization is with cement in the grafted zone and in the recipient bone. The muscles surrounding the graft will fix themselves on it. CLINICAL APPLICATIONS: We can increase the volume of the bone using a prosthesis surrounded by allograft. In bone tumors when muscles and ligaments have been removed we consider the best solution is to use massive metallic articular prostheses surrounded by one allograft. Prosthesis brings immediate stability and allows the patient to walk after a few days while the graft will permit the remaining muscles to fix themselves on it. 266 Cases are rewewed in: Traumatologic deseases: 48 cases; Sepsis: 62 cases; Numerous operations with loss of substances: 119 cases; Tumoral surgery, 37 cases. In 92% of the cases we have had excellent integration of the graft. Complications: - Sepsis recurrences: 3,2 % of the cases - Bad healing at the junction allograft recipient bone: 1 % - Luxation of the prosthesis: 12% necessity of antiluxation ring or retentive cup.

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23 YEARS EXPERIENCE WITH GROWING PROSTHESES

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OBJECTIVES: A comparison of 2 types of growing prostheses in children was investigated. In 1985 a growing prosthesis was implanted for the first time in children with malignant bone tumours of the lower extremity. **METHODS:** 54 patients had osteosarcomas, 14 Ewing's tumours. 15 died of metastases (22%), 2 had amputations due to complications (e.g. irradiation) and 1 due to a local recurrence. There is no information from 2 patients. 28 children reached skeletal maturity out of 48. A modular prosthesis with manual growing modules in 24 and automatic modules in 4 were implanted (10 male, 18 female). 6 Ewing's tumour and 22 osteosarcoma patients with an average age of 10.7 years (6.6 – 16.1) survived till the end of the growth period. 17 with a distal femur replacement, 5 with a total femur, 8 with a proximal tibia and 1 with a proximal femur were investigated. **RESULTS:** At the end of the growth period all reported cases had nearly the same leg length. Complications of the prostheses were loosening in 12, bushing change in 6, screw or prosthesis breakage in 6, malfunction of the elongation mechanism in 3 and others in 3 (30 in 28 = 1.1/case). Other complications were infection in 17, skin necrosis in 12, hematoma in 10, restriction of motion in 10, nerve lesion in 4, instability in 4, stress shielding in 3, fractures in 3 and thrombosis in 2 (65 in 28 = 2.3/case). Manual and automatic modules in the distal femur location were compared in 4 pairs with similar age and growing capacity in order to give comparability. **CONCLUSIONS:** Automatic growing modules had significantly less operations/cm elongation. We hope there will be improvement with a further generation of automatic growing prosthesis.

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MANAGEMENT OF SEPTIC COMPLICATIONS IN MEGAPROSTHESES OF THE PROXIMAL FEMUR

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The treatment of deep prosthetic infection in patients with megaprotheses of the proximal femur remains a major complication as there are no established standards of treatment as for primary THA. Between June 1978 and September 2008, 170 patients received an uncemented Kotz modular prosthesis for limb salvage after resection of bone tumours of the proximal femur. Deep infection occurred in 12 patients (6 males, 6 females with an average age of 47 years, range 10 to 75 years) after a mean of 39 months (range, 1 to 166 months), representing an infection rate of 7.3%. Average follow-up from time of infection was 54 months (range, 4 to 200 months). One patient died of septic shock on the fourth postoperative day. Treatment of infection in the remaining patients was one-stage revision in eight and hip disarticulation in one. Two patients were successfully treated by local wound revision only. Five patients died of reasons not related to infection 4 to 200 months after revision. Infection control by one-stage revision was achieved in five of eight patients (63%). Re-infection occurred in three patients 0 to 165 months after first revision and was treated by successful one-stage revision and two-stage revision in one patient each. One patient developed continuous infection after one-stage revision and finally underwent successful two-stage revision. One-stage revision seems to be a feasible regimen for deep prosthetic infection of megaprotheses around the hip allowing continuous restoration of function and mobility. Re-infection, however, should be addressed by two-stage revision.

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OUTCOMES OF KNEE RECONSTRUCTION USING HINGED KNEE PROSTHESIS

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INTRODUCTION: Treatment of aggressive Giant cell tumor is not limited to extended curettage and cryosurgery or bone grafting or using bone cement. Many Patients with aggressive or malignant Giant cell tumor around the knee joint had been treated with wide resection and reconstruction has been done by allograft or fusion of the knee joint and also with special hinged knee prosthesis. In this study we tried to explain the results of hinged knee prosthesis. **PATIENTS:** During a 10-years period, eleven patients with aggressive giant cell tumor around the knee were treated by enblock resection and then underwent knee reconstruction using Kotz hinged knee prosthesis. **RESULTS:** All patients underwent reconstruction surgery, successfully. Their functional results were excellent and knee range of motion was about 90 degree. No cases of recurrence were observed. Serious early or late complication was not reported. **CONCLUSION:** Aggressive GCT around the knee joint as explained by Jaffe, Dahlin, Enneking and Campanacci, has invasion to the soft tissue by damaging bone cortex. Instead of modified Enneking and fusion of the knee, we could be able to do reconstruction using hinged knee prosthesis that means we did joint saving. In the past we had experience after Enblock resection to do modified Enneking. But for fusion of the knee the patient always had problem for immobilization of the knee joint but we could be able to save the knee motion by Kotz hinged knee prosthesis and the result were good. **Keywords:** GCT, Knee, Hinged, Prosthesis

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Abstract number: 20605

FIBULAR CENTRALISATION FOR THE RECONSTRUCTION OF DEFECTS OF THE TIBIAL DIAPHYSIS AND DISTAL METAPHYSIS AFTER EXCISION OF BONE TUMOURS

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OBJECTIVE: To evaluate the results of fibular centralisation as a stand alone technique to reconstruct defects that occurred after resection of tumours involving the tibial diaphysis and distal metaphysis. **METHOD:** Between January 2003 and December 2006, 15 patients underwent excision of tumours of the tibial diaphysis or distal metaphysis and reconstruction by fibular centralisation. Their mean age was 17 years (7 to 40). Two patients were excluded; one died from the complications of chemotherapy and a second needed a below-knee amputation for a recurrent giant-cell tumour. A total of 13 patients were reviewed after a mean follow-up of 29 months (16 to 48). **RESULTS:** Only 16 of 26 host graft junctions united primarily. Ten junctions in ten patients needed one or more further procedure before union was achieved. At final follow-up 12 of the 13 patients had fully united grafts; 12 walked without aids. The mean time to union at the junctions that united was 12 months (3 to 36). The mean Musculoskeletal Tumor Society Score was 24.7 (16 to 30). **CONCLUSION:** Fibular centralisation is a durable reconstruction for defects of the tibial diaphysis and distal metaphysis with an acceptable functional outcome. Stable osteosynthesis is the key to successful union. Additional bone grafting is recommended for patients who need postoperative radiotherapy.

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LIMB SALVAGE SURGERY FOR MALIGNANT BONE AND SOFT TISSUE SARCOMA IN RAMATHIBODI HOSPITAL

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BACKGROUND: Advanced surgical technique for resection and reconstruction now allows limb salvage to be a reasonable option for most patients with bone or soft tissue sarcomas. **OBJECTIVE:** To report results of limb sparing surgery following malignant bone and soft-tissue tumor resection. **MATERIAL AND METHOD:** From January 1995 to December 2006, a retrospective review was performed in 21 patients underwent limb salvage surgery following malignant bone or soft-tissue tumor removal in Ramathibodi Hospital. There were 11 males and 10 females with a mean age of 21.8 years (range 10-66). The most common diagnosis was conventional osteosarcoma (12 patients). And the most common location was proximal tibia, and proximal humerus. Endoprosthetic reconstruction was performed in 1 patient. **RESULTS:** A mean size of mass was 14 cm (range 7-30). The mean follow-up time was 45 months (range 8-141). Ten patients have been free of the disease, 8 patients still alive and 3 died. The mean Musculoskeletal Tumor Society functional analysis for upper extremity reconstruction was 80.66% (range 73.33-100) and for lower extremity was 84.54% (range 73.33-100). Complications were found in 8 patients (wound infection, nonunion, delay union, fracture, LLD, venous occlusion). **CONCLUSION:** Limb salvage surgery can be done as an alternative for the treatment of malignant bone and soft tissue sarcoma with satisfactory functional outcome.

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PILON ORIF

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The aim of operative fracture treatment of pilon fractures is to achieve a stable fixation, which allows early mobilisation and early weight bearing, an anatomical reconstruction of the articular surface and precise correction of posttraumatic axial deformities. Type C pilon fractures are complete articular fractures, which means that the distal tibial articular surface is broken and completely separated from the proximal fracture fragment. In the first C-type (C1) both the articular and metaphyseal fracture patterns are simple. In the C2-type, the articular fracture is simple but the metaphyseal part comminuted, in the C3-type both the articular and metaphyseal fracture patterns are complex. Evaluation of the classical four-step osteosynthesis of the pilon tibial fracture in regard of the specific problems related to complex pilon fractures is performed. Complex pilon fractures demonstrate that the C2 and C3 type pilon fracture remain a difficult situation to treat. The complications and long-term results are not only influenced by the fracture morphology and the severity of the soft tissue damage, but also by the experience of the surgeon, correct timing of the operation and the correct choice of approach and implants. Soft tissue handling is mandatory for successful outcome. **CONCLUSION:** In open fractures of the distal part of the lower leg we consider the change of method from primary stabilization with external fixator to secondary plating or interlocking nailing an appropriate procedure.

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TREATMENT OF PILON FRACTURES BY ILIZAROV EXTERNAL FIXATION SYSTEM

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INTRODUCTION: Treatment of proximal humeral fractures is still controversial. Conservative treatment may result in malunion and shoulder stiffness. We present our experience with displaced or comminuted fractures of the proximal humerus treated by closed or open 'minimal invasive osteosynthesis' or by open reduction and using of fixed plates or by hemiarthroplasty. PATIENTS & METHODS: This study consists of 189 Pts (18-89 year old, mean 58.5Y) followed for 2-10 years (mean 5.5Y), treated by closed reduction and percutaneous pinning (79), ORIF and minimal osteosynthesis (27), ORIF with rigid plates (17), ORIF by LCP plates (10), ORIF by proximal humeral nail (5) or by hemiarthroplasty (51). Patients were evaluated by the UCLH and by Constant's shoulder grading score systems and radiographs. RESULTS: Overall results were excellent and good in 85% of patients with 2 and 3 parts fractures of the proximal humerus treated by 'minimal osteosynthesis' techniques, with some better results in less comminuted fractures. 26/32 Pts with 4 part fractures treated surgically had good functional results. The other 8 had poor results and 4 of them developed AVN of the humeral head. 75% of the patients treated by hemiarthroplasty had satisfactory results. They were almost free of pain, but had only a moderate improvement in shoulder motion (active abduction or flexion of 30-90 degrees in 38/51). CONCLUSIONS: 'Minimal osteosynthesis' by K.W. techniques, lag screws, rush pins or proximal humeral nail, by closed or open reduction, remains as the first optional treatment of complex fractures of the shoulder, even in young patients with a 4 part fracture. ORIF by conventional plates may be used in young patients and by LCP (locked compression plates) in osteoporotic or comminuted fractures of older patients. In the elderly, hemiarthroplasty seems to be the treatment of choice.

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Abstract number: 21399
COMMON PITFALLS IN ANKLE FRACTURES

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Ankle or malleolar fractures are commonly encountered by orthopaedic surgeons. However, many surgeons forget the fact that malleolar fractures are in fact articular fractures, which necessitate precise reduction and stable fixation. Moreover, these fractures are commonly left in the hands of inexperienced residents. This often results in insufficient preoperative assessment and planning and unsatisfactory outcome may follow. An uncommon pattern, known as Bosworth fracture, must be identified and prompt treatment must be performed. In fact, not all ankle fractures are the same. During surgery, it is very important to restore the fibular length and rotation. This is particularly difficult in the presence of comminuted fibular fractures. The syndesmosis must then be tested by the hook test and the relationship between the distal tibia and fibula must be restored so as to allow healing of the syndesmosis. A correct insertion of the syndesmosis screw should be performed. After fixation, it is often underestimated that the ankle joint has a certain degree of instability and it is important that the ankle must not be put into a subluxed position.

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DO SYNDESMOSIS LESIONS WORSEN TRIMALLEOLAR FRACTURES OUTCOME?

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INTRODUCTION: Ankle syndesmotic injuries may be associated to severe trimalleolar fractures. How bad is the prognosis in case of this association, and to which extend it influences the long term follow-up outcome after surgical treatment? MATERIALS AND METHODS: 97 patients were available for evaluation (follow-up 13.5). Average age is 39.2 years. Weber–A.O. type B: 58 cases including 12 syndesmotic lesions; and type C: 39 cases, with syndesmotic lesions. Before syndesmosis screwing, our patients had internal fixation of malleoli by screws, wires or plates. RESULTS: A scoring system including clinical and radiological exams assesses the outcome of fractures, any instability of syndesmosis and osteo-arthritis. As far as the syndesmosis could be considered as a virtual forth malleolus because of its apical topography, it seems then logical that it should be also well reduced and fixed. This is related to the significant adequacy found between the initial reduction of the syndesmosis and its late complications such as stability and arthritis. Global results look quite better in absence of syndesmotic injury. Group 1: 47 ankles without syndesmotic lesions: good and very good are (34=) 73.9%, fair is (10=) 21.7% and poor is (2=) 4.3%. Group 2: 51 ankles with syndesmotic lesions showing good and very good in (25=) 49.0%, fair in (14=) 27.1% and poor in (12=) 23.9%. The Khi-Two statistical test is significant since the P-value stands at 0.046 which is lower than 5%. CONCLUSIONS: Syndesmotic injuries aggravate trimalleolar ankle fractures and require their accurate reduction and fixation. We could then reduce the risks of instability and range of motion loss, and also avoid or delay arthritis changes.

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PILON FRACTURE

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INTRODUCTION: Pilon fracture is one of the most sever fractures of ankle with many contraversies about treatment and prognosis. **MATERIALS AND METHODS:** It is a cross sectional study over trauma patients which admitted to Sina hospital between 2002-2005 for their Pilon fracture which treated with open reduction and internal fixation or external fixator. 44 patients are studied by their medical records and preoperative and postoperative radiographies and followups were done in outpatient department. **RESULTS:** 44 patients are studied average age of 36.5 years. 16 patients had pilon type A fractures, 7 type B and 21 type C fractures. The most common mechanism of injury was vehicle accident in 36 patients. There were meaningful relation between type A fracture and bone grafting ($P=0.01$). There were 16 complications after surgery which 11 of them were wound breakdown. There were 10 malunions with meaningful relation to type of surgery ($P= 0.001$) which were high in external fixator application. Bad results were seen in postoperative complications, soft tissue surgery and malunion ($P=0.001$). But there were no meaningful relation with fracture type, type of surgery, open or closed fracture, corresponding fractures and operation time. **DISCUSSION:** By attention to findings, bad results had no relation with type of surgery but had relation with postoperative complications and soft tissue surgery. Soft tissue condition determines type of surgery and preservation of soft tissue improves the result and if needed for this goal, using external fixator is mandatory. **Keywords:** fracture, pilon , surgery.

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CAPSULO-LIGAMENTOTAXIS AND DEFINITIVE FIXATION BY TENSIONED WIRE RING FIXATOR: IS IT THE SOLUTION FOR SOFT TISSUE CATASTROPHE IN HIGH-ENERGY PILON FRACTURES?

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High-energy pilon fractures of AO type 43-C2 and C3 are challenging problems for orthopedists because of their unstable nature, associated bony comminution and extensive soft tissue involvement. Open reduction and internal fixation of these injuries frequently leads to serious wound complications and devastating results like infection, osteomyelitis and amputation. Skeletal traction followed by delayed internal fixation, two-stage or three-stage protocols have been employed by surgeons with variable outcomes, but have proved insufficient for decreasing peri-operative morbidity. Eleven pilon fractures of C2 and C3 types, four of them compound, were managed by ankle spanning Ilizarov ring fixators utilizing the principle of capsulo-ligamentotaxis for indirect reduction and fixation. All fractures were operated within six hours of presentation irrespective of fracture type, soft tissue condition or time-lapsed since injury. Ankle mobilization was started at average 3.9 weeks and fixator removal was done after achieving union (average 16.7 weeks). Clinical and radiological healing was achieved at a mean of 15.6 weeks. Five patients had superficial pin track infection and three had malunion. However there was no incidence of deep infection, osteomyelitis, arthrodesis or amputation at mean follow-up of 17 months. External fixation by ring fixator allows indirect reduction of comminuted articular and metaphyseal fragments, without additional trauma to soft tissues. This strong circular construct provides minimal invasive fixation, stable enough to allow early ankle mobilization and weight bearing. With minimum peri-operative morbidity and good healing results, the Ilizarov apparatus appears to be the ideal stabilization system for high-energy pilon fractures.

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CADAVER EVALUATION OF TIBIO-FIBULAR SYNDESMOSIS WITH ROTATIONAL ABNORMALITY OF THE FIBULA: A CT SCAN STUDY

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Diagnosis of injuries to the syndesmosis, especially with AO-Weber type C ankle fractures, can be problematic. The development of CT imaging and its general availability facilitates the diagnosis. We believe that syndesmotic malreduction may be partly due to rotational abnormality after fibular osteosynthesis. CT scans of three cadaver lower limbs were used to visualize disrupted syndesmoses with rotational malreduction of the fibula. Each ankle was studied first in the normal position, and then with the fibula fixed at 10 degrees of lateral and medial rotation with an external fixator after transversal suprasyndesmotic osteotomy. We measured the distance between the fibula and the anterior and posterior parts of the incisura, appreciated the anterior tibio-fibular line and the parallelism of the talus and lateral malleolus. We observed a widening of the syndesmosis exceeding 1 mm with either the lateral or medial rotation of the fibula. Additional findings were the modification of contacts between the talus and lateral malleolus and the disruption of what we call the anterior tibio-fibular line ('cintre tibio fibulaire'). Tridimensional reconstructions giving a better view of the syndesmosis can help in appreciating its malreduction. Although other injuries can lead to problems of syndesmosis, CT images of syndesmotic malreduction should encourage the surgeon to reconsider the osteosynthesis of the fibula, especially in rotation, after a comminuted AO-Weber type C fracture.

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ANKLE INJURY EVALUATION AND ASSESSMENT IN EMERGENCY DEPARTMENT

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INTRODUCTION: Ankle injury is a common disabling injury generally treated with simple conservative measures. Diagnosis of the injury is determined by examination of the location of the bruising (ecchymosis), swelling, and tenderness. In addition, x-rays are often performed to check for the possibility of fracture. MATERIAL AND METHOD: Retrospective study for Riyadh military hospital in the Kingdom of Saudi Arabia from February 2004 to February 2005. 1680 patients were seen for ankle injuries 93 patients were having fracture, inclusion criteria are trauma to the ankle, all skeletal mature age both sex. Exclusion of all non-traumatic injury and skeletal immature age, all patients had x-ray in their assessment then immobilization done for them then reassessed in next days at the orthopaedic clinics. RESULT: This study shows 60% male and 30% female, their age from 16 years to 65 years, the commonest injury in male group due to sport while for female inside house activity, 16 patients had open ankle injury went for surgery, 7 patients had fracture dislocation, average time absence from work was one month. DISCUSSION: In our study we were looking for the presence of ankle injury in the emergency department, from that high suspicion of fractures should be considered and proper assessment will avoid long-term complications.

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OPERATIVE TREATMENT OF THE CENTRAL TALUS FRACTURE

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Fractures of the neck and body of the talus present the rarest and most challenging injuries. These fractures are often associated with other ankle, foot and skeletal injuries. The clinical course of 50 patients with a mean age of 29 years with a severe talus fracture is presented. According to the Hawkins classification there were 16 (32%) of Type I, 14 (28%) of Type II, 9 (18%) of Type III and 11 (22%) of Type IV. Forty-three patients (86%) underwent operative treatment. Mild osteoarthritis of the talocrural joint was seen in 14 patients (28%) and severe osteoarthritis in 10 patients (20%). Collapse of the talar body following avascular necrosis (AVN) was seen in 4 patients (8%). The function of the ankle joint was evaluated according to the Weber-score. Patients with talus fractures of Hawkins Type I and II had considerably better outcomes (with 90% being excellent or good) than individuals suffering dislocated fractures with involvement of the articulating surface with 70% good result in Hawkins type III. The most unsatisfactory results were seen in Hawkins type IV fractures. The displaced talus fractures must be treated by closed and, if necessary, open reduction with internal fixation. The initial postoperative management should consist of ambulation without weight bearing until radiographic appearance of trabecular bone in the fracture zone, indicating revascularization, can be manifested. Key words: talus fracture – operative treatment – avascular necrosis –complex foot injury

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MANAGEMENT OF RECENT AND NEGLECTED FRACTURES OF OS CALCIS

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Fractures of the os calcis with involvement of the subtalar joint, if not treated properly, may give rise to chronic pain and permanent functional impairment. This is produced by subtalar incongruency, broadening of the heel with calcaneofibular abutment and impingement of peroneal tendons, tarsal tunnel compression, valgus or varus hind-foot, flattening of the longitudinal arch and smashed heel-pad syndrome. The decrease in the calcaneal height and length slackens the tendo Achillis. This will result in loss of the push-off of the foot on walking, which is compensated by clinching the floor or the foot wear by the toes causing pain. The horizontal position of the talus causes tibiotalar impingement. ORIF is recommended to avoid these complications. For neglected (conservatively treated) cases, careful localization of the site of pain is necessary to deal with its cause. Subtalar fusion in situ may help if the pain is on the sides of the subtalar joint. If the calcaneus is greatly deformed, subtalar distraction arthrodesis will restore the height of the heel and the normal inclination of the talus. This will relieve the tibiotalar impingement and anterior ankle pain. It will also decompress the peroneal tendons and brings the insertion of the tendo Achillis into an anatomical position. This improves the function of the gastrocnemius-soleus complex. Some patients complain only of pain below the lateral malleolus due to peroneal impingement. These patients would benefit from a limited shaving of the lateral wall bulge of the calcaneus.

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SUBTALAR DISLOCATIONS: EXPERIENCE OVER 10 YEARS

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Subtalar dislocation is a relatively uncommon injury sustained by a twisting injury to the foot. The injury pattern is well defined, with an inversion injury causing a medial dislocation, (talar head lateral) and an eversion injury causing a lateral dislocation (talar head medial). We report our experience of 17 subtalar dislocations seen over 10 years; 15 were medial subtalar dislocations and 2 lateral subtalar dislocations. 7 cases were open, and two cases had irreducible dislocations due to button holing of the capsule or tendon interposition (one medial, one lateral). 1 case presented with gangrene after tight plaster needing amputation; 8 cases needed open reduction, and stabilization. 4 cases were lost to follow up. No case with simple subtalar dislocation developed post reduction AVN; 2 cases of total talar dislocation had significant stiffness in the hindfoot. Gait abnormalities at follow up were minimal. Subtalar dislocations occur when an inversion or eversion injury of the hind foot occurs, but stress concentration is more distal, avoiding the ankle, but disrupting the subtalar joint. Difficulties in reduction arise when the talar neck button-holes in capsule, or a tendon is entrapped around it. Understanding injury biomechanics is imperative as reduction is achieved by a gentle reversal of the deforming force. AVN is uncommon if reduced early, but maybe seen in total dislocation of the talus.

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DIFFERENTIAL SCANNING CALORIMETRIC EXAMINATION OF THE RUPTURED ACHILLES TENDON IN HUMAN

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The Achilles tendon rupture is a common injury of the foot in middle age and physically active population in Europe. The aetiology of the degenerative changes in the collagen structures of the tendon which could be disposed for the rupture is still not clear. Our hypothesis was that before the injury there is a clear pathological abnormality in the tissue elements building up the Achilles tendon, which is responsible for the disease, and could be monitored besides the classical histological methods by differential scanning calorimetry. The thermal denaturation of human samples was monitored by a SETARAM Micro DSC-II calorimeter. All the experiments were performed between 0 and 100 °C. The heating rate was 0.3 K/min. DSC scans clearly demonstrated significant differences between the control and ruptured samples (control: $T_m = 59.7$ °C, $T_{1/2} = 1.4$ °C and $\Delta H_{cal} = 8.54$ J/g; ruptured: $T_m = 62.75$ °C, $T_{1/2} = 2.6$ °C and $\Delta H_{cal} = 1.54$ J/g). These observations could be explained with the structural alterations caused by the biochemical processes. With our investigations we could demonstrate that DSC is a useful and well applicable method for the investigation of collagen tissue of the human Achilles tendon. We can prove with this method, that mechanical overload decreases the thermal stability of collagen in ruptured tendon.

Date: 2009-11-01
Session: Trauma-Foot
Time: 1030-1200
Room: Hall A1

Abstract number: 21726

OPERATIVE TREATMENT OF LISFRANC FOOT INJURIES

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INTRODUCTION: Injuries of the tarsometatarsal (Lisfranc) joint are very rare, involving only 0.2% of all fractures. On the other hand, Lisfranc injuries are very often seen in polytrauma patients without being diagnosed in 20-30% of the cases. This leads to a significant morbidity and loss of function of the foot. Good knowledge and understanding of the anatomy and injury mechanism as well as possibilities of accurate diagnostics play the key role in the successful treatment of Lisfranc injuries. **AIM OF THE STUDY:** To retrospectively evaluate a group of patients with Lisfranc injuries. **MATERIAL:** We are presenting a group of 10 patients with dislocated Lisfranc fracture operated on in the period from 1997-2006 in the Zagreb University Hospital of Traumatology. **METHODS:** The Myerson classification was used for injury evaluation and the results of treatment were assessed using the American Orthopedic Foot and Ankle Society (AOFAS) Midfoot Score questionnaire. The mean follow-up was 31 months (10-72). **RESULTS:** The mean AOFAS Midfoot Score was 76 (range 0-100, 100 points for the excellent result). Lower score was the consequence of occasional mild pain, diminished recreational activity and use of orthotic devices. 5 patients had excellent, 3 good and 2 satisfactory results. One patient developed posttraumatic arthritis. **CONCLUSION:** Operative treatment with anatomical reduction and stable internal fixation is the method of choice. The goal of the surgery is to regain normal anatomical and biomechanical relations of all structures of the Lisfranc joint.

Date: 2009-11-01
Session: Total Knee Arthroplasty
Time: 1330-1500
Room: Hall A1

Abstract number: 22765
THE AUSTRALIAN NATIONAL JOINT REPLACEMENT REGISTRY
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The Registry was established by the Australian Orthopaedic Association in 1998 and has been fully national since 2003. 100% of hip and knee replacements are registered. It is national government funded and is protected by privacy legislation. There have been a number of observations made from this year's report. More than 60% of hip and knee replacements are performed in the private sector. 60% of hip replacements in Australia are cementless and in the older than 75 year age group, this has led to a significantly higher revision rate. Metal on polyethylene bearing surfaces are revised less frequently than any other bearing surface and metal on metal bearing surfaces are revised more often than other bearing surfaces when larger head sizes are used. Total resurfacing hip replacement has continued to decline in numbers for the third year in a row and it is noted that females have a significantly higher rate of revision compared with males. In knee replacement, it is noted that unicompartmental knee replacement has approximately twice the risk of revision at any age. The outcome of a revision of a primary total knee replacement does not vary whether it is a major or minor revision and the revision of a unicompartmental knee to a total knee replacement is just as likely to lead to a further revision as the revision of a total knee replacement to another total knee replacement. Antibiotic cement significantly reduces the risk of revision in primary knee replacement but this is not so evident in primary total hip replacement. Mobile bearing knees have a greater rate of revision. The Australian National Joint Replacement Registry has had a significant impact on prosthetic manufacture and surgeon practice and performance. It is expected that the outcomes will continue to improve.

Date: 2009-11-01
Session: Total Knee Arthroplasty
Time: 1330-1500
Room: Hall A1

Abstract number: 22384

OBJECTIVE OUTCOME OF A NEW ULTRA-CONGRUENT POSTERO-STABILIZED TOTAL KNEE ARTHROPLASTY AT ONE YEAR OF FOLLOW-UP

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The FIRST (Free Insert in Rotation Stabilized in Translation) is a new ultra congruent, postero-stabilized total knee arthroplasty (TKA) with a mobile bearing. We compared objective outcomes using ambulatory gait analysis of the FIRST with 2 standard TKA models at one year of follow-up. MATERIALS AND METHODS: This is a clinical prospective cohort study of 111 patients (53M/58F, 69 ± 4,5 years, 122 prostheses). Data included usual subjective and semi-objective questionnaires. Objective parameters were measured with an ambulatory gait analysis system. Updated outcomes of the FIRST TKA were compared to 29 NexGen® postero-stabilized TKA with a fixed-bearing (FB) and 26 NexGen® postero-stabilized TKA with a mobile-bearing (MB). RESULTS: Pre and post-operative subjective and semi-objective scores are improved for all types of prosthesis ($p < 0.05$). In terms of ambulatory gait analysis, several temporal and spatial gait parameters confirmed an overall improvement of the FIRST TKA results compared to both NexGen® TKAs: they were statistically significant for the gait cycle time, double-support periods, swing speeds of the operated knee, range of motion of operated knees and stride length. No statistical differences were observed in terms of coordination scores. CONCLUSIONS: Clinical outcome of the FIRST confirms very encouraging objective results in terms of patients' gait. We observed overall similar subjective and semi-objective results but statistically significantly better objective outcomes after one year of follow-up with a precise method in daily life conditions. The validity of these positive results will have to be confirmed with longer follow-ups.

Date: 2009-11-01
Session: Total Knee Arthroplasty
Time: 1330-1500
Room: Hall A1

Abstract number: 22192

SAFETY AND EFFICACY OF SINGLE STAGE BILATERAL TOTAL KNEE ARTHROPLASTY IN A DGH

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There has been much debate in the available literature about the safety and efficacy of simultaneous bilateral total knee replacements. Clinical outcome of treating both the arthritic knee at the same time is effective in many ways. Over a period of four years 54 bilateral total knee replacements were performed and followed up. AGC knee was used in all cases. Most of the patients were females between 60 and 80 years of age with ASA grade II. Various perioperative parameters were recorded e.g. anaesthetic time, analgesia, pain score, vital status, hospital stay etc. There was no mortality and deep infection. None of them needed revision. Range of movement was 0-107° on average. Mean hospital stay was 13.69 days (SD 16.8 days). Other than one case of pulmonary embolism there were very few minor post operative complications. Our experience of bilateral total knee replacements under same anaesthetic in a district general hospital is therefore encouraging. In keeping with several other studies single-stage bilateral total knee replacements are safe and cost-effective in properly selected patient population.

Date: 2009-11-01
Session: Total Knee Arthroplasty
Time: 1330-1500
Room: Hall A1

Abstract number: 22346

A 15-YEAR FOLLOW-UP OF POROUS COATED ANATOMIC PROSTHESIS IN PRIMARY TOTAL KNEE ARTHROPLASTY

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OBJECTIVE: We report long-term results of PCA Prosthesis in Primary total knee arthroplasty. **SUBJECTS AND METHODS:** Two hundred and seventy-six TKA were performed between 1987 and 1997, we studied 29 knees in 27 patients with PCA prostheses excluding those with infection, fracture, deaths, and lost to follow-up. Revision was required for 5 knees. Using a revision as the endpoint, the survival of the prosthesis was calculated by the Kaplan-Meier method. Twenty-four knees in 22 patients could be followed up for more than 10 years. The mean ages at the surgery were 62 years (33 to 77 years). The mean follow-up periods were 15 years (10 to 21 years). For clinical evaluation, range of motion and the Knee Society rating score were used. For radiographic evaluation the Knee Society radiographic evaluation system was used. In order to assess the fixation of the prosthesis, the width of clear zone were measured. **RESULTS:** The survival rates calculated by the Kaplan-Meier method were 79.2%. The ranges of motion were 94 degrees before the surgery and 104 degrees at the final observation. The Knee Society rating score improved from 41 points to 60 points. The position of the implant was maintained at the final. A radiolucent line was seen in 29.2%. **DISCUSSION:** Long-term results of PCA prostheses are unfavorable in some patients because of problems in the design and materials such as the flat insert geometry and heat-press processing of polyethylene. **CONCLUSION:** Poor 15-year results of PCA prostheses were observed in some patients.

Date: 2009-11-01
Session: Total Knee Arthroplasty
Time: 1330-1500
Room: Hall A1

Abstract number: 21286

THE RELATIONSHIP BETWEEN SUBJECTIVE AND OBJECTIVE OUTCOME DATA AFTER TOTAL KNEE REPLACEMENT

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INTRODUCTION: Gait analysis is an important tool to measure function following total knee replacement. It is currently unknown whether there is a correlation between subjective and objective outcome. The purpose of this study was to analyse relationships between subjective outcome scores and kinematic and kinetic data. **METHODS:** 25 consecutive patients were selected (mean age 68 years). All subjects were tested a minimum of 24 months following total knee replacement. SF12, Oxford knee score, knee society and KOOS scores were collected. Muscle strength was assessed and symmetry indices were analysed. A timed up and go test and KT2000 measurements were performed. **RESULTS:** Strong correlations ($r=0.52-0.74$) were found between scoring systems and the timed up and go test. Moderate correlations ($r=0.27-0.35$) were found between knee scores and KT2000 measurements. Only weak correlations ($r=0.09-0.12$) were found between knee scores and strength. None of the correlations reached statistical significance. Post hoc contrasts demonstrated adequate power (0.95). **DISCUSSION:** The finding of this study suggests that outcome scores and objective and functional tests following total knee arthroplasty measure different variables of outcome. Whilst objective tests and gait analysis provide an understanding of joint mechanics after surgery and can be used to calculate resultant forces and moments, patient perceived outcomes have no significant correlation to knee biomechanics. In contrast modern implants may provide a satisfactory outcome resulting in high patient satisfaction. The results of this study underline the importance of using subjective patient outcome measures.

Date: 2009-11-01
Session: Total Knee Arthroplasty
Time: 1330-1500
Room: Hall A1

Abstract number: 21018

LATERAL APPROACH HAS AN ADVANTAGE IN TOTAL KNEE ARTHROPLASTY FOR VALGUS DEFORMED KNEE

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INTRODUCTION: For the total knee arthroplasty in valgus deformed knee, superiority of the medial or lateral approach is still controversial. We compared the short-term result of two approach groups. **MATERIAL AND METHOD:** Forty seven knees (42 RA, 5 OA) of valgus deformity over 10 degrees were randomly divided into two group; medial approach (23 knees) and lateral approach (24 knees). We used Scorpio NRG PS for all knees. Median postoperative periods was 30 months in each group. We compared the surgical time, and alignment on standing radiograph, range of motion (ROM) pre/ postoperatively, and degrees of soft-tissue release procedure, and lateral laxity measured by stress radiograph immediately after operation. **RESULT:** Pre/ postoperative alignment, surgical time, lateral laxity, and preoperative ROM had no significant in two groups; however, postoperative ROM was superior in lateral approach group -3 to 122 degrees, -2 to 110 degrees in medial approach group. Ninety one percent of the cases required iliotibial band (ITB) release at Gerdy tubercle, 74% ITB at joint level, 35% lateral collateral ligament (LCL), 35% popliteus tendon (PT) in medial approach group, and 88% ITB at Gerdy tubercle, 63% ITB at joint level, 13% LCL, 21% PT in lateral approach group. **DISCUSSION:** In the valgus knee, lateral structures are tight. Lateral approach can directly adjust the tight structure, and also less vascular compromise to the patella than medial approach with lateral patellar release. Less invasiveness to the quadriceps muscle in lateral approach could result into better range of motion after the surgery.

Date: 2009-11-01

Session: Total Knee Arthroplasty

Time: NERVE INJURY FOLLOWING NERVE BLOCKS IN KNEE SURGERY - IS IT THE TIP OF AN ICEBERG?

Room: Hall A1

Abstract number: 22320

1330-1500

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The aim of the study is to analyse the nerve injury in post operative knee surgery pts who had dissatisfaction and worsened symptoms after surgery. Retrospective study of 6 pts to focus on the factors behind the nerve injuries in post knee surgery operated in 2007-08. The proforma based on the surgery, grade of surgeon and anaesthetist, type of anaesthesia given, medications in nerve blocks, tourniquet time, postoperative findings, nerve conduction study and EMG findings. Age ranges 20-40 with mean age 33. There were 5 females and 1 male. 4 pts had MPFL (medial patella femoral ligament) and 2 had ACL (anterior cruciate ligament) reconstruction. All 6 pts operated by the same consultant. Anaesthesia given by different anaesthetist consultants and one staff grade. 5 pts had chirocaine and 1 pt had bupivacaine. All pts had GA with one of the nerve blocks. 5 had femoral nerve blocks and 1 had fascia iliaca block. Tourniquet time ranges between 62-77 min with the meantime 68min. Postoperatively they had quadriceps weakness, moderate to severe wasting and hypo-aesthesia in femoral nerve dermatomes. 4 out of 6 pts have proven femoral nerve injury on EMG/NCV. Report ranges from severe axonal neuropathy to neuropraxia. All the possible causes of nerve injury like surgical factors, nerve blocks and tourniquet risks were analysed carefully and found that they had nerve injury due to the nerve blocks. After analysis, we have modified the practice and stopped giving nerve blocks and so far no new cases of nerve injury.

Date: 2009-11-01
Session: Total Knee Arthroplasty
Time: 1330-1500
Room: Hall A1

Abstract number: 21999

INTRAOPERATIVE FLEXION CONTRACTURE IMPROVES AFTER TOTAL KNEE ARTHROPLASTY

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BACKGROUND: It is conventional concept in TKA that full knee extension should be achieved intraoperatively to avoid postoperative flexion contracture. However, some studies have reported that postoperative flexion contracture improves with time. Thus, fully correct flexion contracture intraoperatively is controversial. **OBJECTIVE:** To evaluate whether knees with intraoperative 10- to 15-degree flexion contracture will gradually improve after TKA. **MATERIAL AND METHOD:** A consecutive series of 89 patients who underwent unilateral TKAs was prospectively evaluated for a minimum 1-year follow up. All knees had <10° of deformity in coronal plane, <15° of flexion contracture, and < 30 of BMI. Intraoperatively, all knees were left to 10- to 15-degree flexion contracture. All patients were measured for the arc of motion by 3 independent inter-raters using the same long-armed goniometer at preoperative, intraoperative and serial follow-up periods, respectively. Variable data were compared and analyzed. **RESULTS AND CONCLUSION:** Eighty patients were available for evaluation. There were 16 men and 64 women with the mean age of 69.4 years. The mean BMI was 24.4. Intra-class and inter-class correlation coefficients were 0.86 and 0.91. The mean preoperative ROM was 8.8-121.6°. Serial ROMs at 3 months (7.4-130.1°), 6 months (6.2-132.9°), and 12 months (2.1-135.2°) significantly improved ($p, <0.001$) from that of intraoperative period (12-129.2°). However, from 3- to 6-month period, there was no different improvement of flexion contracture. We concluded that flexion contracture in TKA improved with time.

Date: 2009-11-01
Session: Total Knee Arthroplasty
Time: 1330-1500
Room: Hall A1

Abstract number: 21609

THE EFFECTS OF POSTERIOR CRUCIATE LIGAMENT RESECTION IN GAP BALANCING DURING TOTAL KNEE ARTHROPLASTY: CAS MEASUREMENT

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Computer-assisted surgery (CAS) was introduced in total knee arthroplasty with the ability to detect very small change of gap and angle accurately during operation. This study used CAS to measure the effects of PCL resection in gap balancing during TKA. **METHODS:** Sixteen knees of fifteen patients with varus deformity less than 20 degree and grossly intact PCL detected intraoperative were included in this study. We used CAS for recording the changes of extension and flexion gap on both medial and lateral side before and after resection of PCL. The constant pressure was generated by tensioning device. **RESULTS:** The mean increases of extension gap on medial and lateral side before and after resection of PCL are 0.17+/-0.22 mm (range -0.17 to 0.5 mm) and 0.25+/-0.37 mm (range -0.33 to 1.16 mm) respectively. The mean increases of flexion gap on medial and lateral side are 1.29+/- 1.02 mm (range 0-3 mm) and 2.09+/-1.12 (range 0.5-4.66 mm) respectively. **CONCLUSION:** Resection of PCL showed increase of flexion gap more than extension gap (p-value< 0.05) and lateral side of flexion gap will increase more than medial side (p-value<0.05). Although the mean of gap change is relatively small, up to 4 mm of flexion gap change and more than 2 mm difference between medial and lateral side of flexion gap are noticed in some patients. Larger numbers of patients with subgroup may be able to identify this group of patients.

Date: 2009-11-01
Session: Symposium: Sports medicine: Multiple Ligament Reconstruction
Time: 0800-0930
Room: Hall A2

Abstract number: 22762

A STRATEGY TO ACUTE KNEE DISLOCATION WITHOUT NEUROVASCULAR INJURIES

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Isolated knee dislocations without neurovascular injuries are most common. There is a consensus for concluding there is no indication for routine arteriography in patients with a normal physical examination after reduction of the knee dislocation. Nevertheless repeated physical examination should be performed for eliminating popliteal vessel injury. Arteriography is indicated only in case of clinical ischemia. Following reduction MRI is usually performed analysing the various ligament tears. It always shows complete tears of the anterior cruciate ligament, combined in most of the cases with complete tears of the posterior cruciate ligament. Combined posterolateral injuries are more frequent than the complete tears of the medial collateral ligament. No consensus exists regarding the best treatment method. There is a trend to favour early (within two to three weeks) primary repair of all the ligaments coupled with an early rehabilitation program. Only autografts can be used representing a limitation in the graft choice when multiple ligament reconstruction has to be performed. For this reason, some surgeons are using synthetics for acute PCL reconstruction. The outcome of partial repair seems to be less favourable. However, acutely repaired or reconstructed knees may require manipulation because of loss of flexion. There is always a flexion deficit of 10 to 20 degrees but the stability results and the overall knee function are good and more predictable than in chronic cases.

Date: 2009-11-01
Session: Plenary Lecture
Time: 0930-1000
Room: Hall A2

Abstract number: 20220

A DIRECT ANTERIOR APPROACH FOR HIP ARTHROPLASTY - TECHNIQUE, POTENTIAL, AND CRITICAL VALUATION

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Four approaches to the hip joint are regularly used for total hip arthroplasty (THA). The anterior approach uses the only safe internervous plane between the sartorius (femoral nerve) and the tensor fasciae latae (superior gluteal nerve) and the deep plane between the rectus femoris (femoral nerve) and the gluteus medius (superior gluteal nerve), and allows to preserve the entire gluteal muscles as well as their innervation. We have developed a standardized less invasive technique in supine position which allows to preserve even the external rotators in many cases. In about 30% the common tendon of the gemelli muscles and the internal obturator has to be cut. Due to a modification, neuralgia of the cutaneous femoris lateralis nerve seldom occurs. Minimally invasive techniques have been developed for all major approaches for THA with the exception of the transtrochanteric one. A smaller skin incision in a mobile window technique combined with the usual preparation technique in the depth does not change outcome. However, preservation of muscles, especially of external rotators, may show a better outcome. Own studies in the gait lab, with MRI, a register study, and a prospective randomized trial as well as selected literature will be used to bring forward the argument.

Date: 2009-11-01
Session: Trauma-Tibia
Time: 1030-1200
Room: Hall A2

Abstract number: 22184

FRACTURES OF THE PROXIMAL THIRD OF THE TIBIAL SHAFT TREATED WITH INTRAMEDULLARY NAILS WITH MODIFIED TECHNIQUE.

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INTRODUCTION: Proximal third tibia fractures cannot be managed with conventional nail or nailing techniques. Our aim is to report the results of intramedullary nailing of proximal third tibial fractures with special emphasis on techniques of fracture reduction and nail insertion. **METHODS:** 28 patients with proximal tibial fractures treated primarily with intramedullary nailing between July 2006 and July 2008. 22 closed; 6 open fractures; 2 segmental comminution 1 intra-articular extension. The outcome measurements emphasised alignment and reduction postoperatively and at healing. An angular malreduction was defined as greater than 5 degrees in any plane. **RESULTS:** Acceptable alignment obtained in 25 of 28 fractures (89%). Two patients had 5-degree coronal plane deformities (one varus and one valgus), and 1 patient had a 7-degree varus deformity. Two patients had a second stage iliac crest autograft for delayed union. No patient had change in alignment at final radiographic evaluation. Dynamization and exchange nailing were done in one case each. Complications included superficial infection in 2 and deep infection in 1 patient which were successfully treated. **CONCLUSIONS:** Modifications in technique included positioning of knee in semi flexed position, more proximal starting point, medial parapatellar incision to open the joint, direction of reaming parallel to the anterior cortex of the tibia and use of a nail with a more proximal Herzogs bend. Intramedullary nailing of proximal tibial fractures with meticulous attention to the technical details gives excellent results.

Date: 2009-11-01
Session: Trauma-Tibia
Time: 1030-1200
Room: Hall A2

Abstract number: 22474

EVALUATION OF PRE CONTOURED LATERAL PROXIMAL TIBIAL PLATES IN INDIAN TIBIA

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MATERIAL AND METHODS: We assessed the accuracy of the anatomic contour of proximal lateral tibial plates of AO Stryker and Zimmer in 50 Indian dry tibiae. All the plates were placed on the 50 tibia by two independent surgeons according to what they felt was the best fit. The tibiae and the plate fits were mapped, quantified, and analyzed using digital image capturing and adobe photoshop software. By corresponding the clinical appearance of good fit with our digital findings, we created numerical criteria for plate fit in three planes: coronal (volume of free space between the plate and bone), sagittal (alignment with the tibial plateau and shaft), and axial (match in curvature between the proximal horizontal part of the plate and the tibial plateau). **RESULT:** An anatomic fit should mirror the shape of the tibia in all three planes, and only ten plates of different companies qualified this. **DISCUSSION:** Recognizing and understanding the substantial variations in fit that exist between anatomically contoured plates it might be worthwhile developing proximal tibia plates specific for Indian population or validating this study by having a larger multicentric study group. This paper would suggest caution when these plates are used as a tool for indirect reduction of the fractures. Other parameters of reduction should always be considered due to the existence of substantial variation in fit to prevent malreduction of the fracture and/or soft tissue impingement. **KEYWORDS:** proximal tibial fractures, periarticular plates, variation in plate contouring Indian tibia

Date: 2009-11-01
Session: Trauma-Tibia
Time: 1030-1200
Room: Hall A2

Abstract number: 21908

THE NEW LOCALLY MADE MULTIFUNCTION DYNAMIC EXTERNAL FIXATOR SYSTEM FOR DEFINITIVE TREATMENT IN 70 CASES OF OPEN FRACTURES AND ITS COMPLICATIONS

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INTRODUCTION: Open fractures and complications such as infected nonunion, intercalary bone defect, malunion and shortening are still major problems in orthopaedic practices. The authors developed the multifunction dynamic external fixator to used as definitive treatment frames to overcome these problems. **METHODS:** Between 2003-2008, the new external fixators were used for definitive treatment in 43 open tibial fractures, for bone transportation in 9 tibias and 1 femur intercalary defect, 1 tibial lengthening, hybrid application for 3 tibial plafond and 1 tibial plateau fractures, 10 cases of infected nonunion treatments (7 tibias, 2 femurs and 1 humerus) and 2 tibial malunion (45 and 60 degrees) corrections. **RESULTS:** The mean union time in open tibial fracture type II was 11.6 weeks (range 10-15), type IIIA was 15 weeks (range 10-23) and type IIIB was 20 weeks. The mean size of tibial transportation was 5 cm (range 3.5-7) and the mean union time was 30 weeks (range 24-40). In femoral transportation, defect was 5cm and the union time was 36 weeks. In tibial lengthening, the tibia was lengthened 3.5cm in 8 weeks and the union time was 30 weeks. The mean union time in hybrid application was 13 weeks (range 10-16). The mean union time in infected nonunion treatment was 20 weeks in tibia (range 13-32), 24 weeks in femur (range 20-26) and 12 weeks in humerus. The mean duration for malunion correction was 5.5 weeks (range 5-6) and the mean union time was 24 weeks (range 22-26). **CONCLUSIONS:** The authors developed the new dynamic external fixator that base on dynamization, rigidity and versatility concepts for definitive treatment in open fractures and also applied for multifunctions.

Date: 2009-11-01
Session: Trauma-Tibia
Time: 1030-1200
Room: Hall A2

Abstract number: 21174

SIGN NAILING IN TIBIA FRACTURES: FOLLOW-UP RESULTS OF FIRST 60 CONSECUTIVE CASES

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To evaluate efficacy of SIGN nailing in treatment of tibia fractures prospective clinical study of first 60 consecutive cases was performed. MATERIALS: There were only shaft fractures with involvement of upper third of tibia in 8 cases (2 open grade II and 5 segmental) and middle or lower thirds in remaining 52 cases. Open fractures were seen in 9 cases. Distal locking was usually performed without image intensifier. Hand reaming performed in 43, power in 3 and no reaming in 11 cases. RESULTS: Follow-up results were obtained in all 60 patients in terms from 4 to 36 months (mean 13.6±6.6). Mean time to full weight bearing varied from 6 weeks to 8 months: in the subgroup with middle-lower third involvement 16.7 ±4.7, upper third 27.1 ±5.8 (p<0.05). The reason for delayed union in upper third fractures was direct trauma with higher incidence of open, segmental fractures, but the role of relative stability of short proximal fragment should also not be neglected. Two infections occurred (1 due to poor surgical technique multiple distal locking attempts, 1 late infection due to subcutaneous poller-wires in upper third fracture). Malalignments occurred in 6 patients (clinically not-significant at the last follow-up). Anterior knee pain was noticed in 3 patients. CONCLUSIONS: SIGN nailing has short learning curve, is easy to perform without image intensifier. It allowed rapid restoration of lower leg function in most treated fractures, but the efficacy in upper third fractures is somewhat lower.

Date: 2009-11-01
Session: Trauma-Tibia
Time: 1030-1200
Room: Hall A2

Abstract number: 21827

DISTAL THIRD TIBIAL FRACTURE OSTEOSYNTHESIS BY A 'COMB TECHNIQUE'

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Distal tibial fractures are rare lesions often associated with soft tissue injuries and with frequent functional deficits. **MATERIALS AND METHODS:** We report a prospective study of 24 patients (16 men, 8 women) treated by a 'comb technique'. For extra-articular fracture, a single lateral incision is done to perform a fibula osteosynthesis by plate. Image intensifier allows reduction of the tibia. Screws goes through the fibula plate, the fibula and the tibia. For articular fractures, a mini anteromedial approach allows to reduce the articular surface of the tibial pilon. Fixation was done by percutaneous pins or screws. An articular external fixator complete the osteosynthesis and allowed early mobility of the ankle. Average age was 37 years, follow-up was 24 months. Etiology was 18 traffic accidents, 8 sports injuries and 4 falls. Distal screw was removed after 4 months. The 4 articular external fixators were removed at two months. **RESULTS:** The subjective and objective results were evaluated according to the AOFAS classification. At 6 months, 24 patients had a limited dorsal flexion. One distal screw broke in a runner. At long-term follow-up, 12 patients with articular fractures kept a limited dorsal flexion and, 5 patients had a radiological tibio-talar joint narrowing, without significant pain. **CONCLUSION:** This comb technique avoids a large antero-medial approach to fix the tibial fractures. No infection occurred. The temporary distal locking of the fibula and tibia, gave temporary limited dorsal flexion at 6 months. Only articular fractures kept this limitation at long term follow-up.

Date: 2009-11-01
Session: Trauma-Tibia
Time: 1030-1200
Room: Hall A2

Abstract number: 22528

EVALUATION OF THE TECHNIQUE OF BLOCKING SCREW IN TREATMENT OF FRACTURE OF THE DISTAL THIRD OF TIBIA

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The treatment of the distal third of the tibia is still controversial. The open reduction and internal fixation by plate and screws allows axial stability but may increase the risk of soft tissue complications and evacuates the fracture hematoma which is valuable in fracture healing. The closed interlocking nailing avoids the soft tissue complications, preserves the fracture hematoma but the wide and short distal metaphyseal segment make the fracture amenable to varus or valgus deformity. The application of the blocking screw in medial to lateral direction and anterior to the posterior cortex decreases the antero-posterior space in the distal tibial metaphysis before introduction of the guide wire, reaming and application of the nail. 20 cases of closed fracture of the distal third of the tibia underwent closed interlocking nailing after the application of the blocking screw. The age ranges between 20 to 55 years, the follow up period varies between 8 months to 2 years and all cases were evaluated both clinical and radiological for healing of bone, function and pain all cases united without rotation, varus or valgus deformity, 1 case underwent secondary procedure of bone grafting and the final outcome of the case is satisfactory, In 2 cases removal of 2 locking screws were done to allow more compression of the fracture. This study demonstrates that the blocking screw technique and closed interlocking nailing is an effective method in treatment of fracture distal third of tibia. Keywords: blocking screw, distal tibia

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THE USE OF A CALCIUM HYDROXYAPATITE ANTIBIOTIC CARRIER (PEROSSAL[®]) IN LONG BONE CHRONIC OSTEOMYELITIS
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INTRODUCTION: Implant materials impregnated with antibiotics have long been used to manage the dead space created by debridement surgery in patients with osteomyelitis. PURPOSE: To present our preliminary results and in vivo response of patients to PerOssal used to treat bone infection in the form of long bone chronic osteomyelitis. PerOssal is a new osteoconductive bone substitution material for bone filling which consists of an entirely synthetically produced, nanocrystalline hydroxyapatite and calcium sulfate. It can be used effectively as a local antibiotic carrier for the reconstruction of infected bone defects. MATERIAL AND METHODS: We have treated 19 patients with long bone osteomyelitis (15 tibial, 4 femoral) with PerOssal impregnated with the appropriate antibiotic which was used following radical debridement surgery. In all cases we did not rely solely on the mechanical stability that it may provide but we supported the bone when necessary. Postoperative observations were focused on primary wound healing and clinical eradication of infection. RESULTS: We had: 15 eradication of infection, 2 recurrences, in terms of re-infection by different species or amputation, and 2 on-going cases. Declining wound leakage and delayed wound healing was present in 5 cases where PerOssal was used either intramedullarily but not sealed or extraosseously in relatively large amounts. CONCLUSION: We have so far good results with respect to infection control. PerOssal seems to perform better when used in contained defects whereas extraosseous use seems to predispose to prolonged leakage and compromised wound healing or breakdown. The mechanical stability that it provides remains under consideration.

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Abstract number: 22295

MID TERM RESULTS AFTER SALTO TOTAL ANKLE ARTHROPLASTY

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OBJECTIVE: The goal of this mid term prospective study was an evaluation of the results after Salto total ankle arthroplasty (TAA). **MATERIAL AND METHODS:** Our study was based on the clinical examination, the VAS and AOFAS-Score, and the pre- and postoperative X-rays. Additionally all perioperative complications, revisions and additional operations were registered. Out of 880 TAA implanted between 1996 and 2008 413 patients provided with a Salto TAA between 2001 and 2007 were included to our study. There were 215 women and 198 men. Mean age was 57 (18-84) years. The indication was posttraumatic in 53 %, primary in 37 % and rheumatoid arthritis in 10 %. The mean follow up was 41 (12-89) months. **RESULTS:** We completed the results of 402 patients (97 %). The VAS Score improved from 7,4 to 2,0. The ROM for flexion/extension increased from 26 to 35 degrees. The mean AOFAS Score reached 84 points from 52 preoperatively. We registered 22 perioperative complications including 11 malleolar fractures and 8 wound healing problems. The revision rate was 6,5% mainly due to an impingement. Only 3% of the patients had to be converted to an arthrodesis. We additionally performed 148 achillar tenotomies and 135 ligament releases and 17 osteotomies. The survival rate after 41 months was 93%. **DISCUSSION:** The Salto TAA in a complex treatment concept with partially added surgical measures as for example tenotomies demonstrate good functional and clinical mid term results. Therefore this procedure has to be acknowledged as a reasonable alternative to ankle arthrodesis.

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PLANTAR FASCIITIS TREATED BY SHOCK WAVE THERAPY - FOUR YEARS OR MORE FOLLOW-UP

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GOAL: Extracorporeal Shock Wave Therapy (ESWT) has high short term (>95%) success rate in treating plantar fasciitis. The goal of this study was to assess whether this effect is long lasting. METHODS: Previously we reported one year followup (1YFU) results of a prospective cohort of 50 patients who underwent ESWT (five weekly courses of 1500 impulses of 0.32 mj/mm²) for recalcitrant plantar fasciitis. This study is a four year follow-up (4YFU) on this group of patients. The evaluated parameters were AOFAS-Hindfoot score and Visual Analog Scale (VAS) score, composed of pain: on first step in the morning, during prolonged walking, while standing and at the end of the day, maximum intensity and at night. RESULTS: Of the 50 patients 2 died, one became disabled and another had amputation and five lost to follow up, leaving 41 patients as the study group. Pretreatment average VAS score was 43.2 11.4 dropping to 5.3 8.8 at 1YFU and 6.75 11.9 at 4YFU. AOFAS hind-foot Score improved from 51.3±16.3 before ESWT to 94.5±8.9 at 1YFU and 91.6 12.8 at 4YFU. Both 1YFU and 4YFU parameters didn't changed significantly ($p>0.1$), but on the other hand improved significantly ($p<0.0001$) comparing to pretreatment. There was no significant recurrence in the interim period. CONCLUSIONS: The beneficial effect of shock wave therapy that was seen at one year seems to last at four years or more from treatment.

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Room: Hall A2

Abstract number: 21810

EXTRACORPOREAL SHOCK WAVE THERAPY VERSUS MODIFIED ENDOSCOPIC PLANTAR FASCIOTOMY IN THE TREATMENT OF CHRONIC HEEL PAIN

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OBJECTIVE: To compare the results of a modified endoscopic plantar fasciotomy technique with Extracorporeal shock wave (ESWT) for the treatment of recalcitrant heel pain. **METHOD:** 65 patients suffering from chronic heel pain for a minimum 12-month that failed to respond to standard nonoperative methods were randomized to receive either endoscopic plantar fasciotomy (group F) or ESWT (group E). We compared the reduction of pain in the two groups from base line to month 3 post intervention during the first steps in the morning, in addition, achievement of more than 80 points at week 3, month 3, month 12 post intervention in the patients function using AOFAS (American Orthopaedic Foot and Ankle-Hind foot score) were also compared and. Finally, Roles and Maudsley Score at week 3, month 3, and month 12 post intervention were assessed. **RESULTS:** Both groups achieved improvement from the base line at 3 weeks, 3 months and 12 months post intervention. The success rate (Roles and maudsley score excellent and good) in ESWT group at month 12 were 74.19%, while in fasciotomy group results were 82.75% ($p=0.54$ RR 0.795, CI = 0.47-1.33). **CONCLUSION:** ESWT appeared to be a useful, noninvasive treatment method that reduced the necessity for surgical treatment.

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Abstract number: 21850

OUTCOME PREDICTORS OF THE EXTRACORPOREAL SHOCK WAVE FOR CHRONIC PROXIMAL PLANTAR FASCIITIS

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Chronic proximal plantar fasciitis is a common hindfoot disorder. This condition can be a disabling cause of foot pain in the adult population. Extracorporeal shock wave therapy (ESWT) has been proposed as therapeutic option to avoid complications of surgery. We hypothesized that the success of extracorporeal shock wave therapy in patients with chronic plantar fasciitis is affected by patient-related factors. A retrospective review of 225 patients (246 feet) who underwent consecutive ESWT was performed. Subjects were included only if they had plantar fasciitis for more than 6 months and failure to response to at least 5 conservative modalities. Patients were evaluated prospectively with health questionnaires, Roles and Maudsley scores, and American Orthopaedic Foot and Ankle Society (AOFAS) ankle and hindfoot scores at regular intervals. Follow-up was 30.2 +/- 8.7 months post procedure. Multivariable analysis was performed to assess factors leading to successful outcomes. Success rates of 70.7% at 3 months and 77.2% at 12 months were noted in this population. Previous cortisone injections, body mass index, duration of symptoms, presence of bilateral symptoms, and plantar fascia thickness did not influence the outcome of ESWT. The presence of diabetes mellitus, psychological issues, and older age were found to negatively influence ESWT outcome. Whereas many factors have been implicated in the development of plantar fasciitis, only diabetes mellitus, psychological issues, and age were found to negatively influence ESWT outcome.

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Abstract number: 21929

ENDOSCOPIC PLANTAR FASCIA RELEASE - ANATOMICAL CONSIDERATIONS FOR PORTAL CHOICE AND CLINICAL RESULTS

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Endoscopic release of the plantar fascia has been advocated during the last decade as a rapid and simple method for treating plantar fascial related pain. The treatment options are mostly conservative including windlass mechanism lengthening, physical modalities, shoe inserts and cortisone injections. Open surgical release has been associated with a mediocre success rate as well as several complications including delayed wound healing and plantar branch nerve injury. The current study aimed at defining a single portal approach allowing visualization of the plantar fascia and controlled release of the medial part. The amount of fascia release is estimated according to a presurgical evaluation of windlass mechanism shortening. A medical portal 8 mm in length can be defined in which there are no nerves transversing the portal and allowing visualization of the plantar fascia to bone junction. The portal is located 4-8 mm distal to the palpated distal calcaneus' cortex and 3-4 cm anterior to the hind foot skin. The portal is posterior to the area of most pain in plantar fasciitis. The current case series involves 30 patients. All were evaluated pre-operatively using AFAS hind foot score and a VAS scoring board. There was a 2:1 female predominance, average age was 51 years. A third of the patients were diabetic. The patients were operated under local or ankle block anesthesia. Average surgical time was 4 minutes. VAS score decreased from 7 to 3 on average. There was a single complication of nerve injury (lateral plantar partial) that resolved eventually.

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Abstract number: 22149

OSTEOTOMY VERSUS FUSION IN MANAGEMENT OF COMPLEX FOOT DEFORMITY IN ADULTS USING ILIZAROV TECHNIQUE

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Complex foot deformity in adults is challenging. Soft tissue distraction by Ilizarov (distraction histogenesis) is an attractive solution. However, recurrence rate with such technique in adults is very high. Adding bony procedure in the form osteotomy or fusion in selected joints of the foot decreases the risk of recurrence. **MATERIAL AND METHODS:** We compared two groups of patients with complex foot deformity. The first group was treated by calcaneal and mid foot osteotomy with Ilizarov technique. The other group was treated by triple fusion of the talonavicular, calcaneocuboid and the subtalar joint with Ilizarov technique. In both groups gradual correction of the deformity by Ilizarov technique was utilized to gain a plantigrade foot without extensive shortening. After full correction the external fixation frame was left till full consolidation of the distraction callus. The AOFAS functional scoring system was used as an outcome measurement. **RESULTS:** 37 patients were included. 20 patients in 1st group, and 17 in the 2nd group. No statistically significant difference between both groups was found regarding the pathology, age, sex, duration of treatment, complication rate, and the final AOFAS functional score. **CONCLUSION:** We think both techniques give the same out come. May be if we get larger number of patients the statistical analysis would give a different results. But the condition is not very common to get such numbers.

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FREIBERG DISEASE IN FOOTBALLERS TREATED WITH DEBRIDEMENT, SYNOVIECTOMY AND DORSAL WEDGE OSTEOTOMY

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Freiberg's infraction is an osteonecrotic disease process that most often involves the head of the second metatarsal bone. Several mechanisms were described in the written literature for its etiology. Among these stress overloading is the most widely accepted. Nonoperative and operative treatment modalities are the accepted options related with its stages. Commonly, nonoperative treatment is suggested to be effective in the early stages, but in the late stages, surgery is the mainstay. Ten patients of Freiberg's infraction were studied retrospectively. All of them were male football players (3 professional and 7 amateur footballers). Ten patients were treated with debridement, synovectomy, and dorsal wedge osteotomy. The clinical signs and symptoms, review of the etiologies, radiographic presentation, and treatment results of these cases are presented in our review.

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REVERSE SCARF OSTEOTOMY FOR BUNIONETTE CORRECTION: INITIAL RESULTS OF A NEW SURGICAL TECHNIQUE

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The bunionette is a lateral prominence of the fifth metatarsal head. It is usually caused by a wide intermetatarsal angle (IMA) between the 4th and 5th metatarsals with associated varus of the metatarsophalangeal (MTP) joint. Various distal, shaft and basal osteotomies have been described in the literature. We have used a reverse scarf osteotomy in 12 cases (10F: 2M) with a mean follow up of 12 months (range 5-22 months). All patients filled up a Foot Function Index (FFI) questionnaire pre-operatively and a repeat questionnaire at the latest follow-up. All angles were measured on a weight bearing AP radiograph of the foot. Post-operatively we mobilised the patients immediately using a heel bearing shoe. All osteotomies healed sufficiently at 6 weeks to allow unprotected weight bearing. Pre-op mean IMA was 13.1 degrees (range: 10.4-18 degrees) and mean 5th MTP angle was 19.9 degrees (range 12.7- 25.5 degrees). Pre-op mean FFI was 34.2 (range 14-71.3). Post operatively, mean IMA was 7.27 degrees (range: 2.0-11.5 degrees); mean 5th MTP angle was 6.36 degrees (range: 2.8-9.0 degrees) and post-operative mean FFI was 5 (range 0-16.7). All patients would undergo the same procedure on the other foot if required and would recommend the same to a friend. Reverse Scarf osteotomy in the correction of bunionette deformity offers promising results in the short term. Further longterm follow-up would help to establish the benefits of this procedure.

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HINDFOOT ENDOSCOPY FOR THE OS TRIGONUM SYNDROME

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INTRODUCTION: Although Os trigonum is known as one of the major causes of hindfoot pain in athletes, most cases have some co-morbid lesions including flexor hallucis longus (FHL) tendon problems. We hypothesized that hindfoot endoscopy is effective for the management of these disorders. **MATERIALS AND METHODS:** Between 2005 and 2008, 15 cases of Os trigonum syndrome were treated with hindfoot endoscopy. Diagnosis of Os trigonum syndrome was made by both the X-ray and FHL stress test. Endoscopy and the forceps were inserted at just lateral and medial of the Achilles tendon. After diagnosing the lesions, Os trigonum and co-morbid lesions were rejected endoscopically. There were 9 males and 5 females with their ages at the time of surgery ranged from 12 to 57 years. The patients' progress was followed for a mean duration of 2 years and 2 months. **RESULTS:** There were congested synovium around a FHL tendon in all cases. In one case, the FHL tendon was entrapped by a flexor retinaculum at the entrance of the tarsal tunnel, and hollow on the FHL tendon was marked by the flexor retinaculum. The mean AOFAS scale score was 70.2 ± 3.8 points at pre-operation, and 98.1 ± 3.5 points at the most recent follow-up. All patients returned to their initial athletic activity within 2 months after surgery. **CONCLUSION:** We concluded that hindfoot endoscopy is useful for certain diagnosis and early returning to athletic activity in cases of Os trigonum syndrome in athletes.

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DAMAGE CONTROL ORTHOPAEDICS IN POLYTRAUMATIZED PATIENTS

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The principles of fracture management in patients with multiple injuries continue to be of crucial importance. Early treatment of unstable patients with head, chest, abdomen or pelvic injuries with blood loss) followed by an immediate fracture fixation ('Early Total Care') may be associated with a secondary life threatening posttraumatic systemic inflammatory response syndrome (SIRS). This depends on the type and severity of injury ('The first hit'). Fracture fixation by reamed nails in these unstable patients is defined as 'The second hit' and is associated with adult respiratory distress syndrome (ARDS) and multiple organ failure (MOF) with a relatively high morbidity and mortality. Primary external fixation in such patients is a safe procedure. Therefore, current recommendation for long bone fracture fixation in patients with multiple injuries is to use a modular, minimal invasive external frame. This approach currently described as 'Damage Control Orthopaedic Surgery'. The basic principles of DCO are stabilization and control of the injury and than only after few days of metabolic and respiratory recovery followed by a definitive management of the fracture fixation. A significant reduction in incidence of general systemic complications (ARDS, MOF) has been described in DCO groups of patients in comparison with ETC group. Changing of the treatment protocol from ETC to DCO is not associated with increased rate of local complications (pin-tract infections, delayed unions or non-unions). Lower complication rate in DCO despite higher ISS compared with the ETC, DCO surgery appears to be a viable alternative for polytraumatized patients with femoral shaft fracture.

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Abstract number: 21792

MANAGEMENT OF BOMB BLAST INJURIES: AN ORTHOPAEDISTS PERSPECTIVE

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The incidence of bomb blast injuries has escalated many folds especially in the wake of 'War on Terror' and terrorist activities in Afghanistan-Pakistan border area, FATA region and North-West-Frontier-Province (NWFP). To understand these injuries, one must know its pathophysiology. The blast injuries can be, primary (caused by direct impact of overpressure blast wave on the tissue), secondary (caused by flying bomb fragments or debris), tertiary (caused by bodily displacement) or quaternary (caused indirectly by explosion). The major proportion of blast injuries is related to musculoskeletal system. The management of such patients can be divided into pre-hospital management and hospital management. The patients should be triaged at scene of incidence and rushed to nearby health facility. The treatment in hospital should start from ABC and initial goal should be of life-saving especially if injuries involve the vital organs of the body. The management of musculoskeletal injuries begins after the patient is stabilized and resuscitated. The initial goal should be of limb-salvage. The various procedures employed include wound debridement, early fracture stabilization, external fixators, etc. If the injuries are severe, then amputations are performed. The late management of such patients includes proper internal fixation (if needed), prosthetics for amputated limbs, psychotherapy (a neglected aspect of management of blast injuries) and rehabilitation.

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TO STUDY INCIDENCE, ETIOLOGICAL PROFILE AND TREATMENT OF SURGICAL SITE INFECTIONS IN PATIENTS OF GUNSHOT INJURIES AND BOMB BLAST INJURIES

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OBJECTIVE: To determine the incidence, document the etiological causative agents and the treatment of surgical site infections in patients of gunshot injuries and bomb blast injuries. **MATERIAL AND METHODS:** A prospective case-control study was performed in one thousand and thirty-four (1034) patients of gunshot injuries and bomb blast injuries who were admitted in Orthopaedic and Traumatology Department; Post Graduate Medical Institute: Lady Reading Hospital from 1st January 2008 to 31st December 2008. Data was collected from bacteriology reports of all surgical site samples and presentation of patients at follow-up. **RESULTS:** One hundred and forty-seven (14.2%) out of one thousand and thirty-four (1034) patients developed surgical site infection. Culture reports were positive for 124 (84.35%) patients and negative for 23 (15.65%) patients. Only one etiological agent was isolated in 146 (99.3%) patients while more than one in only one (0.7%) patient. The most common pathogen was *Staphylococcus aureus* (44.3%), followed by *Escherichia coli* (25.7%) and *Pseudomonas aeruginosa* (16.9%). The most prescribed antibiotic was ceftriaxone and 135 (91.8%) patients were cured only with the use of antibiotics. **CONCLUSION:** In this large, case-control study, it was found that incidence of surgical site infection is similar in patients of gunshot injuries and bomb blast injuries in developing and developed countries. *Staphylococcus aureus* was found to be the most common pathogen and ceftriaxone was found to be the most prescribed treatment. **Keywords:** Surgical site infection (SSI), gunshot injury, Bomb blast injury, wound culture.

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STRATEGISING MUSCULO-SKELETAL POLYTRAUMA IN INDIA - THE IMPORTANCE OF MICRO PLANNING

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Dealing with polytrauma in any setting is difficult and often does not follow rules. Numerous critical injuries may present with varying intensities spanning multiple body systems. Different injury combinations make resuscitation, surgery and rehabilitation of patients' complex. Treating these injuries in a country as diverse as India with its poor primary care, unstandardised tertiary and secondary facilities, multiple health systems, complex socio-economic problems and prevailing co-morbidities is often a nightmare. This paper deals with our approach to these complexities. It looks at 100 consecutive poly traumas admitted in the orthopaedic department of a tertiary care Calcutta hospital over a 10-year period. It deals with the intricate problems, which an orthopaedic traumatologist faces, and their best solutions. Patient outcomes change with age, injury combinations, and involvement of soft tissues. Delay in presentation to a trauma centre, poor primary management, variability of in-house diagnostic and therapeutic facilities compound the problems. The financial status and presence of co-morbidities such as diabetes (endemic in India) have a direct bearing on prognosis. Micro-planning (customising) strategy is the key to achieving low mortality and morbidity. All polytrauma should be initially resuscitated under the joint care of a traumatologist and intensivist. Surgical sessions should be planned beforehand along with their intervening medical management. Early consultation with other surgical and medical colleagues is mandatory. The order of fixing bones should be formulated. However flexibility is the key in this approach as the condition of the patient might change while the plan is in progress.

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OUTCOME OF 105 NEGLECTED TRAUMA CASES MANAGED BY ILIZAROV TECHNIQUE IN 3RD WORLD COUNTRY LIKE BANGLADESH

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INTRODUCTION: In a third world country like Bangladesh many trauma cases are not managed properly due to poor economic and educational condition. Many had wrong treatment from quack doctors. When patients arrive to tertiary hospital, they already acquire complications like infection, nonunion and malunion. Failed treatment is frustrating for the patients and nightmare for surgeons. In complicated cases by applying Ilizarov technique most of the difficult trauma cases could be managed successfully. **METHOD:** 105 cases of neglected trauma patients treated in Orthopaedic department of Dhaka Medical College Hospital and a Private setup over a 5 year period were taken by prospective proforma. **RESULTS:** Ilizarov technique was applied in all patients. 79 patients (75%) were males and 26 (25%) females. Of them 86 (82%) had non-union and 19 (18%) had mal-union. Median age of the patients was 30 years (range, 1 - 60 years). The median time between injury and application of Ilizarov device was 7 months. Ilizarov rings were maintained for an average of 7 months. The mean \pm SD time of union was 4.48 ± 1.96 months but it varied widely with the site of injury, such as humerus, femur or tibia. The mean \pm SD of lengthening of limb was 5 ± 1.63 cm. In total Success rate was 96% and failure 4%. **DISCUSSION:** Use of an Ilizarov external fixator makes the difficult trauma cases more successful, cost effective and allows conservation of limited resources of human skill time and material.

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USE OF SERUM LACTATE IN PREDICTING THE DEVELOPMENT OF FAT EMBOLISM SYNDROME IN POLYTRAUMA PATIENTS

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Posttraumatic shock is thought to be an important contributing factor for FES. Rahman et al studied the changes of haemostasis in relation to hypovolaemic shock after polytrauma and concluded that shock enhances the development of FES. However, in all the previous works, the assessment of posttraumatic shock had been on clinical parameters only. In recent literature, shock has been evaluated using biochemical parameters like serum lactate and base deficit. There is no study in literature with appropriate quantification of these clinical variables i.e. shock using its biochemical indices and FES using Schonfelds scoring system. Thus it was considered worthwhile to look for this relationship. The study was conducted over a period of three and a half years. A total of 67 polytrauma patients in the age group of 16-40 years of both sexes, who presented within 12 hours of Injury with multiple long bone fractures were included in the study. Forty two patients, had admission lactate values exceeding 22 mgms%. Out of those 42 patients, 20 developed clinical FES, and 12 showed features suggestive of subclinical FES. Only 1 patient developed clinical FES and 6 developed subclinical FES amongst those with serum lactate values of 22 mgms% or less. The statistical significance was calculated using chi-square test and p-value came out to be significant. Finally it can be concluded that plasma lactate levels in initial period of multiple long bone or pelvic fractures can predict the subsequent development of significant hypoxia and FES, whereas base deficit do not.

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CK-MM (CREATINE KINASE MM ISOENZYME) LEVELS AS AN INDICATOR OF THE MAGNITUDE OF SKELETAL TRAUMA

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OBJECTIVE: This study aimed to investigate whether CK-MM levels can be used as a reliable and predictable indicator of skeletal trauma. **METHODS:** 45 patients aged 20 - 60 yrs, with isolated lower limb long bone fractures admitted immediately following injury, were enrolled in this study. Serum levels of CK-MM enzyme were measured on admission and 24hrs, 72hrs, and 120 hrs following trauma, using a CK-NAC method. Baseline serum CK-MM levels were also measured in 10 healthy control subjects. **RESULTS:** The baseline values of CK-MM in healthy subjects ranged between 40-160 iu. 26 patients (58%) had open fractures and 19 (42%) had closed fractures. Two thirds of the patients had tibial fractures and the rest had femoral fractures. The averages of the CK-MM values at admission, 24h, 72h and 120h were 1124iu, 1564iu, 1394iu and 866iu respectively, indicating a peak at 24h. The CK-MM values at 120h seemed to be significantly higher with closed fractures than those with open fractures. (1220iu vs 627iu, $p = 0.012$) Fractures of the femur had nearly twice the values of CKMM, than that seen in tibial fractures. (1249iu vs 608iu at 120h, p value 0.001) **CONCLUSION:** Values of CKMM rose to 8-10 times normal following injury and are therefore a sensitive indicator of trauma. CK-MM isoenzyme levels at 24h and at 5 days following trauma could potentially be used as an indicator to assess the severity of injury.

Date: 2009-11-01
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Time: 0800-0930
Room: Hall A3

Abstract number: 20969

MAJOR REPLANTATION OF THE LOWER LIMB

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OBJECTIVES: To report our results in the major replantation of lower limb the study was carried out. **MATERIALS AND METHODS:** During 1984 to 2005, all patients who had major traumatic amputation or near amputation of their lower limbs were included in the study. After debridement, bones were shortened and stabilized with external fixation. Then, arterial, venous, nerve, tendon, muscle and skin were anatomized and sutured orderly. All patients were followed up for at least 2 years. **RESULTS:** There were 16 patients, 1 female and 15 male. Their ages ranged between 7 and 49 years old. Thirteen had complete amputation and 3 had near amputation. Levels of injuries were ankle disarticulation in 3, leg amputation in 7, knee disarticulation in 1 patients and 5 thighs amputation. Most of the patients had local crushed injury. Ischemic time ranged between 15 minutes and 1 and a half hour. Operative time ranged between 4 and 8 hours. Successful operation was found in 12 patients. Reamputation was done in 3 because of reperfusion syndrome and 1 because of infection. In the successful patients, immediate complications were found in 5, including haematoma, infection, bleeding, acute heart failure and severe pain. Delayed bone union was found in all. Four patients had good function and were in Chen I, 6 patients were in Chen II and 2 patients were in Chen III. **CONCLUSION:** Major replantation of the lower limb should be done in particular patients; however, complications of the surgery have to be concerned.

Date: 2009-11-01

Session: Trauma - Hand & Forearm

Time: 1330-1500

Room: Hall A3

Abstract number: 22209

A NEWLY DESIGNED PROXIMAL INTERLOCKING SCREW SYSTEM AT INTRAMEDULLARY NAILING OF THE ULNA

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BACKGROUND: Intramedullary nailing (IMN) is still not the first choice for the ulna. One of the limiting steps of IMN for the ulna is problems experienced at proximal interlocking screwing (PIS). A newly designed PIS system solves common problems with an eccentrically aligned PIS, which can be sent from a hole located at the proximal tip of IMN. In this in vitro study, we define the optimum angle of PIS, in order to allow sending screw without damage to articular surface. **METHODS:** We used 36 dry cadavers' ulna. The ulnas are split into two equal pieces sagittally. The deepest point of incisura olecrani and ideal IMN entry point (1) is identified for each ulna. Safety distance between articular surface and PIS is assumed as 2 mm. PIS are sent from the entry point through the anterior surface of ulna by targeting a point (B) 3.5mm (2mm safety distance+1.5mm radius PIS) posterior from the deepest point of incisura olecrani. After screws are sent, angles between the medulla and PIS are measured. **RESULTS:** Mean angle was 25.9° (min.19.3°, max.29.2, SD: 2.0). **CONCLUSION:** According to this study, PIS may gives us the opportunity to proximally interlock the nail without articular damage with no need of confirmation of flouroscopy if the angle of PIS on the nail is produced with a optimum 20° fixed angle. 1) Akpinar F et al. Morphologic evaluation of the ulna. Acta Orthop Scand.2003 Aug; 74 (4):415-9.

Date: 2009-11-01
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Abstract number: 22418

VOLAR PLATING OF INTRA-ARTICULAR DISTAL RADIUS FRACTURES

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INTRODUCTION: The purpose of this study was to evaluate patient's radiographic and clinical outcome with a special focus on quality of life after volar plating of intra-articular distal radius fractures. **METHODS:** 54 patients were assessed two and six years postoperatively. Grip strength and range of motion were evaluated. Clinical and radiological data were quantified with the scoring system of Gartland and Werley and Castaing. For subjective outcome assessment the short form 36 and the disabilities of the arm, shoulder and hand questionnaire were completed. **RESULTS:** At the final follow-up 51 patients reached good or excellent results in the score of Gartland and Werley and 50 in the radiological scoring system of Castaing. There was no statistically significant correlation between wrist function and final radiographic alignment ($p > 0.05$). The average post-traumatic arthritis score of the injured wrist increased over time (0.26 ± 0.48 vs 0.43 ± 0.60 ; $p = 0.006$). The median DASH score increased from 0.8 points to 5.9 points at the 6-year follow-up ($p = 0.01$). **DISCUSSION:** On the basis of our good clinical results, we recommend volar plate fixation of comminuted intra-articular DRF as an effective and secure method of treatment. Additional investigations conducted as prospective randomized trials with case load estimation should focus on the importance of patients' physical demands and activity level as well as quality of life across different age subgroups.

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Room: Hall A3

Abstract number: 21982

TREATMENT OF COLLES - FRACTURES WITH K-WIRES VERSUS PALMAR PLATES WITH LOCKING CREWS

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INTRODUCTION: K-wires or a palmar plate with locking screws can be used to maintain an anatomical reduction when treating dorsally displaced distal radius fractures. We wanted to find out which technique was most effective to obtain a good radiological and clinical outcome in patients more than 50 years old. MATERIALS AND METHODS: We performed a prospective randomised study with forty patients. Half of the fractures were treated with percutaneous K-wires and half with a palmar plate and locking screws. Patients were at least 50 years old and high velocity trauma fractures were excluded. Radiological parameters (ulnar variance, palmar tilt, radial inclination) were measured on X-rays taken 5 weeks postoperatively. Clinical results (range of motion, grip strength) and DASH score were determined 3 months postoperatively. OUTCOME: There was no significant difference in palmar tilt and radial inclination between K-wires and palmar plates, but restoration of ulnar variance was significantly better in fractures treated with a plate. No significant difference was found in clinical outcome and DASH- score. CONCLUSION: Radiological outcome tended to better with a palmar plate and locking screws, but short-term clinical results and DASH score were similar in both groups.

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Abstract number: 20329

PROXIMAL INTERPHALANGEAL JOINT FRACTURE DISLOCATIONS: CLOSED MANAGEMENT WITH THE SUZUKI EXTERNAL FIXATOR

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INTRODUCTION: Proximal interphalangeal fracture dislocations are difficult to treat with satisfactory outcome. Open reduction is difficult since the fragment is usually small and not amenable for stable fixation. Results following open surgery for this sensitive joint can be disastrous. Suzuki described a dynamic traction mobilization method for treatment of difficult for fractures of the base of middle phalanx and fracture dislocations. Several modifications and improvement has been described. We describe a simple technique for fracture dislocations of the proximal interphalangeal joint. **MATERIALS AND METHODS:** Eight fingers with a fracture dislocation of the proximal interphalangeal joint were treated with a self designed dynamic external fixator as described by Suzuki, allowing early mobilization. The fixator consists of pins K wires and rubbers. **RESULTS:** The clinic- radiographic outcome and functional results were evaluated and recorded. A near normal function was obtained in four patients. The average total active motion was 82°. Radiographic reduction was maintained. **CONCLUSION:** The combination of longitudinal traction and early mobilization is a more biologic philosophy. Traction maintains the reduction, allows healing of the articular surfaces, and prevents ligamentous shrinkage without disturbing the intraarticular environment. This external fixator is an inexpensive and simple technique for these fracture dislocations. Early intervention is recommended.

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Abstract number: 21830

TITANIUM MINI-PLATE FOR DIFFICULT HAND AND FINGER FRACTURES

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PURPOSE: The purpose of this prospective cohort study was to evaluate clinical outcomes for open reduction and internal fixation of difficult hand and finger fractures using a titanium mini-plate. **METHODS:** Seventy-four consecutive patients (60 male and 14 female) with metaphyseal fractures with comminution and displacement were enrolled. Average age was 38 years (range, 14-80). 20 were open; 14 of these had additional soft tissue injury, involving neurovascular injury in 5 and extensor tendon injury in 7. The average duration from injury to surgery was 8 days (range, 2-60). **RESULTS:** Bone union was successfully achieved in 73 patients over an average period of 2.5 months. The final range of total active motion (%TAM) was excellent (>85%) for 38, good (70%-84%) for 19, fair (50%-69%) for 12, and poor (<49%) for 5. Postoperative complications occurred in 8 patients (redisplacement in 3, a collapse or absorption of the condylar head in 3, and superficial infection or nonunion in one). Plates were removed in 44 cases, and additional surgery was required in 25 cases. Statistical analysis revealed that patient age ($p<.01$) and intra-articular involvement ($p<.01$) were significantly correlated with %TAM of the injured finger at 1-year follow-up. **CONCLUSION:** Despite the technical demands of plating for comminuted metacarpal and phalangeal fractures, the low-profile titanium plate system was highly effective in maintaining anatomic reduction. The objective outcomes approached a reasonable level at 1-year follow-up.

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Abstract number: 21442

SIMULTANEOUS NERVE TRANSFER TO DELTOID AND TRICEPS LONG HEAD MUSCLE USING 4 INTERCOSTAL NERVES: AN ANATOMIC STUDY AND FIVE CASE REPORTS

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PURPOSE: To evaluate the anatomical feasibility and results of nerve transfer to deltoid and triceps long head muscle using 4 intercostal nerve in C5,6,7 brachial plexus avulsion. **METHODS:** the anatomical study was performed on 12 fresh cadavers. The lengths of the 3rd through 6th intercostal nerves and tunnel length were recorded. Based on the anatomic study, 4 intercostal nerves were transferred directly to the anterior axillary nerve and the nerve to long head of triceps in 5 patients. **RESULTS:** The average intercostal nerve length and tunnel length support the feasibility to transfer for deltoid and triceps long head muscle. At two year follow-up the preliminary results showed that the deltoid strength was restored to M4 and triceps strength was restored to M3-M4. The average range of motion for shoulder abduction and elbow extension was 85o and 90o respectively. **CONCLUSION:** This anatomic study with five case reports supports that transfer of 4 intercostal nerves to the anterior axillary nerve and the nerve to long head triceps could be an alternative method for reconstruction of the shoulder abduction and elbow extension in C5 through C7 root avulsion injuries.

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Abstract number: 20883

NERVE TRANSFER FOR WRIST EXTENSION USING NERVE TO FLEXOR DIGITORUM SUPERFICIALIS IN C5,C6, AND C7 ROOT AVULSIONS: AN ANATOMIC STUDY AND A REPORT OF TWO CASES

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PURPOSE: To further evaluate the feasibility of restoring wrist extension in patients with complete C5,6,7 root avulsion injuries by transferring the nerve to FDS muscle (Proximal FDS branch) to the nerve to ECRB muscle (ECRB branch). **METHODS:** The study was performed on ten fresh cadavers. The nerve branches of the median nerve and the radial nerve were measured for length, diameter, the sites of origin and histomorphometric evaluation. Based on this anatomical study, the Proximal FDS branch was transferred directly to the ECRB branch without nerve graft in two patients. **RESULTS:** The average distances from the origin of nerve branches to the interepicondylar line were 3.5 and 2.3 cm for the Proximal FDS branch and ECRB branch. The average numbers of nerve fibers of the Proximal FDS branch and ECRB branch were 983 and 2797. At two years follow-up demonstrated that the wrist extension had gained strength M4. The range of motion for wrist extension was 30 degrees in the first patient and 70 degrees in the second patient. **Conclusion and Clinical Relevance:** The anatomic study with two case reports supported that the transfer of the Proximal FDS branch of median nerve to the ECRB branch of radial nerve could be an alternative method for reconstruction of the wrist extension in C, 5, 6, 7 root avulsion injuries.

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Abstract number: 22266

COPELAND SURFACE SHOULDER REPLACEMENT ARTHROPLASTY FOR CUFF TEAR ARTHROPATHY - EARLY AND MID TERM FUNCTIONAL RESULTS

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INTRODUCTION: We present our results of Copeland shoulder resurfacing arthroplasty for compensated cuff tear arthropathy of shoulder. **METHODS AND MATERIAL:** Between 2003 and 2008, the senior author has performed 28 Copeland surface replacements on 25 patients for compensated cuff tear arthropathy. Of these 25 patients, 20 patients (23 shoulders) were available for review with a mean follow-up of 26 months (Range 8 - 65 months). There were 5 men and 15 females with an average age of 76.92 years (range 58 - 91 years). Mean pre-operative flexion was 81 degrees (range 30 - 100), mean pre-operative abduction was 48 degrees and mean external rotation was 15 degrees. **RESULTS:** The Copeland implant was tilted 15 - 25 degrees upwards to articulate under the acromion. Post-operatively, 2 patients had residual stiffness. The mean post-operative flexion improved to 115.2 degrees (range 90 - 150), abduction improved to 99.2 degrees (range 70 - 130), external rotation improved to 35.6 degrees (range 10 - 70) and internal rotation to L2 level. The mean pre-operative Constant score was 23.16 (range 10 - 44), which improved to a mean post-operative Constant score of 54.4 (range 25 - 82). The mean pre-operative Oxford Shoulder score was 42.7 (range 33 - 57), which improved to a mean post-operative Oxford Shoulder score of 24.1 (range 12 - 48). 5 out of 20 patients (25%) had some discomfort while the rest 15 patients (75%) were satisfied. **CONCLUSION:** Copeland surface replacement arthroplasty gives satisfactory clinical results in this elderly age group with compensated cuff tears.

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Abstract number: 22179

ACUTE ACROMIOCLAVICULAR JOINT INJURIES - SURGICAL MANAGEMENT USING MODIFIED CADENATS PROCEDURE (CORACOACROMIAL LIGAMENT TRANSFER)

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INTRODUCTION: Acromioclavicular (AC) joint injuries are common. Torn coracoclavicular ligaments lead to AC joint sprains/separations. Depending on the severity of the injury, it has been classified into 6 types by Rockwood. Type I and II are managed conservatively, surgical management is recommended for the remaining types. Several methods of surgical reconstruction described. **AIM:** Outcome analysis of surgical management of type III to VI AC joint injuries with modified Cadenats procedure (Coraco-acromial ligament transfer). **METHODS:** The study included total 30 patients. 21 road traffic accidents, 9 sports injury. 50% of the patients were in the age group of 21 to 30 and 33% were in the age group of 41 to 50 yrs. 23 patients had Type III injury, 3 patients had type IV injury and 4 had type V injury. None had type VI injury. **RESULTS:** Functional assessment done using RJ Imatani scoring system: 73% excellent, 20% good and 7% fair results. No poor results. 83% of the patients had cosmetically excellent results. One patient had wound infection and 2 had K-wire loosening and breakage. **DISCUSSION:** This procedure restores the stability by retaining the mobility. A second operation for the removal of coraco-clavicular screw is avoided. Preserving the lateral end of clavicle and restoring the AC joint anatomy contributes to good cosmetic and functional results. Sports persons returned to near normal performance after 6 months. We recommend modified Cadenats procedure for acute type III to VI injuries in physically active patients.

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Abstract number: 21965

MANAGEMENT OF CHRONIC ACROMIOCLAVICULAR DISRUPTION BY LARS LIGAMENT RECONSTRUCTION

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Chronic acromioclavicular (AC) joint dislocation is a common sequelae of non-operative management of grade 3 acromio-clavicular disruption. It is difficult to repair ruptured ligament on late presentation because of attenuated tissues. Although most cases remain asymptomatic, some complain of pain during weight lifting. 4 chronically disrupted patients (6 months to 22 years) with pain on lifting weights and prominent lateral end of clavicle were operated using LARS polyester ligament, which was sutured onto itself without additional implants; K-wires were used for temporary stabilisation in three patients. Immediate active assisted shoulder movements were started as per pain tolerance. Follow-up ranged from 6 to 20 months; all 4 were asymptomatic within 1 month of surgery, with no lateral clavicular prominence. 1 case got infected due to k-wire migration and settled after debridement. Although many options ranging from autograft and artificial substitutes are available for AC joint reconstruction, the option of using Polyester ligaments is less documented. We have found it to be a strong construct with the ability of the ligament being anchored by sutures alone. The additional possibility of allowing tissue ingrowth in the extraarticular situation makes LARS a good modality for reconstruction of neglected AC joints, and the initial fixation strength allows early rehabilitation of shoulder. It has the advantage that no auto graft or allograft is needed, with reduced donor morbidity and disease transmission risks. Cost limitations are offset by reduced morbidity, but infection issues remains strong, especially in tropical countries.

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Abstract number: 21711

OUTCOMES OF ARTHROSCOPIC DOUBLE-ROW REPAIR FOR LARGE OR MASSIVE ROTATOR CUFF TEAR

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PURPOSE: The purpose of this study was to analyze clinical and structural outcomes of arthroscopic rotator cuff repair (ARCR) for large or massive tears. **METHODS:** 37 patients with large or massive rotator cuff tears were enrolled as the subjects of this study. There were 10 females and 27 males whose average age was 63.7 years. On the size of the tears, large tear was observed in 27 patients and massive tear in 10. All patients were treated with arthroscopic double-row repair using suture anchors. Clinical outcomes were evaluated on the basis of the UCLA shoulder score, and structural outcomes were analyzed using T2-weighted images of postoperative MRI. The average follow-up period was 18.5 months, and postoperative MRI was performed 14.4 months on average. **RESULTS:** The average UCLA score of the 37 patients improved significantly from 17.4 points preoperatively to 32.9 points postoperatively. All the patients obtained satisfactory outcomes at the final follow-up. Postoperative MRI revealed sufficient thickness of the repaired cuff in 22 patients, insufficient thickness in 5 and recurrence tear in 10. The average UCLA score in the 10 patients with recurrence tear was statistically lower than that in the 22 patients with sufficient thickness of the repaired cuff. **CONCLUSION:** In this study, incidence of postoperative recurrence tear of arthroscopic double-row repair was same as that of open repair in the previous reports. Arthroscopic double-row repair for large or massive rotator cuff tears is a definite procedure to obtain satisfactory outcomes clinically and structurally.

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ROTATOR CUFF TEAR - A COMPARISON OF MRI, USG AND ARTHROSCOPIC FINDINGS

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INTRODUCTION: Rotator cuff tear diagnosis; comparison of MRI, ultrasonographic and arthroscopic findings. METHODS: Retrospective study of 50 patients treated for shoulder pain due to rotator cuff tear, initially conservatively and after more than 6 months by arthroscopic shoulder surgery. Comparison of intraoperative findings with preoperative US and MRI images. RESULTS: Sensitivity of USG - 1.0, specificity 0.82. Sensitivity of MRI - 0.95, specificity 1.0. DISCUSSION: Clinical examination and physical tests are not fully reliable diagnostic tools in patients with shoulder pain, because symptoms of different conditions overlap. Using ultrasound to visualize the shoulder area has some advantages to other imaging techniques such as CT scan or MRI, and has a very good sensitivity and good specificity. Many authors agree that MRI is one of the most effective methods for the diagnosis of rotator cuff tear. CONCLUSIONS: Ultrasound and magnetic resonance imaging are both very sensitive techniques for diagnosis of rotator cuff abnormalities especially full-thickness tear. Ultrasonography was highly accurate for detecting full-thickness rotator cuff tears, characterizing their extent, and visualizing dislocations of the biceps tendon. It was less sensitive for detecting partial-thickness rotator cuff tears and ruptures of the biceps tendon. Ultrasonography can be used as a primary method owing to its fast procedure and affordable cost.

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A LONG TERM FOLLOW UP OUTCOME AFTER ARTHROSCOPIC ROTATOR CUFF REPAIR

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PURPOSE: To follow long term outcome results of patients who underwent rotator cuff repair using arthroscopic repair techniques. **METHODS:** We retrospectively reviewed 80 patients who underwent arthroscopic rotator cuff repair. Follow-up averaged 23 months (range, 3 to 43 months). Standard arthroscopic portals are used. Using Spiralok (Mitek) anchors loaded with two strands of Orthocord suture, the tendons are re-attached with mattress stitches by means of an arthroscopic grasper (Mitek). The patient data was recorded as age, activity level, mechanisms of injury, associated findings at surgery, and tear size measured. The outcome for the patients was evaluated using the UCLA (University of California at Los Angeles) shoulder rating system, DASH and SST (simple shoulder test). After surgery the limb is immobilized in a shoulder polysling for 6 weeks during which, in accordance with the strength of re-attachment, passive exercise is carried out. Rehabilitation therapy should continue for 6 months at least. **RESULTS:** Of the 80 patients treated for rotator cuff tears by arthroscopic repair, all patients were fully evaluated. The average post-operative UCLA score was 33.74 points, DASH score was 12.44 points and SST score was 9.28 points. In addition to rotator cuff repair, we performed acromioplasty (28) and acromioclavicular joint resection (2). In two patients we recorded superficial wound infection. They were completely treated. All patients were satisfied with treatment outcome. **CONCLUSIONS:** This study confirms that long-term results for arthroscopic rotator cuff repair are good to excellent and supports continued use of arthroscopic repair techniques.

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TUBEROPLASTY FOR MASSIVE IRREPAIRABLE ROTATOR CUFF TEARS

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Tuberoplasty is a relatively new technique for the treatment of massive rotator cuff tears. It is less invasive compared to other procedures i.e. rotator cuff arthroplasty, shoulder replacement and reverse shoulder replacement. We report our series of 30 cases with an average follow-up of 18 months following shoulder tuberoplasty for massive rotator cuff tears. We used ASES Shoulder Evaluation Form and Disabilities of the Arm, Shoulder and Hand (DASH) scoring system to evaluate the clinical outcome. The procedure includes an arthroscopic debridement of the subacromial space, an arthroscopic excision of tuberosity using a shaver, +/- tenotomy of biceps. Acromioplasty is not performed. The procedure preserves the coracoacromial arch. Thirty patients underwent this procedure. All patients had significant symptoms in terms of pain and disability performing ADL preoperatively. We had one complication in the form of superficial infection of the port, treated successfully with antibiotics. We have obtained good short to midterm results with regard to pain relief, functional recovery, and patient satisfaction. We conclude that tuberoplasty offers a less invasive treatment for massive rotator cuff tears compared to open procedures.

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REPAIR OF TEARS OF THE SUBSCAPULARIS: MINIMUM TWO YEAR FOLLOW-UP RESULTS OF 84 CASES

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The purpose of this study is to report the results of repair of isolated tears of the subscapularis. Methods: 84 shoulders that had undergone open repair of the subscapularis tendon were reviewed. The mean age at surgery was 53.2 years. Fifty-seven tears were traumatic, and 27 were degenerative in etiology. Twenty-three of the tears involved the superior third of the subscapularis tendon, 41 involved the superior two thirds, and 20 were complete tears. Fifty-four shoulders had a dislocation or subluxation and 10 shoulders had a rupture of the long head of the biceps tendon. Forty-eight shoulders underwent concomitant biceps tenodesis; 13 shoulders underwent concomitant biceps tenotomy; and four shoulders underwent concomitant recentering of the biceps. Patients were evaluated clinically and radiographically at a mean forty-five month followup (range 24 to 132 months). RESULTS: The mean Constant score increased from 55.0 points preoperatively to 79.5 points postoperatively ($p < 0.001$). Seventy-five patients were satisfied or very satisfied with the result. Tenodesis or tenotomy of the biceps tendon at the time of subscapularis repair was associated with improved subjective and objective results independent of the preoperative condition of the biceps tendon. CONCLUSIONS: Repair of isolated subscapularis tears yields acceptable improvement in shoulder function in properly selected patients. Additionally, results from this study seem to advocate routine tenodesis or tenotomy of the long head of the biceps tendon at the time of subscapularis repair.

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LONG-TERM CLINICAL AND MRI RESULTS OF OPEN REPAIR OF THE SUPRASPINATUS TENDON

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We retrospectively analyzed 47 patients (49 shoulders) treated by open proximalized reinsertion of the supraspinatus tendon for chronic retracted detachment. The mean age of the patients was 59 years. We had prospectively followed the patients using system of Constant-Murley. The minimum followup was 60 months (mean, 87 months; range, 60-133 months). Imaging included standard pre- and postoperative radiographs and a standardized MRI at the last followup. At last followup there was an improvement in the age and gender-adjusted. Constant score from 67% preoperatively to 95% postoperatively and in the pain score, from 5.9 points to 13 points. Combined repairs of both supraspinatus and infraspinatus tendons yielded similar functional results. At the last followup MRI evaluation, the supraspinatus tendon was reruptured in five patients (12%) but the presence of a rerupture did not negatively influence the functional result. Once healing of the repaired tendons was achieved, supraspinatus muscle atrophy never worsened. As assessed on MRI, fatty infiltration of the supraspinatus, infraspinatus and subscapularis muscles significantly increased postoperatively, independent of tendons healing. Additionally, eight primary incomplete tendons ruptures were present at the last followup. Radiographic centering of the humeral head was preserved and glenohumeral arthritis remained stable. Functional results were better when the standardized supraspinatus muscle area was greater than 0.5 at the final evaluation.

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PERCUTANEOUS PINNING FOR DISPLACED 2-PART AND 3-PART FRACTURES OF THE PROXIMAL HUMERUS: OUTCOME OF 60 CASES

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INTRODUCTION: Surgical management of proximal humerus fractures is difficult. Poor bone quality, comminution, and the deforming forces of the rotator cuff on the tuberosities influence the choice of operative approach and fixation techniques. The objective of this study was to see the outcome of percutaneous pinning of surgical neck fracture of Humerus. **MATERIALS AND METHODS:** 60 cases of surgical neck fracture of Humerus treated with percutaneous pinning under C-arm guidance in a Private setup and Orthopaedic department of Labaid Specialized Hospital from January 2004 to December 2008. Data were obtained by prospective proforma. **RESULTS:** Of the 60 patients 37 were female and 23 males with mean age 54 years. Mean follow up periods were 1.5 years (range 1-2 years). Preoperative and postoperative X-rays were assessed. 19 (32%) obtained excellent results, 21 (35%) good results, 11 (18%) fair results and 9 (15%) achieved poor results. 5 patients developed shoulder joint stiffness. 3 patients had loss of fracture position due to failure of internal fixation, all of these patients underwent revision surgery. 1 patient had infection which was resolved later on. There were no cases of avascular necrosis or neurovascular complications. **CONCLUSION:** Closed reduction and percutaneous pinning offers a good option for management of fracture fixation of displaced 2 and 3 part fractures of the proximal humerus with minimal soft tissue damage. These patients should be monitored closely for a period of 4 weeks, since joint stiffness, secondary displacement and failure of fixation can occur in this period.

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CLOSED REDUCTION AND PERCUTANEOUS PINNING IN ELDERLY PATIENTS WITH THREE-PART FRACTURES OF THE PROXIMAL HUMERUS

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SUMMARY OF BACKGROUND DATA: Three-part fractures account for 13 to 16 percent of all proximal humeral fractures. Although some authors suggest that open reduction internal fixation of these fractures is feasible, other studies have reported unsatisfactory results associated with pain, non-union and avascular necrosis. **OBJECTIVE:** To study the role of closed reduction and percutaneous pinning in three-part fractures of the proximal humerus analyzing its clinical and radiographic outcome. **PATIENTS AND METHODS:** Thirty patients with three- part fractures of the proximal humerus were treated with closed reduction and percutaneous pinning. They were seventeen women and thirteen men and all patients were above 50 years of age (average 59y). Patients were followed for a minimum of 1 year. **RESULTS:** Patients were evaluated radiographically for union and clinically for pain and range of motion. All patients fully united with no incidence of AVN. The average Constant score was 80 at 1 year postoperatively and all patients could perform their activities of daily living. Complications were limited. **CONCLUSION:** Minimally invasive surgical treatment of three- part fractures is a valuable alternative in these complex fractures, minimizing the incidence of avascular necrosis and yielding satisfactory clinical and radiological results.

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ACROMIOCLAVICULAR DISLOCATIONS AND FRACTURES OF THE DISTAL CLAVICLE TREATED WITH HOOK PLATE

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The treatment of Type III acromioclavicular joint dislocation is still controversial. Today's patients demand cosmetic as well as functional results and most surgeons would advocate operative treatment. Type II distal clavicle fractures have a high incidence of nonunion and these fractures are generally reduced and fixed internally. Surgery for both these injuries has included various types of implants, procedures and excision of the distal clavicle. We have used the hook plate as the implant of choice for both these injuries. The surgical technique is simple but the implant needs to be removed as it can produce osteolysis of the acromion in some cases. This seems to be asymptomatic so far. The hook plate was used in 51 patients. The ages ranged from 18 years to 61 years. One plate was removed for infection. Stiffness of the shoulder and osteolysis of the acromion are some of the complications. The myriad of procedures for these injuries leaves no doubt in one's mind that there is no one best treatment to date. It would be proper to compare this implant with other implants or procedures in a randomized controlled trial.

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IS JOINT REPLACEMENT A SUCCESSFUL THERAPY FOR CHRONIC-LOCKED POSTERIOR DISLOCATION OF THE SHOULDER?

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INTRODUCTION: Chronic-locked posterior dislocations (CLPD) of the shoulder are found with seizures, electric accidents and in combination with other severe injuries. Treatment depends on: duration of symptoms, head involvement, glenoid and general health. Joint replacement becomes necessary with head involvement >45%. The objective of the study is the investigation of results after arthroplasty for CLPD. **METHODS:** Retrospective analysis (Xray, clinical) of 11 patients (12 joints), (n=10 hemiarthroplasties), 1999-2005. ROM, Constant score (CS). Xray: implant position, radiolucent lines, loosening. **RESULTS:** Age (11 male) 49.8 ±8.6. FU 37.4m ±16.8. Duration of symptoms: 14.5m ±23.3. Postop CS 59.4 ±21.6 (related CS 67.1 ±24.0). Significant improvement for flexion (84.2° ±22.3 to 125.0°±47.0; p=0,021), abduction (55.4°± 21.0 to 95.8°±53.3; p=0,007) and ER (6.7°±20.2 to 36.7°±19.7; p=0,003). Negative correlation related CS and number previous surgeries (r=-0.594, p=0.042), duration of symptoms (r=-0.709, p=0.010). One revision surgery after 36m (dissociation PE-inlay). Two patients moderate (5-10mm), one severe (>10mm) cranial migration. No radiolucent lines or loosening. **CONCLUSION:** Joint replacement is successful for CLPD of the shoulder with severe head involvement. Early diagnosis and treatment are the key issues for good results and in the best avoidance of arthroplasty. The technically demanding procedure should be reserved for high-volume centers.

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THE SMR REVERSE SHOULDER PROSTHESIS IN THE TREATMENT OF CUFF DEFICIENT SHOULDER CONDITIONS

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Reverse total shoulder arthroplasty (RSA) is a relatively recent concept that provides further options in the management of cuff-deficient shoulder disorders. While early results utilizing the Delta III prosthesis (DePuy, Warsaw, IN) have been promising, there is limited data in the literature on outcomes utilizing differing prosthetic designs. We report on the outcomes of Reverse total shoulder arthroplasty (RSA) utilizing a previously unreported prosthesis, the SMR Modular Shoulder System (Systema Multiplana Randelli, Lima-LTO, Italy.) 49 arthroplasties in 48 patients who underwent Reverse Shoulder Arthroplasty with the SMR prosthesis were available for follow up. There were 10 males and 38 females with a mean age of 78.9 years (55-94) at time of operation. The most common indications were cuff tear arthropathy and osteoarthritis with cuff deficiency (66%), followed by fracture and fracture sequelae (16%). At a mean 38 months follow up, 89% of patients rated their outcome as good or excellent. The mean American Shoulder and Elbow Surgeon Score was 70.1 (range 3-100), and the mean Oxford Shoulder Score 22.0 (12-47). The mean active anterior elevation was 122 degrees (range 45-180) and the mean external rotation 14.7 degrees (25-75). Inferior glenoid notching was seen in 24% of patients. There was no radiological evidence of component loosening and no reoperations. Modern RSA designs give encouraging results in the treatment of cuff deficient shoulder conditions. Our early experience with the SMR RSA shows favourable outcomes and a low rate of complications.

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COMPARISON OF FUNCTIONAL OUTCOMES OF REVERSE SHOULDER ARTHROPLASTY VERSUS HEMIARTHROPLASTY IN THE PRIMARY TREATMENT OF ACUTE PROXIMAL HUMERUS FRACTURE

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Reverse shoulder arthroplasty (RSA) has been suggested as an alternative to hemiarthroplasty for the treatment of complex proximal humeral fractures. We compared outcomes of ten patients (mean age 77) undergoing RSA for acute fracture against ten patients (mean age 75) who underwent hemiarthroplasty for the same condition. At minimum 2 year follow up the mean ASES score was 65 (range 40-88) in the RSA group and 67 (26-100) in the hemiarthroplasty group. Mean Oxford Shoulder scores were 29 (15-56) and 22 (12-34) respectively. Mean forward elevation was 115° (range 45-140°) and active external rotation was 49° (5-105°) in the RSA group, versus 108° (50-180°) and 48° (10-90°) in the hemiarthroplasty group. No statistically significant differences in outcome scores or range of motion were seen. Outcomes following RSA tended to be more consistent, with a wider range of functional results seen in the hemiarthroplasty group. This study provides the first direct comparison between the two surgical options within a population group and at a single institution. In these early results the expected functional gains with the reverse shoulder arthroplasty were not realised, suggesting its use as the primary treatment for acute fracture should remain guarded.

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SHOULDER HEMIARTHROPLASTY IN GERIATRIC PATIENTS WITH COMMUNATED FRACTURES OF THE PROXIMAL HUMERUS

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INTRODUCTION: Management of displaced comminuted fractures of the proximal humerus in elderly is still controversial. Conservative treatment may result in severe disability due to malunion and shoulder stiffness. Fixation of these fractures by plates may offer stability in anatomic position, but requires extensive soft tissue exposure and may result in a relatively high incidence of avascular necrosis of the humeral head. We present our experience with hemiarthroplasty of the shoulder in senior patients with comminuted fractures of the proximal humerus. **PATIENTS:** This study consists of 79 Pts. (49F, 30M; 67-89 year old, mean 72.5Y; 32 with 3 parts fractures and 47 with 4 parts fracture) treated by hemiarthroplasty of the proximal humerus. Patients were followed for 2-8 years (mean 3.5Y), and evaluated by the Constant's shoulder grading score and radiographs. **RESULTS:** 75% of the patients treated by hemiarthroplasty had satisfactory results. They were almost free of pain, but most of them had only a moderate improvement in shoulder motion (active abduction or flexion of 110-130 degrees were observed in 10/79, of 90-110 degrees in 18/79, of 50-90 degrees in 33/79 and of 30-50 degrees in 18/79). **CONCLUSIONS:** Based on this study it seems that pain relief by hemiarthroplasty may be achieved in older patients with comminuted fractures of the proximal humerus, but the gain in shoulder function is relatively limited.

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MID-TERM RESULTS AFTER LATITUDE® ELBOW ARTHROPLASTY - EVALUATION OF ELBOW FUNCTION WITH A ASSESSMENT SET

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The Latitude Total Elbow is the first 3rd generation elbow prosthesis, provides a high modularity of its components, features a true anatomical joint reconstruction and is adaptable to a wide range of indications. We assessed mid-term results of the Latitude prosthesis using a comprehensive assessment set for the evaluation of subjective elbow function and objective clinical findings. 52 patients were treated with elbow arthroplasty due to rheumatoid or posttraumatic arthritis since 2005. We underwent a retrospective joint assessment for the subjective and objective evaluation using the following scores: SF-36, DASH, PREE, ASES-e. The mean follow up time was 3.6 years. In the SF-36 score, the mean physical component scale (PCS) was worse the mean mental component scale (MCS) better than normative values of a German population. Whereas the pain level dropped down to normal, functional deficits remains: PREE 67.9, ASES-e 67.1, DASH 57.5 points. Clinical examination resulted in a mean ASES-e score of 75.6 points. The grip strength measured 17.2 kg, the ROM (flexion/extension) 116.2 degree on average. 87% of the patients were completely satisfied with the operation result, 89% would undergo the procedure again. Assessment of mid-term results after elbow arthroplasty yielded good clinical and subjective results. Despite the functional deficits patient satisfaction was high and quality of life could be regained significantly. The absence of major complications such as loosening or instability indicates for the accuracy of the implant, restoring the natural kinematics and function of the elbow joint.