

CHO Hong man
Gwangju Veterans Hospital. KOREA
chm1228@hanmail.net

Lower limb

Clinical and Functional Outcomes of Treatment for Type A1 Intertrochanteric Femoral Fracture in Elderly Patients: Comparison of Dynamic Hip Screw and Proximal Femoral Nail Antirotation.

Introduction:

We aimed to evaluate and compare the clinical and functional outcomes of dynamic hip screw (DHS) and proximal femoral nail antirotation (PFNA) treatment of AO type 1 intertrochanteric fractures in elderly patients.

Cases description:

We retrospectively reviewed 194 consecutive patients with type A1 intertrochanteric femoral fractures who were treated with DHS (n=113) or PFNA (n=81). We evaluated operation time, intraoperative blood loss, and functional outcomes, walking ability, and the Barthel activities index. Fracture union, sliding of hip screw, proximal femur shortening, and presence of complications were assessed radiologically at relevant follow-up intervals. The mean operation time and blood loss were significantly lower for the PFNA group, but walking ability and Barthel index decreased to a similar extent for both groups. However, patients in the DHS group complained of significantly more pain ($P=0.049$). Although there were no significant differences between the two groups with respect to the time until fracture union was achieved, patients in the DHS group exhibited a higher extent of proximal femoral shortening and sliding of the hip screw. Differences about hip screw sliding and proximal femur shortening within each subgroup were not significant.

Conclusion:

Compared to DHS treatment, PFNA treatment of type A1 intertrochanteric fractures is associated with reduced blood loss, shorter operation time, and less severe pain after surgery. Additionally, sliding of the hip screw and proximal femur shortening are expected to occur more frequently after DHS.

KIM Jungryul
Busan Veterans Hospital, KOREA
duke419@hanmail.net

Lower limb
Surgical Treatment of Dementia Patients Following Undisplaced Femur Neck Fractures
Using PFNA

Introduction:

People with dementia have been reported to have poor mobility and discharge outcomes following hip fracture. The purpose of this study was to evaluate the clinical and radiological results of internal fixation by proximal femoral nail antirotation (PFNA) to dementia patients following undisplaced femur neck fracture (Garden 1 and 2).

Cases description:

We studied retrospectively 19 MDFNF patients over 70 years of age who walked independently with a cane or crutches and who suffered moderate-to-severe dementia, treated by PFNA and followed up for more than two years. Revision, loss of fixation, complication, and walking-ability outcomes were measured. In walking-ability evaluation, patients showed an average decrease of just 0.2 levels at the final follow-up. Walking ability was evaluated from before injury to 4 weeks after surgery showed decreases of less than 0.5 levels. Radiological bone union was achieved in 17 cases; the average time duration to bone union was 4.14 months (2.5~7 months). As complications, nonunion occurred in two cases; among these, there was one case of femoral head avascular necrosis.

Conclusion:

It was found that for patients with osteoporotic bone tissues in their femoral head or patients (e.g. those suffering dementia) for whom cooperating with medical workers for postoperative walking-control or rehabilitation exercises is difficult, implanting a mechanically stable spiral blade for fixation of femoral neck fractures could facilitate walking after surgery.



Samuel Klatman, MD
LSUHSC New Orleans, LA, USA
sklatm@lsuhsc.edu

Upper limb
Timing of Fixation for Distal Radius Fractures

Distal radius fractures are a common orthopaedic injury, over 600,000 are seen every year. At safety net tertiary facilities, patients are often not seen within three weeks of their initial injury because of poor access to care at outlying community hospitals. A comprehensive review of the literature supports failure to restore anatomic alignment results in poor outcomes. The purpose of this study is to evaluate the impact of delay in care on radiographic alignment following distal radius fractures using the unique population we have at our tertiary referral center. Using the AO system for classifying distal radius fractures, radiographic alignment of patients treated acutely within three weeks of injury was compared to those treated at or greater than 3 weeks. Inclusion criteria for our study included all distal radius fractures treated over a two year period by an orthopaedic surgeon at our institution. Our primary measure is pre and post radiographic parameters of radial height, volar tilt and radial inclination. In addition we have collected the following demographic information AO fracture classification, BMI, insurance, smoking status, age and sex for subgroup analysis. Over 2 years we have collected 100 distal radius fractures with approximately 33% treated in the chronic group. We found that distal radius fractures treated beyond three weeks had significantly worse restoration of radial height and inclination. We can definitively say delay in fixation results in poorer outcomes as measured by standard radiographic parameters and we suggest early operative intervention of these fractures when possible.



David Seligson / Chris Dunlap
UofL hospital / Uof Louisville
seligson@louisville.edu | chris.dunlap@louisville.edu

Lower limb
Henry Jacob Bigelow - a reminiscence

Henry Jacob Bigelow 1786-1879 was Professor of Surgery at the Massachusetts General Hospital. Not only was he a surgeon but also a Botanist and a Poet. He was present at the first demonstration of general anesthesia in the Ether Dome at the Massachusetts General and described rhabdomyolysis to improve fracture reduction and healing.



David Seligson / Jeeshan Faridi
UofL hospital / University of Louisville
seligson@louisville.edu | Jeeshanf@gmail.com

Lower limb
Hindfoot nailing for deformity - five cases

Hindfoot nailing, originally described in 1906 by Lexer is a useful technique for the correction of deformity in the distal tibia or ankle joints. In five cases a functional relationship between the foot and the leg was restored either with closed repositioning of the displaced distal part or by an osteotomy from anterior or posterior. Complications include recurrence of infection and distal screw migration. In one patient removal of the nail resulted in an improved gait with some restoration of ankle motion.



David Easley, MD
White Lattice
DavidEasleymd@gmail.com

Upper limb
Opiates, suboxone and pregnancy

Drug addicts become pregnant. Court ordered detoxification results in a 'clean' mother and a healthy baby. One unwanted chain of events occurs when the baby's father, often after incarceration, returns and continues the drug habit. The mother, now detoxified, is opiate naïve and participating again in drugs, overdoses. The mortality exceeds 70% and leaves an exceptionally difficult social situation. Several cases are presented. Social engineering can have unwanted consequences.



Engin Eren Desteli
MD Orthopaedics and Traumatology
erendesteli@yahoo.co.uk

Lower limb

Circular type external fixator-assisted acute femoral deformity correction and subsequent lengthening over an intramedullary nail:a case report

Introduction:

Intramedullar nails can be used together with external fixators in treatment of deformity correction. In the case presented here , femoral malunion with 90 degrees external rotation deformity together with shortness of the affected limb is corrected using these two methods together.

Materials and Methods:

One-sided external fixator was applied with two Schanz screws ,under fluoroscopy control, an intramedullar guide was placed within the intramedullar canal retrograde from the intercondylar notch. An osteotomy was made by applying the multiple drill-hole technique under fluoroscopy of the metaphyseal area in the femoral distal supracondylar region and the prepared nail was placed in the medullary canal. One-sided external fixator which had been applied temporarily was removed, leaving the Schanz screws in the bone. Using these Schanz screws as a joy-stick, acute correction was applied to the external rotation deformity. The previously prepared circular type external fixator was fixed to the femur with 6 screws, using the existing Schanz screws and by placing a further 2 pairs of 6 x 220mm Schanz screws to the proximal and distal rings. The distraction test was applied to the osteotomy line with the external fixator and was found to be satisfactory, mechanical and anatomic axes of the femur was checked using fluoroscopy, and correction of the deformity was confirmed. Postoperative tenth day distraction was started.

Results:

Satisfactory deformity correction and limb lengthening was achieved.

Discussion:

Complications such as Pin-tract infection, joint stiffness, recurrence of the deformity significantly decrease by use of IM nails also enabling earlier removal of the external fixator.



*Vsevolod Kalenskiy / Pavel Ivanov / Nikita Zadneprovskiy / Alexander Nevedrov
Sklifosofsky Clinical and Research institute / Sklifosofsky Clinical and Research institute / Sklifosofsky Clinical
and Research institute / Sklifosofsky Clinical and Research institute
vsevolod.kalenskiy@gmail.com | ipamailbox@gmail.com | zacuta2011@gmail.com | alexnev1985@yandex.ru*

**Lower limb
COMPARISON OF THREE METHODS OF CALCANEAL FRACTURE
TREATMENT**

Background:

Up to now choice between conservative and surgical treatment and especially optimal operative procedure in calcaneal fracture treatment remains challenging. Thus continuing research in this field is essential.

Materials and methods:

95 patients with calcaneal fractures were treated from 2013 to 2016. Mean age was 39,0± 12,5 years. In our retrospective study all patients were divided into three groups according to treatment method. Group 1: 41 patients with 54 fractures were treated conservatively; group 2: 18 patients with 22 fractures, were treated with open reduction and plating; group 3: 36 patients with 40 fractures, were treated with miniinvasive reduction and nail fixation. There was no difference in risk factors incidence. Mean follow-up period was 20,8± 9,0 month. Results were documented in 68 of 95 patients (71,6%). Foot Function Index and Lower Extremity Functional Score were used to measure functional outcome.

Results:

FFI and LEFS scores in group 1 were lower, than in groups 2 and 3 ($p < 0.05$) at 6 and 12 month. At 24 month difference was not statistically significant ($p > 0.05$). There was no difference between groups 2 and 3 in any follow-up period ($p > 0.05$). Total wound complication rate in group 2 were higher, than in groups 1 and 3 ($p < 0.05$).

Conclusion:

Any of two described surgical methods allows to restore function after calcaneal fracture in a relatively short time compared to conservative treatment. Long-time outcomes were equal between described surgical methods, but complication rate was higher in group of open reduction and plating.



*Rabun Fox | Robert Zura | Samuel Klatman
Louisiana State University - New Orleans | Louisiana State University - New Orleans | Louisiana State
University - New Orleans
rsfox13@gmail.com | sklatm@lsuhsc.edu*

**Lower limb
Challenges and Complications in Management of Fractures to the Foot and Ankle
Secondary to Gunshot**

In the United States, approximately 84,000 non-fatal gunshot wounds occur annually. Experience within an urban trauma center indicates that approximately 59% of patients sustained gunshot required orthopedic consultation. These injuries present with considerable variability based on those specific structures damaged by the projectile and ballistic fragments. The body of literature on these injuries to the upper extremity and long bones of the lower extremity is considerable. However, studies demonstrating the challenges and complications in management of ballistic injuries to the foot and ankle are very limited.

We have performed a multi-center retrospective analysis at of fractures sustained by gunshot wounds to the ankle, hindfoot, mid foot, and forefoot from 2012 until 2017. The purpose of this study is to survey adverse outcomes of infection, nonunion, and malunion rates, as well as the effect of antibiotic and surgical management on these outcomes. In addition to this data, we will present a review of select cases. Through this, we will highlight the various approaches and challenges of management of these ballistic injuries from our experience at an urban Level I trauma center where we treat a high volume of these injuries.



Engin Eren Desteli
MD Orthopaedics and Traumatology
erendesteli@yahoo.co.uk

Lower limb

The Effect of Tricyclic Antidepressants on Fracture Healing: An Experimental Study

Objectives:

To evaluate the effect of Tri-Cyclic Antidepressants (TCAs) on fracture healing.

Background: Disorders of mood and post-traumatic stress disorder (PTSD) are commonly encountered following major trauma. Antidepressant therapy using TCAs such serotonin (5-hydroxytryptamine or 5-HT) reuptake inhibitors may be the treatment of choice in some of these conditions. The presence of specific receptors on various cells involved in bone metabolism results in known measurable effects of 5-HT on the physiology of bone tissue. There are limited and conflicting reports regarding the effects of 5-HT signaling on bone tissue and formation as it pertains to fracture healing.

Methods:

Twelve skeletally mature Wistar rats were divided into two groups. All twelve rats had intramedullary pinning of the right tibia prior to creation of a complete mid-diaphyseal fracture. The rats were then randomly divided into two groups of six - control and study. Study group rats were given 10mg/kg amitriptyline daily via an intra-peritoneal catheter for twenty-eight days. Control group rats were given an equal volume intra-peritoneal infusion of plain saline for twenty-eight days. All rats were euthanized five hours after the last dose on the twenty-eighth day to assess for fracture healing radiologically, microscopically and histologically.

Results:

The total volume of bone formation at the 28-day mark of fracture healing in Wistar rats was 1.077 mm³ in control rats, and 1.824 mm³ in those receiving amitriptyline ($p < 0.01$).

Conclusion:

Tricyclic antidepressants appear to have positive effect on the early phases of fracture healing by increasing new bone formation.

*Rashad Usmani | David Seligson | John Toole
University of Louisville Department of Orthopaedic Surgery | University of Louisville Department of
Orthopaedic Surgery | University of Louisville Department of Orthopaedic Surgery
rusmani@indiana.edu | david.seligson@louisville.edu | johndwardtoole@gmail.com*

Lower limb

Return of motion after removal of hindfoot intramedullary implant

Introduction:

Fragility fractures about the distal tibia and ankle are common in the elderly. Traditional open reduction and internal fixation of such fractures require large incisions and prolonged weight bearing restrictions. Alternatively, intramedullary hindfoot nailing can be used to confer stability, minimize trauma to soft tissues, and allow for early weight bearing. Previous studies have demonstrated that retaining hindfoot intramedullary nails after fracture union often results in implant subsidence, loss of ankle and hindfoot range of motion, and deep infection. This study aims to determine if removal of intramedullary implant after fracture union will result in return of tibiotalar and subtalar range of motion and reduced infection rates.

Materials and Methods:

A single-center prospective case series was performed. The primary outcome measures were tibiotalar and subtalar range of motion at final follow up after implant removal.

Results:

Seven patients were eligible for the study. Mean time from implant placement to removal was 12.3 months. All patients had clinical and radiographic evidence of fracture union. Mean time of final follow up after implant removal was 4.9 months. At final follow up, average tibiotalar range of motion was 7.1 degrees dorsiflexion to 14.3 degrees plantarflexion and average subtalar range of motion was 9.3 degrees inversion to 2.1 degrees eversion. One of seven patients developed a superficial wound infection treated with antibiotics.

Conclusion:

Hindfoot intramedullary nailing is a viable treatment option for distal tibia and ankle fragility fractures. Implant removal after fracture union confers partial return of tibiotalar and subtalar range of motion.



Jeeshan Faridi / David Seligson
University of Louisville Department of Orthopaedic Surgery / University of Louisville Department of
Orthopaedic Surgery
jeeshanf@gmail.com | david.seligson@louisville.edu

Lower limb
The Small Cut: Minimizing Anterior Knee Pain following Intramedullary Fixation of Tibial Shaft Fractures

Tibial shaft fractures are the most common long bone fractures encountered in adults. Intramedullary nailing is a widely accepted and practiced strategy for these fractures with anterior knee pain being the most encountered complication. The etiology of this pain has not been clearly identified though most authors feel injury to structures during nail insertion to be the culprit. These structures include the patellar chondral surface, fat pad, patellar tendon and paratenon, infrapatellar branch of saphenous nerve, medial meniscus, lateral tibial plateau, and transverse ligament. Other authors have attempted to describe techniques of tibia nailing that minimize anterior knee pain including paratendinous versus transtendinous approaches, minimum nail tip to apex distance and skin incision techniques among others. Incidence of anterior knee pain at our institution is not as high as the reported 47-56% in the literature. This is due to adherence to the techniques originally described by Professor Kuntscher which espouse minimal soft tissue handling, avoiding the intraarticular structures of the knee, and making a small incision to reduce risk of injury to the infrapatellar branch of the saphenous nerve.



Kalashnikov Andriy

The Institute of Traumatology and Orthopedics by NAMSU, Kyiv, Ukraine

uato2010@gmail.com

Lower limb

Elasticity modulus of an implant and its effect on bone fractures treatment

Introduction:

The majority of complications after osteosynthesis is caused by the difference between elasticity modulus (EM) of fixing devices and EM of bone tissue itself.

Material and methods:

Experimental study involved 36 chinchilla rabbits, subdivided into 4 groups: control group of intact animals; femoral bone fracture, fixed by IM nail of stainless steel 316L, EM - 220 GPa; fracture, fixed by IM nail of vanadium-titanium alloy BT-6 (EM - 110 GPa); fracture, fixed by IM nail of zirconium-titanium alloy (EM - 47 GPa). Observation period - 90 days.

Results:

Morphologic study revealed the difference in structural and functional conditions of bone regeneration after implants made of different alloys, with reasonable superiority of Zr-Ti alloy implants.

Mechanical study showed the best results of Zr-Ti implants (71.8+/-3.1MPa), which elasticity modulus was closest to the elasticity modulus of natural bone tissue (60.5+/-1.5MPa).

The X-ray examination revealed that fixators with high elasticity modulus leads to the femoral shaft compact layer thinning, irregularity of a bone compact layer's periosteal surface from sites without external bony plates, and to the presence of resorption lacunae surface of the diaphysis and extension of cortical bone's central channel.

Conclusion:

The results of experimental study prove the higher efficiency of implants, which elasticity modulus is closer to elasticity modulus of natural bone tissue for femoral bone fractures treatment in rabbits.

References:

Influence of Alloy Elements on the Osteoconductivity of Anodized Ti-29Nb-13Ta-4.6Zr Alloy / D. Yamamoto1, A. Waki, K. Kuroda [et al.] // J.Biomaterials and Nanobiotechnology. - 2013. - Vol. 4. - P. 229-236.



Lonnie Douglas, MD
University of Louisville
lonniedouglas@gmail.com

Lower limb

The Douglas Box: An alternative to the Starr Frame for Complex Pelvic Reductions

Complex pelvic reductions have typically been addressed when using external fixation using the Starr Frame. This frame attaches to the edge of the bed and uses pins into the pelvis to maintain the reduction. It is also two-step procedure, with redundant pins used in both provisional and definitive fixation which results in inefficient use of time and resources.

The Douglas Box frame is used to produce satisfactory reduction similar to that capable with the Starr frame but without extended set up time or uncommon equipment.

The Douglas Box frame can be used as an alternative to the Starr frame in situations where the Starr frame is not available, efficiency in the operating room is important, or should the physician prefer an alternative. Use of the Douglas Box does require the primary surgeon to have sufficient strength to perform and hold multiplanar reductions by hand.



Kaźmierczyk Andrzej

x

janek24061982@tlen.pl

Lower limb

Comminuted calcaneal fracture with avulsion of Achilles insertion treated with the use of intramedullary nailing in the modified original method

Calcaneal fracture has always posed a diagnostic and therapeutic problem. A thorough knowledge of the morphology of fracture, correct time to begin treatment and minimally-invasive surgery that allows for early physical mobilization of the operated limb are of critical importance in the treatment of calcaneal fractures. We operated a male patient with a high-impact injury with the use of a low-invasive, our original and modified method ensuring early kinesitherapy and achieved a good functional outcome of treatment.



LUCAS Y HERNANDEZ, Julien
Bordeaux hospital University, FRANCE
julienlucas@gmail.com

Lower limb
3D CT ANALYSIS OF CALCANEAL FRACTURES AFTER INTRAMEDULLARY NAIL PROCEDURE

In 2010, a new closed reduction, internal fixation procedure for displaced intra-articular calcaneus fractures was developed (DIACF).

The aim of this study was to assess the restoration of the angles and shape of the calcaneus, thalamic reduction on the three dimensional computed tomography scans based on Goldzakâ's global articular reduction classification. The secondary objective was to assess the occurrence of complications and the functional results. Patients were included prospectively with analysis of radiographs and CT scans. The functional outcome and restoration of the radiographic parameters were evaluated postoperatively, at 3 months, 1 year and at the last follow-up.

26 patients were included, 2 were lost to follow-up, 2 patients sustained a secondary subtalar arthrodesis. Mean follow-up was 2.8 years. The mean AOFAS-AHS and SEFAS were respectively 79 and 35.8 at the last follow-up. The mean Böhler angle rose from -1° pre-operatively to 33° postoperatively. The mean calcaneal height index and length rose respectively from 0.44 to 0.86 and 83mm to 87mm, and the width decreased from 50mm to 46mm. The Goldzak global articular reduction assessment was excellent in 39% of patients, good in 42% of patients and poor in 19% of patients. One patient developed of deep infection was reported. Three patients needed device removal.

the radiographic parameters were restored and stable at last follow-up. The skin complication rate was lower than with open reduction procedures. This study confirms the efficiency and reliability of this procedure for the reduction and the osteosynthesis of DIACF.



LUCAS Y HERNANDEZ, Julien
BORDEAUX HOSPITAL UNIVERSITY, FRANCE
julienlucas@gmail.com

Lower limb

Tibiototalcaneal arthrodesis using a straight intramedullary nail: follow-up of 5 Years

Tibiototalcaneal (TTC) arthrodesis is a proven solution for severe hindfoot arthropathy. The aim of this study was to determine clinical outcome, analyze the fusion, and determine final hindfoot alignment in a consecutive series of patients using a single design straight intramedullary nail.

This study evaluated 63 patients treated with at least 36 months follow up. four patients were lost to follow up, leaving 49 patients available for review. The average follow-up was 70.7±15.1 months.

The AOFAS score improved from 29.7±15.1 before arthrodesis to 65.8±14.6 after ($P<0.001$) with 83.7% (41/49) of patients stating they were satisfied or very satisfied with the outcome. The hindfoot angle improved from -3±15 degrees (varus) before the arthrodesis to 3.5±4 degrees (valgus) after; the tibiotalar angle averaged 103±4.2 degrees after the arthrodesis. Fusion occurred in both joints in 86% (42/49) of patients and in 93% (91/98) of all joints. The average time to fusion was 4.5±2 months.

These results are comparable to previously published studies using intramedullary nailing to achieve tibiototalcaneal arthrodesis. Analysis of the results shows that current smokers have a significantly ($p= .03$) higher risk of complications; however, the complication concerns typically associated with straight nails were not found. Use of an allograft, with or without BMP2, lead to comparable results even in the presence of a large bone defect. We recommend using a retrograde IM nail for the fixation of TTC arthrodesis and adding an allograft in cases of significant bone loss.



Kalashnikov Andriy / Shydlovskiy Mykola / Litun Iurii
SI "The Institute of Traumatology and Orthopedics by NAMSU", Kyiv, Ukraine / NTU "Kyiv Polytechnic Institute", Kyiv, Ukraine / SI "The Institute of Traumatology and Orthopedics by NAMSU", Kyiv, Ukraine
uato2010@gmail.com | uato2010@gmail.com | uato2010@gmail.com

Lower limb

Changes in Ankle after Fibula Bone Injuries. Natural Modeling.

Introduction:

Shin bone fractures in 80% of cases include fractures of fibula. Although the necessity of fibula bone osteosynthesis is undeniable, if injured are segments 43 and 44 (AO/ASIF). Osteosynthesis of injured 42 segment is under discussion.

Materials and methods:

12 fresh-frozen limb samples and universal examining machine TIRAtest-2151 to examine axial static and cyclic loadings of ankle at changes of foot's position and modeled fibula injuries (osteotomy and resection of middle and lower thirds thereof), tibia bone is intact.

Results:

ankle-foot system (A-F) axial loading increase causes its toughness augmentation, although insulated FB injuries on syndesmosis or lower level not influence reasonably the system's toughness. Foot's position change in case of FB injuries affect A-F system's toughness under static and cyclic loadings.

Conclusion:

modeled injuries of lower and middle third of fibula, if distal tibiofibular syndesmosis is intact and tibia has stable fixation (fracture types 42A, B1, B2), do not cause critical decrease of ankle-foot complex load bearing capacity, and increase compression toughness of examples.

To decrease the pressure on ankle and to increase the toughness of bone-and-fixator system in 42B3 and 42C fractures, and injuries of 43 segment, in addition to tibial bone stabilization, fibula bone fixation is required in the middle or lower third thereof.

References:

The role of fibular fixation in combined fractures of the tibia and fibula: a biomechanical investigation. / T. G. Weber, R. M. Harrington, M. B. Henley [et al.] // <http://journals.lww.com/jorthotrauma/pages/default.aspx> Journal of orthopaedic trauma. - 1997. - Vol. 11, - 3. - P. 206-211.



Anton SIALITSKI | Oleg KEZLYA

*Minsk (BELARUS) Belarusian Medical Academy of Post-graduate Education, Department of Traumatology and Orthopedics, senior teacher | Department of Traumatology and Orthopedics, head of the department, Doctor of Medical Sciences, Associate Professor
antonnew71@mail.ru | antonnew71@mail.ru*

Lower limb

Application blocked intramedullary nailing in patients with segmental tibial fractures.

Introduction:

Segmental tibial shaft fracture - a unique type of fracture. Control of axial position, rotation of fragments, controlled compression between different fracture lines is one of the unresolved issues in this type of fracture and is associated with the complications that accompany the indirect closed fracture reposition.

Material and method:

We developed a device from the elements of the Ilizarov external fixator for the distraction and repositioning of complex and irregular fractures of the tibia (type C2 and C3, AO classification) during blocked intramedullary nailing. During 2007 - 2016, this external fixator was used in 29 patients with segmental fractures of the tibia. Open fractures comprised 41,4%, closed fractures - 58,6%. Blocked osteosynthesis with a nail was applied with open injuries IO1, IO2 (AO classification), at 7-10 and 14 days, and with closed damages IC1, IC2, IC3 (AO), for 5-7 days. In all cases, during the operation, a distraction-reposition external fixator was used.

Results:

Bone fracture healing was obtained in 16.2% of patients at the time of 6.5 - 9 months, and in 83.8% of patients - 9-12 months.

Conclusion:

Using distraction-reposition external fixator with blocked nailing allowed:

- Create conditions for controlled reposition and compression fractures.
- Reduce the operation time.
- Reduce the radiation burden for the patient and the medical team.

4. Create favorable conditions for the fusion of complex segmental and irregular tibial fractures.



*Stafeev Dmitrii V. / Efimov Nikolai N. / Lasunskii Sergei A. / Chugaev Dmitrii V.
Vreden Russian Research Institute of Traumatology and Orthopedics, St. Petersburg, Russian Federation /
Vreden Russian Research Institute of Traumatology and Orthopedics, St. Petersburg, Russian Federation /
Vreden Russian Research Institute of Traumatology and Orthopedics, St. Petersburg, Russian Federation /
stafeevd@gmail.com | efimov-n-n@mail.ru | salasunskiy@rniito.ru | dvchugaev@rniito.ru*

Lower limb PFN versus arthroplasty in unstable intertrochanteric fractures

Introduction:

While intramedullary nailing remains a standard treatment option for unstable intertrochanteric fractures, arthroplasty has proven to be a sound alternative in elderly patients. The aim of this study was to compare these two methods.

Materials and methods:

We included 71 patients with unstable intertrochanteric fractures (AO 31 A2.2 and A2.3), mean age was 75,3 years (SD 10,1 years). 47 of them underwent osteosynthesis (PFN) and 24 - arthroplasty (15 bipolar hemiarthroplasties and 9 THAs with dual-mobility cups; cementless femoral fixation in all cases). The two groups were comparable in age, sex, BMI, fracture type, time to surgery, preoperative comorbidity and bone density (mean preoperative T-score -3,05, SD 0,57). Patients were followed for a minimum of 1 year.

Results:

1-year mortality rates were 17% (8 of 47) in nailing group and 20,8% (5 of 24) in arthroplasty group. There were no differences in general complications. The overall rate of implant-related complications in nailing group was 12,7%: 3 cases of cut-out syndrome, 2 periimplant fractures and 1 case of screw lateral migration. In arthroplasty group we only observed 1 dislocation of a bipolar prosthesis (4,1%). The two groups did not differ significantly in functional outcomes.

Conclusion:

Arthroplasty (preferably THA with dual-mobility cups) is superior to intramedullary nailing in unstable intertrochanteric fractures in terms of implant-related complications.



*Leonid Sychevskii | Alexander Chilimtsev | Olga Khotim
medical doctor | medical doctor | medical doctor
leosych@gmail.com | chilimtsev@mail.ru | lgasergey89@gmail.com*

Upper limb

Analys of using intramedullary fixation for fractures of long bones in children

Introduction:

Diaphyseal fractures of long bones are the most common pediatric injuries. They are characterized by a limited potential for spontaneous correction because of distance to the physis. Although conservative treatment has been practiced for many years with satisfying results, several aspects have led to an increase in the numbers of surgical procedures including changes of living, sports habits. The gold standard of pediatric diaphyseal fracture treatment is elastic stable intramedullary nailing and Kirschner wire pinning. So the aim of this study is to provide an outcome comparison of both techniques.

Material and methods:

We retrospectively observed 88 patients with diaphyseal fractures of long bones who were treated using intramedullary fixation in Grodno Regional Children Hospital during the period from 2015 to 2017 year.

Results:

During the period of 2 years 88 patients from 245 with diaphyseal fractures of humerus (3), forearm (73), femur (6) and lower leg (6) were treated using intramedullary fixation, both elastic stable intramedullary nailing and Kirschner wires. We researched the time of operation, the efficiency of stabilization, the time of until callus formation, duration of immobilization and after rehabilitation.

Conclusion:

Both elastic stable intramedullary nail and intramedullary Kirschner wire fixation were effective in stabilizing pediatric diaphyseal fractures. These methods do not have significant differences in the time of operation, the union time of fractures (clinical and radiological) and in rehabilitation of range of motion in the neighbor joints. The duration of immobilization for femur and lower leg was slightly more for Kirschner wire fixation.



*lek. Wojciech AmbroŹy, lek. Karol Korzycki, dr n. med. Paweł Źsłeczka
Trauma & Orthopaedic Department, Hospital SP ZOZ in MyŹlenice
karolkorzycki@gmail.com*

Lower limb

Intramedullary nailing for distal tibia extra-articular fractures - our own experience.

Background:

Intramedullary nailing (IMN) has been reported as an effective device for treating distal tibia extra-articular fractures. We would like to show our experience with intramedullary nailing this method.

Methods:

In our hospital, we have treated with intramedullary nailing 7 patients with 1/4 distal tibia extraarticular fracture in 2017r. 3 of them didn't enter to follow up - 2 of them are a drunkard, 1 didn't answer the phone. Follow up was after 4-14 months and involve nonunion, malunion, time to a full bearing, knee pain, wound complication, a range of flexion and extension of ankle joint and function assessed with Olerud and Molander score.

Results:

3/4 patient have a union, the one is only 4 months after treatment, 1/4 patient has malposition, mean time to full bearing was 4 months, one patient has knee pain, 3/4 has good or excellent functional results, mean ROM of the ankle joint was 10° of extension and 46° of flexion. One patient had wound complications after open fracture treated with FHL flap, healed after 4 months.

Conclusion:

Our experience with IMN distal 1/4 tibia extra-articular fractures shows good functional and radiological effects.



julien LUCAS Y HERNANDEZ
BORDEAUX HOSPITAL UNIVERSITY
julienlucas@gmail.com

Lower limb

Tibiototalcaneal arthrodesis using a straight intramedullary nail: follow-up of 5 Years

Tibiototalcaneal (TTC) arthrodesis is a proven solution for severe hindfoot arthropathy. The aim of this study was to determine clinical outcome, analyze the fusion, and determine final hindfoot alignment in a consecutive series of patients using a single design straight intramedullary nail.

This study evaluated 53 patients treated with at least 36 months follow up. four patients were lost to follow up, leaving 49 patients available for review. The average follow-up was 70.7±15.1 months.

The AOFAS score improved from 29.7±15.1 before arthrodesis to 65.8±14.6 after (P<0.001) with 83.7% (41/49) of patients stating they were satisfied or very satisfied with the outcome. The hindfoot angle improved from -3±15 degrees (varus) before the arthrodesis to 3.5±4 degrees (valgus) after; the tibiotalar angle averaged 103±4.2 degrees after the arthrodesis. Fusion occurred in both joints in 86% (42/49) of patients and in 93% (91/98) of all joints. The average time to fusion was 4.5±2 months.

These results are comparable to previously published studies using intramedullary nailing to achieve tibiototalcaneal arthrodesis. Analysis of the results shows that current smokers have a significantly (p= .03) higher risk of complications; however, the complication concerns typically associated with straight nails were not found. Use of an allograft, with or without BMP2, lead to comparable results even in the presence of a large bone defect. We recommend using a retrograde IM nail for the fixation of TTC arthrodesis and adding an allograft in cases of significant bone loss.

Kiciński Maciej
SPSK im. A. Grucy w Otwocku, CMKP
maciej.kicinski@yahoo.com

Upper limb
Proximal Humerus Fracture Nailing, Posterior Approach - technique description and preliminary results.

Introduction:

Common Proximal Humerus Fracture (PHF) nailing complication is stiffness and persistent pain. One of the reasons for that is iatrogenic rotator cuff damage at nail introduction. In this study we present a technique used by our team to nail the PHF with Targon straight nail via posterior approach, sparing rotator cuff tendons.

Results:

15 patients have been operated on in 2014 for displaced proximal humerus fracture, 10 female and 5 man. Two patients have been lost to follow-up, 5 of them due to the technical difficulties had to be converted to antero-lateral (nailing) or lateral (plating) approach. Out of eight left: two were 3-part fractures and six 2-part fractures. 4/10 shoulders were dominant side. The mean Constant score after surgery was 91,875 (pain 14,125; ROM 36; function 19,25; strength 22,5). Mean VAS 0,2.

Conclusion:

The posterior approach to PHF nailing via extended Neviaser portal is a very good alternative to the standard approaches. It requires only a small muscle belly spread, respecting rotator cuff tendons, which prevents from all consequences of tendon scarification after PHF nailing. A risk of noble structures damage (in particular suprascapular bundle) is slender, if proceeded according to a technique described.



Viktor Spasov MD

Bulgarian Orthopaedic and Traumatology Association (BOTA)

spassoff@abv.bg

Lower limb Complications in trochanteric hip fractures

Introduction:

Trochanteric fractures are the most common fractures of the hip, especially in elderly patients. The aim of the research is to analyze the most common complications and the reasons for them in patients with unstable trochanteric fractures treated with the FI-twin screw nail. The observed complications are: shaft medialization and collapse of the fracture; cut out of head and neck screws; Z-effect and reverse Z-effect.

Materials and methods:

The present study analyzes 1381 patients, for a period of 4 years, with unstable trochanteric hip fractures classified according the AO as 31A2 and 31A3. Divided by gender – 464 males (33,5%) and 918 females (66,5%). Average age – 78 years. 519 (38%) patients were unfollowed up. In 48 patients complications were observed (3.5%). All the patients in the target group were treated with the FI-twin screw nail.

Results

The shown results are only X-Ray based– the postoperative ones and the followed up from 1 to 12 months. Complications after fixation are shown in 48 patients (3.5%). The complications are divided into the following groups: shaft medialization and fracture collapse – 13 (27%); cut out – 17 (35%); Z-effect – 15 (31%) and nonunion – 1 (2%).

Conclusion:

The FI-twin screw nail is a good implant for treating unstable trochanteric hip fractures. The reasons for the complications are: positioning of the trochanteric screw; bone quality; early weight bearing.



Pawel Kolodziejski / Krzysztof Brylka
Poradnia Chorob Stopy, Warszawa / Poradnia Chorob Stopy
paul.kolodziejski@gmail.com | krzyzbrylka@poradniastopy.pl

Lower limb

Calcaneal malunions - the outcomes of the treatment

Calcaneal malunions are typical complications of improper treatment of intraarticular calcaneal fractures. The most common problems associated with the treatment of these injuries include: arthrosis of the subtalar joint, reduction of calcaneus height, flattening of medial longitudinal arch of the foot, conflict of the widened lateral wall with peroneal tendons and calcaneal axis disorder. Most symptomatic deformities require surgical treatment, the scope of which depends on the present components.

The aim of the study is to assess the results of surgical treatment of post-traumatic calcaneal malunions.

The study include 19 patients with complications after treatment of the intra-articular fracture of the calcaneus (previously treated surgically or non-operatively), who underwent remedial surgeries between 2012-2015, such as: arthrodesis of the subtalar joint with resection of the lateral calcaneal wall and, if necessary, bone graft and corrective osteotomies of the calcaneus along with arthrodesis of the joints of the hindfoot. The evaluation of the results has been based on the AOFAS and VAS scales. The tests were performed preoperatively and in 3 and 6 months after the surgery.

The mean pre-operative value in the VAS scale was 7.4 and in the AOFAS scale 32. Post-operative scores in the VAS scale decreased to 3 and 1.4, respectively, 3 and 6 months after the operation, and the AOFAS scores have increased accordingly to 52 and 84 on average.

Corrective treatment has reduced pain and has improved the function of the ankle and foot measured in the AOFAS and VAS scales.



*Evgenii Sorokin / Nikita Konovalchuk / Viktor Fomichev / Anton Gudz / Dmitrii Chugaev / Sergei Lasunskii
Russian Scientific Research Institute of Traumatology and Orthopedics named after R.R. Vreden, Saint-Petersburg, Russia / Russian Scientific Research Institute of Traumatology and Orthopedics named after R.R. Vreden, Saint-Petersburg, Russia / Russian Sci
sorokinortoped@gmail.com | konovalchuk91@yandex.ru | vafomichev@rniito.ru | aigudz@rniito.ru |
dr.chugaev@gmail.com | salasunskij@rniito.ru*

Lower limb

Can a tibiocalcaneal arthrodesis return patients to normal level of daily activity?

Introduction:

Tibiotalar arthrodesis (TTA) is one of the only surgical options to salvage the limb and restore function in patients with loss of talar body.

Materials and methods:

This is a prospective series of 11 patients who underwent TTA via lateral approach. Of the 11 patients, 3 had a significant defect after failed ankle arthroplasty, 2 had diabetes mellitus, 1 had rheumatoid arthritis, 5 had posttraumatic avascular necrosis. Intramedullary hindfoot nail was used in 9 patients, lateral locking plate was used in 2 patients. Bone allografting was used in 4 patients. VAS (visual analogue scale) of pain syndrome and AOFAS (The American Orthopedic Foot and Ankle Society) hindfoot score were used for clinical evaluation preoperatively and after 6 months postoperatively. AP, lateral and axial hindfoot weightbearing x-rays were performed preoperatively and after 6 months postoperatively. We used CT to confirm fusion in several cases.

Results:

Mean duration of follow-up was $10,8 \pm 2,9$ months. There were no non-unions and no cases of deep or superficial infection. Mean preoperative VAS score was $6,5 \pm 1,13$; at 6 months post-op - $1,7 \pm 0,75$. Mean preoperative AOFAS score was $39 \pm 9,6$; at 6 months post-op - $68,6 \pm 8,6$.

Conclusion:

Tibiotalar arthrodesis provides good clinical results and allows patients to resume pain free ambulation and normal level of activity.



*Halil Ābrahim BalcĀ± | Serkan Bayram | Fikret Berkan Anarat | Levent Eralp
Istanbul University Faculty of Medicine | Istanbul University Faculty of Medicine | Istanbul University Faculty
of Medicine | Istanbul University Faculty of Medicine
balcihalili@gmail.com | dr.serkanbayram89@gmail.com | berkananarat@gmail.com | drleventeralp@gmail.com*

Lower limb Proximal Femoral Nail for Treatment of Intertrochanteric Femoral Fractures in Patients over 90 years

Introduction:

The purpose of the study was to investigate the clinical and survival results of the patients over 90 years with intertrochanteric fractures treated with proximal femoral nail system.

Materials:

From September 2010 to December 2016, 41 patients (8 males and 33 females, ranged in age from 90 to 104 years with an average of 92.7 years with intertrochanteric femoral fractures were surgically treated with proximal femoral nailing. The fractures were classified according to the AO classification: 11 patients were type A2.1, 21 patients were type A2.2, 2 5 patients were type A2.3 9 patients were type A3.1, 6 patients were A3.2 and 18 patients were A3.3. The patients underwent surgery within a mean of 3.2 days from injury. The mean hospital stay was 12.8 days.

Results:

At the time of this study, 28 (68%) patients had deceased. Survival rates at first month, 6 months, 1 year and five years after surgery were 86%, 79%, 68% and 4.5% respectively. The median survival after surgery was 23.4 (10 days-62 months) months for deceased patients. There were 13 (32%) surviving patients with a mean survival of 29.1 months (6-75 months). The mean mobilization time was 6.1 (2-21). 5 patients could not be mobilized. The mean American Society of Anaesthesiologists (ASA) score was 3.1 (2-4). Fracture type and mobilization were not correlated with survival but ASA score was associated. One patient has implant failure, one patient has blade loosening.

Conclusion:

Patients over 90 have high mortality and morbidities following intertrochanteric fractures, possibly due to comorbidities.



Jacek Rycombel
SPZOZ Myślenice
jacek_r89@o2.pl

Upper limb

Intramedullary fibula autograft for pseudoarthrosis of humerus - our own experience.

Background:

Fracture of the humeral shaft is one of the most common fractures. Disorders of union are a significant problem in treatment.

We would like to show our experience with fibula autograft for pseudoarthrosis of humerus.

Methods:

We treated with fibula autograft 2 patients with pseudoarthrosis of humerus. In both cases non vascularized 3-cortical graft was placed intramedullary, in previously overdrilled medullary canal. Bone was stabilized using locking plate.

Follow up was 24 and 36 months (mean 30 months) and involved range of motion of shulder and elbow, pain level with VAS scale and bone union on X-ray.

Results:

All the patient have a union. Satisfaction of the patients is good. Wound healing complications didn't ocured.

Elbow range of motion elbow joint is full in both patients, ROM of shloulder is limited in one of two patient due to rotatot cuff massive tear.

Conclusion:

Our experience with fibula autograft for treatment of pseudoarthrosis of humerus shows good functional and radiological outcome.

Dawid Lisowski M.D. | Mateusz Mroczkowski M.D. | Tomasz Sorysz M.D. Ph.D
Szpital Miejski Specjalistyczny im. Gabriela Narutowicza w Krakowie | Szpital Miejski Specjalistyczny im.
Gabriela Narutowicza w Krakowie | Szpital Miejski Specjalistyczny im. Gabriela Narutowicza w Krakowie
dawidl1980@gmail.com | mroczkowski.mateusz@gmail.com | tsorysz@gmail.com

Lower limb

Results and observations in operative treatment of displaced intra-articular calcaneal fractures with use of Calcanail®

Introduction:

Since introduction of the Calcanail® in 2011 more and more surgeons has been treating calcaneal fractures with use of this method. It is mainly because of its safety concerning wound healing and final outcomes comparable to ORIF. This study is to show the intraoperative problems the surgeon may encounter beginning with this method as well as final results in comparison to more experienced operators.

Material and methods:

Study of eleven displaced intraarticular calcaneal fractures operated between November 2015 and April 2018 with the use of the Calcanail®. All patients were evaluated with use of the AOFAS Hindfoot score. Pain, shoe fit and look of the foot was evaluated in 11 point VAS scale. Böhler's angle was measured before, after operation and in 3 and 6 month time. All intra and post operative complications were carefully noted.

Results:

Average AOFAS Hindfoot score was 79,75. VAS pain 2.0, shoe fit 1.5, look of the foot 1.25. Average Böhler's angle restoration was 17,77 with no significant decrease with time. No intra- or post-operative complications were observed. Patients with less comminuted fractures and better reduction got better final results.

Conclusion:

Treatment of displaced calcaneal fractures with the Calcanail® is safe and good alternative for other procedures. Restoration of articular surface is on one hand the most difficult stage of the procedure and on the other a key to a good final outcome.



Uladzimir Dziatsel
traumatologist
pina@tut.by

Lower limb

Treatment of tibial C3 pilon fractures by nailing with the distal locking of the second level.

Introduction:

Surgical treatment of tibial C3 pilon fractures demands a stable fracture fixation while minimizing the irritation to the soft tissues by approach and implant. However, a conventional locking tibial nail cannot fix the pilon fractures properly because of the small size of the distal fragment. The locking nail with the distal locking of the second level can eliminate this drawback.

Material and methods:

An approach through osteotomized lateral malleolar is applied for an open reposition of the articular surface, securing with K-wires and following nailing by the tibial nail with the single distal locking hole. A blocking bushing is inserted into the distal locking hole of the nail in the coronal plane. Up to seven locking screws is inserted into locking holes of the bushing in the sagittal plane. We called this unorthodox locking method as a distal locking of the second level. Using this method during a 2-year period, we performed nailing in 8 patients with severely comminuted high-energy tibial pilon fractures.

Results:

Using this biological technique, no tibial wound problems were encountered and all fractures went on to union at a mean union time of 12 - 16 weeks with no evidence of secondary loss of fixation.

Conclusion:

To our knowledge, there are no reports in the literature for the use of IMN in the treatment of tibial C3 pilon fractures. The rationale for the use of IMN is to ensure more reliable fixation and eliminate soft-tissue disruption from application of plates on the surface of the tibia.



Marcin Bęcki

Orthopedic Department, Hospital Ostrów Wlkp, Poland

vincent.v@wp.pl

Lower limb

Practical evaluation of transmedullary support screws (TMS) and fibular management in distal tibial fracture nailing based on a new biomechanical Goldzak classification

Introduction:

Distal tibia fractures are challenging to treat. Two options are being considered. The first one is plate osteosynthesis which requires a longer relieving of an operated limb and often is connected with a higher risk of infection. The other method is intramedullary osteosynthesis which is related with a risk of non-anatomic reduction.

The aim of the work is an practical evaluation of the bio-mechanical Goldzak classification significance in treating the area of intramedullary osteosynthesis.

Material and methods:

During the period of 2014 - 2017, 52 patients with distal tibia fracture were treated with intramedullary Targon nails and additional TMS screws. Fibular and lateral and malleolar fractures were treated with using the plate or intramedullary rods.

Pre, post and after fracture healing operative radiograms were subject to evaluation. According to radiograms, we evaluated anatomical reposition or its loss, ankle joint position and problems related with the implant. The clinical outcomes were evaluated according to AOFAS score.

Results:

27 patients showed fracture healing. With the other patients, the fracture healing took 12 months since the injury occurred. 2 patients were treated with osteosynthesis dynamization.

With 25 cases, an appropriate anatomical position of ankle joint was asserted. With 3 cases the ankle joint line position was in varus and 2 cases in valgus.

The above mentioned problems with the ankle joint line occurred with the patients showing 3B fractures according to Goldzak classification.

Conclusion:

An appropriate evaluation of fractures types according to Goldzak classification and an appropriate usage of TMS screws allow to get an anatomical reduction of distal tibia fracture.



Lauren Fader
University of Louisville
lfader21@gmail.com

Lower limb
Tibia fractures and NSAIDs. Does it make a difference? A Multicenter Retrospective Study

Purpose:

The purpose of this study was to compare healing time for diaphyseal tibia fractures treated with IMN in one geographic cohort using NSAIDs for post-operative pain control to that of another geographic cohort using narcotics. Groups represent differing cultural approaches to postoperative pain control. We hypothesized there would be no difference in healing time.

Methods:

Tibia fractures presenting at two level I trauma centers in different countries between 2012-2015 were retrospectively screened for enrollment. Fractures classified as OTA/AO 42A, B, or C that were treated with IMN and had radiographic follow up to union were included. Post-operatively, one cohort (n=179) was prescribed NSAIDs and the other (n=179) was prescribed narcotics. Each analgesic method represented standard of care for that location. Primary outcome was healing time on radiographic evaluation.

Results:

There was no significant difference in healing time between the two groups (189 days in narcotic cohort, 181 days in NSAID cohort; p=0.3). The two groups were similar in age and in number of patients requiring revision surgery for initial nonunion.

Conclusion:

The difference in healing time between the two groups was not statistically significant. The deleterious effect of NSAIDs on fracture healing has been debated for decades, with numerous animal studies supporting this theory. However, high quality studies in humans have not provided convincing evidence to substantiate this negative effect. Our study suggests that NSAIDs may be used safely in fracture healing without significantly increasing risk of delayed union. Prospective randomized studies are necessary to rule out the negative effect of NSAIDS on bone healing.



Bargiel Andrzej | Falis Mirosław | Pyszal Krystian

Dr | Dr | Dr

andrzej.bargiel@yahoo.com | falis@osw.pl | krystianpyszal@gmail.com

Lower limb

Assessment of functional results and quality of life in patients after subtalar arthrodesis with Calcanail intramedullary nail.

Introduction:

The proposal for stiffening the joint in the era of dynamic development of surgical techniques and arthroplasty may arouse controversy. While the triple arthrodesis of the joint in foot surgery is a recognized technique of treatment, the procedure of primary, isolated subtalar arthrodesis remains debatable. The aim of this study was to evaluate quality of life and functional effects of isolated subtalar primary and secondary arthrodesis using Calcanail intramedullary nail.

Materials and methods:

Twenty five patients that underwent subtalar arthrodesis using Calcanail in years 2015-2018 were included. Patients were assessed with AOFAS Scale, Maryland Foot Score and Visual Analog Scale (VAS) questionnaire and asked if they would recommend the procedure. Additional surgery of the used foot was performed in 1 patient (spine osteosynthesis and abdominal surgery- polytraumatized patient suicide attempt); 5 patients suffered multiple lower extremity injuries.

Results:

92% of all patients would recommend the procedure to others. The function of the operated feet acc. AOFAS was 79,28 and acc. MFS was 86,52. The patients of AOFAS pain score obtained 31,6 points and 38,2 in MFS pain score which corresponds to low intensity pain. It was confirmed in VAS - Avg 3,48.

Conclusion:

All patients have become capable of walking efficiently. The greatest improvement in the functional scale was noted in patients after calcaneus fractures. The least satisfactory improvement was noted in patients without previous injury (ie flat crooked foot). Existing functional outcomes measures were influenced by concomitant injuries and additional procedures. This demands development of instruments suitable for severely injured patients with multiple or complex injuries.



Mariya Hadzhinikolova / Asen Baltov / Dian Enchev / Michail Rashkov
UMBALSMÈS PirogovâÈt' Sofia, Bulgaria | UMBALSMÈS PirogovâÈt' Sofia, Bulgaria | UMBALSMÈS PirogovâÈt'
Sofia, Bulgaria | UMBALSMÈS PirogovâÈt' Sofia, Bulgaria
mariya.hadzhinikolova@gmail.com | asen_b@bitex.bg | dian_enchev@yahoo.com | rashkov_mihail@abv.bg

Upper limb

Shoulder hemi-arthroplasty for proximal humerus fractures - high complication rate in low-demand patients.

Purpose:

To analyze the commonest complications after shoulder hemi-arthroplasty for proximal humerus fractures in low demand patients.

Patients and method:

This is a retrospective, clinical/radiographic study of 71 patients with three and four-part fractures and fracture-dislocations of the shoulder. Shoulder trauma series and CT were done in all cases. At surgery, rotatory cuff integrity was assessed. 28 mono-block and 43 modular prostheses were implanted. Tuberosity grafting was performed at surgeons discretion. At the latest follow-up patients were evaluated for tuberosities healing/resorption, prosthesis migration, shoulder stiffness (up to 60° of forward and lateral elevation) and pain. Constant scoring and VAS for pain were used along with standard radiography and CT in selected cases.

Results:

We studied 71 patients of average age 69. The average follow-up was 1.2 (0.9-1.4) years. Tuberosities healing problems were found in 6 patients - 5 tuberosity non-union, in one case both tuberosities did not heal. Resorption was common, but did not appear to affect healing or function. In 3 cases marked resorption was established. Proximal migration was found in 21 cases (29.6%). Stiffness was recorded in 17 patients (23.9%). The average Constant score was 48 (SD17). The mean VAS score was 2.9 (0-5).

Conclusion:

Hemiarthroplasty after proximal humerus fractures is not problem free. Tuberosities healing is predictable, but non-union is still an issue. Proximal migration is common and related to poor function.

*Dimitar Todorov, MD / Prof. Dian Enchev / Assoc. Prof. Mihail Rashkov / Alexander Stefanov, MD
UMHATEM "N. I. Pirogov", Sofia, Bulgaria / UMHATEM "N. I. Pirogov", Sofia, Bulgaria / UMHATEM "N. I.
Pirogov", Sofia, Bulgaria / UMHATEM "N. I. Pirogov", Sofia, Bulgaria
dstodorov@mail.bg | dian_enchev@yahoo.com | rashkov_mihail@abv.bg | dr.alex.stefanov@gmail.com*

Lower limb

Intramedullary Fixation of Distal Tibial Fractures as a Suitable Method of Treatment

Introduction:

Distal tibia fractures are reported of having high complication rate due to soft tissue damage, infection, malalignment, nonunion and ankle arthrosis. Treatment options and implant choice are debatable. The aim of our study is to evaluate the outcomes of treating distal tibial fractures with intramedullary nails.

Materials and methods:

We performed a retrospective analysis of medical documentation in level-1 trauma center. Including criteria are skeletal mature patients sustaining an AO/OTA fracture type 43A or distal 42A-C in combination with 43B treated with IM nail.

Thirty patients were included during a 5-year period. Average age was 50.5 years, male-female ratio - 3:1, open fractures sustained 10%. Outcomes of interest were union and infection rate, loss of alignment, secondary surgical procedures and subjective patient outcome score (Olerud- Molander Ankle Score).

In order to detect any loss of reduction an interobserver analysis was conducted on postoperative and follow up x-ray pictures (interobserver deviation $\leq 5^\circ$).

Results:

Average follow up was 6.6 (3-28) months. Radiographic consolidation of fracture was average 5 (3-10) months. Two patients (6.6%) with primary skin defect required additional surgery. One case (3%) of septic nonunion and one case (3%) of early superficial infection. 10 patients (33%) endured dynamisation. 85% of followed-up patients had good/excellent OMAS score.

No loss of reposition was found on x-ray analysis in frontal and sagittal plane.

Conclusion:

Intramedullary fixation of distal tibial fracture is a demanding procedure, requiring high surgical skills. However, it is a useful tool in surgeons' armamentarium because of less invasiveness and low complication rate.



*Musa Kafelov / Kostadin Tanovski / Philip Hitov / Borislav Tasev / Asen Baltov / Mihail Rashkov / Dian Enchev
/ Lychezar Zahariev / Bujar Shabani
UMHATAEM "N.I.Pirogov" / UMHATAEM "N.I.Pirogov" / UMHATAEM "N.I.Pirogov" / UMHATAEM
"N.I.Pirogov" / UMHATAEM "N.I.Pirogov" / UMHATAEM "N.I.Pirogov" / UMHATAEM "N.I.Pirogov" /
UMHATAEM "N.I.Pirogov" / University of Prishtina - Faculty of Medicine
m_kafelov@abv.bg | kostadin_tanovski@yahoo.com | philip_hitov@hotmail.com | dr.tasev@gmail.com |
asen_b@bitex.bg | rashkov_mihail@abv.bg | dian_enchev@yahoo.com | drzahariev@gmail.com |
bujarish@gmail.com*

Lower limb

Our results with percutaneous treatment of AO/OTA 82B/C fractures

Introduction:

The management of calcaneus fractures and their associated soft tissue injuries is a challenging task for the surgeon. Open reduction and stable internal fixation with lateral plate has been established as the gold standard in large clinical series. Anatomical joint reduction and restoration of the overall shape of the calcaneus are important prognostic factors, however complications, including wound dehiscence and infections are common. The less extensive or percutaneous approaches decrease the rate and severity of these complications. We present our experience with the technique for indirect reduction which is appropriate for all AO/OTA 82B/C.

Aim:

To evaluate the results of the treatment of AO/OTA 82B/C using percutaneous technique.

Materials and methods:

Seventeen patients (2 women - 11,7%, and 15 men - 88,2%), operated between 2013 and 2017, were included. The average age was 48(25-71) years and the mean follow-up was 8 (1 - 33) months. The fractures were classified after Essex-Lopresti and Sanders. Ten (58,8%) were tongue type and 7 (41,1%) were joint depression type. Sander type II were 11 (57,9) and type III were 4 (36,4%). The average Böhler angle was 14,67°(0°-30.16°) and the average Gissane angle was 135°(100°-145°)

Results:

There were no cases of wound dehiscence, skin necrosis and infections. The average postoperative Böhler angle was 24,45°(5°-40°) - improved by 9,78°; the Gissane angle was 123°(110°-145°) - improved by 12°

Conclusion:

This technique is suitable for most AO/OTA 82B/C, especially in patients with compromised soft tissues. Better results can be expected in tongue type and Sanders type II fractures.



Krzysztof Pyszczak | Mirosław Falis | Bargiel Andrzej
ZZOZ Ostrów Wielkopolski | ZZOZ Ostrów Wielkopolski | ZZOZ Ostrów Wielkopolski
krzysztof.pyszczak@gmail.com | falis@osw.pl | andrzej.bargiel@yahoo.com

Lower limb

Clinical results of displaced intra-articular calcaneal fractures treatment by intramedullary nail Calcanail

Introduction:

Open reduction and plate stabilisation is a recognised method of treatment of intra-articular calcaneal fractures. The surgical approach to the calcaneal bone used in these procedures is associated with a high risk of complications. The aim of this paper is to present the author's experience with a new surgical method and analyse early outcomes of the treatment of calcaneal fractures by Calcanail intramedullary nailing.

Material and methods:

The study encompassed 85 patients (17 women and 68 men) with 93 calcaneal fractures (43 in the right foot and 50 in the left foot). 8 patients have bilateral fractures. The mean age of the patients was 49 years (range: 18-77 years). The mean time between the injury and surgery was 6 days (range: 3-14 days). The mean duration of follow-up was 60 months (range: 6-60 months). The fractures were classified according to the system presented by Guy Utheza.

Results:

Bone union was achieved in all patients within 12 weeks of surgery. No infectious complications were observed but in 1 cases had metallosis. The mean AOFAS score was 82/100. Mean Bohler's angle was -3 degrees pre-operatively and +27 degrees post-operatively.

Conclusion:

The use of Calcanail intramedullary nailing in the treatment of displaced intra-articular fractures is a minimally invasive procedure associated with a low risk of complications. 2. The innovative posterior approach allows for the intrafocal reduction of an articular surface fracture through the prepared intramedullary canal.



Krzysztof Pyszel | Mirosław Falis
ZZOZ Ostrów Wielkopolski | ZZOZ Ostrów Wielkopolski
krzysztianpyszel@gmail.com | falis@osw.pl

Lower limb

Treatment of oblique, transverse and collapsed trochanteric fractures with use of an intramedullary Targon PF nail- in my hands tips and trips.

Introduction:

Intertrochanteric fractures of type A1.2 and A3.1 and A3.2 according to AO. are problematic in treatment using intramedullary nails.

Aim:

The aim of the work was to present a proposal for surgical treatment of oblique, transverse and collapsed through greater trochanteric fractures with use of an intramedullary PF nail.

Material and methods:

In the case of type A1.2 according to AO, fracture adjustment should be performed in a proper way due to collapse of the compression trochanter. Lack of this maneuver results in a very quick shortening of the limb after surgery and prolonged adhesion as well as chronic pain. In our department we treated this method 5 patients. The A3.1 and A3.2 fractures according to AO require the use of an additional TMSS in the lateral region of the femur to correctly align the fracture. Lack of the screw can result in secondary displacement during loading, as well as shortening of the limb, prolonged adhesion and, as a result limping. In our department we treated this method 3 patients.

Results:

In all cases anatomical reduction has been done using this maneuvers. Patients after surgery received healing of the fractures after 6 weeks and rehabilitation was successful.

Conclusion:

Presented maneuvers are repeatable and leads to anatomical reduction of this special type of the trochanteric fractures. After applying the appropriate fracture adjustment and an additional TMSS screw, the implantation process itself proceeded without problems in the discussed cases In the case of an A1.2 type fracture, it requires a proper adjustment before intramedullary implantation, while a A3.1 and A3.2 fracture according to AO requires an additional TMSS screw in the lateral region.



Krzysztof Pyszel | Mirosław Falis
ZZOZ Ostrów Wielkopolski | ZZOZ Ostrów Wielkopolski
krzysztianpyszel@gmail.com | falis@osw.pl

Lower limb

Targon F intramedullary nail as the internal fixator of the knee spacer after complicated periprosthetic fracture- case report

Introduction:

Fractures around the prosthesis and infection sometimes require a non-standard solution to the problem of healing the fracture and complications. We present a case of periprosthetic fracture of the femur in a 64-year-old woman after total knee replacement treated with a spacer on an intramedullary nail.

Material and methods:

A 64-year-old female patient who underwent total knee replacement, initially treated with a TARGON RF intramedullary nail. Due to non-union and destabilization, the fracture was restabilized on the LCP plate. Due to infection of the fracture area and lack of treatment options, it was decided to remove the knee endoprosthesis with the distal end of the femur. Eventually, a knee spacer was inserted on a medium of Targon F nail.

Results:

A multi-stage healing process of periprosthetic fracture ended with healing of the fracture area and resolving the infection.

Conclusion:

Periprosthetic fractures constitute a significant healing problem. The use of the Targon F intramedullary nail as an intramedullary spacer carrier gives you the opportunity to heal the infection and gives you the opportunity for secondary knee arthroplasty using the castomade prosthesis.



*Aliaksandr Brytsko / Viktor Anosov
Grodno State Medical University, Grodno, Belarus / Grodno State Medical University, Grodno, Belarus
emik3ster@gmail.com | aviktor8@gmail.com*

Lower limb Results of minimal invasive correction of intra-articular calcaneal fractures

Introduction:

One of the most controversial and challenging problem is comminuted intra-articular calcaneal fractures in terms of outcomes despite of method for fracture fixation.

Various open approaches has been developed including extensile lateral approach, medial approach, combined lateral and medial approach, limited posterolateral approach, and sinus tarsi approach. However, fracture malreduction, correction fracture fragments loosening in early postoperative period and hindfoot deformities and long-term disability due to pain (from scar also) and chronic stiffness in long-term follow-up claims to minimize the surgical intervention.

Material and methods:

We retrospectively observed 16 intraarticular calcaneal fractures in 14 patients, who underwent surgery using distraction frame for fracture fragments temporary correction and screws for definitive fixation. The mean age was 48 years (16-74 years) and the mean follow-up was 2.6 years. In according to the Sanders classification 10 patients had type II, 6 - type III fractures.

Results:

The postoperative mean AOFAS score was 79.4 points, with good or excellent results in 12 of all patients. The average Bohler's angle and Gissane's angle preoperative were 2.9 ± 4.3 and 143.3 ± 12.1 and became 29.2 ± 5.1 and 125.4 ± 5.4 after operation. It was no patients with wound complications or subtalar arthrodesis needing.

Conclusion:

Less-invasive method of calcaneal fractures treatment using distraction frame for temporary correction and screws for fragments fixation is a valid option for displaced intra-articular calcaneal fractures cure.



A.B. DZEMIANTSOV | A.V. BELETSKI | V.S. ANOSOV
State Institution «Republican Scientific-Practical Centre of Traumatology and Orthopedics, Minsk, Belarus
Grodno Medical University
aviktor8@gmail.com | vic8@mail.ru

Lower limb
Comparative results of radiological outcomes after triple pelvic osteotomy and conservative treatment in severe cases of Perthes disease

Introduction:

We have compared the radiological outcomes of severe cases of Perthes disease and prognosticated the development of an arthrosis. The results of treatment were estimated using Stulberg classification. According to this classification we took into account both the form of femur's head and the acetabulum form.

Material and methods:

In order to restore the anatomy of a hip joint we performed 53 triple pelvic osteotomy (TPO) for 51 patients (Group 1). We observed 20 children with unfavorable symptoms of the disease, who didn't have surgery for various reasons. They were treated conservatively (Group 2). Groups are statistically comparable by the main indicators.

Results:

Clinical outcome after the TPO is much better than after conservative treatment (based on Stulberg classification). In «Group 1» the majority of joints - 41 (77%) (Fisher's exact test $P=0$) is in keeping with Class I and II. There were only 4 regular joints (20%) in «Group 2». In «Group 1» there were 12 joints (23%) with the «aspherical congruency» treatment issue. In the «Group 2» there were 13 of such joints (65%), which is more than in the first group (Fisher's exact test $P=0,0017$). There were no evident deformation with «aspherical incongruency» in the first group, and there were three cases of it (15%) in the second group.

Conclusion:

This leads us to conclusion that TPO makes a positive form-building impact on femur's proximal part.



Andrzej Warzocha
Rehasport Clinic
andrzejwarzocha2@gmail.com

Lower limb
Subtalar arthrodesis using Calcanail implant

Introduction:

Sequele of displaced intraarticular calcaneal fractures have a very strong impact on patients overall physical fitness. Cotton commented in 1916 that "the man who breaks his heel bone is done so far as his industrial future is concerned." On the contrary for many years subtalar fusion has been a useful tool for improving gait characteristics and quality of life in patients after failed primary treatment of calcaneal fractures. The topic of the presentation is a review of available literature focused on treatment algorithms in primary and revision subtalar fusions as well as presentation Calcanail arthrodesis implant and its characteristics.

Material and methods:

We analyzed current literature concerning posttraumatic subtalar arthritis, calcaneal fracture malunion and nonunion using PubMed database. Apart from subtalar arthritis, in most cases authors mentioned varus malunion and loss of calcaneal height causing anterior ankle impingement and gait disturbances. In many cases it is necessary to perform a simultaneous correction of malunion as well as subtalar fusion.

We present main features of arthrodesis version of Calcanail and the operational technique.

Clinical examples include four subtalar fusions using Calcanail implant (two primary fusions, calcaneal fracture nonunion after ORIF and revision of failed subtalar arthrodesis).

Results:

We managed to achieve fusion in all cases. Apart from one delayed union requiring bone grafting and additional fixation there were no complications. Implant removal was not necessary.

Conclusions:

With correct indications Calcanail seems to be a user friendly implant. Devices included in the Calcanail set significantly facilitate deformity correction and performing of arthrodesis.



Andrzej Warzocha
Rehasport Clinic
andrzejwarzocha2@gmail.com

Lower limb

Conversion from external fixator to intramedullary nail in damage control orthopedics and infected nonunions

Introduction:

External fixation is the current standard of treatment in damage control orthopedics and infected nonunions. It allows to maintain enough stability using a simple frame design in the primary phases of treatment, but usually, with the exception of ring fixators (Ilizarov technique) it is not suitable for achieving healing of fracture/nonunion.

Material and methods:

We analyzed current literature on the topic of conversion from external fixator to intramedullary nail in damage control orthopedics and infected nonunions: indications, contraindications, treatment algorithms, complications, success rate.

Literature covers also the subject of dedicated implants like antibiotic covered nails.

Clinical examples include cases of high energy lower limb trauma treated with external fixation in the primary phase and later converted to intramedullary nail as well as staged treatment of chronic posttraumatic infected nonunions.

Results:

Data from the literature support conversion from external fixator to intramedullary nail as a part of staged treatment protocol.

We managed to achieve bone healing in all presented cases without major complications and recurrence of chronic infection.

Conclusion:

With correct indications intramedullary nailing is a safe and effective method of achieving bone healing without seriously compromising blood supply in the area of fracture/nonunion.



*Viktor Anosov | Prof. Alexandr Beletski
Grodno Medical University, Grodno, Belarus | State Institution «Republican Scientific and Practical Centre for
Traumatology and Orthopedics», Minsk, Belarus
aviktor8@gmail.com | aviktor8@gmail.com*

Lower limb Precise derotation osteotomy of tibia for torsional profile correction

Background:

Torsional deformities of long bones of lower extremity are common among children, and not always resolve spontaneously. Persisted deformity leads to excessive joint wearing and overloading.

Objectives:

Precise correction of rotational deformity of tibia was done by special frame application during surgery.

Methods:

Original screening method of measurement of torsional profile was designed. Before operation computer tomography torsional profile also was done. During 2 years (since 2015 y.) 15 patients of pediatric orthopedic department were included into the study. Mean patient age was 16 years (min 15, max 17). Our novel correction frame was used. During procedure we applied correction frame on tibia. Transverse osteotomy was done 8-10 cm distally to tibial tuberosity. Planned correction was reach by controlled rotation of distal fragment in frame. Pins position was checked by inclinometer. Fixation with intramedullary nail allow us for patient rehabilitation without external fixation.

Results:

Measured ultrasound femur condyles inclination angle and femur condylar axis on computer tomography scan was compared before and after surgery. This mistake was 2.2 ± 0.8 degrees. Difference between ultrasound femur condyles inclination angle and CT femur condylar axis version came to 7.3 ± 1.2 degrees. Mean value of ultrasound femur condyles inclination angle was 13.1 ± 5.1 degrees.

Conclusion:

Measurement of ultrasound femur condyles inclination angle is simple, non ionizing technique for as screening of lower extremity torsional profile abnormality. Early diagnosis of torsional pathology allowed us to prescribe preservation treatment and postponed joint degenerative changes. Precise derotation osteotomy of tibia for torsional profile correction with frame is good method for planned osteotomy application.

Viktor Anosov | Alexandr Beletski
Grodno Medical University, Grodno, Belarus | State Institution «Republican Scientific and Practical Centre for Traumatology and Orthopedics», Minsk, Belarus
aviktor8@gmail.com | aviktor8@gmail.com

Lower limb

Temporary corrective lateral arthrorisis of subtalar joint in children with flat-foot and torsional malalignment

Purpose:

Application of simultaneous minimum invasive procedure for flatfoot treatment among children.

Materials and the methods:

The known procedure of 'calcaneo-stop' technique was modernized and received a new biomechanical background for management of flatfoot deformity. Being based on our data, after analyzing of anatomical and biomechanical features of subtalar joint we improved known procedure. Since 2015y. correcting lateral arthrorisis of subtalar joint was performed in 18 children with mobile flat-foot (30 procedures). For results evaluation we estimate patient's satisfaction with procedure, dynamic footplantography, pedobarography, x-ray examination.

The principle of operation relies on temporary locking of the hyperpronation of subtalar joint by screw. Operation took 20-30 minutes; spongy screw was settled in the lateral process of talus through 8mm skin incision under image intensifier with special guide. Immobilization was not used, 3 days after operation the course of conservative treatment is conducted with full weightbearing.

Results:

During early postoperative period in patients correction of deformity was achieved, the level of the physical activity before and after of operation did not change, patients and parents were contented by the effect of surgery.

Conclusion:

The high efficiency of this procedure makes it possible to reach good results of treatment.

*Rodolfo Zamora | Thomas Schlierf | John Nyland
University of Louisville | University of Louisville | University of Louisville
rodolfo.zamora@louisville.edu | thomas.schlierf@gmail.com*

Lower limb

Extended Anterior Approach with Greater Trochanter Sparing for Proximal Femur Resection and Hip Reconstruction: Description of the Approach.

Proximal femur resection for metastatic diseases such as tumors can make it very difficult to restore essential hip function for activities of daily living such as walking and stair climbing. This technical note describes a greater trochanter sparing proximal femur resection and hip reconstruction approach for treating patients with these concerns. Connecting the extended anterior surgical approach of this technique with a conventional ilioinguinal surgical approach also enables easy pelvic cavity access if needed. With the patient in supine, this surgical technique allows for easy assessment of lower extremity length and hip rotational alignment compared with the contralateral lower extremity. By preserving the native gluteus medius insertion and vastus lateralis origin, greater trochanter region blood supply and hip abductor muscle function is more easily maintained. In using a femoral implant that promotes bony ingrowth from the preserved greater trochanter, this technique improves the potential for restoring normal gait. We discuss the profiles of three patients who underwent right proximal femur resection and hip reconstruction using this technique in association with metastatic breast cancer treatment. Patients were a mean 14 months post-surgery (range = 6 to 27 months). Although one patient died at 15 months post-surgery due to cancer complications, all 3 patients had returned to pain-free, right lower extremity full weight bearing gait on flat surfaces and stairs at time of follow-up.



*Falis Mirosław | Pyszel Krystian | Bargiel Andrzej
Dr | Dr | Dr*

falis@osw.pl | krystianpyszel@gmail.com | andrzej.bargiel@yahoo.com

Lower limb

Subtalar joint arthrodesis using intramedullary Calcanail in displaced intraarticular calcaneal fracture (DIACF)- evaluation of the new treatment method.

Introduction:

The treatment of displaced intra-articular calcaneal fractures (DIACF) and foot disorder remains challenging. The aim of the study was to evaluate the new surgical approach of primary and secondary arthrodesis using intramedullary Calcanail in displaced intraarticular calcaneus fractures and to analyse the complications connected with implant and surgical techniques.

Material and methods:

25 patients that underwent subtalar arthrodesis using Calcanail in years 2015-2017 were included. Patients were divided in two groups - Group A primary subtalar arthrodesis (10 patients) and Group B secondary subtalar arthrodesis (15). Average follow-up time was 19 months. BonAlive substitution of the bone was used in open calcaneal fracture treatment and allogenic bone grafting in all secondary arthrodesis was used. Postoperative and post 3,6 and 12 months X-rays were assessed.

Results:

Subtalar joint arthrodesis was obtained in all cases in average time: 9,8 months (6 weeks- 11 months) in A Group and 6 months in Group B (6 weeks-7,4 months). No problems regarding implant design were found. In 4 cases problem with proximal interlocking screw occurred due to conflict with lateral malleolus during the surgical procedure. In one patient superficial wound infection occurred in the subtalar joint surgical approach; one patient experienced suralis nerve palsy which subsided six months after surgery

Conclusion:

The method of intramedullary nail arthrodesis using Calcanail provide to full subtalar joint fusion during the primary and secondary surgical procedure. Considering the severe nature of the injury or posttraumatic foot disorder this method is repeatable, very useful and has a lower risk of complications.



*Falis Mirosław | Łśmiłowicz Rafał | Bargiel Andrzej
Dr / Dr / Dr*

falis@osw.pl | andrzej.bargiel@yahoo.com | andrzej.bargiel@yahoo.com

Upper limb

Shoulder function after displaced proximal humeral fractures- comparison nonoperative and operative treatment using Targon Ph intramedullary nail.

Introduction:

Displaced proximal humerus fractures (DPHF) are complex treatment problem. The choice of treatment method - surgical or non-surgical - is controversial. The aim of this study was to evaluate shoulder function after non-operative and operative treatment of DPHF with Targon Ph intramedullary nailing and to analyse radiograms and to describe complications.

Material and methods:

67 patients treated due to proximal humerus fractures were evaluated according to Constant-Murley score. 25 were treated nonoperatively and 42 operatively. The follow up was 19 months. Fractures and displacement were classified according to Neer system. Non-operative treatment was done by splint immobilization, and rehabilitation since the second week. Targon Ph intramedullary nailing was used in operative treatment. Non-operative and operative treatment was performed by five orthopedists and 2 therapists according to the common protocol. AP and axial or Y X-rays after injury, 6 and 12 weeks after treatment were analyzed. Subsequently union, signs of avascular necrosis of humeral head or greater tuberosity, bone infection, improper reduction or implant complications was assessed.

Results:

Patients after non-operative treatment obtained 52 and after operative treatment 70 according to Constant-Murley score. Complications in the group of patients treated non-operatively occurred in 16% and 42,84% in the group of patients treated operatively.

Conclusion:

Shoulder function in Constant- Murley score after non-operative treatment of DPHF was unsatisfactory and satisfactory in operative treatment group. Better results of operative treatment of DPHF compared to non-operative treatment in Constant-Murley score was found. Operative treatment of DHPF has higher risk of complications occurrence.



Dominique Misselyn
LEUVEN UNIVERSITY HOSPITAL
dominique.misselyn@uzleuven.be

Lower limb

3D PRINTS IMPROVE THE INTER-OBSERVER AGREEMENT OF THE SANDERS CLASSIFICATION OF CALCANEAL FRACTURES

Introduction:

The Sanders classification is the most used classification of calcaneal fractures, but it has a moderate inter-observer agreement. To improve this reliability, several authors tested the added value of 3D imaging but they were not really successful.

Material and methods:

After segmentation (virtual disarticulation), 11 intra-articular calcaneal fractures corresponding to different types of the Sanders classification were 3D-printed with a standard 3D-printer. The 3D-prints and their 2D-CT counterparts of the same fractures were presented separately to 24 observers (trainees, radiologists, foot surgeons).

Interobserver agreement for the Sanders classification was assessed by using the kappa coefficient values (Fleiss kappa).

Three versions of the classification were considered: Sanders classification with subclasses, without subclasses and combining Sanders III and IV subclasses.

The 3D print always yielded higher values for agreement and chance-corrected agreement. The (Brennan and Prediger) weighted kappa equaled 0.35 (for 2D) and 0.63 (for 3D) for Sanders with subclasses ($p=0.004$), 0.55 (2D) and 0.76 (3D) for Sanders without subclasses ($p=0.003$), and 0.58 (2D) and 0.78 (3D) for the fusion of Sanders III and IV ($p=0.027$). There was also greater agreement with the peroperative evaluation, 88% vs 65% (3D vs 2D, $p<0.0001$), and a higher percentage of Sanders III-IV with 2D compared to 3D, 56% vs 32% ($p<0.0001$).

Conclusion:

Based on this study we strongly advocate the use of 3D imaging of calcaneal fracture, with virtual disarticulation prior to perform osteosynthesis.



*YOUGUN WON / Sangbum Kim / Gi Soo Lee / Byunh Hak Oh / Yoo Jung Park
KONYANG UNIVERSITY / College of Medicine, Konyang University / College of Medicine, Chung Nam
University / College of Medicine, Konyang University / College of Medicine, Yeonsei University
yougunwon@gmail.com | sangbumos@me.com | gslee1899@gmail.com | sebslab@hanmail.net |
oriolees83@hanmail.net*

**Lower limb
Amputated limb by cerclage wire of femoral diaphyseal fracture**

An entrapment of the femoral artery by cerclage wiring is a rare complication after spiral diaphyseal femoral fractures. We report the case of an 82-year-old female treated by an antegrade intramedullary nailing and multiple cable augmentation, which was then complicated by injury to the femoral artery that resulted in ipsilateral leg necrosis and amputation. The entrapment was caused by direct belting by the cable and resulted in a total obstruction of the femoral artery.

YOUNG WON
KONYANG UNIVERSITY
yougunwon@gmail.com

Lower limb
Role of Appositional Screw Fixation in Minimally Invasive Plate Osteosynthesis for Distal Tibial Fracture

Over the decades, minimal invasive plate osteosynthesis has been well established as a treatment of distal tibial shaft fractures. However, the effect of inter-fragmentary appositional screw fixation has not been adequately investigated.

Of the 60 patients (group 1), 30 were treated with MIPO with appositional screw fixation according to the surgeon's discretion and the other 30 (group 2) were treated without the screw. Results were assessed for time to initial callus formation, bridging callus formation, and radiological union defined as the presence of a bridging callus in three cortices. Clinical outcomes were assessed at the final follow-up examination.

In group 1, the rate of clinical union was significantly higher than that in group 2 in analysis of the 1-year cumulative detection rate ($p=0.0063$). In group 2, the duration before radiological union was significantly longer than in group 1 ($p=0.016$). Four nonunion patients in group 2 who achieved union after placement of an additional bone graft. None of group 1 diagnosed with delayed union or nonunion ($p=0.022$). American Orthopedic Foot and Ankle Scores did not significantly differ between groups 1 and 2 ($p=0.43$).

We regarded that the group without appositional screw fixation had significantly extended healing time and higher incidence of nonunion and delayed union that required additional bone graft placement to heal, thus significantly extending times for clinical union and radiological union.

Enes OCALAN | Kubilay EROL | Cebrazil ALEKBEROV | Kemal AKTUĞLU
Turgutlu State Hospital, Manisa, TURKEY | Ege University Orthopaedic and Traumatology Clinic, Izmir,
TURKEY | Scientific Research Institute of Traumatology and Orthopedics, Baku, AZERBEYCAN | Ege
University Orthopaedic and Traumatology Clinic, Izmir, TURK
enes.ocalan@hotmail.com | kubilayerol89@gmail.com | dr.alekberov@yahoo.com | kemal.aktuglu@gmail.com

Upper limb

Gradual lengthening of the ulna by distraction osteogenesis in children with Multiple Hereditary Exostoses. Results and comparison circular and unilateral fixators.

Introduction:

Hereditary Multiple Exostoses (HME) are a rare autosomal dominant disorder characterized by the presence of osteochondromas located on the long bones and axial skeleton. Patients present with complaints of pain, deformity and limited joint motion.

Materials and Methods:

We retrospectively evaluated the results after gradual ulnar lengthening and radial deformity correction using an external fixator for forearm deformities caused by osteochondromas. Seven patients treated with external fixator with multiple hereditary osteochondromas. Circular external fixators (Ilizarov) were used in four forearms and unilateral external fixators were used in three forearms.

Results:

The mean follow-up time was 16 months (12-20). The average radial articular angle improved from 38.5° to 24.7° (range, 20° - 31°) and the carpal slip improved from 54% to 30.1% (range, 25-35%) postoperatively. The average shortening of the ulna was reduced from 37 mm to 4,57 mm (range 0 to 8mm) after the treatment. The average pronation grade increased from 35° to 50° (15° - 75°). Mean Mayo elbow score improved from 54 to 81 (70-90). The mean distraction time was 50.1 days (30-61) and the mean fixation time was 67 (40-96) days. A patient needed a secondary procedure due to the early removal of the fixator.

Conclusion:

Ulnar osteotomy and gradual lengthening by an external fixator had excellent results in the treatment of forearm deformities in children with HME. We couldn't prove it statistically but although the possibility of intervention during lengthening in patients used Ilizarov method was higher, patients were more comfortable with unilateral external fixators.

Enes OCALAN / Kubilay EROL / Kemal AKTUĞLU
Turgutlu State Hospital, Manisa, TURKEY / Ege University Orthopaedic and Traumatology Clinic, Izmir,
TURKEY / Ege University Orthopaedic and Traumatology Clinic, Izmir, TURKEY
enes.ocalan@hotmail.com | kubilayerol89@gmail.com | kemal.aktuglu@gmail.com

Lower limb

Necessity for fibular fixation associated with extraarticular distal tibia fractures treated with intramedullary nailing

Introduction:

Intramedullary nailing (IMN) is an accepted method in extraarticular distal tibia fractures. Operative stabilization of fibula is still a controversial issue. This study aims to evaluate the role of fibular fixation in the treatment of distal third tibial fractures.

Patients and methods:

Between January 2010 and March 2017, 82 patients (57 male, 25 female) underwent intramedullary nailing surgery for extra-articular distal tibia fractures. Patients were classified according to whether fibular fixation was performed or not (29 (%35,3) with fibular fixation and 53 (%64,6) only IMN). The groups were analyzed with regards to fracture types, time to surgery, reamed or not, associated trauma, hospital stay, Injury Severity Score (ISS), nonunion, reoperation rate, malalignment and Olerud and Molander Functional Score.

Results:

Fibula fixation and nonfixation groups had no significant differences with regards to age and gender. No significant differences between fibula fixation (6.2° coronal, 2.4° sagittal plane malalignment) and nonfixation group (7.1° coronal, 2.96° sagittal plane malalignment) with malalignment. We also saw no significant differences, trauma types, time to surgery, hospital time, hardware failure, fracture type, union time and union rate. Nine patients (%10,9) experienced nonunion; all of these required a secondary procedure (p=0.441). Olerud and Molander score assessed and found that mean 61,04 (35-75) in nonfixation group and mean 46,2 (25-70) in fixation group. Functional score measurement showed that nonfixation group had statistically significant higher results (p=0.008).

Conclusion:

Both fixation methods offer good results; however, stiffness, stair climbing, and squatting hurdle were more pronounced in the fixation group so functional outcomes better in nonfixation group.



Enes OÇALAN / Kubilay EROL / Kemal AKTUĐLU
Turgutlu State Hospital, Manisa, TURKEY / Ege University Orthopaedic and Traumatology Clinic, Izmir,
TURKEY / Ege University Orthopaedic and Traumatology Clinic, Izmir, TURKEY
enes.ocalan@hotmail.com | kubilayerol89@gmail.com | kemal.aktuglu@gmail.com

Lower limb

Management of Segmental tibia fractures with intramedullary nailing and results of alignment.

Introduction:

Segmental tibia fractures are usually seen in young patients who have had high-energy trauma. Because of soft tissue and skin problems are common in these fractures, the Intramedullary Nailing(IMN) method is often preferred for treatment. However, there was no study to determine postoperative malalignment.

Materials and methods:

A total of 29 patients (3 female,26 male), 30 segmental tibia fractures treated with IMN, were included in the present study from 2010-2017. The average age was 36,1 (18-69). Fall from high, traffic accidents and industry injuries were the main types of trauma that were exposed.

Results:

The average follow-up time was 30.6 (15-66) months. The mean time to surgery was 4 (1-14) days, hospital time was 10.4 (2-27) days. Nine(%30) reamed and twentyone(%70) unreamed nails inserted. 9(%30) patients had nonunion and all of them needed secondary procedure. Four nails dynamized for delayed unions and nine nails were exchanged with larger nails in the patients who had nonunions. Mean valgus angulation of the tibia was $5,3^{\circ}$ and mean antero-posterior angulation of the tibia was 4.86° in all patients. There were 10 segmental fractures which had distal part and their mean valgus angulation was 9.4° ($p<0.05$) and mean antero-posterior angulation was 9.8° ($p<0.05$).

Conclusion:

The IMN is an accepted method.However, it should be kept in mind that these segmental tibia fractures, which have distal component, may cause reduction loss and consequently malalignment. This can be attributed to the fact that segmental fractures develop as a result of high-energy traumas and in general, unreamed nails are preferred.



David Seligson / Sam Gracey
University of Louisville Hospital / University of Louisville Hospital
seligson@louisville.edu | sampaulgracey@gmail.com

Lower limb
screw placement for percutaneous fixation of the calcaneus

Stout screws placed from the calcaneus tuberosity to the body of the calcaneus are usually placed parallel. The parallel orientation does not correspond to the anatomy of the calcaneus. Using fresh cadaver specimens we found that one screw from the tuberosity aimed to the calcaneo- cuboid joint and the second screw from the postero-lateral surface of the calcaneus and directed dorsally to the 'constant' sustentacular fragment is the correct pattern and avoids screws which are not in bone.



Jongho, Noh

*Department of Orthopedic Surgery, The Catholic University of Korea
scorpio84@naver.com*

Lower limb

Treatment of proximal femur osteomyelitis occurred after proximal femoral nail anti-rotation fixation, with antibiotic cement-coated tibia intramedullary nail: A case report

Antibiotic cement-coated intramedullary nails maintain a locally high antibiotic concentration while contributing to bone stability. We present a case of femoral subtrochanteric fracture in a patient with an infected nonunion who was successfully treated for an infection and nonunion using an antibiotic cement-coated tibial intramedullary nail.

A 79-year-old woman with a right femoral subtrochanteric fracture underwent internal fixation using proximal femoral nail antirotation (PFNA). She developed osteomyelitis with nonunion at the surgical site, 10 months postoperatively. A two-stage surgery, including removal of the existing PFNA to treat the infection and stable fixation to treat the nonunion, is generally performed but requires a prolonged hospitalization period. We therefore decided to insert an antibiotic cement-coated intramedullary nail in a one-stage surgery. However, the patient's diaphysis of the femur was too shallow to insert the antibiotic cement-coated intramedullary nail, even when using the smallest femoral intramedullary nail. Stable fixation could not be achieved using an antibiotic cement-coated intramedullary K-wire, thus, we decided to use an antibiotic cement-coated tibial intramedullary nail. After coating the nail with bone cement mixed with antibiotics, bone fixation was achieved by inserting the nail at the site of the PFNA. The patient's symptoms improved, symptoms from the infection disappeared, and bone union was confirmed.

Osteomyelitis occurred because of postoperative infection following a proximal femoral fracture. Antibiotic cement-coated tibial intramedullary nails are an effective option to treat patients with osteomyelitis of the femur and achieve bone union where nonunion persists with a shallow intramedullary femoral canal.



KEVIN C ANDERSON MD
BEACON ORTHOPAEDICS AND SPORTS SPECIALISTS
kevinandersonmd@gmail.com

Lower limb
Early experience and technical pearls with CALCANail intramedullary nailing of calcaneus fractures

Calcaneus fractures represent a difficult challenge for management and return to function. The fixation method and surgical approach addressing calcaneus fractures has evolved over the past few decades. Wound dehiscence and infection secondary to surgical approach has led to innovative techniques and surgical implants. The CALCANail (FH Orthopedics) implant was designed to limit the surgical approach and dissection without compromising anatomic reduction and restoration of function. In addition, the approach may allow for earlier surgical intervention. We discuss our preliminary results of the CALCANail implant in the United States as well as technical considerations during fracture reduction and implantation. Our results reveal no post-operative wound dehiscence or infection. One implant was removed secondary to implant positioning. All fractures and primary arthrodeses healed within eight weeks. Weight-bearing was limited until six weeks for fractures and four weeks for arthrodesis.



S. van Hove
MD MUMC Maastricht
s.vanhoeve@hotmail.com

Lower limb

Gait analysis and clinical outcome in patients after pilon fracture surgery

Abstract Background:

Fractures of the tibial plafond are uncommon. Earlier studies showed poor clinical outcome after treatment based on radiographic imaging and patient-reported outcome measures (PROM). In this study kinematic parameters, radiographic findings and PROM in patients after pilon fracture were analyzed and compared with healthy subjects.

Methods:

Nine patients, ten feet, who were treated with open reduction and internal fixation after pilon fracture underwent kinematic analysis with the multi-segmented Oxford foot model. Fractures were evaluated for post-operative step-off and gap on CT-scans and PROM were collected (AOFAS, FADI, SF-36, VAS). Results were compared to 11 healthy subjects, 20 feet.

Findings:

Range of motion (ROM) between hindfoot and tibia was significantly decreased in the sagittal plane (flexion/extension) during push-off phase in the pilon group 9.02 vs. 12.59, $p=0.011$. Also the ROM in the transverse plane (inversion/eversion) during push-off phase was decreased, but ROM in the frontal plane (abduction/adduction) was increased. Correlations were found between flexion/extension and PROM (FADI ($r=0.470$ $p=0.009$), AOFAS ankle-hindfoot score ($r=0.374$, $p=0.042$) and between abduction/adduction in both phases and gap in the talocrural joint were found ($r=0.721$ $p=0.044$, $r=0.750$ $p=0.032$).

Interpretation:

Patients with pilon fractures showed less ROM between the hindfoot and tibia in the sagittal and transverse (inversion/eversion) plane and more ROM in the frontal plane during push-off phase. ROM showed significant correlations with PROM and gap in the talo-crural joint measured.



Sherry Kosinar, LCSW
Norton Childrenâ's Hospital, Louisville, Kentucky
sherrykosinar@gmail.com

Upper limb

Understanding Emotional Trauma in the Medical Setting

When treating physical injury or illness, medical staff are often faced with patients suffering from emotional stress or trauma. The consideration of psychological effects can enhance their treatment. Recognition of both acute distress disorder and post-traumatic stress disorder following a traumatic event can aid in potential paths for recovery, which can then facilitate physical healing.

Objectives:

Understand the difference between acute distress disorder and post-traumatic stress disorder, and recognize the symptoms of both;

Learn the benefits of a Trauma-Informed Approach;

Recognize the connection between emotional trauma and symptoms of trauma such as substance misuse, depression, and anxiety.

Learn about different trauma treatment approaches.

Information about Presenter:

Sherry Kosinar, LCSW

Licensed Clinical Social Worker

Medical Social Worker at Norton Childrenâ's Hospital, Louisville, Kentucky

Psychotherapist at medication-assisted treatment (opioid use disorder) medical practice, Louisville, Kentucky



Liubov Kylymniuk
National Pirogov Memorial Medical University, Vinnytsia, Ukraine
kylymniuk@gmail.com

Lower limb

Efficiency of extracorporeal shockwave therapy for delayed union and nonunion of long bones

Introduction:

Due to the high frequency of unsatisfactory outcomes of the surgical techniques for fracture healing disorders, the problem of nonoperative stimulation needs further investigation. So, the aim was to evaluate the efficiency of nonoperative stimulation by using extracorporeal shockwave therapy (ESWT) for fracture-healing disorders.

Materials and methods:

Treatment results of 67 patients with delayed union and nonunion of tubular bones were analyzed. Two groups of patients were formed - the study group, which consists of 36 (53.73%) patients and the control group, which included 31 (46.27%). The average age was 49.67 ± 16.32 years. The vast majority 42 (62.69 %) was working age people. In the control group, there were used surgical methods. In the study group, patients were given a course of ESWT using apparatus Swiss DolorClast. The results of treatment were evaluated using scale Neer-Grantham-Shelton.

Results:

In comparison with the control group, the long-term results of treatment of the patients who belonged to the study group showed better indicators in the severity of the pain ($p=0.03$), the anatomical shortening of the segment ($p=0.007$) and the restoration of working capacity ($p=0.02$). The patients of both groups didn't have significant differences of the movement limitation ($p=0.86$), radiological changes ($p=0.19$) and overall treatment results ($p=0.16$). Full healing without operation was achieved in 63.89% patients of the study group.

Conclusion:

The absence of a significant difference in the long-term results compared surgical treatment and the using of ESWT has been established allows recommending the use of this method as an alternative treatment for fracture healing complications.



Liubov Kylymniuk / Volodymyr Kovalchuk
National Pirogov Memorial Medical University, Vinnytsia, Ukraine / Shupyk National Medical Academy of
Postgraduate Education, Kyiv, Ukraine
kylymniuk@gmail.com | volodymyr.kovalchuk@gmail.com

Lower limb Risk factors and their prognostic value in case of fracture-healing complication

Introduction:

The aim of present study was to identify the risk factors which were associated with fracture-healing complications, to assess their structure and predictive value.

Materials and methods:

58 patients with delay union of long bones that were included in the study group and 58 patients in the control group with similar lesions without disorders of reparative regeneration were examined. To assess the probability of risk factor's effect on the formation of fracture-healing complications odds ratios (OR) and 95% confidence intervals (CI) were estimated. The probability of an error-free prediction was determined at $p \leq 0.05$.

Results:

As a result, it was found that factors such as smoking (OR=5.08, CI 2.09-12.34, $p=0.0001$), diabetes mellitus (OR=5.14, CI 1.04-25.38, $p=0.02$), peripheral vascular disease (OR=4.04, CI 1.35-12.06, $p=0.007$) and the taking nonsteroidal anti-inflammatory drugs (OR=5.92, CI 2.28-15.38, $p=0.00006$) have a significantly higher effect of formation fracture-healing complications. Risk factors related with an injury - the presence of an open fracture (OR=3.28, CI 1.23-8.71, $p=0.01$) and high-energy traumatic mechanism (OR=2.75, CI 1.1-7.87, $p=0.01$) are also associated with a higher risk of fracture-healing complications.

Conclusion:

The presence of diabetes mellitus, peripheral vascular disease, smoking, the use of nonsteroidal anti-inflammatory drugs, the presence of an open fracture and the high-energy mechanism of injury are associated with a higher risk of fracture-healing complications. Careful study of existing risk factors and awareness of their role will improve the results of the treatment of patients with fracture-healing disorders and reduce the level of disability among working age people.

P.K.E. Herlyn¹, A.C. Kregehr², T. Mittlmeier¹, A. Herlyn¹, S. Bruhn³, B. Vollmar²
1Department of Trauma-, Hand – and Reconstructive Surgery, University Medicine Rostock
2Rudolf-Zenker-Institute for Experimental Surgery, University Medicine Rostock
3Institute of Sport Science, University of Rostock
philipp.herlyn@med.uni-rostock.de

Physical exercise in a model of Complex Regional Pain Syndrome – effects on local osteopenia

Aims

Posttraumatic Complex Regional Pain Syndrome is a well known complication of limb injury. Patients develop a localized osteopenia in the affected limb. This bone loss is assumed to be involved in the generation of pain since anti-osteoporotic medication such as bisphosphonates act as pain medication in the disease. Other treatments typically include physiotherapy. Traditionally, physiotherapy is recommended below the pain threshold. However, promising results were recently found in patients who were treated with physiotherapy above the pain threshold.

The aim of this study was to find out whether intensive physiotherapy can lead to a reduction in bone loss in an animal model for neuropathic pain.

Methods

Complex Regional Pain Syndrome was achieved with a Chronic Constriction Injury (CCI) in 22 male rats. In this procedure four loose ligatures are tied around the left sciatic nerve. Physiotherapy was simulated with a treadmill running exercise. 13 Rats (CCI Run) were trained for a total of 7 weeks with an intensive interval running regime. A control group of 9 animals (CCI Sit) received CCI without any training and had free ambulation in their cages. Symptoms of neuropathic pain were recorded during the observation period. After 7 weeks the both tibiae were harvested and stored in 70% Ethanol at 7°C. Prior scanning, the bones were rinsed with 0,9% saline solution and soaked overnight in 0,9% NaCl. The tibiae were individually placed in a Bruker SkyScan 1076 micro-CT and scanned, reconstructed and analyzed according to the manufacturers specifications (Resolution 9µm, 0,5mm Aluminum filter, tube settings 48kV & 200µA). Morphometric analysis was performed using the CTAn software package. A region of interest for the trabecular bone was drawn manually according to the suggestions in the supplied method note. Structural parameters were calculated using the built-in software. For each animal an individual left-to-right normalization of the results for the tibiae was obtained. For statistical analysis a t-test was performed.

Results

Animals in the control group (CCI Sit) developed symptoms of neuropathic pain that were present at the end of the observation period. Animals that received treadmill training (CCI Run) displayed significantly less pain. This was paralleled by a pronounced bone loss and deterioration of bone microarchitecture in the tibia of control animals (CCI Sit) while animals that underwent treadmill training (CCI Run) showed significantly less bone loss and improved bone microarchitecture. Normalized BV/TV (training: 0,59 SD 0,13; control: 0,43, SD 0,12 p<0,05) normalized Connectivity density (training: 0,58 SD 0,19; control: 0,36 SD 0,13 p<0,05) normalized Trabecular Number (training: 0,64 SD 0,14 control: 0,47 SD 0,12 p<0,05) normalized Trabecular Separation (training: 1,36 SD 0,21 control: 1,72 SD 0,51 p<0,05).

No significant differences were found for normalized Trabecular Thickness, Structure Model Index or Degree of Anisotropy.



Conclusion

While a model of neuropathic pain led to pronounced bone loss and deterioration of bone micro architecture in the affected limbs of rats, intensive treadmill running improved bone mass and structural parameters.

In conclusion, physical exercise led in this model for Complex Regional Pain Syndrome to reduced neuropathic pain which was paralleled by an improved (or preserved) bone-mass and -micro architecture. Therefore, a role of the bone lesion in the development of neuropathic pain can be postulated.



Benedikt Ritter¹, Philipp Karl Ewald Herlyn², Thomas Mittlmeier², Anica Herlyn²

1 Dept. of Trauma, Orthopedics, Plastic and Hand Surgery, Augsburg Clinics, Stenglinstr. 2, D-86156

Augsburg, Germany

2 Dept. of Trauma, Hand and Reconstructive Surgery, University Medicine, Schillingallee 35, D-18057 Rostock,

Germany

kylymniuk@gmail.com | volodymyr.kovalchuk@gmail.com

Lower limb

Preoperative skin antiseptics using chlorhexidine may reduce surgical wound infections in lower limb trauma surgery when compared to povidone iodine - a prospective randomized trial

Background:

About 3.5% of aseptic traumatologic operations of the lower leg and foot are complicated by nosocomial surgical site infections (SSI). Skin antiseptics prior surgical incision is thought to reduce local microorganisms and is commonly performed using chlorhexidine gluconate (CHX) or povidone iodine (PVI). Until now, it is unclear which antiseptic is most effective and there is no gold standard for trauma surgery yet. This prospective randomized trial analysed the efficacy of CHX vs. PVI in reduction of postoperative wound complication rates after aseptic trauma surgery on the lower leg and foot. Additionally, perioperative risk factors for SSI were identified.

Methods:

330 consecutive patients (Ø 50.7 years, range 20-91; 131 women, 148 men) with elective or emergency surgery of the lower leg or foot were randomized and received surgical skin preparations using CHX (ChlorPrep®, n=112) or PVI (Braunoderm®, n=167). Primary clinical endpoints were SSI and wound healing disorders (WHD) within 6 months after surgery. These were identified using inpatient and outpatient charts. Secondary outcomes included demographic and perioperative risk factors for SSI.

Results:

Rates of WHD and SSI were significantly higher in the PVI treatment group (12.6%, n=21: 9 SSI, 12 WHD) than in the CHX treatment group (4.5%, n=5: 2 SSI, 3 WHD; p=0.022). 63.6% (n=7) of all infections occurred after patient discharge and lead to an overall infection rate of 3.9% (n=11). SSI occurred more often in patients with cardiovascular disease (8.6%, n=10/116; no cardiovascular disease 0.6%, n=1/163; p=0.002). BMI is increased in patients with WHD (BMI 32, range 22-42; no WHD BMI 28, range 16-52; p=0.036). Longer surgery time for WHD (111 min, range 29-210; no WHD 77.7 min, range 8-451; p=0.02) and closed suction drainage for SSI (6.9% n=10/144; no drainage 0.7%, n=1/135; p=0.028) were identified as perioperative risk factors.

Conclusions:

Preoperative skin antiseptics for traumatologic surgery of the lower leg and foot using CHX led to significantly lower complications of wound healing when compared to PVI. Perioperative risk factors for WHD were obesity and longer time for surgery, whereas SSI were increased in patients with cardiovascular diseases and intraoperative placed suction drainage.