EVOLUTION OF PATELLAR CLUNK IN ROTATING PLATFORM TKA: A FOLLOW-UP REPORT

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Purpose:
We previously reported that a rotating platform tibial component in TKA does not increase the risk of Patellar Clunk. In a consecutive series of 659 primary TKAs using the identical posterior stabilized femoral component (PFC Sigma Total Knee System, DePuy, Warsaw, IN, USA), the incidence of Patellar Clunk was 1.8% (6/329) with a fixed bearing and 3% (10/330) with a rotating platform tibial component. (p=NS) We have continued to follow prospectively the evolution of the Patellar Clunk in these patients and in all TKAs.

Methods:
The original cohort from 12/98 through 6/06 was extended to 6/07. 785 Primary TKAs were implanted with 329 fixed bearing and 456 rotating platform tibial components.

Results:
The incidence of Patellar Clunk is now 2% (7/329) with a fixed bearing and 3.5% (16/456) with a rotating platform tibial component. (p=NS) A single arthroscopy was sufficient to eliminate the problem in fixed bearing knees. However, in the rotating platform group, 5 patients required additional surgery: 2 patients required one additional arthroscopy, 2 patients an open debridement, and 1 patient an additional arthroscopy and an open debridement.

Conclusions:
While the actual incidence of Patellar Clunk may not be increased by a rotating platform tibial component, the lesion appears more resistant to treatment. The self-aligning property of the rotating platform may improve patellar tracking and cause the extensor mechanism to seat deeper in the trochlear groove. This may predispose to recurrence of or increased symptoms from the Patellar Clunk lesion.
2.

UNICONDYLAR KNEE REPLACEMENT USING OXFORD PROSTHESIS
Short term and mid term results

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Background:
The Oxford unicompartmental knee arthroplasty (Biomet Ltd, Bridgent, UK) is a mobile bearing prosthesis, which showed good clinical results for unicondylar knee osteoarthritis in recent studies.
The aim of this study is to present our experience with the Oxford prosthesis and evaluate the correlation between the clinical and the radiological results.

Methods:
59 patients (59 knees) underwent medial UKA during 2003-2006. The patients were interviewed, examined and had standing AP+LAT X-rays. The patients answered a WOMAC questionnaire an International Knee Society Score was evaluated.

Results:
6 knees were converted to TKR. 41 patients (30 females, 12 males) completed evaluation of WOMAC score, IKS and X-rays. Average International Knee Score (IKS) was 163 and WOMAC score was 31. Male patients had better functional outcomes. Patients with AVN had worse outcomes comparing to those with osteoarthritis. The only radiological parameter that proved to be statistical significant is the deviation from the normal mechanical axis. The sagital positioning of the implant had no significance on functional outcomes.

Conclusion:
UKA using OXFORD prosthesis is a technically demanding procedure that may be a good solution for the relatively young patient with osteoarthritis. It is critical to achieve a mechanical axis, as close to zero as possible. The sagital angels are less important than the coronal.
3.

SINGLE TUNNEL ARTHROSCOPIC ASSISTED PCL RECONSTRUCTION – NOVEL FEMORAL GRAFT FIXATION – TWO YEARS FOLLOW-UP

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Objectives:
1. To describe surgical technique for Femoral graft fixation during Single Tunnel Arthroscopic assisted posterior cruciate ligament (PCL) reconstruction.
2. To report on early results of 21 patients treated with that technique.

Background:
Arthroscopic assisted PCL reconstruction is a highly demanding technical operation. Any shortcut in the operative steps may reduce the operative time, avoid complications and make the surgeon life easier. The femoral canal imposes several hazards: killing angle, fracture of the medial femoral condyle (MFC), imprecise site at the PCL femoral footprint.

Design/Methods:
From 2004 to 2007, 21 endoscopic single tunnel PCL reconstructions using either autogenous Hamstring tendons or allograft Achilles were performed using this technique. An Anterior cruciate ligament (ACL) reconstruction drill system (DePuy Mitek RIGIDFIX Cross Pin System) has been modified to allow retrograde femoral drilling starting from inside the notch. The operation is begun with arthroscopy to asses the cruciate ligaments and treat any meniscial and articular cartilage lesions using infero-lateral, infero-medial and postero-medial portals. Torn PCL is debribed from the tibial insertion site, however, intact PCL bundles (usually the postero-medial bundle) are left in place. Tibial tunnel is drilled using a predetermined length jig, 10-12 mm below the intercondylar eminence level under arthroscopic view. The femoral PCL insertion site is marked with a radiofrequency probe at the notch border of the cartilage of the MFC. The MFC is drilled from the notch to the Medial Femoral cortex. Drill diameter is according to graft size. Care is taken to avoid injury to the lateral Femoral condyle. The RIGIDFIX Cross Pin jig is inserted through the infero-lateral portal. Two cross pin sleeves are drilled into the MFC in antero-posterior direction, medial to the Patella in order to avoid damage to weight bearing surface. Several #5 Ethibond threads are passed through the tunnels to smoothen the killing angles ( Tibial and Femoral) and assure clearance from any soft tissue that might interfere with graft passage. The graft is inserted from the Tibial tunnel into the joint and into the Femoral tunnel. Tibial fixation is done first with absorbable interference screw. Femoral fixation is done next with absorbable cross pins in 90 degrees flexion and anterior drawer manoeuvre. Mean follow up period was 2 years (3 months -40 months, median 24 months).

Results:
The knees were assessed before and after surgery with physical examination, Lisholm knee ligament rating scale and stress radiography. In 5 cases additional posterolateral reconstruction was performed. ACL reconstruction was performed in three cases of knee dislocation (one acute case). The Medial Collateral Ligament (MCL) was reconstructed in three cases. Two cases were revision reconstruction. Immediate fixation was achieved in all knees. At last follow up examination the posterior drawer has improved from ++ to normal in 18 cases, ++ to + in one case and remained ++ in two case (revision case, multi ligamentary reconstruction). Subjective scales improved in 18 patients. There were no complications.

Discussion:
Our early results are comparable to other fixation methods and even better . This technique is beneficial in terms of facility of execution and decreased operative time. The order of fixation (Tibial first and then Femoral fixation) may play a role in achieving graft tension.
4.

SECOND GENERATION ACI WITH BioCart™II: TREATMENT OF FEMORAL LESIONS. SHORT TERM RESULTS


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Purpose:
Clinical evaluation of a novel autologous chondrocyte implant, BioCart™II for cartilage repair.

Materials and Methods:
BioCart™II is a matrix-assisted, fibrin hyaluronic acid-based implant containing autologous chondrocytes propagated with a unique growth factor variant to maintain their chondrogenic potential. The scaffold is a porous open channel structure enabling a three dimensional distribution of the cells and full thickness repair.

Nine patients aged 17-50, with cartilage lesions diagnosed by MRI underwent arthroscopy and biopsy from the antero-lateral margin of the intercondylar notch. Two to three weeks later, BioCart™II was implanted through a small 4-5 cm longitudinal parapatellar incision. Deep lesions were treated with two layers. Rehabilitation included 4-6 weeks of non-weight bearing and CPM, followed by 3 weeks of partial weight. Full activities were resumed at 4-6 months and follow-up was 3-22 months.

Results:
At diagnosis all patients scored under 4 points in the subjective ICRS questionnaire improving to over 6 post operation. The IKDC score for all patients improved from grades C and D before the operation to A or B post operation. Second look arthroscopy and biopsy on one patient due to pain and sensation of catching, showed excellent coverage, full integration and new hyaline-type cartilage. Six months post operative MRI on 6 patients showed good integration of the graft with signs of bone edema at the implantation site.

Conclusions:
BioCart™II is safe, effective and user-friendly both for the patient and the surgeon. The short time from biopsy to implantation and good to excellent clinical outcome further encourage the continued use of this technique and product.
5.

EFFICACY OF LOCAL ANALGESIA FOLLOWING ACL RECONSTRUCTION: A DOUBLE BLIND RANDOMIZED PROSPECTIVE STUDY

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Introduction:
Effective continuous post surgical pain control is essential in the initiation of a successful rehabilitation program following ACL reconstruction. The advantages of local analgesia include fewer side effects, improved patient compliance, and better cost effectiveness.

Patients and Methods:
In a double blind randomized prospective study, 51 individuals undergoing primary ACL reconstruction were divided into two matched groups: 23 in the treatment group A, and 28 in the control group B. Immediately after surgery and for the following 48 hour period, the surgical wound was infiltrated with a continuous infusion of 0.25% Bupivacaine in group A, and 0.9% NaCl in group B, via an 18 G catheter inserted in the operative wound prior to skin closure. V.A.S. score, knee range of motion, and morphine consumption data were studied over the 48 hour period, and evaluated using the 2-tailed t-test.

Results:
No statistical significant differences were found between the two groups regarding the examined parameters except of the morphine consumption during the first 4 hours following surgery. During this period the PCA morphine consumption was significantly lower in the treatment group.

Conclusion:
This study concluded that local anaesthesia may be important in reducing immediate post operative morphine consumption, but is ineffective as a method of longer term pain control after ACL reconstructive surgery.
ELECTRONIC MEDICAL RECORDS (EMR) IN ARTHROSCOPIC SURGERY: A NEW ERA IN EBM ORTHOPAEDIC PRACTICE – THE HADASSAH EXPERIENCE

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Current data reporting in Arthroscopic surgery involves writing on an open template and image recording. The disadvantages of this method include lack of consistency in reporting, lack of association with internationally recognized scoring systems, lack of integration between visual imaging data and surgical reporting. In addition, association between outpatient records and the operative report is impossible.

Commercially available orthopaedic software utilizes open templates for medical recording, including operative and operative reports. These open templates are not based upon internationally recognized scoring systems, like IKDC, KOOS, SF 36, etc. This prevents consistency in data collection due to inter and intra observer differences. Moreover, existing software utilize open templates, because they are orientated to commercial and insurance coding, like ICD 9, CPT, E&M, etc, not for medical data base.

Evidence Based Medicine EBM requires consistency in acquisition of medical information, preferably based on internationally accepted scoring systems, and not on open personal templates. Without a reliable and distinctly defined Date Base, it is impossible to compare clinical findings, diagnoses, and treatment outcome, or to retrieve data in the future.

The Arthroscopy and Sport Injury Unit at Hadassah Mt Scopus, in collaboration with Vision Inc., has developed a unique Application Service Provider (ASP) which is a web-based platform that stores EMR and electronic patient medical records including visual images. This system records Data Elements with distinct word or numerical values based on the IKDC system, that are stored in a database. It enables simultaneous Web Access to EMR from outpatient clinic, OR, and Hospital Department sources, as well as full digital imaging incorporation. The system integrates with Practice Management Systems for demographic and billing issues.

The fact that our system applies a homogeneous data base, enables creation of consistent or ad hoc reports based on various specific Data Elements. Each report could isolate data such as specific diagnosis, treatment modality, and compare pre, intra and post operative data elements.
The reports can be exported as Excel files for further statistical analysis and research.
7.

HIALURONIC-ACID [VISCOSEAL®] versus SALINE FOLLOWING ARTHROSCOPY OF THE KNEE
A Prospective, Randomized, Single-Blind, Controlled Study

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Patients undergoing knee arthroscopy, frequently encounter pain, swelling, and impaired function in the immediate and middle postoperative period. Current practice involves lavage of the normal hyper-viscous synovial fluid, as an integral part of the procedure, leaving Normal Saline as the only lubricating fluid of the joint in the early postoperative phase, to be replaced later on by the new naturally formed synovial fluid.

55 young patients (age ranged 18-40) undergoing knee arthroscopy, for meniscus tear, without significant chondral lesions or additional ACL tear, were picked randomly to receive Viscoseal®. At the end of the procedure, the control group (N=27) was treated with Normal Saline and the study group (N=28) was treated with 10ml of Viscoseal®. Pain was evaluated according to the VAS as well as the consumption of escape medication. NSAIDS were avoided. Joint circumference was measured. Joint function was evaluated according to KOOS score. Parameters were recorded before surgery and at a selected day, 1 week, 1 month, and 3 months post op. Results: Statistically significant (p=0.003) improvement in pain was noted in the study group in the first postoperative week (data was analyzed using ANOVA with repeated measurements).

Conclusions:
This study shows that early replacement of lubricating fluid with hyper-viscous solution, Viscoseal®, is beneficial in the early postoperative period. Pain was significantly reduced. As expected, the benefits were mostly significant in the first postoperative week.
OPENING WEDGE OSTEOTOMY AROUND THE KNEE.  
Preoperative Arthroscopy and Operative Technique to Decrease Complications and Promote Early Union and Function

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Objective:
The purpose of this study was: 1) to evaluate whether a preoperative arthroscopy influences the decision of the surgeon to proceed with osteotomies around the knee and to treat intra-articular pathology combined with the osteotomy to improve operative results. 2) To evaluate the operative technique using internal fixation with allograft iliac crest bone graft and bone substitute wedge, to provide a reliable strong and reproducible results for High Tibial Osteotomy [H.T.O.] and Distal Femoral Osteotomy [D.F.O.].

Methods:
The operative and post-operative technique will be described in details.
A total of 22 consecutive patients, age 18-62 years, who underwent H.T.O. (26 knees, 4 patients had bilateral osteotomies), were observed at a mean of 31 months post operatively.
A total of 6 patients, age 24-57 years, (7 knees one bilateral). D.F.O. was observed at a mean of 34 months. The osteotomy opening size ranged from 10-15 mm in the Tibia and 10-12.5 mm in the Femur. Two cases of H.T.O. were combined with P.C.L. or A.C.L. reconstruction. Another case was a revision 23 years after close wedge osteotomy.

Results:
Five patients that were scheduled for osteotomy, the arthroscopy before surgery showed chondral lesions in two compartments grade III-IV, therefore the osteotomy was not performed. In 6 cases meniscal lesions were found and surgical arthroscopy was performed just before the osteotomy. The osteotomy united in all patients. In average it took 7 weeks for union in the Tibia and 12 weeks in the Femur. There were no infections, nerve or arterial injuries. One patient complained on having pain. He had TKR 18 months after surgery.

Conclusions:
Arthroscopy before performing osteotomy contributes to the success of osteotomies around the knee. The operative technique that includes bone substitute and iliac crest allograft with a progressive rehabilitation program successfully prevented non-union and knee arthrofibrosis.
9.

SURGICAL TREATMENT OF OSGOOD-SCHLATTER DISEASE IN YOUNG ADULTS

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Introduction:
Osgood-Schlatter disease (OSD) is a well-known condition, characterized by swelling over the tibia tubercle with subsequent pain in young adulthood. Treatment is symptomatic. Mostly, symptoms resolve after physeal closure. Rarely patients need surgical intervention. There are relatively few reports in the literature about surgical treatment of OSD. We report our experience in patients with OSD refractory to conservative treatment, with clinically evident of free mobile ossicle and with radiological confirmation.

Patients and Methods:
From January 2000 to May 2006 we treated surgically 22 patients, 21 males and one female. Patients had documented history of OSD for an average period of 3.5 years prior to surgery. The average age at surgery was 19 years. The average follow up period was 38 month. All were treated in the acute phase by conservative protocol that included 3 weeks of complete activity restriction, course of topical and oral NSAID and infra-Patellar braces. Inclusion criteria were: age, over 16 years, painful bursitis over the tibia tubercle after failure of conservative treatment of 3 month and radiological evidence of osseous fragment anterior to the tibia tubercle with closure of growth plate.

Results:
All, patients but two underwent day care surgery. All patients returned to previous physical activity within 12 weeks following surgery. All, but one were pain free during kneeling or direct pressure over the knee joint. One patient complained on pain during kneeling and physical activity. Three patients had numbness over the incision, and one patient developed a keloid scar. 18 patients reported subjective satisfaction with the surgery. One patient with keloid scar was partially satisfied, and one patient with residual pain over the tubercle reported dissatisfaction from the operation. This patient was the only one operated due to persistent pain despite conservative treatment and without clear visualization of separated osseous fragment. Sixteen patients had clinically evident "mobile ossicle"(feeling of mobility after firm grasping and sliding of the tip of the tuberosity).

Conclusions:
We describe results of treatment in 20 young adult patients with known OSD treated by simple excision of mobile ossicles. All our patients suffered from pain with kneeling and direct pressure over the ossicles. All patients were at skeletal maturity according to their physis appearance. Sixteen patients had clinically mobile ossicle and all patients showed clear separation of the ossicles from the tibia tubercle. We believe that the key factors for successful surgical treatment are clear visualization of separation of the ossicle from the bony bed on the lateral knee x-ray view and clinical mobility positive test (firm grasping of the prominent part of the tubercle and sliding movement of it). The results are uniformly good, the only one failure related to mistaken inclusion criteria, were the lateral x-ray did not show clear ossicle separation.
10.

FIXATOR-ASSISTED NAILING IN METAPHYSEAL FRACTURES OF THE TIBIA

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Introduction:
Proximal and distal metaphyseal fractures of the tibia can be difficult to nail using conventional technique (traction table or universal distractor and Schanz pins). Pitfalls include loss of fixation, valgus malalignment, AP translation in proximal fractures, frontal and sagittal malalignment in distal fractures. Aim of the study was to improve the technique of closed interlocking nailing in fractures of the proximal and distal tibia introducing a circular external fixator.

Material and Methods:
Over a 3 year period, 33 proximal and 27 distal tibia fractures and nonunions were treated with closed interlocked nailing. Reduction was provided by a distractor consisted of a half-ring proximally and a ring distally, connected with 3 telescopic rods, with a support for controllable knee flexion. Solid titanium nails (diameter 9-12 mm) were used in all cases with minimal reaming. To prevent valgus and apex anterior angulation in proximal fractures two approaches were introduced: 1) insertion of 2 frontal wires into the short fragment to gain spatial control regardless knee flexion, 2) K-wires instead of Poller screws to prevent too posterior and lateral nail position. In distal fractures the Poller K-wires also were used to prevent frontal and sagittal plane malalignment.

Results:
Only 4/33 proximal and 3/27 distal fractures had angulation of 5 degrees or greater in the frontal or sagittal plane. In 2/33 proximal and 2/27 distal cases there was partial loss of fixation caused by. All of them occurred at the initial period of the study while the technique of reduction was being refined. In 2/33 cases of proximal fractures healing was reached after exchange nailing. Deep infection occurred in two cases of nailing in nonunions (1 failed plate and 1 after external fixation). In both cases the short fragment was fixed with two locking screws only.

Discussion and Conclusion:
The presented technique of reduction provides reliable control of the fragment position. It provides satisfactory reduction before, and maintains it during low invasive nail insertion in knee hyperflexion. It makes unnecessary many common tricks like lateral point of insertion, knee semi-extension, extended incision, Poller screws, buttress plating, reduction clamps, plating of the fibula. Fixator-assisted nailing in combination Poller K-wires is a simple, reproducible and readily available solution for nailing in problematic fractures of the tibia.
11.

SHORT TROCHANTERIC ANTEGRADE NAIL (T.A.N.) – A NEW SOLUTION FOR DISPLACED SUBCAPITAL FRACTURES OF THE FEMUR

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Purpose:
Describe our experience with our new approach for treating displaced subcapital femoral fractures in our active patients.

Materials and Methods:
From August 2005 till September 2007, 62 active patients were treated with displaced Subcapital Femoral fracture by close reduction and internal fixation with Short Trochanteric Antegrade Nail (T.A.N.) (Smith&Nephew). Mean age 73 (range 26-93), Partial weight bearing began 0-4 weeks P.O. and Full Weight Bearing 4-8 weeks P.O. Patients were evaluated at 1,2,6,12&24 months after the operation.

Results:
All patients returned to walk on their feet. The patients were scored by modified lower extremity questionnaire with mean results 4.3 (scale of 1-5, 1-poor, 5-excellent). There were no cases of implant failure. No cases of infections. Two patients had a cut-out of the implant. There were no cases of avascular necrosis.

Conclusions:
Our complications rate for displaced subcapital fractures treated by C.R.I.F. were lower than that reported for the alternative treatment modality. Our findings show that these fractures can be treated with a high rate of success by closed reduction and internal fixation with an intramedullary biaxial fixation in all age groups. With this simple and minimally invasive operation and the nail’s biaxial angular stability, we can achieve stable fixation. This procedure offers several advantages over hemiarthroplasty, by lowering the risk of immediate complications such as prolonged anesthesia, bleeding, infection, periprosthetic fractures and dislocations. Furthermore, the use of the short TAN preserves the femoral head and the normal anatomy in active patients in order to avoid the late complications of hemiarthroplasty.
HYBRID EXTERNAL FIXATION CONFIGURATION FOR TREATMENT OF SEVERELY INJURED LIMBS

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Introduction:
The treatment of high-energy injuries often necessitates the use of different systems of external fixators. The hybrid external fixation frame combines the advantages of each system by minimally invasive fixation technique.

Material and Methods:
Dozen patients suffered from complex high-energy fractures were treated with stabilization in different modular hybrid external fixation frames severe trauma to limbs we have used several simple methods for joining between different external fixation systems using only parts from standard sets. Thus simplifying and shortening the operation procedure, eliminating the need for additional transitional blocks. Usually we use combinations between AO tubular fixator and Ilizarov circular frame. Certain components of other fixators and also standard hybrid frames were also included in treatment of some patients. We propose simple, universal intersystem connections between various components from standard sets of external fixators such as tubular, circular (Ilizarov) or hybrid systems. We emphasize the use only standard units of the available different external fixation systems. Each external fixation frame is tailored to concrete surgical problem and anatomical place.

Results:
The hybrid frames were minimally invasive, reducing further tissue damage, providing three-plane stabilization of the fractures, allowing early mobilization. In all patients the modular hybrid external fixation was the definitive treatment option. No one of those patients needed conversion to internal or other kind external fixation. All fractures healed, no osteomyelitis developed, and no other major complications were noticed. The described techniques are simple, cost efficient, and have been extensively tested under clinical conditions.

Conclusion:
The hybrid frame combined advantages of both unilateral and circular external fixation systems, and may provide a good solution achieve good results using of the advantages of each system with larger possibilities to resolve problems facing unusual cases in orthopaedic trauma. This allows building such universal adaptable and stabile modular fixation frame as in maximal extent suitable to each clinical case.
13.

COMPARATIVE, MULTI-CENTER STUDY EVALUATING THE TREATMENT OUTCOME OF HIGH-ENERGY FEMORAL FRACTURES AS A MEASURE OF THE EFFECTIVENESS OF THE ORTHOPAEDIC TRAUMA SYSTEM IN ISRAEL

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Background:
In 1992 a nationwide trauma system had been established in Israel. Six hospitals were designated as level I trauma centers (LITC) and 18 as regional trauma centers (RCT). The goal of our study was to compare the treatment of trauma victims suffering from high energy femoral shaft fractures (HEFST) in LITC and RTC. We hypothesized that treatment of these fractures would prove better in the LITCs.

Methods:
Between 2004-2005 eleven trauma centers (5 LITCs, 6 RTCs) participated in a comparative, prospective multi-center study. Patients whose ages were between 18 and 65 years, and suffered from HEFST were eligible for inclusion. Data was collected during hospitalization, and at 6 weeks and 6 months following it. Statistical analysis was done using tables and the $\chi^2$ test for categorical variables, mean ± sd and t-test for continuous variables. OR and CI were derived from logistic regression for categorical dependent variables.

Results:
125 patients were treated at LITCs and 113 at RTCs. No significant difference was found in regards to fracture severity (AO-32-B or C 44% in LIRCs and 53% in RTCs) and ISS score (>25=27% in LITCs and 19% in RTCs). There were no statistically significant differences regarding: complications (29.4% at LITC; 26.7% at RTC), length of stay (LITC 16.5±18.1; RTC 17.1±26.0), and Majeed function score after 6 months (LITC 60.7±18.6; RTC 63.2±16.6).

Discussion:
In spite of the special investment LITCs had no advantage over RTCs in the treatment of HEFST. Such investigations should be conducted in other disciplines to evaluate their function.
Purpose:
1. Consider the most suitable treatment of non-united fractures and pseudoarthrosis of the tibial shaft.
2. Consider the most suitable treatment in cases of the tibial bone defect.

Materials and methods:
From 2004 till 2006 the clinical material of the Hospital of Traumatology and Orthopaedics and 34 patients with non-united fractures and pseudoarthrosis of the tibial shaft were examined.
The average posttraumatic time before treatment was from 2 till 48 months.
Examined patients were 16 to 72 years old, 26 male, 8 female.
19 examined cases included open fractures.
Before hospitalization in our hospital patients were treated in other hospitals using external fixators-13 cases, UTN-7 cases, osteosynthesis with plate-8 cases and conservative treatment-6 cases. 4 patients had evolved bone defects.

Results:
The methods of treatment in cases of non-union and pseudoarthrosis of the tibial shaft in our hospital were the following:
- UTN -23 cases;
- osteosynthesis with plate - 7 cases;
- external fixator - 4 cases.
Out of 34 cases with tibial non-union and pseudoarthrosis in 8 cases bone grafting operation was performed, but in 4 cases bone transport was used.

Conclusions:
1. In the treatment of non-united fractures and pseudoarthrosis of the tibial shaft most common method was osteosynthesis with UTN.
2. In cases of the tibial bone defect as the most suitable treatment must be considered osteosynthesis with ring system external fixator.
3. Tibial shaft fractures remain the risk of the serious bone consolidation complications, which need use of complicated surgical techniques.
15.

ANTERIOR KNEE PAIN FOLLOWING A MODIFIED LATERAL PARAPATELLAR APPROACH FOR TIBIAL NAILING

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Purpose:
Anterior knee pain after intramedullary nailing of tibial shaft fractures is a common clinical problem which may occur in up to 70% of cases. Various surgical approaches, nail positions, injury to intraarticular structures, and inadequate rehabilitation have been implicated as possible etiological factors. We have used a lateral parapatellar approach with meticulous atraumatic elevation of the retropatellar fat pad to expose the starting point. Our hypothesis was that this approach leads to a lower incidence of knee pain than has been reported previously.

Methods:
A consecutive series of tibial fractures that were treated by a single surgeon between February 2003 and August 2007 were retrospectively analyzed. All fractures were treated with reamed intramedullary nailing using the fat pad elevation technique. Eighty-four patients were identified, 47 of which were available for inclusion. Chart review was performed to determine complaints of knee pain and range of motion, and Lysholm knee scores were collected prospectively. Average follow-up was 13 months (range, 6-26 months).

Results:
Six patients (12.7%) had subjective anterior knee pain when directly questioned. Thirty-six (76.5%) of the patients had excellent knee range of motion (130° of flexion or more), and 8 patients (17.0%) had good knee range of motion (90 to 130°). Mean Lysholm score was 86.1 (SD, 12.9; range, 55 to 100). Seven patients (15.9%) had discomfort with kneeling.

Conclusion and Significance:
The modified lateral parapatellar approach for tibial nailing, although it does not eliminate knee pain altogether, has the potential to significantly reduce anterior knee pain after intramedullary nailing of the tibial shaft. This may be due to avoidance of injury to the retropatellar fat pad.
TREATMENT BY ILIZAROV EXTERNAL FIXATOR FOR FRACTURES OF THE DISTAL END OF THE HUMERUS IN ELDERLY PATIENTS

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Background:
The goal of distal humerus fracture treatment is articular surface repositioning and a stable fixation for early mobilization. This can usually done by open reduction and internal fixation with plates. In the elderly, osteoporotic patient this method of treatment is difficult to achieve and carries poor functional outcome. Many authors have tried to address this problem, and suggested alternative methods of treatment, ranging from nonoperative treatment with temporary immobilization to primary total elbow arthroplasty. In this article we present our experience with treatment by closed reduction and external fixation with Ilizarov device.

Patients and Methods:
10 females, Age 70-89 (average - 78.4). Fracture types (AO/ASIF): 3 supracondylar fractures (type A), 7 supraintercondylar fractures (type C). One patient presented with radial palsy, one with minor head injury and one with a Colles fracture. All patients were treated by closed reduction and external fixation with Ilizarov device of the distal humerus only, immediate postoperative mobilization of the elbow. External fixation time 62 to 90 days, average 72 days.

Results:
All fractures united in our patients. Average range of movement at six months postoperative was 15° to 120°. Complications included one patient with radial palsy post operatively which resolved 3 months after operation and one patient with a superficial decubitus ulcer on the chest wall from the hardware. All patients had low grade pin tract infections which responded to local and systemic measures.

Conclusion:
Minimally invasive, functional treatment by closed reduction and Ilizarov external fixation is effective for treatment of comminuted fractures of the distal humerus in elderly patients with osteoporotic bone. This treatment enables immediate mobilization of the elbow, and allows return of patient to function of ADL. It should be considered an alternative to ORIF or Total elbow replacement (TEA).
WHAT'S NEW IN OPEN FRACTURE MANAGEMENT

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Open fracture management represents an Orthopaedic Emergency. The annual incidence rate of open fractures of long bones has been estimated to 11.5 per 100,000 persons. Severe open fractures of long bones of the lower extremities have been associated with substantial complications such as infection, knee stiffness, malunion, loss of fixation, soft-tissue failure, and amputations. Close collaboration of orthopaedic and plastic surgery teams, within the same trauma unit has resulted in salvaging even the most severe types of this spectrum of injuries.

Debridement and wash-out of the wound, followed by stabilization of the bony elements and closure of the soft-tissue envelope are all considered essential. Early aggressive management of these debilitating injuries within the first 6h has been encouraged in order to minimize the risk of infection and long term sequelae. However, the available scientific evidence supporting the timing of this multistage approach of open fracture management, and the “Six-hour rule” itself, are unclear.

Irrigation has always been and will remain a key step in the initial management of open fractures. Latest gathered evidence suggests that normal saline should be used routinely for the irrigation of fractures. The use of antibiotics and antiseptics as additives should be limited because of inconclusive evidence and potential risks. Low-pressure irrigation methods should be used routinely. Surgeons who continue to use high-pressure pulsed lavage systems should limit the pressure to 50 psi.

The early closure of open fractures grade I, II, IIIa is recommended with the obvious exception of wounds grossly contaminated. Grade IIIb and IIIc injuries should be managed by specialist teams and the wound should be closed at the earliest possible time. Early administration of growth factors (BMP’s) appears to enhance the fracture healing response and to minimize the risk of non-union.

In general terms the latest advances made particularly in the fields of bone fixation and soft tissue reconstruction, have improved the overall outcome of these severe injuries.
THE ANTERIOR TRUNK OF THE AXILLARY NERVE: SURGICAL ANATOMY AND GUIDELINES. A FRESH, YOUNG, CADAVERS STUDY

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Background:
Injury to the axillary nerve has devastating results. Variations in the distance between the acromial edge and axillary nerve range from 20-70 mm. Clear guidelines for estimating the location of the axillary nerve along the deltoid muscle are needed. The purpose of this study was to anatomically analyze the relations between the anterior trunk of the axillary nerve and the acromion in order to provide guidelines for minimizing intraoperative iatrogenic neural injury.

Methods:
The distances between the axillary nerve and the posterolateral, midlateral, and anterolateral edges of the acromion were measured in 60 cadaveric shoulders (30 fresh cadavers). The correlations between these measurements to the weight, height and sex of the cadavers were statistically analyzed.

Results:
The distances between the axillary nerve and all three acromial anatomic landmarks significantly correlated with the cadaver’s height (p<0.001) The axillary nerve was found as close as 30-35 mm distal to the acromion in cadavers shorter than 170 cm, (5.7”), whereas the minimal distance between the acromion and axillary nerve was 45-49 mm in cadavers taller than 170 cm.

Conclusions:
We recommend using the height of the patients as an index for determining the relations between the axillary nerve and the acromion. We defined a general safety zone for patients shorter and those taller than 170 cm. We believe that using these guidelines can minimize iatrogenic injuries to the axillary nerve better than the commonly used 5-cm safety zone when performing a deltoid split.

Clinical Relevance:
This study quantifies the relative risk of injury to the axillary nerve during shoulder surgery based on the patient’s height and provides guidelines to assist surgeons in avoiding such injury.
THE ROLE OF MSM IN KNEE OSTEOARTHRITIS
A Double Blind, Randomized, Prospective Study

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Osteoarthritis (OA) is among the most common causes of disability in the elderly. Since the recent publications illustrating the lethal adverse affects of cox-2 selective anti-inflammatory drugs, there has emerged a need for safe long term treatment in OA. As a result, patients have begun using dietary supplements sold OTC. These include glucoseamine, chondroitine sulfate and methylsulfonylmethane (MSM). MSM is a natural substance produced in our body that has analgesic and anti-inflammatory properties. There is lack of research on the efficacy of MSM in treating knee OA. The aim of the study was to determine the efficacy of MSM in treating knee OA patients.

Methods:
This study is a prospective, randomized, double-blinded, controlled study. 60 men and women, 45-90 (68 ±7.3) years of age with knee OA graded 1-4 (3 ±1) according to Kellgren & Lawrence, were enrolled in the study and randomly assigned into 2 groups: One receiving MSM in doses of 1.125 milligrams 3 times daily, and the other receiving a placebo. Patients were assessed at baseline, 6, and 12 weeks. During their appointments, the patients were asked to fill out questioners on their pain and physical function: SF-36, WOMAC, KFS, and KSS. The patients physical function was also assessed using Aggregated Locomotor Function (ALF).

Results:
There were significant improvements in pain, stiffness, and physical function in the experimental group according to both the WOMAC questioner (p-value=0.009) and the SF36 questioner (p-value=0.031). No significant differences between the groups were found using the KSS and KFS questioners. A seven second improvement in the total time measured (ALF) was also found in the study group, while no such improvement was seen in the placebo group (p-value=0.009). No adverse effects were recorded.

Conclusions:
The findings demonstrate that methylsulfonylmethane (MSM) is effective and significantly improve function and reduce pain in knee OA patients.
ENDOTHELIAL PROGENITOR CELLS HEAL CRITICAL-SIZED BONE DEFECTS

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In this study we developed a novel cell therapy method for promoting repair of large bone defects. Our model tested the healing potential of circulating autologous endothelial progenitor cells (EPC) in a critical-sized bone defect created in sheep tibia. Peripheral mononuclear fraction was isolated using Lymphoprep™ (Axis-Shield, Oslo, Norway), seeded on fibronectin-coated plates and cultured in EBM-2 media supplemented with EGM-2MV SingleQuote (Clonetics, Cambrex Bio Science, MD, USA). The endothelial nature of adherent colonies was identified by incorporation of Dil-acetylated LDL (Molecular Probes, Oregon, USA), tube formation on Matrigel (BD Labware, MA, USA) and immunostaining for von Willebrand factor (Dako, Glostrup, Denmark). A defect of 3.2 cm was created in the mid-shaft of sheep tibia, partially preserving the periosteum. Two weeks later, a longitudinal wedge was cut along the regenerating tissue filling the gap, 2x10⁷ EPC were transplanted into the formed tunnel and covered with the removed scar tissue. Sham-operated sheep served as controls. Bone regeneration was followed during the next three months by x-rays radiography every two weeks. At the end of the experiment, the operated fragment bone was removed and subjected to a detailed qualitative and quantitative 3-D evaluation at a resolution of 36 micrometers using a micro computed tomography (µCT) imaging system (µCT 40, Scanco Medical, Bassersdorf, Switzerland). No significant new bone formation was observed radiographically in 4 sham-operated sheep. In contrast, 5 out of six EPC-transplanted sheep showed full bridging at 3 months, starting 2 to 4 weeks post EPC transplantation. Data collected showed an increase of 500% of total tissue volume (TV), 700% of bone volume (BV) in EPC-transplanted gaps vs. sham-operated ones. Material density increased 2-folds both in the entire volume and in the mineralized tissue compartment. We conclude that EPC have a promising potential for healing of large bone defects.
Purpose:
Evaluating the potential of an injected degradable polymer- Poly(sebacic-co-ricinoleic-ester-anhydride) containing gentamicin in the treatment of osteomyelitis.

Material and Methods:
Osteomyelitis of both tibiae was induced in 13 female Fischer rats by injecting a suspension containing approximately $1 \times 10^5$ (CFU)/ml of S. Aureus (SA-RA) into the tibial medullar canal. Injection entree was between tibial plateau and tibial tuberosity. Three weeks later both tibiae were x rayed and then drilled down the medullar canal, washed with 50µl gentamicin solution (80mg/2ml) and then injected with 50µl P(SA-RA) + gentamycin 20% w/v to right tibia and 50µl P(SA-RA) without gentamicin to left tibia. Three weeks later, the rats were sacrificed, the tibiae were x rayed and histopathology evaluation of the tibiae was done in a blinded manner.

Results:
X ray- all the Tibiae developed changes compatible with osteomyelitis in 3 weeks: localized bone resorption, metaphyseal enlargement and periosteal reaction. No change in the x rays after 6 weeks and no difference between treated and untreated tibiae.

Histological evaluation- In several rats, significant differences between right versus left tibiae were noted. Typical changes in the left tibia included the presence of moderate (Grade 3) intramedullary abscess formation. Typical changes in the right tibia of some rats treated included the absence (or minimal grade only) of abscesses. When using a signed-rank test to compare between left and right tibia, P-value was 0.0625 and might be significant with a larger sample.

Conclusion:
Locally injected degradable polymer releasing gentamicin proved to be efficient histologically in treatment of osteomyelitis. 3 weeks of treatment are not sufficient time for radiographic cure. This technique might be an adjunct or alternative for the existing treatments. It may save antibiotic treatment, hospitalization and operative treatment.
Regeneration of mesenchymal mineralized tissues affected by chronic diseases comprises a major scientific and clinical challenge. Periodontitis one such prevalent disease, involves chronic destruction of the mesenchymal tooth-supporting tissues: alveolar bone, periodontal-ligament and cementum, often leading to tooth loss. In 1997 it became clear that in addition to their function in enamel structural organization and mineralization, enamel matrix proteins (EMPs) play a fundamental role in the regeneration of these periodontal tissues. The epithelial enamel matrix extracellular proteins are a heterogeneous mixture of polypeptides encoded by several genes, the amelogenins comprising about 90% of the EMPs. It was not clear, however, which of these many EMPs induces the regeneration and what are the possible mechanisms involved. In this study we showed, for the first time, that a single recombinant amelogenin protein and its degradation products induced \textit{in-vivo} regeneration of all tooth-supporting tissues, after induction of chronic periodontitis in the dog model. Searching for possible mechanisms associated with such regeneration, we established the expression pattern of amelogenin in the cells of normal and regenerating alveolar bone, periodontal ligament, and cementum, in specific bone marrow cells and stromal cells. Amelogenin expression was highest in areas of high bone turnover and activity, in normal and regenerating tissues. Further immunohistochemistry studies using markers for mesenchymal stem cells, RT-PCR and sequencing, combined with the above findings, suggests that amelogenin induces, directly or indirectly, recruitment of mesenchymal stem cells, during regeneration of the tooth supporting tissues.
MOLDING SIGNIFICANTLY AFFECTS THE MECHANICAL PROPERTIES OF PLASTER OF PARIS IN ORTHOPAEDIC USE

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The use of Plaster of Paris (POP) as a means for immobilizing an injured limb is well accepted for centuries. Although new casting materials are used ever more frequently, POP remains the mainstay of fracture care. Our study is aimed at assessing the effects of water temperature and plastering technique on the mechanical properties of POP casts.

120 preformed casts divided into four equal groups were mechanically evaluated using the Instron model 1122 servohydraulic system. Two groups of casts were applied with use of either ice-cold water (aprx.10 °C) - the “Cold” group or use of water heated to as hot a temperature as the clinician setting the cast could tolerate (aprx. 55 °C) - the “Hot” group. Another two groups of casts were applied while in the control group no active molding or amalgamation of the surface of the cast was performed (“No molding” group), whereas in the “Molding” group molding was performed at the cast applying clinicians’ will. These groups were applied using room temperature water.

A statistically significant (p<0.01) difference in all mechanical parameters assessed (modulus of elasticity, maximal stress and load-displacement slope) by the Instron device was found when comparing the “molding” group with that of all the other groups (Control, Hot and Cold). The molded cast group outperformed the other groups by at least 31% in each of the assessed parameters.

Our findings emphasize that proper molding technique with evenly applied pressure along the sheets of gauze and optimal fitting with use of designated padding materials are the makers of an avid cast with superior mechanical properties.
TRAUMATIC PAINFUL HIP IN THE ELDERLY: ULTRASOUND AS A SCREENING TEST FOR OCCULT HIP FRACTURES

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Introduction:
Non-displaced hip fractures may be radiographically occult and require MRI or SPECT bone scintigraphy for accurate diagnosis. Both exams are expensive and are not available in many hospitals. Ultrasound examination is relatively inexpensive and has been shown to be effective in diagnosis of occult ankle fractures. Our objective was to evaluate US examination as a screening tool for occult hip fractures in post traumatic painful hips in the elderly.

Methods:
We prospectively evaluated 21 patients (ages 55-94 yrs), who were admitted for painful hip after sustaining a low energy trauma. Patients’ hip and pelvic x-rays showed no fractures. Following inclusion patients underwent both hip ultrasound examination for signs of bony or soft tissue injury. Following completion of US examination, patients underwent MRI of both hips. Ultrasonographic results were then compared to the MRI findings which served as a reference for the existence of a hip fracture.

Results:
Five hip fractures were diagnosed using the MRI. Ultrasound examination showed pathologic changes in all five hip fractures and screened out correctly 9 of the 16 non-fractured hips.

Discussion:
Occult hip fractures in the elderly should be diagnosed early in order to prevent their conversion to fully displaced fractures. Ultrasound examination has worked well as a screening tool for occult hip fractures. Using the US examination we can potentially clear suspected hips that do not show any pathology and proceed with MRI only to those with pathologic US exam.
A NOVEL TECHNIQUE IN STAGED LOWER EXTREMITY WOUND CLOSURE: IMPLANTATION OF THE V.A.C. DRESSING FOAM WITH DELAYED PRIMARY AND RANDOM PATTERN FLAPS

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Purpose:
The use of Vacuum-Assisted Closure® K.C.I. (VAC) therapy has been shown to be an effective tool in managing complex surgical wounds. We describe a novel technique to manage acute wound breakdown over implanted orthopaedic hardware and vital structures including tendons, joints and bone. We utilized the VAC system in a buried fashion in conjunction with delayed primary or random pattern flaps as part of a staged closure.

Methods:
This retrospective study consisted of 12 consecutive patients, 6 males and 6 females with an average age of 50 years (range 28-91), who developed post operative lower extremity wound breakdown and had either bone, joint, tendon or orthopedic hardware exposed. All patients were treated with a similar staged wound closure protocol involving thorough I & D and a V.A.C dressing foam buried beneath the newly developed skin flaps. The development of skin flaps is initiated at the first operative setting. This was followed by a second look I & D and final closure utilizing either delayed primary or random pattern flap closure.

Results:
The mean length of follow up was 11.7 months (range 2-26). The mean time from initial procedure (first stage) until definitive closure (second stage) as described was 4.6 days (range 3-10). All Twelve patients had an uneventful clinical course after closure was achieved. Each patient underwent 2 operations as part of the 2 stage protocol with 2 requiring additional interim debridements. Each patient also underwent 4 days of topical VAC dressing over the flaps following definite wound closure.

Discussion:
We have utilized VAC technology in a novel application. The VAC is implanted and works directly on the undersurface of the mobilized skin. The known beneficial effects gained by the VAC foam at its interface with the wound bed are realized on the undersurface of newly developed flaps. Theoretically, improvement in capillary perfusion and decreased tissue edema should be expected. This study expands the concept of negative pressure being an effective adjunct therapy in delayed tissue transfer and its ability to enhance tissue survival when challenged with delay techniques.
26.

SYSTEMIC INFLAMMATORY RESPONSE SYNDROME AND MULTIPLE TRAUMA

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Technological advances and shorter rescue times shifted the problem from early and effective resuscitation to treatment of the host response to injury. Nowadays, the clinical problems in the posttraumatic phase are inflicted upon by the inflammatory reaction. Patients are at risk of progressive organ dysfunction from what appears to be an uncontrolled immunologic process.

In recent years, increasing understanding of the pathophysiology of the immunologic events occurring in both traumatic and surgical injury has contributed enormously to the debate surrounding the aetiology of post-traumatic complications. In some respects the response resembles an exaggerated activation of the immune system with the potential to cause cell-mediated damage in remote organs, and in other respects it resembles immunosuppression, which is widely thought to contribute to infection and sepsis after trauma. Multiple alterations in inflammatory and immunologic functions have been demonstrated in clinical and experimental situations within hours of trauma and haemorrhage, suggesting that a cascade of abnormalities that ultimately leads to ARDS and MODS is initiated in the immediate post-injury period. In this pathological process a number of mediators and cellular elements have been implicated to participate.

The development of the Systemic Inflammatory Response Syndrome (SIRS) can be divided in three stages: 1) local immune response, 2) initial systemic immune response, 3) exacerbating systemic inflammation. The main cells involved are polymorphnuclear granulocytes (PMN), monocytes and lymphocytes. They interact and adhere to the endothelium via adhesion molecules like L-selectin and ICAM-1. An overview of the current concepts governing the inflammatory response to injury is presented.
TREATMENT OF INFECTED PSEUDARTHROSIS OF THE FEMUR UTILIZING THE ILIZAROV APPARATUS

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Between 1982 to 1990, 40 patients with infected pseudarthrosis of the femur were treated at the Lecco Hospital. 29 patients have completed treatment and have at least 7 years follow-up status-post frame removal. Of those 29 patients, there were 22 males and 7 females. Median age was 33.1 years (range 15-83 yrs.). The primary injuries included 11 open and 18 closed fractures. 3 primary injuries involved segmental loss of bone in the femur. 10 patients were initially treated with internal plating, 5 with intramedullary nailing, 7 with placement of an external fixator, 2 with skeletal traction and 4 with spica casting. 10 patients had undergone at least one additional attempt at fixation prior to the index procedure. All patients had obvious draining wounds. At the time of the index procedure, 7 non-unions were classified as normo-trophic, 16 as hypo-trophic and 6 as hypo-trophic with significant bone loss, either post-traumatic or iatrogenic.

The index procedure consisted of stabilisation of the pseudarthrosis site with an Ilizarov apparatus. 17 patients had isolated stabilisation of the fracture without the need for bony lengthening (monofocal treatment). 5 of these 17 patients also underwent open débridement of the non-union site with removal of all infected/necrotic bone and soft tissue. 12 patients had a simultaneous corticotomy for lengthening of the femoral shaft (bifocal treatment), or a portion thereof for stabilisation of the pseudarthrosis site (partial transportation). 4 of these patients also underwent open débridement of the pseudarthrosis site. In most cases an isolated bacteria was not cultured. In 5 cases a single bacterial strain was isolated (2 pseudomonas, 2 s. aureus, 1 enterococcus). All patients received a transient (7-10 day) course of broad-spectrum intra-venous antibiotics. Patients did not receive further routine antibiotics. The patients were allowed to weight-bear as tolerated in the frame. In patients under-going lengthening, distraction was begun 5 to 7 days post-operatively.

Results:
Average follow-up for patients evaluated was 69.9 months (24-144 mo.). At final removal of their frame, 28 of 29 patients had healed their non-union site. One frame was discontinued secondary to frame intolerance. This patient subsequently went to a different facility where she underwent intramedullary nailing with intercalary allografting. The wound remained infected and she ultimately came to trans-femoral amputation. 27 of 29 patients had no residual evidence of infection.

22 of 29 patients had the same or better range of motion (ROM) of the involved hip at final follow-up compared to that prior to frame placement. 21 of 29 patients had the same or better ROM of the involved knee at final follow-up.

The time in the Ilizarov frame averaged 8.8 months (4-16 mo.) for patients with monofocal treatment. Patients undergoing bifocal treatment averaged 14.6 months (3-26 mo.) in the apparatus and patients undergoing partial transportation of bone averaged 22 months (5-39 mo.) in the frame. In those patients undergoing lengthening, the length gained averaged 9.7 cm. (5-22 cm.). At final follow-up, 10 patients still had a significant limb length discrepancy averaging 4.4 cm. (2.5-10 cm.).

Overall results were classified as excellent in 18 patients (62%) and good in 9 patients (31%). One patient (3.5%) had a fair result with healing of the pseudarthrosis but persistent infection and one patient (3.5%) had a poor result with persistence of the infected pseudarthrosis for which she underwent amputation following an allograft and IM nailing at an outside facility.
28.

INTRAMEDULLARY LENGTHENING NAIL

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During the last several decades the incidence of proximal femoral fractures has continued to increase. There is no implant presently in existence which completely satisfies all the needs for reliable fixation of all these fractures. While intramedullary nails have become popular to solve this problem, they retain certain limitations.

To overcome the complications associated with intramedullary devices, a new nailing system with a new concept of secure intraoperative fracture-compression and rational stability, an antegrade intertrochanteric nail (Intertan), has been developed. This lecture will describe the design rationale, intraoperative experience, and clinical outcome using this implant.
STABLE DYNAMIC FIXATION OF PERTROCHANTERIC HIP FRACTURES

Treatment Rational

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A steady increase in hip fractures is reported world wide, reaching the extent of an orthopaedic epidemic. About 50% of hip fractures are pertrochanteric fractures. Despite of improved techniques and devices, failure of fixation is still a problem and can reach high proportions. Post operative functional results are rather disappointing. Only 55-60% of patients have been reported to regain independent mobility at one year following surgery. The AAOS (American Academy of Orthopaedic Surgeons) expressed concern because of the inferior functional results. Different approaches have been used to solve this problem, including trochanteric osteotomy techniques, cementing and different types of fixation devices. It became important to look again into the so called “golden standards” of treatment, critically evaluate the anatomical pathology as well as fracture biomechanics and search for better understanding and hence new treatment modalities. On this way the new approach: Stable Dynamic fixation was born and is presented in the following.

A biomechanical study was conducted to evaluate the implementation of the principles of controlled fracture impaction in a new fixation device: PC.C.P (PerCutaneous compression Plating). The biomechanical data revealed the benefit of pertrochanteric fracture fixation based on the controlled fracture impaction principles. The PC.C.P system was found to provide adequate bending stiffness and torsion stability which, with the sliding capability, leads to controlled fracture impaction. Cyclic loading enhanced the performance. It was an important laboratory validation of the approach in which pertrochanteric hip fractures must be post operative stable and must be dynamic in order to achieve a controlled fracture impaction-this was thought to be implemented in fracture plating as well as fracture nailing.

The PC.C.P technique was designed around a series of fundamental principles representing together a new surgical approach to the problems associated with this fracture. The four basic principles of treatment with the Gotfried PC.C.P are: 1. Minimal invasive surgery and no fracture exposure. 2. Different, close fracture reduction using a new device for posterior fracture reduction. 3. Provision of rotational fracture stability with a double fixation parallel telescoping screws. 4. Preventing fracturing the lateral wall and hence avoiding fracture collapse.

Since poor functional outcomes are associated with the treatment of hip fractures in the elderly. A single blind prospective comparison of functional recovery and pain was used to compare the PC.C.P with the golden standard: The DHS (Dynamic Hip Screw). Parameters for evaluation: Functional Recovery Score (FRS), Ambulation: Aids required for ambulation, Pain examination (VAS - Visual Analog Scale); Walking Pain; Night Pain.

Results:

Functional recovery & pain were significantly better in the PCCP patients. The PC.C.P was found to be superior, compared with the current golden standard (DHS), in maximizing the potential for recovery. The PH NAIL (physiological hip nail) was designed to implement the principles of Stable Dynamic fixation in a fracture nailing modality. The PH NAIL implant and surgical method are based on minimally invasive techniques, implementing the controlled fracture impaction principles. The PH nail addresses approximately 60% of the hip fractures by stabilizing pertrochanteric, subtrochanteric, and base of neck fractures. The design technology enables the fixation device to comply with the hip fracture biomechanical environment. Four basic principles are involved in the PH nail: 1. Double axis parallel telescoping fixation: Enhanced rotational stability.2. Elimination of the blocking effect: resulting in controlled fracture impaction. 3. Elimination of the Z effect phenomenon by providing locking mechanism of the barrel to the nail.4. Lateral Wall & Glutei muscle sparing using straight nail design.
31.

SUBTROCHANTERIC SHORTENING OSTEOTOMY THR FOR HIGH-RIDING DDH


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Introduction:
Patients presenting with symptomatic Crowe type 4 DDH pose a great challenge to the orthopedic surgeon when facing a total hip replacement procedure. Frequently, reduction of femoral head into the true acetabulum requires a femoral shortening osteotomy. Fully coated femoral stem anchors both in distal and proximal fragments and enhances the stability in the osteotomy site. We report a short term follow of this procedure.

Methods:
13 patients (16 hips) with Crowe type 4 DDH underwent THR with femoral shortening osteotomy using a fully coated femoral stem. In 7 hips the there was no additional fixation of the osteotomy site, while in 9 hips it was fixed either by plate or by cerclage wires. There were 9 women and 4 men; the average age was 55±12 years. The Modified Harris' Hip Score (M-HHS) was performed before the procedure as part of our prospective arthroplasty database and at the last follow up. Patients’ files were reviewed for complications, hospitalization length and blood transfusions. Mean follow up was 12 months.

Results:
Average hospitalization was 8.75±4 days with 2.8±1 blood packs given in each case. Average preoperative M-HHS was 34±7. On the last follow up, the M-HHS was 60±21. There was no difference in M-HHS between patients with fixation of the osteotomy and those without. There were three complications related to femoral osteotomy; two of them in patients without osteotomy fixation. The third patient had an intraoperative fracture of the proximal fragment fixed with a plate and later had a traumatic dislocation.

Discussion:
Femoral shortening osteotomy using fully coated femoral stem is a relatively safe procedure for this challenging clinical problem. Our short term review of 16 hips significant improvement of pain and functioning. The complications had significant effect on the immediate post operative course but not on the final outcome. It seems wise to fixate the osteotomy site in addition to the femoral stem.
143 CERAMIC ON CERAMIC TOTAL HIP REPLACEMENTS: PRELIMINARY FOLLOW-UP AT AN AVERAGE OF 5 YEARS

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Purpose:
To compare early to medium range results of a ceramic coupling with classical Charnley cemented THA results.

Materials & Methods:
143 total hip ceramic coupling arthroplasties were done in young active patients for a variety of indications starting in 1999. The implants were: stems-Zweymuller porous titanium, rectangular cross-section. The cups were Lima porous titanium shells, cementless HA coated. Liner inserts Biolox Forte cone ceramic “cushioned” within HDPE cone, gas sterilized. Heads were of Biolox Forte 28 mm. The largest group was for O.A. on a background of dysplasia. Follow-up was by radiographs and Harris scores at 6 months to 8 years. 11 patients were lost to follow-up.

Results:
Average Harris score improved from 46 to 89 (132 cases). There were 2 liner insert breakages due to surgical technique failures. 1 early cup loosening in a L.E. patient on steroids and 3 dislocations due to less than optimal orientation of the implants. There were not infections.

Radiographic results:
No clear lines round cups. Gruen zone 1 showed a less than 1 mm clear line in 82 cases at one year follow-up. After this the clear line remained non-progressive. No cup migration. No stem subsidence.

Conclusion:
Clinical results at average 5 years similar to Charnley. Radiographic results much superior: No clear lines at all around the cups and no clear lines progression around the stems indicate that osteolysis loosening in the future is unlikely. Ceramic is unforgiving: orientation of implants must be exact. Cups must be at 35 to 40 degrees inclination to the horizontal. New large heads and new delta ceramic will reduce incidence of dislocations and breakages.
CLINICAL REVIEW OF MALLORY-HEAD FEMORAL COMPONENT IN REVISION TOTAL HIP ARTHROPLASTY: 5 YEAR EXPERIENCE IN THE TEL-AVIV MEDICAL CENTER

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Background:
Calcar replacement femoral stems are one the many options available for revision total hip surgery. We report our experience with the Mallory-Head non-cemented femoral stem in the last 5 years.

Methods:
In the years 2002-2007 we performed more than 100 revision total hip surgeries. The average patient age was 69.7 year (35-94), 11 males and 19 females.
In 30 revision surgeries the Mallory-Head non-cemented femoral stem was used - maximum fill of the diaphysis of the femur, with contact of the collar on part of the proximal aspect of the femoral shaft. The study group available for follow-up consisted of 30 patients (30 hips)*, with an average follow-up time of 3 years. All revision stems were 220-300mm long. The surgical technique included an antrolateral (26) and postrolateral (4) approach + splited of the femur for cemented removal, in many cases bone graft (allo/auto) use to reinforce proximal femur (25/30).

Results:
We had 3 (10%) cases of complications: In one case- cable brake and trochanteric separation, in one case- prosthesis subsidence how was revision in another hospital, in one case-deep infection- treated with two stage reconstruction revision. The rate of survival was 90%. All those patients showed minimal or no subsidence with good integration of bone to upper femoral stem. In none of our patients stress shielding phenomena appeared at the upper femur.

Conclusions:
In our last 5 years experience, the Mallory-Head revision femoral design (proximal calcar-replacement non-cemented with extensive porous coated), achieved reliable fixation and stability. This prosthesis allows great variability by using different size of calcar tailor the need of any patient during surgery. No deterioration was seen in clinical and radiographic follow-up. No stress shielding phenomena in upper femur appear with this prost
CERAMIC LINER INTERNAL DIAMETER REDUCTION ON IMPACTION

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Introduction:
Biolox forte is the most commonly used ceramic on ceramic liner material in acetabular cups. The liner outer male taper locks into a matching female metal taper usually via 3 or 4 firm hammer blows to a ball punch. The inner articulating spherical face is designed to slightly mis-match the ceramic ball outer dimensions. Manufacturing tolerances for the articulating surfaces and the male and female tapers are strictly controlled, but the impaction force varies with the individual surgeon. This study was performed to investigate these changes.

Patients and methods:
During development of a new 3-in-1 acetabular cup the Biolox forte liner was designed within a circumferential CoCr ring to interface with the TiAlV outer shell. (This was necessary as the polyethylene liner was also designed within a circumferential metal dome to prevent poly back wear.) The effects of impaction on the internal diameter of the ceramic liner into the ring were studied using a CMM machine.

Results:
There was a surprising, and unexpected relationship between the impaction force and a change to the internal radius of the ceramic liner on the articulating surface.
It was possible to reduce the internal dimensions of a “32mm” liner at its extreme tolerance to below the maximum tolerance of the “32mm” ceramic ball.

Conclusion:
A heavy handed surgeon could impact a ceramic liner with sufficient force to reduce the articulating surface radius to below that of the ball, and potentially cause abnormal crepitus and rapid surface wear.
MINIMALLY INVASIVE HIP REPLACEMENT – A PROSPECTIVE RANDOMISED CONTROLLED TRIAL

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Aim:
The aim of this study was to compare a single-incision minimally invasive posterior approach with a standard posterior approach in a double-blind prospective randomised controlled trial.

Method:
A pilot study was carried out to assess the efficacy of the minimally invasive (MI) approach. The protocol described in the CONSORT statement was used as a template for the study design. Primary total hip replacements meeting the inclusion criteria were randomised in theatre to either the MI approach (using a small incision with preservation of piriformis and distal aspect of quadratus femoris) or the standard posterior approach. Hips meeting the inclusion criteria were randomised in theatre using sealed identical opaque envelopes. Patients were blinded to allocation and all patients remained in the group they were allocated to. Pre and post-operative care programmes were identical. Patients were scored by a blinded research physiotherapist pre-operatively, at Day 2, 2 weeks, 6 weeks and 3 months post operation.

The primary outcome measure was function, assessed using the Oxford hip score, SF-12 questionnaire, Iowa score, 6-minute walk test and the number of walking aids required after 2 and 6 weeks post operatively. Secondary outcomes were complication rates, patient satisfaction, difficulty of the procedure as perceived by the surgeon, soft tissue trauma (CRP and blood loss) and radiographic analysis.

Results:
52 patients were admitted to the trial, 26 in each group. None were lost to follow-up. There was no significant difference between the characteristics of the groups. There was no statistically significant difference in operation time, length of stay, soft tissue trauma, perceived operation difficulty or complication rates. There was no significant difference between the groups with regards to the relative improvement in Oxford hip score, SF-12 Score, walking speed or 6 minute walk test.

Statistical Significance did occur with regards to the number of walking aids used at the 2 week mark. 75% of those in the MIS group were able to use one or less aids, as opposed to only 41% of the standard group. However by the 6th week the difference no longer reached statistical significance. There was no significant difference between the groups in any other outcome.

Conclusion:
Our study suggests there is no real clinical difference between the single incision minimally invasive posterior approach and the standard posterior approach for total hip arthroplasty with regards to function, patient satisfaction, soft tissue trauma and component positioning.
Background:
Dislocation and infection may complicate revision Total Hip Arthroplasty (THA). Our objective was to evaluate the correlation between the numbers of revision THAs to the incidence of these complications.

Materials and Methods:
Data were obtained from 749 revision THAs in 632 patients who were followed for a minimum of two years (range - 6 months to 24 years, mean – 13.2 years) or until one of the complications occurred. Revisions specifically performed because of previous infection or instability were excluded from the analysis. Patients were grouped to First Revision (FR, 1st revision THA), Recurrent Revision (RR, 2nd and 3rd revision THA) and Multiple Revision (MR, 4th or above revision THAs).
Non parametric Chi test was used to compare the groups. Statistical significance was considered positive when P<0.05.

Results:
Dislocation occurred after 61 (8.14%) revisions. Dislocation rate correlated directly with the number of the revision and was highest (P<0.001) in the MR group (5.68%, 7.93% and 27.45%, respectively).
Infection was witnessed in 16 (2.14%) revisions. Again, it correlated directly with the number of the revision and was highest (P<0.001) in the MR group (1.35%, 2.13%, and 7.84%, respectively).

Conclusions:
Dislocation and infection are exponentially correlated to the number of revision THA. In RR those risks increase by approximately 50%, while from the 4th revision onwards those risks are multiplied. This correlation can be attributed to the surgical complexity, extent of soft tissue dissection and their ensuing function. This information is of value both to the surgeons and their patients.
SURGICAL TREATMENT OF DISPLACED ACETABULAR FRACTURES

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There is wide agreement in the surgical treatment of displaced acetabular fractures that anatomic reduction of the joint is a mandatory prerequisite for good functional results. Regarding the surgical treatment of complex acetabular fractures there is an ongoing debate about the choice of the appropriate surgical approach. The purpose of this study is to assess choice of surgical approach as well as the rate of anatomical reduction, morbidity and complication in the treatment of displaced acetabular fractures.

Material and methods:
A total of 205 patients (124 male and 81 female) with displaced acetabular fractures were treated with open reduction and internal fixation. With a single operative approach (Kocher-Langenbeck, ilioinguinal or extended iliofemoral) were operated 194 hips. The 11 remaining were operated with combined approach.
According to Letournel classification 68 (38%) were elementary and 137 (67%) complex fractures, of which 51 (25%) were both column fractures.

Results:
Postoperative reduction was graded as anatomic in 123 (60%), satisfactory in 66 (34%) and nonanatomic in 16 (8%). The rate of anatomic reduction was related to the type of fracture, choice of surgical approach and the interval between the injury and surgery. The overall clinical results were graded according D’Aubigne Postel scoring system (after 2 year follow-up) as excellent in 78 (38%), good in 70 (34%), fair in 33 (16%) and poor in 24 (12%).
The radiographic joint status at follow-up was evaluated according to Heeg (Heeg I-145, Heeg II-32, Heeg III-12, Heeg IV-16).
A direct correlation between good clinical function, radiographic results and anatomic results was found.
Complications were seen as follows: mild osteoarthritis in 51 (25%), severe coxarthrosis leading to total hip arthroplasty in 16 (8%), avascular femoral head necrosis in 12 (6%). Heterotopic ossification was found in 18 (9%) and was classified according Brooker (class I-8, class II-5, class III-3 and class IV-2).

Conclusion:
Acetabular surgery can lead to excellent and good functional results of appropriate approach is chosen and anatomical reduction is achieved. There is direct correlation between excellent/good clinical and radiographic results and anatomic intraoperative reduction.
THE ACCURACY OF A LATERAL INJECTION OF THE HIP JOINT WITHOUT IMAGE GUIDED ASSISTANCE

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Introduction:
Intra-articular injections of the hip have traditionally utilized image guidance assistance. Previous studies report high failure rates with injections based solely on anatomic landmarks. This study reports the accuracy of a simple lateral injection technique in osteoarthritic patients without using image assistance.

Methods:
This study was conducted in 40 consecutive patients undergoing total hip arthroplasty. Prior to sedation, each patient was positioned in a lateral decubitus position. Under sterile conditions, methylene blue dye was injected through an 18G spinal needle that was inserted 1 cm proximal to the midline of the greater trochanter, and directed towards the superolateral aspect of the femoral neck according to preoperative hip x-rays. The joint and surrounding tissues were examined intra operatively for the presence of the dye.

Results:
Injections were successful in 6 of the first 10 patients (60%) and in 25 of the remaining 30 patients (83.3%). Overall, injections were successful in 31 of 40 (77.5%) patients with disseminated dye solely in the intra capsular space. In all 9 unsuccessful injections, the dye was located distal to the joint, along the more lateral aspect of the femoral neck.

Conclusion: This study demonstrates that the accuracy of a simple injection technique of the hip joint based on anatomic landmarks and preoperative x-rays is similar to those documented in knee and shoulder literature. When unsuccessful, the injected material was not found close to neurovascular structures. This technique has an acceptable learning curve and can be utilized safely in an office setting.
ARE THERE GENETIC ASSOCIATIONS BETWEEN LEGG-CALVE-PERTHES DISEASE AND GAUCHER DISEASE, COLLAGEN MUTATIONS OR GENETIC THROMBOPHILIA?

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Introduction:
The aim of our study was to evaluate the role of genetic factors in Legg-Calve-Perthes Disease (LCPD) patients. The role of heritable hypercoagulability in the pathogenesis of LCPD is controversial. Clinical and radiological findings of avascular hip necrosis due to Gaucher disease may be similar to those found in LCPD. Familial osteonecrosis of femoral head has recently been reported to be associated with mutations of collagen type II.

Methods:
Genomic DNA of confirmed LCPD patients (diagnosed 1986-2005) was analyzed for several common thrombophilic polymorphisms. Results were compared to a control group of pediatric patients. DNA was also analyzed for Gaucher mutations and enzyme assays were performed for confirmation of Gaucher disease status. Collagen (COL2A1) mutations were analyzed as well.

Results:
One hundred and nineteen LCPD patients were studied. The prevalence of thrombophilic markers was similar among these patients and controls. Gaucher mutations prevalence was consistent with Israeli population carriership data and did not confirm the association with LCPD found in a smaller previous study. All our patients were negative for COLA21 mutations studied.

Conclusions:
Our study fails to confirm genetic association of LCPD and either Gaucher disease or COLA22 mutations. Thrombophilia was not increased among our patients as compared to controls. On the other hand, a thorough review of the literature and a meta-analysis of case-controlled studies revealed a positive association of Factor V Leiden and LCPD, whose impact upon the disease remains to be elucidated.
TREATMENT OF SEVERE LATE-ONSET PERTHES’ DISEASE WITH SOFT TISSUE RELEASE AND ARTICULATED HIP DISTRACTION: RESULTS AT SKELETAL MATURITY

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Conservative treatment and conventional surgical techniques have limited value in late onset Perthes disease. We used a combination of soft tissue release and joint distraction with a hinged mono-lateral external fixator for these patients. Ten of our patients reached skeletal maturity and were evaluated.

The evaluation includes clinical parameters and the Harris hip score, as well as the Oxford questionnaire and radiographic measurements.

Our study included 8 boys and 2 girls (mean age at surgery) 12.3 years, range 9.4-15.1, mean age at last follow-up 18.1 years, range 15.2-22.8). The mean follow-up was 5/7 years (range 4.3-7.8). The mean Harris hip score was 86.3/100 (range 48.5-96); one patient had <85 points. The hip ROM was slightly limited in most patients, and 7 patients had limb shortening between 1-4 centimeters. The mean Oxford hip score was 17.4/60 (range 12-31). The mean Sharp transverse acetabular inclination of the affected side was 42 degrees (range 36-54) compared to 39 degrees for the unaffected side (P = 0.045). The mean uncoverage percentage was 37% (range 27-47) compared to 20% for the unaffected side (P = 0.017). The mean epiphyseal index was 0.71 (range 0.31-0.92) before surgery, 0.79 (range 0.50-0.93) at frame removal (P = 0.012), and 0.72 (range 0.51-0.89) at last follow-up (P= 0.646). The epiphyseal quotient for the 8 unilateral cases was 0.72 (range 0.49-0.91), and the Stulberg classification was type III for 3 cases and type IV for 7.

We conclude that patient satisfaction for function and pain following the combined procedure was good. Radiographic parameters did not change significantly. This should be regarded as a salvage procedure.
41.

TEMPORARY HEMIEPIPHYSIODESIS FOR ANGULAR DEFORMITY CORRECTION

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TIBIAL OSTEOTOMY AND DEFORMITY CORRECTION WITH THE TAYLOR SPATIAL FRAME. THE AFULA EXPERIENCE

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Introduction:
The TSF is an evolution of the classic Ilizarov frame, the computer program calculates a schedule for gradual strut and frame adjustment, simultaneously correcting multiple aspects of deformity around a virtual hinge without the need for complicated frame modification. The purpose of this study is to evaluate our first experience in 17 patients treated for different types of tibial deformity.

Material and Methods:
The TSF has been used with the Total Residual Deformity Correction mode. Since January 2004 to date. Fifty patients have been treated in our department with the TSF with various etiologies. 17 of these patients with sufficient follow-up, twelve males and 5 females - underwent correction for tibial deformity. The mean age of the patients was 34 years (range 8 – 67 years). The etiologies for the tibial deformity are the following: malunion into varus, or valgus – 4 patients, late onset tibia vara – 3 patients, medial compartment osteoarthritis of the knee (MCOA) – 5 patients. Two patients suffered from lateral compartment osteoarthritis, and renal rickets. Three patients had proximal physeal tibial damage in childhood resulting in recurvatum (2 patients) and varus (1 patient). The mean follow up is 31 months (range 19 – 48 months). The following parameters (according to Paley) were calculated: Pre and postoperative MPTA (medial proximal tibial angle), PPTA (proximal posterior tibial angle), LDFA (lateral distal femoral angle), PDFA (posterior distal femoral angle), the angle of the deformity and the LLD (leg length discrepancy). Rotation was assessed clinically. The tibial osteotomy was performed with the Gigly saw in 11 patients. All frames were removed at an average of 5.1 months (range 3.5 – 13 months).

Results:
The average preoperative MPTA in 12 patients suffered from varus deformity was 79° (range, 66 – 86) and 90.3° at the latest follow up (range 89 – 92). The average pre-operatively PPTA in 5 patients with recurvatum deformity was 97.2° (range, 87 -110), and 82° (range 82 – 84) post-operatively. Pre-operative MPTA in three patients suffered from valgus deformity was 103° (range 100 – 110), and an average of 91° was achieved (range, 90 - 96) at the latest follow up. Three patients had combined varus and recurvatum deformity. The average pre-operative angular deformity in all patients was 10.8° (range 5 – 24). At the latest follow up all deformities were corrected to within the normal range or according to the pre-operative planning. Limb length discrepancy was corrected in six patients, an average of 3.3 cm of tibial lengthening was achieved (range 2 – 6 cm). Internal tibial torsion of between 10 to 15° was corrected in three patients. The following five complications were noticed: One patient had subcapital fracture during treatment. One patient suffered from nonunion of the tibial osteotomy. The non-union has healed following open plating and bone grafting. Knee flexion contracture of 40° was developed in one nine year old girl. One patient is still suffering from pain in her knee and is a candidate for unicompartmental knee replacement. One 67 years old patient, had a partial loss of the correction, as seen at her latest follow-up.

Conclusion:
Based on our results, the TSF allows safe gradual correction and is accurate and well tolerated. The gradual correction of the deformity, as opposed to acute correction, allows for confirmation of the mechanical axis and joint line correction during treatment. Residual correction is easily performed utilizing the computer program during treatment, with no further operative treatment required.
ULTRASOUND STUDY OF NEONATES AT RISK FOR DEVELOPMENTAL DYSPLASIA OF THE HIP

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Introduction:
Developmental dysplasia of the hip (DDH) is a condition that may cause serious disability in childhood, and may result in severe degenerative arthritis in the first decades of life. DDH is one of the most common etiologies of degenerative joint disease. Early treatment of hip subluxation/dislocation yields good results and decreases the danger of future degenerative arthritis. The purpose of this study was to determine the prevalence of DDH in neonates who were born in Western Galilee Hospital (WGH) in 2005 and 2006, to examine whether there is a difference in prevalence of DDH in male and female neonates, and in neonates from different ethnic groups, to determine to what extent physical examination can predict DDH, and to correlate findings from clinical examination and findings from sonography.

Patients and Methods:
This study was carried out between January 2005 and December 2006. In our study, physical examination was performed as a routine exam, and sonography was performed on a selective basis in neonates with suspicious physical examination and neonates in high-risk groups. During the study period 437 neonates born in the WGH were either in high-risk groups for DDH or had physical examination suspicious for DDH. The high-risk groups include multiple-fetus pregnancy, breech delivery, skeletal deformities, family history of DDH, and oligohydramnios.

Results:
The prevalence of DDH in our study population was 0.6% or 5.9 per 1000 births per year. Pathology was found in the left hip on 70.8%, in the right in 14.6%, and was bilateral in 14.6%. Female neonates comprised 77% of affected infants, and male neonates 23%. No statistically significant difference was found among ethnic groups. In neonates with abnormal physical examination, 79% had positive sonography for DDH. In 47% of neonates with abnormal sonography, physical examination had been normal.

Conclusions:
Sonography is the first line imaging examination to discover DDH in neonates. The combination of physical examination and sonography reduces the number of undiagnosed cases of DDH. The prevalence of DDH is significantly higher in females compared to males, and higher in the left hip than on the right. There is no significant difference in prevalence of DDH among various ethnic groups in our population.
The term fibular hemimelia encompasses a broad spectrum of congenital limb deficiency, characterized in all cases by variable limb shortening, fibular hypoplasia or absence, and foot deficiency and deformity. The more severe varieties can be successfully treated with foot ablation by Syme or Boyd amputation combined with prosthetic fitting. There has traditionally been cultural resistance to amputation in Italy, however, and this treatment is rarely accepted in our country. The introduction of Ilizarov’s external fixator, and more importantly, his method of limb lengthening to Italy in 1981 has greatly changed our management of fibular hemimelia, particularly for the more severe forms of this congenital anomaly.

We here present a classification of this disorder modified from that of Dal Monte, outline our treatment program for the management of this severe congenital limb deficiency.
45.

CORRECTION OF ARTHROGYPOTIC CLUBFOOT WITH A MODIFIED PONSETI TECHNIQUE

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Purpose:
To examine if a plantigrade, braceable foot could be achieved in the arthrogrypotic clubfoot using the Ponseti technique modified with an initial percutaneous Achilles tenotomy prior to casting.

Materials and Methods:
Ten patients with 19 arthrogrypotic clubfeet, mean age 16.2 months (range, 3-40), underwent an initial percutaneous Achilles tenotomy (PAT), followed by weekly Ponseti style castings. A second PAT was performed prior to the last 3-week cast, except if the ankle dorsiflexed at least 20 degrees. Correction was maintained by continuous ankle-foot orthosis (AFOs).

Results:
Mean follow-up was 34.7 months (range, 6-60), age 54 months (range, 12.5-86.5). Mean number of casts was 7.7 (range, 4-12), 10 feet required a second PAT. Dimeglio/Bensahel score was 16 (range, 12-18) pretreatment, and 5 (range, 2-9) after initial series of casts. Similarly, Catterall/Pirani scores improved from 4.8 (range, 1.5-6.0) to 0.9 (range, 0-2.0). Mean ankle dorsiflexion improved from –42 degrees (range, -75 to -25 degrees) pretreatment to 5 degrees (range, -10 to 25 degrees) at follow-up. At latest follow-up, all patients' feet were braceable, 7 feet were in equinus of 10 degrees or less, one had limited bilateral posterior ankle releases for recurrences of 40 degrees of equinus, and no patient's ambulatory ability was compromised by foot shape.

Conclusion:
Arthrogrypotic clubfeet were corrected with the modified Ponseti technique without extensive surgery during infancy and early childhood. The initial PAT was crucial for unlocking the calcaneus from the posterior tibia, allowing for correction with Ponseti casting. Correction was maintained with AFOs at final follow-up of 35 months. Although limited surgery may be required as the children age, braceable feet were achieved effectively in these patients with arthrogryposis, creating a stable platform for weightbearing.
Introduction:
Idiopathic congenital talipes equinovarus (i.e., clubfoot) is a common musculoskeletal birth defect. Initial treatment of idiopathic congenital clubfoot should be nonoperative with manipulation and serial casting. There has been a renewed interest in the Ponseti method of manipulation and serial casting of clubfoot deformity during the past decade. The Ponseti treatment has been applied since 1997 by the two senior authors in Baltimore and Afula, using a strict Ponseti protocol. We performed a retrospective study using prospectively gathered data to evaluate the quality of the Ponseti treatment. We are now presenting the longest follow-up outside of Iowa with a minimum of five-year follow-up of the Ponseti treatment for idiopathic clubfoot.

Material and Methods:
Since 1997, a total of 88 (31 females, 57 males) babies with club feet, with minimum follow-up of five years, were treated by the Ponseti method at both centers (Baltimore: center - 1, Afula: center - 2). Of these patients, 14 were excluded from the study as lost for follow-up or were unable to return for follow-up, leaving 74 patients (33 Afula patients, 41 Baltimore patients) in the study with 117 feet (59 left side, 58 right side). There were 26 female and 48 male patients in the series. All patients were followed for a mean of 6.3 years (minimum, 5 years; maximum, 9 years; standard deviation, 1.22263). The club feet were treated at weekly intervals as described by Ponseti. At the time of presentation, the clubfoot deformities were graded with the 6-point scale of Pirani. Other information routinely obtained at the initial treatment session included any previous treatment or family history. Information obtained at the last follow-up was compliance with the foot abduction brace (FAB), performance of the percutaneous Achilles tenotomy, number of casts applied, and performance of additional surgical procedures. These procedures were divided into small (e.g., ATTT), medium (e.g., posterior release), and large (e.g., posterior medial release). Compliance with bracing was ascertained on the basis of the parents’ report. Good compliance was defined as full-time brace use for at least 3 months followed by at least 9 months of nighttime and nap time use. All babies were clinically examined to determine ankle and subtalar range of motion. We divided the quality of ankle dorsiflexion
into three groups: poor (between 0–4 degrees), mild (between 5 to 10 degrees), and good (beyond 10 degrees of ankle dorsiflexion). There is a difference between the centers with regards to the age at presentation. We defined early presentation as up to 28 days old, and babies older than 28 days old as late presentation for treatment. Average age at presentation was 67 days (range, 1 – 630). Most of the late presentation babies belong to the Maltimore group. Application of psychometric statistical principles defined an easy-to-use, 10-item DSI (Disease Specific Instrument), to reflect parents' attitudes toward their child's outcome.

Results:
The Pirani scoring for 101 feet at presentation was on average of 4.8 points (range 1 – 6). Lower points were assigned to babies belonging to the Baltimore group (P = 0.010). An average of 6.26 (range, 2-14) casts were applied on 106 feet. Out of a total of 108 feet, 15 (13.8%) had not undergone tenotomy of the Achilles. Compliance was evaluated in 70 babies and was almost evenly distributed between good and bad; 31 (44.3%) were noncompliant and 39 (55.7%) were compliant. Of 50 babies who presented early for treatment (younger than 28 days), 24 (48%) were compliant and 26 (52%) not. On the other hand, of 20 babies who presented late for treatment, the compliance was much better: 15 (75%) with a significant P value of 0.040 (significant). As for ankle range of motion at the last examination, 89% of the 109 feet had either good or mild dorsiflexion. Of 111 feet, 23 (20.7%) underwent ATTT, eight feet (7.2%) underwent posterior release, four feet (3.6%) underwent major surgery (two PMR and other two babies the application of TSF). Five feet (4.5%) underwent more than one procedure: ATTT plus PMR (two feet), ATTT plus posterior release (two feet), and one foot underwent posterior release plus TSF. The high reliability of the questionnaire is expressed by the Cronbach’s Alfa: 0.676. All parents expressed major satisfaction with the treatment results.

Conclusion:
Based on our experience and the experience of other authors, the Ponseti method is a simple and effective method of treating idiopathic clubfoot. If treatment starts late or failed at other centers, it is still liable to succeed if the Ponseti method is subsequently applied properly without any short cuts or aberrations. Compliance with the foot abduction brace (FAB) is the major drawback of the method. Unfortunately, it has been shown that it has a direct affect on the success of treatment. The parent questionnaire clearly shows that parents’ satisfaction with the Ponseti treatment is not dependent on physical parameters such as range of motion or appearance of the feet.
ARTHROSCOPIC ASSISTED FIXATION OF IDEBERG TYPE 1 GLENOID FRACTURE – A NOVEL TECHNIQUE.
TECHNIQUE AND OUTCOMES

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Background:
Glenoid Fractures comprise 11 to 15 per cent of scapular fractures. Whenever these fractures are associated with gleno humeral dislocations late instability and incongruency might be resulted. An extensive open surgical approach combined with axillary nerve injury risk and soft tissue adhesions motivated us to seek an arthroscopic assisted technique for these type of fracture.

Methods:
Between December 2001 and March 2007 six patients (all males; mean age fifty-one year) with gleno humeral dislocation and an Ideberg type 1 glenoid fracture were treated with arthroscopic assisted fixation using suture anchors and cannulated screws. An inferior through suscapularis portal was used for release, mobilization and fixation of the glenoid fragment. Time from injury to operation ranged from 5 to 30 days. Patients were immobilized for six weeks post operatively followed by rehabilitation protocol of gradual range of motion and muscle strengthening exercises. All were available for follow up for a period that ranged from 6 to 80 months (mean 30 months).

Results:
All patient underwent the operation uneventfully without any neurological deficit. In all patients full mobilization of the fragment to the glenoid level with congruent articular surface was performed successfully. Stable fragment fixation resulted with complete fracture union at six weeks. There were slight to moderate deficit in the range of motion compared with the values on contralateral. Strengths was equal to contralateral shoulder.

Conclusion:
The technique of arthroscopic assisted fixation is a safe and effective option for the treatment of Ideberg type 1 glenoid fractures.
THE ROLE OF ARTHROSCOPIC ROTATOR INTERVAL CLOSURE IN THE ARTHROSCOPIC MANAGEMENT OF ANTERO-INFERIOR INSTABILITY OF THE SHOULDER ASSOCIATED WITH MULTI DIRECTIONAL INSTABILITY

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Introduction:
The increasing use of Arthroscopic surgery for recurrent anterior shoulder dislocations (RASD) has questioned the indications and contraindications for this procedure. The ideal candidate for this kind of surgery is an overhead athlete, who participates in a non-contact sport, with traumatic unidirectional anterior instability with a well-defined Bankart lesion.

Purpose of the paper:
To demonstrate that complementing the Arthroscopic Bankart Repair (ABR) with an Arthroscopic Rotator Interval Closure (ARIC) the indication for Arthroscopic management of Anterior shoulder instability can be broaden for patients who has a less defined Bankart lesion and has additional multidirectional hyperlaxity.

Patients and Methods:
Between January 1, 1999 and December 31, 2002, 206 patients (220 shoulders) suffering from recurrent anterior dislocations were treated by ABR. In the first two years, only patients who had unidirectional instability with no Hyperlaxity or grade 1 Hyperlaxity were selected for this specific method of treatment. Encouraged by the results, beginning of October 2001, in addition to the first group of patients we started to operate patients suffering of recurrent dislocations having grade 2 or grade 3 Hyperlaxity. In this second group of patients we added to the ABR an ARIC procedure. In the first group 138 shoulders whereas in the second group 82 shoulders were operated on. We used Panalok-Panacryl Smith and Nephew 3.5mm x2 Ethibond sutures (OBL) suture anchors or Bioknotless (Mitek) anchors. 192 cases had one side operated whereas in 14 cases both sides were operated on. There were 190 male patients and 16 females in these two groups, 104 patients had the left shoulder, 88 patients had the right shoulder and 14 patients had both shoulders operated on. The mean follow-up was 5 years with a minimum follow-up of 25 months

Results:
In spite of the relatively short follow-up for the second group of patients we encountered very good preliminary results. At revision of all the cases we found 10 recurrences for the ABR group (representing 7.24%) almost similar to the 5 reoccurrences in the ABR supplemented by ARIC procedure (7.09%).

Conclusions:
The ARIC is a new and easy technique that broadens the indications for arthroscopic shoulder surgery as a solution for recurrent dislocations associated with joint hyperlaxity.
ROTATOR CUFF REPAIR – 10 YEAR EXPERIENCE

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Introduction:
With the development of the arthroscopic technologies and instrumentation arthroscopic repair of the rotator cuff become more and more frequent. However Arthroscopic Rotator Cuff Repair is a relatively novel technique; it is on of the most demanding technique of the shoulder arthroscopic procedures.

Purpose of the paper:
I would like to present the results our experience with Rotator cuff Repair in the shoulder unit of the Tel-Aviv Medical Center and the transition of the operative technique from the all open to mini-open and finally to all arthroscopic during the 10 years of the study.

Patients and Methods:
Between January 1, 1996 and December 2005 - 494 rotator cuff tears were operated on in our unit. The average follow up was 52 months ranging between 12-120 months. The sex distribution was slightly on the favor of male patients. The dominant arm was affected in 328 cases whereas the no dominant side was affected only in 166 cases. The average age at surgery of the patients operated on was 52 years, the youngest 34 year old, the oldest operated was 82. The average time from the onset of the symptoms to surgery was 12.5 months. 39% were blue collar workers, 29% white collar workers, 20% were retired and 12% were house wives. In 67% of the cases no traumatic event was recorded. I those cases, wear and tear and natural aging was considered the cause of the condition. In 30% of the cases a traumatic event was recorded. Unfortunately in most of those cases a compensation claim was involved. The patients were divided in 3 different groups: in the first those operated by an all open technique, in the second group those operated by mini-open technique and the third group operated by all arthroscopic technique.

The clinical evaluation of the results was done with the aid of the “Constant Functional Assessment score.

Results:
Of the total number of cases we recorded 70% to be excellent, 21% good, 8% poor and 1% of worse results. When the results were analyzed according to the etiology, the patients were divided in compensation cases and cases which were not involved in litigation; we found much better results in the non compensation group.

Conclusions:
In the arthroscopic repairs the postoperative rehabilitation was much easier and shorter than in the mini-open procedures (no damage to Deltoid muscle). The postoperative stiffness period was shorter and less frequently observed in the arthroscopic repair group than in the mini-open group. Arthroscopic repair of rotator cuff is technically demanding, but it is less invasive and with practice it becomes very rewarding. In difficult repairs, the beach chair position allows the surgeon to switch easily the arthroscopic procedure to a mini-open repair. Among the “compensation claim” group the results were not as good.
IS THERE STILL A PLACE TODAY FOR NEER'S CAPSULAR SHIFT REPAIR IN ATHLETES WITH RECURRENT ANTERIOR SHOULDER DISLOCATION

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Introduction:
Various surgical methods have been described to manage the problem of recurrent anterior dislocation of the shoulder. Older procedures Putti-Platt’s, Magnuson-Stack's or Bristow's and Boytchev's repair are not used today due to a high percentage of failure of 7%-17% incidence of recurrence associated with limited ROM. However, in the last decade the goal of treatment has changed. It is directed now towards restoration of normal function with full ROM of the affected shoulder, based mainly on arthroscopic stabilization or on "open" Neer's capsular shift procedures combined with Bankart's repair. However, during the last few years there are more and more papers dealing with a surprising unexpected high number of patients with shoulder instability following arthroscopic repair. The purpose of this study is to review the long term results of "open" Neer's capsular shift procedure.

Materials & Methods:
This is a presentation of 87 (78M; 9F) consecutive patients, 19 to 47 year old (mean 23 Y) with a length of follow-up of 4Y-15Y (mean 6Y). 45 of them with traumatic recurrent anterior dislocation of the shoulder had a capsular shift procedure according to Rockwood's modification. In 42 other patients that had a multidirectional instability with proved dislocations of the affected shoulder a Protzman's modified capsular shift procedure was used.

Results:
82/87 patients had a stable shoulder without recurrent dislocation. 3 patients had an episode of traumatic shoulder dislocation within 2 months following operation. Two other patients of 42 with multidirectional instability had a recurrence of traumatic dislocation. One patient developed partial brachial plexus injury, most probably due to traction of the affected limb following operation. 78/87 had at follow-up normal shoulder function with full ROM, and the remaining 9 patients had only a slight limitation in shoulder abduction and in external rotation.

Conclusions:
Based on this study, it is suggested that capsular shift procedure is an excellent method for repair of recurrent anterior shoulder dislocation, preferable to the “older” procedures, and allows restoration of shoulder stability with better functional results. This is suitable mainly for patients with structural hyperlaxity and multidirectional instability, whereas arthroscopic stabilization might be used in patients with true traumatic instability.
Purpose:
Zone II flexor tendon repairs may create a bulging effect with resistance to tendon gliding. A biomechanical study was performed comparing the Cross locked cruciate to a 4 strand modified Kessler repair, in terms of strength characteristics and work of flexion.

Materials and Methods:
Sixteen fresh frozen human fingers were placed in a custom jig. Flexor digitorum profundus tendons were sectioned at A3 pulley level. Fingers were divided to two repair groups: 4 strand cross locked cruciate (CLC) and 4 strand modified Kessler (MK) core suture. Work of flexion was determined for each group, with and without an Interlocking Horizontal Mattress (IHM) circumferential suture. Final repair including IHM was tested for 2mm gap failure and ultimate load to failure.

Results:
The CLC had significantly less work of flexion than the 4 strand MK repair method (average 8J vs 17J, p < 0.02). The CLC-IHM had significantly less work of flexion than the 4 strand MK-IHM method (average 14J vs 31J, p < 0.05). For both suture types, the circumferential suture resulted in increased work of flexion; however, peak force produced upon entry of the repair into the A2 pulley was reduced. The CLC-IHM had a significantly higher 2mm gap failure (58N vs 45N, p < 0.001).

Conclusions:
(1) The CLC-IHM suture method is stronger with less work of flexion than the MK method.
(2) This new combination repair method of cross locked cruciate (CLC) core suture with interlocking horizontal mattress (IHM) circumferential suture (CLC-IHM) is biomechanically superior to the commonly performed modified Kessler technique.
RESURFACED BUT NOT REPLACED – GLENOID TREATMENT FOR SHOULDER RESURFACING ARTHROPLASTY

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Introduction:
Pridie and Steadman independently noticed the development of a smooth layer of fibrocartilage when treating exposed subchondral bone in the knee using their techniques of drilling or microfracture respectively. Since 1997, patients presenting to our unit for a Copeland cementless Surface Replacement Arthroplasty (CSRA) with a congruent glenohumeral joint have routinely undergone biological resurfacing of the glenoid using a technique similar to that described by Pridie and Steadman.
We present this technique of glenoid resurfacing, the histological and surgical outcomes in a consecutive group of patients. Methods/Results Between 1987 and 2002, 218 CSRA were performed without replacing the glenoid. From 1997, 133 CSRA have been performed with multiple drilling of the glenoid face with a guide wire through the subchondral bone in to the underlying soft cancellous bone to stimulate bleeding. This causes formation of a fibrocartilaginous layer - biological resurfacing. 9 (6.8%) of the patients with biological resurfacing have subsequently undergone a shoulder arthroscopy for postoperative impingement pain. This allowed us to evaluate the glenoid surface – macroscopically a layer of cartilage was noted in all patients, intraoperative biopsies have confirmed this layer to be fibrocartilage microscopically. The mean postoperative Constant score (CS) is 86.9 (age/sex adjusted), with a mean improvement in CS of 71.0. 3 (2.3%) patients have required revision.

Conclusion:
Our results confirm that glenoid drilling at the time of CSRA leads to the formation of a fibrocartilaginous layer over the glenoid, with significant improvements in Constant scores and functional outcomes. These results are comparable to other published results for total shoulder replacement with polyethylene resurfacing of the glenoid and better than patients that have undergone stemmed shoulder hemiarthroplasty.
HEMIARTHROPLASTY VERSUS TOTAL SHOULDER ARTHROPLASTY WITH THE COPELAND SURFACE REPLACEMENT ARTHROPLASTY. FUNCTIONAL OUTCOME AND SURVIVAL ANALYSIS

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The choice of hemiarthroplasty or total shoulder arthroplasty for the treatment of shoulder arthritis remains a controversial issue. Published studies using stemmed prostheses suggest functional outcome is better with total shoulder arthroplasty. There are no published comparative studies using a surface replacement. Objective. The aims of the study were to compare functional outcome of humeral surface arthroplasty (HSA) with total shoulder resurfacing arthroplasty (TSA) using the Copeland resurfacing arthroplasty and to compare mid and long term survival in order to determine whether HSA or TSA is the better option for treatment of shoulder arthritis.

Methodology:
340 consecutive patients who underwent TSA or HSA with a minimum follow up of 2 years were identified. There were 218 in the HSA group of whom 30 had died and 11 were lost to follow up. There were 122 in the TSA group of whom 29 had died and 7 were lost to follow up. Patients who were lost were excluded from our analysis. We used the Constant score for functional assessment. All clinical data were collected prospectively and kept on a dedicated database. For those who had died, the most recent clinical data (usually within 12 months of death) were used in the analysis. Results. 218 patients who underwent HSA for osteoarthritis were compared with 122 patients who underwent TSA. 71% were female in the HSA group and 72% in the TSA group. Their mean ages were 65.8 (HSA group) and 65.2 (TSA group). Mean follow up was 4.8 and 7.8 years respectively. At the time of follow up, 21 of 115 TSA (18.3%) had been revised and 6 of 207 hemiarthroplasties (2.9%) had been revised and this difference was statistically significant (p<0.0001). The Kaplan-Meier survival curves demonstrated a significant difference in implant survival with revision for any reason as the endpoint (p=0.0028, Log rank test). For patients with surviving prostheses, we found no significant functional difference between TSA and HSA in pain, strength, range of movement, power and overall Constant score.

Conclusion:
The long-term survival of HSA was significantly superior to TSA. There was no significant difference in function between the two groups. We recommend HSA without insertion of a glenoid prosthesis.
ARTHROSCOPIC ASSESSMENT OF BLOOD FLOW IN THE ROTATOR CUFF BY LASER DOPPLER FLOWMETRY (LDF)

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Introduction:
Despite in vitro studies, the implications of perfusion and blood flow abnormalities in the rotator cuff (RC) in vivo are not clearly understood. The aim of our study was to quantify in vivo (during arthroscopy) the microcirculation of the normal rotator cuff and demonstrate alteration, if it existed, in diseased cuff tissue.

Method:
56 patients were recruited in the study, grouped as those with and without cuff disease respectively. Laser Doppler flowmetry was performed intra-operatively during arthroscopic assessment in 6 different zones of the rotator cuff to obtain 336 flux measurements from normal(control) and diseased cuff (impingement and cuff tears).

Results:
336 measurements were recorded (6 anatomical locations per shoulder). The observed mean (95% CI) for the LDFf was 32.8 (27.4–38.1) in the normal cuff, 25.4 (22.4–28.5) in impingement and 43.1 (37.8–48.4) in cuff tear cases (p<0.0001, One-way ANOVA). Blood flow was significantly lower in cuffs with impingement compared to normal cuffs (P=0.0196). It was significantly higher at the edges of the tear in torn cuffs as compared to normal cuffs (P=0.0089) and significantly lower in cuffs with impingement compared to torn cuffs (P<0.0001). The normal cuff did not demonstrate a functional zone of hypoperfusion / critical zone in our study (P=0.2730).

Discussion/Conclusion:
Laser Doppler flowmetry allows in vivo quantitative assessment of the micro-circulation of the human supraspinatus tendon within an arthroscopic setup. We found the flux in areas of cuff pathology to be significantly reduced in lesions of impingement, and to be significantly increased within the margins of a full thickness cuff tear.

This is a preliminary study of its kind assessing flux in ‘normal’ cuff tissue. We were unable to demonstrate a functional ‘critical zone of hypoperfusion’ in the normal tendon. It is probably an artefact of injection technique done in cadavers, where most studies have looked at vessels > 20 microns in diameter. LDF allows measurements in vessels of 10 microns, and these would appear to play a significant role in perfusion as implied by our study.

A major strength of this technique is that it allows real-time output. This method of assessing the microcirculation could be used in additional studies on the shoulder joint and the rotator cuff and may help to identify specific tendon-repair strategies based on the knowledge of individual perfusion patterns.
DISPLACED, INTRA-ARTICULAR FRACTURES OF THE CALCANEUS

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Fractures of the calcaneus were described as early as 1843 by Malgaigne. They account for approximately 2% of all fractures, with displaced intra-articular fractures comprising 60-75% of these injuries.

The majority of calcaneal fractures occur in male industrial workers, making the economic importance of this injury substantial.

Many authors have reported that patients may be totally incapacitated for up to three years, and partially impaired for up to five years post injury.

Although modern operative intervention has improved the outcome in many patients, there still exists no real consensus on classification, treatment, operative technique, or post-operative management.

This lecture will review the current thinking regarding the management of these very difficult fractures.
56.

SPORTS FOOT AND ANKLE INJURIES

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TREATMENT OF COMPLEX PROXIMAL HUMERUS FRACTURES WITH A PROSTHESIS – DOES ANATOMIC RECONSTRUCTION MAKE A DIFFERENCE?

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Introduction:
Factors that affect the outcome of humeral head replacement for fractures have been analyzed in a number of studies. These factors include problems with greater tuberosity healing, patient age and the timing of surgery. This study presents the results of 52 hemiarthroplasties for complex proximal humerus fractures that were graded according to the quality of the anatomic reconstruction of the proximal humerus. The purpose of this study was to test the hypothesis that anatomic reconstruction and restoration of glenohumeral alignment results in superior functional outcome and pain relief.

Materials and Methods:
52 patients were evaluated at a mean follow-up of 3 years (range, 1 to 11 years). Shoulders were stratified into two groups: Group I, had union of both the greater and lesser tuberosities with less than 5mm of displacement and anatomic glenohumeral alignment. Anatomic alignment was achieved when the distance between the center of the humeral head and the center of the glenoid was less than 20% of the humeral head diameter, the humeral head height was 2 to 10 mm above the greater tuberosity, and the acromiohumeral interval was greater than 3 mm. Group II shoulders did not meet these criteria.

Outcome measure included ASES scores, SST and Visual Analog Scores for pain and function.

Results:
ANOVA analysis of forward flexion, internal rotation, and strength were significantly better for Group I versus Group II (p<0.0001). Similarly, SST and ASES scores for Group I demonstrated better results, (p<0.0005 and p<0.002, respectively).

Conclusion:
The data presented suggests that reconstructions that more closely approximate original anatomy leads to improved function and decreased pain at an average follow-up of 3 years. The combination of decreased difficulty in performing tasks, decreased pain, and the ability to perform a larger number of normal ADL’s suggests a better quality of life for patients whose post-surgical results more normally approximate their pre-injury anatomy.
58.

THE DEVELOPMENT OF SHOULDER ARTHROPLASTY. PAST, PRESENT WHERE ARE WE GOING?

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PREVENTION OF THROMBO-EMBOLISM IN ORTHOPAEDIC PATIENTS

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Data from clinical trials in surgical patients have clearly demonstrated the efficacy and safety of pharmacological agents such as low-molecular-weight heparins and unfractionated heparin in preventing venous thromboembolism (VTE). It seems clear that the large body of evidence supports VTE prophylaxis in at-risk surgical patients, and international guidelines have been developed accordingly.

Despite this, surveys suggest that a substantial proportion of surgical patients at risk of VTE do not receive any thromboprophylaxis. Moreover, those who do receive thromboprophylaxis often receive suboptimal thromboprophylaxis, with respect to the patient's risk level and guideline-recommended agent, dose, and duration.

The reason that VTE prophylaxis, in many cases, is often not (accurately) implemented or guideline recommendations are not followed may stem from difficulties in defining and recognizing the risk factors that are associated with the development of deep-vein thrombosis (DVT) or pulmonary embolism in some surgical patients, and the fact that the guidelines may be perceived to be too complicated or difficult to apply in a routine manner. Thus, there is a need to develop strategies and practical tools that improve the implementation of thromboprophylaxis.

Risk-assessment models may provide an important framework for developing strategies to improve VTE prophylaxis. Such models have been developed based on published data on VTE risk factors and their associated relative risk of VTE.

Another way to improve the implementation of evidence-based guidelines is through educational programmes such as the DVT Safety Zone. The DVT Safety Zone is a comprehensive healthcare-quality improvement programme designed to educate both physicians and nurses on the importance of DVT, and to provide them with tools to facilitate risk assessment and implementation of standard protocols for prophylaxis.

Recently, the value of alert systems, such as the computer-alert system developed by Kucher and colleagues, has become apparent. These alert systems are powerful tools that have been shown to help with the identification, and appropriate thromboprophylaxis, of patients at risk of VTE.

In this presentation, different strategies that have been implemented in the clinical setting to support VTE prophylaxis will be reviewed. Risk-assessment models, physician education, and alert systems, or a combination of these tools, may be part of these strategies, and their use and benefits will be discussed in more detail. The participants will be able to use this information to design strategies for the appropriate implementation of VTE prophylaxis for the surgical patient in their own hospital.
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ENDOSCOPIC TREATMENT OF INSERTIONAL ACHILLES TENDINITIS

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Purpose of the study:
Achilles tendinitis, either insertional or noninsertional, is multifactorial. Haglund deformity, a specific condition, is a bone prominence of the superior lateral posterior calcaneus that can be the cause of the tendinitis. The purpose of this study is to present the endoscopic technique, and preliminary results, of treating Insertional Achilles Tendinitis (IAT).

Materials and Methods:
6 consecutive patients who had IAT, unrelieved by nonoperative measures were treated with the endoscopic technique. Mean age was sixty-one years (range fifty-one to seventy-three years). Two portals were created, one laterally and one medially, at the retrocalcaneal space between the bony prominence and the Achilles tendon. The inflamed bursa was removed and the prominent bone was resected. Patients were evaluated postoperatively.

Results:
Follow-up ranged from 3 to 19 months. 4 patients showed excellent results and 1 good result, with less pain and better walking ability. 1 was reoperated, with open technique, 5 months after the endoscopic procedure due to consistent pain. The Achilles tendon and the retrocalcaneal area were debrided and reattached.

Conclusions:
Endoscopic treatment of IAT is an effective procedure. It is minimally invasive with less scaring and complications comparing to the open procedure.
LONG TERM FOLLOW-UP ON PLANTAR FASCIITIS TREATED BY SHOCK WAVE THERAPY

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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 follow-up (1YFU) results of a prospective cohort of 50 patients who underwent ESWT (five weekly courses of 1500 impulses of 0.32mj/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 Average Visual Analog Scale (VAS) score, composed of six parameters 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 (both due to unrelated cause) and 5 were 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.
THE EFFECT OF FOOT ANATOMY AND BIOMECHANICS ON HEEL WEAR PATTERN IN THE NEW IDF MILITARY BOOT

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Introduction
The new IDF boots were introduced into the infantry service three years ago. They were designed to decrease training injuries but their biomechanical properties have not been scientifically tested. Our purpose was to study the correlation between the new IDF shoes and boot's heel wear and the incidence of stress fractures and Achilles tendinitis.

Materials and Methods
The target group of the observational prospective study were elite infantry recruits. All participants underwent anthropometric and anthropomorphic measurements. These included foot prints on a pressure plate and photographic assessment of tibio-calcaneal angles standing flat and on tiptoes. Follow-up examinations for signs of overuse injuries were performed every 3 weeks during basic training. At the end of training the boot's heel wear was measured. The different types of foot structure were determined by using software processing of the digital footprints.

Results
Sixty elite infantry recruits participated. Average shoes wear was 30%. Most of the wear patterns were symmetrical (R/L), wear maximally on the lateral heel counter. The angle of maximum wear was correlated with foot-progression angle (P < 0.05, R=0.25). No association was found between the boot’s heel wear and other foot or body parameters. The incidence of the stress fractures and Achilles tendinitis was 18.8% and 5.8% respectively with the new IDF boots.

Discussion
The new IDF shoes were associated with high rate of wear in conditions of vigorous physical activity during basic infantry training. Further studies are needed to identify the contributing factors and to improve boots’ durability.
A MODIFIED AND EFFECTIVE PRESURGICAL PREPARATION TECHNIQUE FOR THE REDUCTION OF BACTERIAL SKIN CONTAMINATION IN FOOT OPERATIONS

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Effective presurgical preparation is an important step in limiting surgical wound contamination and prevention of surgical site infection. The purpose of this study is to evaluate bacterial skin contamination after surgical skin preparation with a regular two-step technique method, in foot surgery, prior to surgery and at the end of surgery and to compare with a modified surgical skin preparation in order to determine if current techniques are satisfactory in eliminating harmful pathogens, and reducing re-colonization rate.

Methods:
38 consecutive patients scheduled for Hallux Valgus procedures were studied (40 feet). 20 lower extremities (group 1) were prepared in the regular method with a two-step technique, Septal scrub followed by a Alcohol Chlorhexidine antiseptic solution and 20 lower extremities (group 2) were prepared first with 10 minutes of Alcohol Chlorhexidine antiseptic solution scrubbing and then the regular method with a two-step technique, Septal scrub followed by a Alcohol Chlorhexidine antiseptic solution. After preparation and draping, cultures were spaces, and the anterior ankle (control), from the two groups.

Results:
In group 1 - Prior to surgery, positive cultures were obtained from 80% of hallux nail folds and 5% of web spaces. At the end of surgery, positive cultures were obtained from 80% of hallux nail folds and 25% of web spaces. None of the controls had positive culture. 5% of all cases developed postoperative infection. In group 2 - Prior to surgery, positive cultures were obtained from 10% of hallux nail folds and 5% of web spaces. At the end of surgery, positive cultures were obtained from 10% of hallux nail folds and 10% of web spaces. None of the controls had positive culture.

Conclusions:
The unique environment of the foot and its resident organisms probably plays a role in the higher infection rates associated with surgery of the foot. Based on the findings of the current study, presurgical skin preparation with a two-step Septal scrub followed by a Alcohol Chlorhexidine antiseptic solution is not sufficient in eliminating pathogens in foot and ankle surgery. 10 minutes of Alcohol Chlorhexidine antiseptic solution scrubbing and then the regular presurgical skin preparation method with a two-step technique is superior in eliminating pathogens in foot and ankle surgery.
OUR EXPERIENCE WITH THE KOENIG TOTAL TOE SYSTEM: A REVIEW OF OUR FIRST SIX YEARS

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Introduction:
Hallux Limitus is an often-debilitating condition of the first MTPJ. Treatment options include both conservative and surgical approaches. Review of the literature reveals varying degrees of success for each of the different methods of treatment.

Materials and Methods:
The authors describe their experience with the Koenig Total Toe System (TTS) from 2001-2007. They describe their first twenty two cases, which include a unique case of arthroplasty after arthrodesis as well as a revision of TTS. The authors describe their approach to proper patient selection for the procedure as well as the decision-making that is involved intraoperatively. The authors will provide video description of the key parts of the procedure. Twenty two patients whose primary diagnosis was Hallux Limitus underwent surgical correction of their condition with the TTS. These patients were followed from 12-69 months. They were subjected to preoperative AOFAS foot score evaluation as well as VAS for pain evaluation. They were also given comparative AOFAS foot score evaluation in the summer of 2007 during a retrospective review of our cases.

Results:
Of the twenty two patients 19 completed the questionnaires at both sessions. The average improvement of pain using VAS was from 7.20 to 2.10. The average improvement of AOFAS foot score was from 35 to 80. The average improvement in ROM was from 15 to 27 degrees of dorsiflexion and from 6 to eighteen degrees of plantarflexion. Of the nineteen patients fifteen replied they had overall satisfaction from the procedure and its outcome. sixteen stated they would have the procedure done on the contralateral side were they to need it. Fifteen related that they would recommend the procedure to a friend with similar complaints. Of the ones who viewed the overall outcome as less than satisfactory most of their complaints were due to the length of the postoperative period.

Conclusions:
TTS is a good surgical option to treat Hallux Limitus within certain preoperative parameters. There is a distinct learning curve for good performance of the technique but when mastered results are very successful. Patient selection is a crucial part of good outcomes and can be the deciding factor between an overall good case and one that is unsatisfactory. While ROM was not vastly improved, patients related satisfaction from their relief from pain.
USE OF VACUUM ASSISTED-CLOSURE DEVICE (VAC) IN TREATMENT OF DIABETIC, ISCHAEMIC AND POST TRAUMATIC WOUNDS OF THE EXTREMITIES

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Introduction:
Topical negative pressure (TNP) in the form of vacuum-assisted closure (VAC) has been used for wound management in patients with diabetic ulcers, decubitus ulcers, and management of wounds following high-energy open fracture. The purpose of this study is to report our experience with VAC therapy in patients with such non-healing wounds and in patients with high energy injuries following road traffic or work accidents and war injuries.

Patients and Methods:
This study includes 58 patients (33 M, 25 F) 3 to 79 years of age (mean age 46 Y) of them 46 with non-healing diabetic ulcers or ischaemic wounds in patients with PVD, and 12 patients with soft tissue injuries post various types of trauma, including 5 with crush injuries of the foot or leg following RTA, 4 with open fractures of the tibia, and 3 following shrapnel injuries with open fractures of the tibia. Diabetic patients were treated by wound debridement and then the VAC was applied and dressings were changed every 72 hours for the period needed for wound cleansing. Patients with PVD ulcers and some of the diabetic patients had also a vascular bypass. Patients with post traumatic injuries were treated by wound debridement and external fixation of fractures and then by VAC. The next stage included closure of wounds by secondary closure or by skin grafts. Exposed bone was then covered with the local or cross-leg random fascio-cutaneous flap.

Results:
Limb saving in patients with non healing diabetic ulcers or ischaemic feet were observed in 40/46 Pts. In the post trauma patients all flaps survived, and one of them developed cellulites in the area of the flap that resolved after antibiotic treatment.

Conclusion:
Based on this study it seems that the use of vacuum assisted-closure device (VAC) in treatment of diabetic, ischaemic and post traumatic wounds of the extremities may be useful in most patients. Soft tissue reconstruction of open fracture of low extremity is difficult and challenging problem. The use of improved wound care technology can simplify post traumatic soft tissue reconstruction of lower extremity and treatment of diabetic non healing ulcers. Last studies demonstrate a change in practice with a trend down the reconstructive ladder, currently using fewer free flaps and more delayed closures with frequent use of Vacuum Assisted-Closure (VAC).
PREVENTION OF AVASCULAR NECROSIS IN DISPLACED TALAR NECK FRACTURES BY HYPERBARIC OXYGENATION THERAPY: PRELIMINARY RESULTS

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Purpose:
Talar neck fractures are a rare injury that account for less then 2% of all foot fractures. Displaced fractures are associated with an exceedingly high rate of avascular necrosis (AVN). The incidence of AVN following Hawkins type three and four fractures of the talar neck may approach 100% particularly if diagnosis and reduction are delayed. Severe cases may present as pain and disability of the ankle and the subtalar joints due to a talar dome collapse, resulting in degenerative changes that usually require hindfoot Arthrodesis. The purpose of our study was to evaluate the efficacy of HBOT as a prophylactic tool in order to prevent AVN of the talus.

Materials and methods:
We present 10 cases of traumatic displaced talar neck fractures which were treated surgically relatively late following injury (5 to 15 days) due to a delay in diagnosis or inability to perform the surgery. All patients underwent hyperbaric oxygen therapy (HBOT) following the operation.

Results:
No cases of AVN of the talus were evidenced after the treatment with HBOT (6 month to 5 years follow up). All patients reported on return to daily and sports activity.

Conclusions:
We suggest this favorable result may be due to the beneficial effects of HBOT.
TREATMENT OF CALCANEAL FRACTURES WITH CLOSED REDUCTION AND FIXATION BY ILIZAROV EXTERNAL FIXATOR

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Purpose:
The treatment of intra-articular fractures of the calcaneus is still controversial. Conservative treatment is usually associated with increased pain and disability. Open reduction of calcaneal fractures allows excellent access to anatomical structures and enables stable fixation. However, it requires extensive exposure, and may cause increased risk of early wound complications, including skin necrosis and even osteomyelitis.

Materials and Methods:
Since 2000, thirty nine patients with 43 fractures of the calcaneus were treated in our department by closed reduction and Ilizarov external fixation. Four of them had fractures of both calanei. There were 36 males and 3 females, with age range of 18 to 54 years (mean - 30 years). We used the Letournel Classification System. 9/43 fractures were classified as Type III and 34/43 as Type IV. Six fractures were open and nine patients had additional injuries. All patients underwent surgery within the first week after injury. Weight bearing was allowed in all patients during first postoperative week. The average time of fixation in Ilizarov frame was 3.5 months (range 2.5-4.5 months). No additional immobilization was required.

Results:
On follow-up of 2 to 6 years (mean 3.5 years) 16 of 39 patients (41%) had excellent results, 17 patients (43.6%) had good results and six patient (15.4%) had fair results. In 6/39 patients (15.4%) superficial pin tract infection was successfully managed by local treatment and oral antibiotics. Three of the patients with poor results had a secondary procedure of subtalar arthrodresis. No cases of osteomyelitis, neuro-vascular injuries and skin necrosis were observed.

Conclusions:
This method is technically easy and safe. No major complications were observed. The use of Ilizarov external fixator in treatment of patients with comminuted calcaneal fractures allows good reduction with stable fixation and early weight bearing. The healing time is short and the functional outcome is satisfactory.
RESORBABLE MTP ARTHROPLASTY FOR HALLUX RIGIDUS: RATIONALE AND SOME CLINICAL RESULTS

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Hallux rigidus is a common disorder especially in older males. It leads to limitation of MTP dorsiflexion with attendant difficulty in gait due to pain and stiffness. Current treatments include rigid shoe inlays, rocker soles and a variety of surgical options including resection arthroplasty, total joint arthroplasty and arthrodesis. Treatment alternatives include arthrodesis, resection arthroplasty or joint replacement.

The Newly Described Procedure:
Regional anesthesia., a dorsal incision, arthrotomy and osteophyte removal from the metatarsal head, resection of 2 mm of the base of the proximal phalanx in order to achieve a flat surface, microfracture of the denuded joint surfaces, gel foam is stuffed into the cavity until the collaterals are tight.

Methods:
The current procedure utilizing a Gelfoam spacer is a cross between the first two options. On the one hand, the joint retains its inherent stability and toe shortening is prevented and on the other hand the procedure is not as technically demanding as total joint arthroplasty and bone stock loss is minimal. Thus, arthrodesis remains a relatively easy fall back procedure. Use of a stable spacer that does not undergo resorption is problematic due to particulate debris and resultant synovitis as happened with the silicone spacers. Thus, a slowly resorbing spacer might be ideal especially if it stimulates fibrous tissue formation. Thus, the end result might be a fibrous non-union in place of the first MTP. Provided there is no bone contact, pain should be minimal and range of motion should be maintained.

Patients and Results:
8 patients are included in this study.

<table>
<thead>
<tr>
<th>Age</th>
<th>53±5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>6 males</td>
</tr>
<tr>
<td>Hallux rigidus grade</td>
<td>0 patients minimal</td>
</tr>
<tr>
<td>Pre-op dorsiflexion</td>
<td>0 more than 10°</td>
</tr>
<tr>
<td>Post-op dorsiflexion</td>
<td>4 patients &gt; 10°</td>
</tr>
<tr>
<td>Pre-op Score*</td>
<td>2 fair</td>
</tr>
<tr>
<td>Post-op Score*</td>
<td>2 good</td>
</tr>
<tr>
<td>Radiographic joint space post operative in mm</td>
<td>4±1 mm</td>
</tr>
<tr>
<td>Radiographic joint space one year post-operative in mm</td>
<td>4±1 mm</td>
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</tbody>
</table>

Conclusion: this procedure can be used for patients with Hallux rigidus as a low cost and relatively low morbidity alternative to joint replacement surgery. Short term results appear to superior to those usually achieved by arthrodesis.
TREATMENT FOR OSTEOCHONDRAL LESIONS OF THE ANKLE:
A LONG TERM FOLLOW-UP AND RETROSPECTIVE CLINICAL AND RADIOGRAPHIC EVALUATION OF PRE AND POST-OPERATIVE FACTORS INFLUENCING PROGNOSIS

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Introduction:
Osteochondral lesions of the ankle result from rotational injuries of the ankle in athletes. The purpose of this study is to evaluate the results of arthroscopic treatment of ankle osteochondral lesions and to define the clinical and arthroscopic factors influencing prognosis.

Material and Methods:
From 1993 to 2002 a total of 108 patients underwent 132 arthroscopic procedures for diagnosis and treatment of osteochondral lesions of the ankle. The evaluations included a pre and postoperative clinical scoring, radiographic evaluation including pre and postoperative anterior- posterior, lateral and mortise view of the ankle, as well as CT and MRI of the ankle. Operative techniques included: microfractures technique (81 patients), fixation of the lesions using polylactic acid “Biofix” rods (17 patients), diagnostic arthroscopy followed by cartilage lesions shaving (16 patients), retrograde drilling of the lesion to the subchondral bone (12 patients) bone graft filling of subchondral cysts (4 patients ) osteochondral autografts(OATS 2 patients).

Results:
Traumatic etiology of the lesions was found to be associated with postero-medial Talar lesions (p<0.012).
Significant clinical and radiographic improvements comparing pre and post operative CT scoring (p<0.005), plane radiographs (p<0.01) and clinical score (p<0.003).
No correlation was found between the X-ray CT findings and arthroscopic grading. Clinical improvements where found to correlate directly with CT grading (p<0.05).
Fixation technique with “Biofix” was found to be associated with postoperative subchondral cyst formation detected on plane radiographs and on CT (p<0.0001). Tibial and Talar "kissing lesions" correlated with poor pre and post operative clinical score (p<0.05).
Lesions with sclerosis and or cyst on X-ray or CT before operation, appeared to have less clinical improvement with surgery (p<0.05).

Conclusions:
Ankle X-rays and CT plays a limited role in planning the intra-operative procedure. Findings like sclerosis and subchondral cyst carry less favorable prognosis, which is not reflected in the current classifications.
Arthroscopy is a valuable tool for evaluation and treatment of ankle osteochondral lesions. The operative technique should be selected according to arthroscopic findings and the surgeon should be prepared to tailor the different types of treatment to each lesion.
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MANAGEMENT OF SACRAL TUMORS: OUR EXPERIENCE WITH SIX PATIENTS

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Introduction:
Sacrum is a relatively rare location for primary bone tumors. The present study reviews our experience with marginal resection of low grade malignant sacral tumors.

Patients and Methods:
Six patients with sacral tumors were operated during the period of 1998 through 2004. They were four women and two men in the age range of 41-70 years. Five patients had chordomas and one had low grade hemangiopericytoma. Marginal resection of the tumors was achieved in four surgeries by combined anterior and posterior approaches and in two by posterior approach only. One patient underwent total sacrectomy, two sub-total sacrectomy, one high sacral resection and two low sacral resections. In one patient rectal anterior resection and colostomy were performed. Ilio-lumbar stabilization was done in three patients. Soft tissue coverage was achieved by bilateral transverse V-Y plasty of gluteus maximus muscles in all patients.

Results:
Four patients suffered from urinary mal/dysfunction, two had some degree of motor deficit and two experienced prolong wound drainage and breakdown. One patient died four months after the surgery due to meningitis. All other patients retuned to their normal life after rehabilitation period, two of them need urinary intermittent catheterization. Two of the patients experienced tumor recurrence, one of them has been re-operated.

Conclusions:
Management of sacral tumors is highly challenging, requiring multi-disciplinary team approach in order to achieve resection of the tumor. Surgery has resulted with high complication rate and morbidity.
A RETROSPECTIVE ANALYSIS OF THE RESULTS OF LIMB-SPARING SURGERY IN 38 SKELETALLY IMMATURE PATIENTS WITH BONE SARCOMA OF THE LOWER LIMB IN WHOM EXPANDABLE PROSTHESES WERE USED FROM 1988 TO 2005

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Background:
During the last 3 decades progress was made in the diagnosis and treatment of bone sarcomas. Most patients today get limb sparing surgery (L.S.S) in contrast to amputation. When treating children before skeletal maturity with L.S.S the result is limb length discrepancy (LLD) that affects function. One solution is the use of expandable endoprosthesis. We analyzed the results of L.S.S in 38 skeletally immature patients with bone sarcoma of the lower limb in whom different types of expandable endoprostheses were used from 1988 to 2005.

Methods:
We analyzed a series of 38 patients under the age of 14 who were treated by a single team from 1988 to 2005 for bone sarcomas (Osteosarcoma in 26 and Ewing's sarcoma in 12) located in the long bones of the lower limbs. Information included the tumor characteristics, the surgical and other treatment modalities, complications and their treatment, the final LLD and functional results using the AMSTS scoring system at the last follow up. We compared our results with those in the literature.

Results:
55% of the patients survived and had a mean follow-up of 113 months. All the survivors reached skeletal maturity during the follow up. 55% of the patients had at least one elongation (80% of survivors). 71% of the survivors had a satisfactory function and 29% had a poor result. Complications were documented in 58% of patients (90% of the survivors); the most common was infection that was diagnosed 56 times (primary -16% and secondary-84%).

A significant correlation was found between function and final LLD (grater than 5 cm = inferior function), the number of complications and the number of surgical procedures done other than prosthesis elongation. The younger the patient was at definitive surgery the shorter time it took for the prosthesis to fail. No significant correlation was found between the anatomic location of the tumor and the LLD or the functional results.

Conclusions:
The final function of patients treated with L.S.S with an expandable endoprosthesis at childhood is influenced negatively by a LLD greater than 5 cm and by the number of complications and secondary operations. In order to improve results we need to reduce as much as possible the number of operations. It can be achieved by the use of novel non-invasive expandable endoprostheses.
CT GUIDED RADIO FREQUENCY ABLATION OF PEDIATRIC OSTEOID OSTEOMA

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Introduction:
Traditionally, open excision has been the gold standard in the treatment of osteoid osteoma (OO). However, it was fraught with complications relating to difficulties in exposure, nidus identification and damage to neighboring structures. As imaging modalities improved, percutaneous CT guided ablation became popular. Recently, the sensitivity of OO to hyperthermia was noted and ablation by means of thermal energy administered directly to the nidus was shown to be effective. This is a review of our results of thermal ablation of OO in the pediatric age group utilizing a Radiofrequency (RF) probe.

Methods:
Medical records of twenty patients ages 4 to 18 (average 14) with OO who were treated with RF ablation from 2002 to 2007 were reviewed. Demographic data, pre-operative clinical features, nidus location and size, radiographic appearance and post operative course were recorded.

Ablation technique: All procedures were performed under general anesthesia, in the CT suite, using the Cool-tip™ Tyco probe. All the patients were discharged within 24 hours. Full weight-bearing was allowed post-operatively without crutches.

Results:
Fourteen OO’s were in the femur, and one in each of the following bones: humerus, tibia, calcaneus, 2nd metatarsus, sacrum and talus. Seven lesions were intra-articular. All patients but one had their symptoms resolved immediately following a single RF treatment.

Complications: One patient had partial relief after the ablation and underwent second successful ablation. Another patient with superficial nidus in the tibial shin suffered from infection that resolved after treatment. There were no neuro-vascular complications.

Discussion:
Previous surgical techniques, based on nidus removal, weakened the bone. This exposed the patients to the risk of fracture and necessitated long periods of protected weight bearing. RF thermal ablation was shown previously to be effective in the treatment of OO in the general population eliminating the risk of fracture. This is the first report documenting the high effectiveness of the Cool-tip™ Tyco RF probe in the treatment pediatric OO.

Summary:
Percuteneous CT-guided RF thermal ablation using a water-cooled probe is a simple, highly effective, minimally invasive and safe technique for treatment of pediatric OO.
PAIN PALLIATION IN PATIENTS WITH BONE METASTASIS USING MR GUIDED FOCUSED ULTRASOUND SURGERY. PRELIMINARY MULTICENTER CLINICAL EXPERIENCE

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Background:
Bone is a common organ for metastasis, third only to the lungs and the liver, increasing longevity among cancer patients contributes to the high incidence and prevalence of bone metastasis in this population.
Non invasive thermal ablation using MR guided focused ultrasound (MRgFUS) was shown to be clinically effective in uterine fibroids, and is evaluated for breast, liver, and brain lesions.
In order To evaluate the efficacy and safety of MRgFUS on painful bone metastasis, a multi center study was conducted in patients suffering from painful bone metastasis for whom other treatments failed or was not feasible

Methods:
31 patients in three medical centers, with painful bone metastasis, underwent MRgFUS procedure, treatment safety was evaluated assessing the device related complications, pain palliation was evaluated using the visual analog pain score (VAS), and measurable changes in pain medications.

Results:
36 treatments in 31 patients were conducted, targeting 32 bone metastasis.
With mean follow up of 4 months, 30 patients received the planed treatment and were available to follow up after 3 months, no severe adverse events were recorded, 2 patients died due to disease progression.
Mean baseline VAS score before treatment was 5.9, and reached 1.8 3 months after treatment. Most patients reported substantial pain relief 3 days after treatment that continued to improve during follow up, with a decrease in pain medication dosage. Few patients reported slight pain after treatment that didn’t change their overall improvement during follow up.

Conclusions:
We suggest that MRgFUS may provide safe and effective non invasive alternative for pain palliation in patients with painful bone metastasis.
SPACE SARCOMAS: EXTRA COMPARTMENTAL SOFT TISSUE TUMORS OF THE LOWER EXTREMITIES

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\textbf{Background:}
Soft tissue sarcomas of extra compartmental spaces of the lower extremities; femoral triangle, sartorial canal and popliteal space arise outside anatomic muscle compartments. Unique features of these sarcomas, which grow in these tight virtual spaces, include ability to extend proximally and distally with minimal anatomic restraint and great proximity to major neurovascular structures which enables early invasion. All these make for a more complex resection.
We analyzed the general principles of proper surgical approach, tumor resection and soft tissue reconstruction and their application to the three lower extremity spaces.

\textbf{Methods:}
A retrospective database and chart review from one referral center identified 53 consecutive patients. Sarcomas were differentiated into three groups according to the surrounding structures they invaded. There were 15 groin, 16 sartorial canal and 22 popliteal fossa tumors. There were 11 type 1, luminal tumors that did not invade surrounding structures, 29 type 2, wall lesions that invaded surrounding fascia and 13 type 3, vessel lesions that invaded the neurovascular bundle.

\textbf{Results:}
Limb sparing surgery was achieved in 50 patients (94%). Amputation was necessary in only three patients. Superficial wound complications occurred in 21% emphasizing the importance of soft tissue reconstruction to protect the vessels. The 2 year and five year survival rates were 88% and 81% accordingly. The 2 and 5 year local recurrence rates were 10% and 14%.

\textbf{Conclusions:}
Space sarcomas should be resected with a systematic approach that emphasizes wide exposure, type specific planes of resection and soft tissue reconstruction.
FREE VASCULARISED FIBULAR GRAFT FOR THE TREATMENT OF AVN OF THE FEMORAL HEAD – THE SOURASKY MEDICAL CENTER EXPERIENCE

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A vascular necrosis of the femoral head continues to be a difficult problem to manage. Due to lack of understanding the etiological process responsible for it, numerous pathophysiological mechanisms have been postulated as the causes. Unfortunately the common end result is osteoarthritis. In principle, treatment options fall into one of two categories: prosthetic replacement or femoral head salvage. The results of the conservative treatment in AVN of the femoral head are poor with eventual joint destruction. Our aim was to evaluate the safety and efficacy of the salvage procedure popularized by J. Urbaniak ie; free vascularised fibular graft for the treatment of AVN of the femoral head.

Materials and Methods:
Between the years 2004-2007 8 patients with 10 diseased femoral heads were operated by a team comprising orthopedic and micro-vascular surgeons. In all cases the fibula was harvested from the contralateral side. In all cases the harvesting of the fibula and the preparation of the femoral head and neck were undertaken simultaneously. The post operative weight bearing protocol was partial to total weight bearing in six month.

Results:
Complications: two cases of re-operation within 24 hours because of anastamotic problems. One case of superficial wound infection at the hip incision site. Four cases of minor flexion contracture of the big toe and one case of mild ankle discomfort at the donor side. In one case revision to THR was undertaken due to extreme unexplained pain. In nine out of 10 hips Harris hip scores were markedly increased.

Conclusion:
Based on our limited experience and although the procedure is technically demanding and mandates a team approach and dedication. It is a safe and reproducible procedure, which must be available as a treatment option especially in young patients and those suffering from bilateral disease.
SYNOVIAL SARCOMA OF THE EXTREMITIES AND TRUNK: A LONG LASTING DISEASE


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Introduction:
Synovial sarcoma of an extremity or trunk is a relatively rare type of soft tissue sarcoma. SS most commonly affects adolescents and young adults. SS usually originates at an extremity, carries a t(X;18)(p11;q11) translocation, and approached by limb sparing surgery, radiation therapy, and chemotherapy.

Patients and Methods:
A retrospective analysis of clinical and histopathological data of 73 patients with proven SS, treated at the National Unit of Orthopedic Oncology, from January 1991 through December 2004 was performed.

Results:
At a median follow-up time of 6 years, a disease-recurrence was observed in 42.5% of the patients (local-only in 6.8 %, systemic-only in 24.6 %, and combined in 11%). Accumulation of events of local and systemic recurrence following a limb sparing approach, did not reach a plateau even after 192 months from diagnosis. The 10-year local recurrence free survival (LRFS), the 10-year systemic recurrence-free survival (SRFS), and the 10-year overall survival (OS) were 78%, 68%, and 61%, respectively. The median SRFS time was 180 months, while the median LRFS and OS have not been reached yet. LRFS was significantly better for ILP treated patients; SRFS was influenced by a shorter delay in diagnosis.

Conclusions:
The practical aspects of our observations are the need for long-term follow-up for diagnosis of recurrence, the fact that not all local or distant recurrences are necessarily associated with shortening of overall survival, and the important role of induction ILP with TNF in cases of extremity SS.
'TELANGIECTATIC' TRANSFORMATION IN SOFT TISSUE SARCOMAS. 
A CLINICOPATHOLOGIC ANALYSIS OF AN AGGRESSIVE FEATURE OF HIGH-
GRADE SARCOMAS

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Introduction:
'Telangiectatic' change, which contains a large fluid hemorrhagic component, occurs in a
variety of extremity high grade soft tissue sarcomas.

Methods:
A retrospective database review identified 20 consecutive patients (3%) with 'telangiectatic' 
change in soft tissue sarcomas.

Results:
Tumors were located in the thigh (55%), shoulder (15%), calf (15%), upper arm (10%), and 
buttock in one patient. All twenty tumors were high grade. Histologic diagnosis was MFH 
(40%), Leiomyosarcoma (15%), Synovial sarcoma (10%) and one each of seven other 
sarcomas (35%). Tumors contained a fluctuant mass of large size- more than 10 cm (35%),
between 5 and ten cm (60%) and less than 5 cm in one case. The main differential diagnosis 
is a deep tissue hematoma since a history of contusion to the tumor site that was followed by 
swelling was common. 80% of patients presented with a painful mass. On MRI imaging, 60% 
appeared to contain more than 50% blood. 50% had a hemosiderin laden rim around the 
tumor. 55% contained well defined tumor nodules within the wall of the hematoma. Limb 
sparing surgery was carried out in 90% of patients, 10% underwent primary amputation. The 
5-year event free survival rate was 30%. 15% presented initially with metastatic disease. 
53% developed metastatic disease within two years of diagnosis. The overall local 
recurrence rate was 30%.

Conclusions:
Telangiectatic transformation in soft tissue sarcomas is a rare feature of aggressive high 
grade soft tissue sarcomas and is unique in its clinical presentation, MRI characteristics, 
pathologic pattern and a tendency for a worse off prognosis.
ELASTOFIBROMA AT THE SCAPULAR REGION – CASE SERIES AND REVIEW OF LITERATURE

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Introduction:
Elastofibroma is a rare type of lesion, consisted of elastic fibers within a stroma of collagen and fatty tissue. It is usually located on the scapular region, attached firmly to the thoracic cage, causing debilitating pain. Its clinical presentation can mimic that of soft tissue sarcoma. In this report we review the literature regarding this specific lesion and report our experience in treating 11 patients.

Materials and Methods:
Between January 1997 and March 2007, 11 patients (nine female and two male patients) between 52 and 71 years of age (mean 63) were surgically treated by the orthopedic oncology service at our institution. Due to mass at the lower scapular angle and clunking on shoulder abduction. All patients underwent radiological evaluation, and seven underwent histological evaluation as well (FNA or CNB). Which allows differentiate this benign tumor from soft tissue sarcoma.

Results:
All patients were available for follow up in the outpatient clinic for at least one year except for the last patient who followed for six months. All of the patients were functionally active, with full function of ADL. One patient was conservatively treated due to serotic discharge from the wound. There were no recurrences observed.

Conclusion:
Deep to the facia situated soft tissue mass in the elderly, challenging differential diagnosis of soft tissue sarcoma. Awareness of the clinical presentation, coupled by imaging modality, aid in establishing the correct diagnosis preoperatively. Which is enabling delicate surgical removal of the tumor for patient whose symptoms are causing distress.
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CHOICE OF SURGICAL APPROACH IN THE TREATMENT OF SUB AXIAL CERVICAL SPINE INJURIES

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Introduction:
Surgical approach in the treatment of subaxial cervical spine injuries (SCSI) is still controversial. Some surgeons approached this segment anteriorly, while the others used the posterior approach.

The purpose of this study is to review our experience in determining the indications for anterior or posterior approach based on mechanism of injury.

Material and Methods:
Our experience is based on more than 750 patients with surgical treatment of subaxial cervical spine fractures in period of 30 years. This study included 284 patients with long-term follow-up after surgical treatment of SCSI. Of all patients 62% (176 pt) were male and 38% (108 pt) female. Less than 50 years were aged 74% of the patients, nearly 30% were in the third decade. Motor vehicle accidents (MVA) accounted 68%; followed by diving 16%; falls 12 % and other injuries 4%. According to Allen and Ferguson classification 20% (57 pt) were found with compression flexion injury (CF); 13% (37 pt) with vertical compression (VC); 15% (43 pt) with distraction flexion (DF); 22% (63 pt) distraction extension (DE); 12% (34 pt) with compression extension (CE) and 18% (43 pt) with lateral flexion injuries (LC). Neurologic grading was done by Frankel scale : group A-25% (71 pt); B-12% (34 pt); C-12% (34 pt); D-16% (45 pt) and E-35% (100 pt). All patients were diagnosed according to a protocol which included: accurate history, careful neurologic examination, plain radiographs; CT and MRI (if necessary). Sometimes additional views were performed to achieve a more detailed assessment. Instability was assessed according to White and Panjabi criteria. Posterior fixation with lateral mass plates was done in patients with DF, CE and some LC injuries. Anterior corpectomy , fusion and plate stabilization was done in patients with CF, VC, DE, LC spinal injuries. Combined approach was used in 32 pt with marked instability. Methylprednisolone was given recently according to the NASCIS II, III protocol in patients admitted within 8 hours of injury. The follow-up period ranged from 1 to 8 years.

Results:
From the mechanical standpoint an initial improvement in the alignment of deformities was achieved in all of the patients. In 14 cases the reduction was incomplete, 9 patients were reoperated; 11 patients had postoperative infection (10 with posterior and 2 with anterior surgery) one patient had bone graft expulsion. The postoperative neurologic recovery was as follows: from group A to group B-2 pt; from B to D-12 pt; B to E-9 pt; C to E-16 pt; C to D-8 pt; D to E-30 pt. In the other cases no changes in the neurologic status were registered. The overall mortality rate in cases with complete spinal cord lesion was 30,4%. The mean hospital stay was 38,9 days (range 8-79 days).

Conclusion:
- Unstable SCSI should be reduced and fixed as soon as possible, especially in a case of progression of the neurologic deficit. Decompression of the spinal cord is required for recovery.
- The choice of surgical approach depends on the site of injury. If the posterior elements are disrupted (FD, EC, LC fractures), posterior decompression and stabilization with lateral mass plates and screws can be utilized to provide stability for the posterior structures. If the anterior elements are disrupted (CF, VC, DE, LC fractures) anterior decompression fusion stabilization with plates and screws can be done.
SURGICAL MANAGEMENT OF MULTIPLE MYELOMA PATIENTS WITH ACUTE NEUROLOGICAL DEFICITS

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Background:
Multiple Myeloma accounts for 10% of hematological tumors. In most cases the vertebrae, long bones, skull and pelvis are being involved as osteolytic lesions, which can cause pathological fractures.
Spinal cord compression is a rare clinical presentation of Multiple Myeloma, and scarcely has been described in the English literature.

Objective:
To present the surgical management of 4 Myeloma patients, with acute neurological deterioration.

Methods:
During the last three years we, had four Myeloma patients (all men), age 57-62, with acute neurological deterioration, who underwent spinal decompression and fusion.
Three had lesions penetrating the spinal cord at different levels of the thoracic spine, causing sensory level at T2, paraparesis and paraplegia respectively. One had paraparesis due to compression at L2 level.
In the case of T1-2 lesion, we have performed anterior decompression and cementation and posterior T1-T3 fusion through costotransversectomy approach. The two patients with T12 and L2 lesions had corpectomy of the involved levels, ASF using cage & instrumented PSF.
One case with cord compression from T5-T10, without evidence of mechanical instability, was treated with posterior wide decompression alone.

Results:
Adequate decompression, spinal stabilization and neurological improvement has been achieved in three cases.
One of the patients had died 3 weeks following the surgery due to general deterioration, and one patient underwent immediate extension of the posterior fusion (T11-L1 → T9-L3) due to mechanical failure.

Conclusion:
In cases of penetrating Multiple Myeloma lesions at the lower thoracic and the thoraco-lumbar region, the preferred surgical management to achieve spinal decompression, stabilization and fusion is through combined posterior and anterior approach.
When the lesion is at the upper thoracic area (case 1) the same goals can be accomplish through costotransversectomy, enabling anterior decompression and fusion through posterior approach alone.
This surgical strategy is applicable for most of the primary and secondary malignant spine lesions.
SPINAL INJURY IN POLYTRAUMA PATIENTS PRESENTING TO A LEVEL I CANADIAN TRAUMA INSTITUTION

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Introduction:
Traumatic injuries of the spinal column in young people result in neurological deficit in 10 to 25%. Management is based on the epidemiology, biomechanics, and pathophysiology of the injury. Controversies exist regarding management. Previous reports included heterogeneous populations of spinal trauma. The purpose of the present study was to evaluate the demographics, etiology, and management of spinal injuries in polytraumatized patients presenting to a Level I Canadian trauma institution.

Materials and Method:
Review of a prospective database of consecutive patients with spinal injury and ISS score > 15 admitted between 1998 and 2005 at a Level 1 trauma institution. A chart and radiological review was conducted by an independent observer.

Results:
161 consecutive patients were identified. Mean age was 45.4±19.7; male: female ratio was 2:1. 45% were transferred to a rehabilitation facility or another hospital. MVA (56.1%) was the leading etiology, followed by falls (25.2%), industrial/recreational accidents (9%), pedestrian (8.4%) and GSW (1.3%). Mean ISS scores were 31.7±10.9. GCS was <8 in 19%, 8-12 in 5%, and over 12 in 76%. Mortality rate was 10%. According to AO classification 50% of patients were type A, 29% B and 21% C. Neurological deficit according to Frankel score: A 15%, B 8%, C 3%, D 4%, E 70%. A higher AO grade was associated with greater neurological dysfunction and higher rate of surgery (p<0.0001). 48% of injuries occurred in the occipital and cervical region, 32% thoracic, 26% lumbar, and 4% sacral. Multilevel spinal column injury occurred in 33% of polytrauma patients. 34% of the cases were treated operatively (76% posterior, 15% anterior, 9% combined approaches). The timing of surgery was not statistically different comparing neurological groups. 44% required ICU admission (mean 5.6±11.5 days). Mean hospital stay was 23.1±20.8 days. More severe spinal injuries and multilevel injuries were associated with a longer hospital stay (p<0.01).

Discussion and Conclusion:
The overall difference in etiology of spinal injury in polytrauma patients with ISS score more than 15 suggests a higher prevalence of MVA – 56.1 % vs. 45% in the literature. The overall incidence of neurological deficits (30%) is higher than in previous studies most probably as a result of higher ISS in the present study compared to heterogeneous spinal trauma populations in other series. The incidence of multilevel fractures was much higher than in previous studies – 33% vs. 3% to 5%. Therefore, a high index of suspicion is warranted in the evaluation for non-contiguous spinal injuries and in clearance of the spine in patients presenting with an ISS of more than 15. This initial study will serve as a foundation for comparative studies to other spinal trauma subpopulations that may ultimately include a prospective study on treatment outcomes. A better understanding of the demographics and prognostic predictive factors in the subpopulation of spinal trauma in polytraumatized patients may guide the development of a management algorithm in medical and surgical treatment.
Study Design:
A cross section analysis of 395 consecutive patients diagnosed with spinal stenosis, degenerative disc disease or osteoporotic vertebral fractures.

Objective:
To compare the prevalence of diabetes mellitus in patients with spinal stenosis, degenerative disc disease or osteoporotic vertebral fractures.

Summary of Background Data:
Diabetes mellitus is a multi-organ disorder affecting many types of connective tissues, including bone and cartilage. Certain skeletal changes are more prevalent in diabetic patients compared to non-diabetic individuals. A possible association of diabetes mellitus and lumbar spinal stenosis has been raised.

Methods:
The study cohort consisted of all patients examined by one senior author (YM) in the outpatient orthopaedic clinic of a large general hospital between June 2004 and January 2006 and diagnosed as having either lumbar spinal stenosis (n=225), degenerative disc disease (n=124) or osteoporotic vertebral fractures (n=46).

Results:
The prevalence of diabetes mellitus in the spinal stenosis group, the osteoporotic fracture group and the degenerative disc disease group was 28%, 6.5% and 12.1%, respectively, revealing a significantly higher prevalence in the spinal stenosis group compared with the others (p=0.001). The higher prevalence of diabetes in the stenotic patients was unrelated to the presence of degenerative spondylolisthesis.

Conclusions:
There is an association between DM and lumbar spinal stenosis. Diabetes mellitus may be a predisposing factor for the development of lumbar spinal stenosis.
POSTERIOR LUMBAR INTERBODY FUSION (PLIF STAND-ALONE) FOR CHRONIC LOW BACK PAIN

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Objective:
To evaluate the fusion achieved by Posterior Lumbar Interbody Fusion - PLIF (B-TWIN, Disc-O-Tech) stand-alone in terms of intervertebra fusion on the basis of radiographs imaging.

Summary of Background Data:
Lumbar fusion is being used to reduce pain and decrease disability in patients with chronic low back pain. Different surgical techniques are available. In the past, postero-lateral fusion with bone graft alone had a high rate of failure therefore fusion techniques using instrumentation began to develop, such as the postero-lateral pedicle-screw fixation, the Transforaminal Lumbar Interbody Fusion (TLIF), the Posterior Lumbar Interbody Fusion (PLIF) and the Anterior Lumbar Interbody Fusion (ALIF). Combination of pedicle screws and PLIF/ALIF/TLIF created “circumferential fusion” and high rate of success though higher rate of complications. The use of PLIF stand-alone has been described with controversial results.

Methods:
From 2003 through 2006, 14 patients with chronic low back pain were operated in our department with the following etiologies: spinal stenosis - 6, degenerative spondylolisthesis - 6 and degenerative disc disease – 2, underwent 15 interbody fusion with PLIF (one patient underwent 2 levels). The mean follow-up period was 36 months (17-55). In order to evaluate the quality of fusion flexion and extension radiographs were performed. Difference of 4 degree was considered as failure of fusion.

Results:
14 patients, 5 male and 9 female mean age 56 (43-72). Underwent 15 lumbar interbody fusions. 14 patients (93%) had less than 4 degree of different between flexion and extension radiographs. the overall median score was 1.7 degree. the male group had median score of 2.9 and the female group 1.1 (P=0.066). All the patients with degenerative disc disease had scores above 1.7 degree, 57% (4) of the patients with spondylolisthesis had scores above 1.7 degree and 16% (1) patient with spinal stenosis had score above 1.7 degree (P=0.096).

Conclusions:
A fusion rate of 93% was achieved. The results suggested a tendency for better results in the female group and better results in the spinal stenosis group compared with the spondylolisthesis group and the degenerative disc disease group. Majority of the patients expressed decline in the amount of pain. There is a need for further investigation in order to establish our findings.
MINIATURE ROBOTICS IN SPINE SURGERY – BEYOND THE LEARNING CURVE AND FUTURE OUTLOOK

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Introduction:
Misplacement of implants during spinal surgery is not an uncommon event, and may lead to chronic pain, bothering neurological deficits and even result in catastrophic events such as death or pentaplegia. Navigation systems have not gained popularity in spine surgery due to financial, staff, and space issues, moreover, their accuracy has not proven to be superior enough to justify wider use. The SpineAssist miniature robot technology is based on merging of the preoperative CT scan with intra-operative fluoroscopy images taken after the robot is mounted to the patient's body. It assists the surgeon in aiming of implants. Difficulties encountered during the development phase of the SpineAssist in two spine centers were previously reported. However, the results of the routine use of the robot for up-to 2 years were not reported yet.

Patients and Methods:
24 Patients 18 males and 6 females (mean age 61 range 24-78) underwent robotic assisted procedures, 19 patients were fused, 4 underwent Vertebro/Kyphoplasty, and 1 underwent percutaneous biopsy. The SpineAssist was used in fusion procedures, for pedicle screws insertion, both through open approaches or per-cutaneusely, in biopsy and in Vertebroplasty or Kyphoplasty procedures- for optimal needle positioning. Data included operative time, time of robot usage, overall success, complications and failure analysis.

Results:
Procedure time ranged from 47 to 298 minutes (average 186 minutes), robot usage time 17-95 minutes (39.9 minutes average) and time per screw insertion 4.3-64 min (10.28 min average). The overall success was 85.0%. Of the 24 procedures in the series, technical failures were encountered in two, and surgeon related errors occurred in two. These failures and possible solutions for future users are summarized. No major complications related to the use of robot occurred. 6 complications unrelated to the robot are described.

Conclusion:
The spine assist is a highly accurate surgical guidance system, incorporating a bone mounted miniature robot, this system has been validated successfully, and is undergoing further evolution, for future uses, in C1-C2 fusion, cervical and thoracic spine pedicle screws, Deformity surgery, and excision of lesions such as osteoid osteoma of the spine.
BIOMECHANICAL EVALUATION OF THE B-TWIN IMPLANT IN KYPHOPLASTY OF INDUCED COMPRESSION FRACTURES IN HUMAN VERTEBRAE

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Purpose:
In Vertebroplasty and Kyphoplasty, percutaneous injection of cement is used for the treatment of compression fractures due to osteoporosis or malignancy. The B-twin implant is a titanium made implant which is expanded in the vertebral body and used to support the vertebral body during the cement injection. In this work we evaluated the B-twin implant in Kyphoplasty of induced ex-vivo compression fractures in human vertebrae.

Methods:
Compression fractures were induced in 18 human vertebrae. The vertebrae were divided into two groups of vertebrae. One group was injected with cement the other was implanted with the B-twin implant and thru it injected with cement. The vertebrae were then divided into 3 groups of 6 vertebrae each. The first group was tested by applying static compression. The next two groups by applying dynamic compression.

Results:
In both groups we found a rise in vertebral height after implantation with no statistical difference. There was no statistical difference in the height of the vertebrae after compression, the measured yield load and ultimate load between the two implants. We didn’t find any statistical difference between the vertebrae that were injected with cement and the vertebrae that where implanted with the B-twin implant. Failure of the implant wasn’t found under the different compression forces.

Conclusions:
The B-twin implant can be used as a metal skeleton supporting the vertebral body during injection of cement. The implant did not change the elastic characteristics of the vertebrae nor the vertebral stiffness.
86.

BIOMECHANICAL COMPARISON OF SURFACE CONTACT AREA BETWEEN STANDARD BACKBOARD AND OTHER RIGID SURFACES

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Introduction:
Backboards are routinely used to protect the spine of trauma patients during transportation. Our objective was to evaluate the mechanical support provided by a standard backboard in comparison to various rigid immobilization surfaces, by examining their respective Surface Contact Area (SCA).

Materials and Methods:
SCAs comparisons of a standard Aluminum Backboard (AB), a rigid military stretcher, an AB covered by blanket, 3 and 5 cm thickness foam and a cushioned stretcher were made in twelve volunteers.
The evaluation was performed by a computer mediated system that generated a diagram indicating pressure distribution and SCA score in each volunteer. These data were compared to a medical grade mattress, which served as the control group.

Results:
The median backboard's SCA was 14.6±5.5 times smaller than the stretcher's SCA (range 4.6-28, average 15, p<0.001). Its median SCA was essentially doubled by covering it by a standard military blanket and tripled when covered by 3 cm layer of foam. Using a 5 cm layer of foam increased the backboard's SCA by 11 times. Cushioning the stretcher beneath the lumbar spine and the hamstrings by folded blankets, significantly improved its median SCA (96±31.1, range 36-125, average 89.7).

Conclusions:
The backboard's SCA was significantly inferior to all the other surfaces. Although no dynamic evaluation was performed, these data imply that backboards need to be appropriately cushioned or alternate surfaces should be employed in order to improve the mechanical support during trauma patient transportation.
THORACOSCOPIC RESECTION OF THE FIRST RIB FOR THORACIC OUTLET SYNDROME

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Introduction:
Thoracic Outlet Syndrome (TOS) is a group of distinct disorders producing signs and symptoms attributed to compression of nerves and blood vessels in the thoracic outlet region. Clinical signs and symptoms of TOS usually include pain in the neck and shoulder area and numbness and weakness in the arm/hand. Most patients with TOS will improve with conservative treatment that includes physical therapy, postural training, muscle strengthening exercises, and heat treatments with ultrasound. Drugs may be used to control pain and muscle spasm. Only a small number of patients require surgery and resection of the first rib is the most common one.

Patients:
We would like to present a new technique of thoracoscopic resection of the first rib in two young women 31 and 22 years old with thrombosis of the right subclavian vein and typical symptoms of arterial thoracic outlet syndrome, of the right side, lasting 10 and 4 months respectively both failed conservative treatment.
The surgical technique included general anesthesia with double lumen tube: with the patients lying on the asymptomatic side. The surgery was performed through three entry ports one for the scope and two for manipulation and resection of the first rib. In both patients a 4-6 cm of the rib at the area above the neurovascular bundle was resected using long high speed drills, curates and roungeours.

Results:
The average blood lose in both cases was negligible, no general and neurologic complications were recoded and both patients were released home 4 days after surgery. In both of them immediate relief of the arterial symptoms and improve of the right arm edema was achieved ( in first case on duplex examination –full recanalisation of the subclavian vein with good flow) and it was lasted until last follow up 3 and 1 month after surgery respectively. No complications were recorded in both of them.

Conclusions:
Thoracoscopic resection of the first rib in patients with thoracic outlet syndrome is possible. It involves much less extensive surgery than the usual transaxillary, supraclavicular and subclavicular combined approaches with short term good results.
**POSTER SESSION**
88.

**SHOCKWAVE THERAPY (ESWT) FOR NON-HEALING WOUNDS**

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Shock wave therapy might be novel to dermatologists, but its use is mainstream to urologists, who have been using the therapy for 35 years to destroy kidney stones. A new study suggests that extracorporeal shock wave therapy (ESWT) is highly effective in treating patients with several types of skin lesions, including venous ulcers and burns. Researchers presented their findings at the 8th International Congress on Shock Wave Therapy in Vienna.

200 patients have been treated with shock wave therapy from September 2004 till February 2006. These are the results, as it was reported by the Trauma Center in Meidling, Vienna:

**How does it work?**

Shockwave therapy is, basically, the use of mechanical pressures. It can be compared to ballistic sound waves that a jet plane creates around it during flight. The ESWT machines create a combination of four kinds of waves; electromagnetic waves, sound waves, light waves, and heat waves all in wide range of intensity. It is still unknown which of these waves has the highest ability, and what each kind of wave contributes on its own.

There is already a 10 year experience, in the western world, of using high frequency energy shock wave therapy for fracture treatment. The ESWT was approved for use on such cases by the European health authorities.

Thanks to basic research done in recent years; scientists know that tissue that is exposed to shock waves initiates the production of growth factor, such as VEGF (vessel endothelial growth factor). Also, from in vitro trials, it is known that there is a high antibacterial effect of shock wave, perhaps because of the influence the therapy has on biofilms that are produced by the bacteria. Shock waves seem to crack that and make it easier for the body to fight infection.

Shock wave therapy is good news for several medical problems. It can replace surgeries and cut down hospitalization and medication expenses for the state and the HMO companies, as well as cut down patient suffering. Recently, shockwave therapy was introduced to orthopedic and diabetic ulcers in Rambam medical center.
CIVILIAN GUNSHOT WOUNDS TO THE EXTREMITIES IN A LEVEL I TRAUMA CENTER: OUR EXPERIENCE AND A REVIEW OF LITERATURE

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Introduction:
Gunshot wounds are a continuous burden on community and hospital resources. Gunshot injuries to the extremities might involve complex soft tissue, bone, vascular, musculotendinous, and nerve injuries. Precise knowledge of anatomy is needed in order to evaluate and treat those injuries. In this article we review our experience with gunshot wounds to the extremities

Patients and methods:
We retrospectively reviewed all cases of gunshot wounds to the limbs in a civilian setting treated in our institution in the years 2003-2005. 60 patients with 77 injuries were evaluated.

Results:
Of our sixty patients, 36 had fractures, 75% of them in the lower extremity and 81% in long bones. The most common fixation modality is external fixation (33%), followed by intramedullary nailing (25%). This is a relatively high percentage of fracture treated with external fixation and is attributed either to the comminuted pattern of the fractures, the generalized status of the patient, or the local soft tissue problems encountered in gunshot wounds. About one fifth of the fractures were treated by debridement only without hardware fixation. We treated 10 vascular injuries in 8 patients, 6 of them were injuries to the popliteal vessels. We found that fractures about the knee comprise the highest risk factor for vascular injuries, as 5 of the 12 fractures about the knee were associated with vascular injury requiring repair. There were 13 nerve injuries (16.8%), the majority of them were deep peroneal nerve (38%). Only three patients had concomitant nerve and vascular injuries. The overall direct complication rate in our series was 20%.

Conclusion:
Treating complex gunshot injuries requires a team approach. Our opinion, which we apply in our institution, is that this team should be led by an orthopedic surgeon knowledgeable in the functional anatomy of the limbs. This approach will lead to a favorable result.
POSTER SESSION
90.

HIP SURGERY – COMPARING PATIENTS VS. SURGEONS EXPECTATIONS

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Background:
THR is one of the most common and successful orthopedic procedures. The most frequent indication is continuing pain around the hip. It is usually the patients who seek operative solution for the pain, even after receiving explanations of possible complications during and after surgery, as rare as they may be. The surgery can be performed at almost any age, but the average is about 60 years old. Inappropriate expectations can lead to a lower level of patient satisfaction in spite of good surgical outcome, and a less than desired readiness to deal with possible complications. Insufficient information given by the medical stuff or misleading information gathered using unreliable sourced such as friends opinions and the internet can attribute to the formation of such expectations.

Purpose:
To compare the patients' expectations vs. Surgeons' before THR.

Materials and Methods:
Written questionnaires were used to assessed patients' and doctors' expectations before THR. The distribution of the questionnaires and the compiling of the information were done in the Sheba Medical Center during the period of 4 months- December 2006 to April 2007.

Results:
Significant differences were found in most subjects that were studied. Major findings concerning expectations of patients vs. surgeons, were on the following points:
1. Pre operative information and guidance
2. Post operative pain control
3. The need for walking aids such as crutches, walkers
4. Impairment of sexual performance
5. Discharge from hospital
6. Independence in activities of daily living
In addition, differences in expectations were found between age groups (younger than 40 and older than 60).

Conclusions:
According to the surveys findings, there are significant differences between patients' and surgeons' expectations before THR. Despite several meetings between the patients and surgeons, questions and answers and informed instruction, patients' expectations were not in correlation with what was thought to be conveyed during pre-operative meeting with surgeons and nurses. There is place for intervention, by surgeons as well as nurses. We can presume that the best opportunity to do so, would be in the pre-surgical clinic. Like wise, special attention towards the older age group (over 65 years) due to even more inadequate expectations in thus age group.
POSTER SESSION
91.

WEIGHT-BEARING DEFICITS FOLLOWING ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Introduction:
Asymmetric gait patterns persist up to one year after Anterior Cruciate Ligament reconstruction (ACLR). Early normal gait restoration has shown not only to be safe, but important in order to rapidly regain normal muscle function and to significantly lower post-surgical complications. There are no short-term studies quantifying different weight-bearing deficits following ACLR, nor if differences exist between the various surgical procedures and replacement graft choices in the acute-phase (0-3 weeks) post surgery.

Aims:
To determine to what extent weight-bearing is affected during gait in the acute-phase (0-3 weeks) following ACLR, as well as whether there exist different weight-bearing deficits between various surgical procedures and replacement graft choices in the acute-phase (0-3 weeks) following ACLR.

Materials and Methods:
The percentage body weight/weight-bearing (PBW/WB) values and gait characteristics in the acute post-surgical stage (0-3 weeks) of 15 patients who had undergone ACLR were measured, utilizing a new, innovative computerized air-insole auditory biofeedback system. The entire group was sub-grouped into those patients who underwent only a hamstrings graft reconstruction, those who underwent an allograft reconstruction, and finally those who had a hamstring graft reconstruction combined with a medial meniscus suture.

Results:
The average entire-foot, hind-foot and fore-foot PBW/WB values of the operated group were all statistically significantly lower than the normal group (p<0.05). The most marked difference being that of the hind-foot PBW/WB value. The combined hamstrings graft/medial meniscus repair group exhibited a statistically significant difference in the percentage time spent in both the stance and swing phases, as compared to the norm (p<0.05). The allograft group scored the best on all PBW/WB values.

Conclusions:
Clinicians involved in post-ACLS rehabilitation should place more emphasis on encouraging hind-foot weight-bearing as early on as possible following ACLR. Initial results may indicate the choice of the allograft over the other graft types in terms of post-surgical pain and functional weight-bearing ability in the short-term.
VARIABILITY AND ACCURACY OF ACETABULAR ORIENTATION:
NEW METHOD AND CLINICAL STUDY

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**Introduction:**
Hip stability and longevity following hip arthroplasty and hip osteoarthritis pathogenesis are commonly attributed to the abduction/anteversion angles of the acetabulum. However, no method for the robust assessment of the acetabular orientation angles is available to date. The aim of this study is to present a new accurate and repeatable CT-based method for computing acetabular abduction/anteversion angles and evaluate its variability in normal population.

**Methods:**
We introduce a new plane: the Acetabular Rim Plane. This is the average plane containing points identified on the acetabular rim. Projecting this plane on the Anterior Pelvic Plane enables to measure the related abduction and anteversion angles between planes more accurately and robustly than previous methods.

25 adult pelvic CT studies, with no evidence of hip osteoarthritis, were retrospectively collected from our database. Using AmiraDev© software, the scans were processed and plane landmarks were selected. Subsequent plane and angle computations were performed using Matlab®, and inter- and intra-observer repeatability studies were performed.

**Results:**
The mean anteversion and abduction angles values are 17.2±5.7° and 53.7±6.5° respectively. The angular difference between individuals was 24.5° and 23.4° respectively. The mean difference between left and right angle values of each patient is 0.3° and 0.5° respectively. Inter- and intra-observer measurements had no statistically significant difference, indicating a robust and accurate method.

**Discussion:**
The proposed method to compute abduction and anteversion angles from a CT study is reliable and accurate. The abduction/anteversion variation range in the population is significant (> 20°), whereas the difference between right and left side is small.