

## **ABSTRACTS FROM BOFSS MEETING 2007**

British Orthopaedic Foot and Ankle Society,  
Carden Park, Cheshire UK  
31 October-2 November 2007  
Chairman: Mr P. Laing  
Editorial Secretaries: N. Geary and C Walker  
Correspondence to Mr C Walker,  
Royal Liverpool University Hospital  
Prescot Street  
Liverpool  
L7 8XP

List of contents in Plum ■  
Abstracts in black ■

### **OSTEOCHONDRAL DEFECTS OF THE TALUS: RESULTS OF REPEAT ARTHROSCOPIC DEBRIDEMENT**

**N Savva, M Jabur, TS Saxby**  
*Brisbane Foot and Ankle Centre*

### **CORRECTIVE LENGTHENING FIBULAR OSTEOTOMY IN MAL-UNITED ANKLE FRACTURES**

**A. Sinha, S. P. Sirikonda, N. Giotakis, C. R. Walker**  
*Royal Liverpool and Broadgreen University Hospital NHS Trust*

### **ANKLE ARTHRODESIS IN HIGH RISK PATIENTS. A RADIOGRAPHIC AND CLINICAL STUDY.**

**AP Molloy, MS Myerson, CE Gamba, R Sealey, F Garcia, C Jeng**  
*Institute for Foot and Ankle Reconstruction at Mercy, Baltimore, USA*

### **RANGE OF MOTION OF THE HINDFOOT FOLLOWING ANKLE ARTHRODESIS: A PROSPECTIVE ANALYSIS.**

**R J Sealey , M S Myerson, AP Molloy, CE Gamba, C Jeng.**  
*Institute for Foot and Ankle Reconstruction at Mercy, Baltimore, USA*

### **EARLY OUTCOMES AND SURGICAL LEARNING CURVE OF THE MOBILITY TOTAL ANKLE REPLACEMENT COMPARED TO THE STAR ANKLE REPLACEMENT**

**Jackson WFM, Cooke, PH, Sharp RJ**  
*Nuffield Orthopaedic Centre, Oxford*

### **AN INTERMEDIATE TERM REVIEW OF AGILITY ANKLE REPLACEMENTS USED IN A SINGLE CENTRE IN THE UK**

**D J M Macdonald, N Logan, F Harrold, C S Kumar**  
*Department of Trauma and Orthopaedics, The Glasgow Royal Infirmary*

### **PERFORMANCE OF TOTAL ANKLE REPLACEMENT IN ANKLES WITH**

**SIGNIFICANT PRE-OPERATIVE HIND FOOT DEFORMITY**

*S Hobson., S Dhar.*

*Queens Medical Centre, Nottingham.*

**ANALYSIS OF BONE MINERAL DENSITY AROUND THE ANKLE BEFORE AND AFTER TOTAL ANKLE REPLACEMENT**

*B Purushothaman, P Lakshmanan, D Rowlings, P Patterson, M Siddique*

*Freeman Hospital , Newcastle*

**FINITE-ELEMENT-MODEL ANALYSIS OF THE EVANS OSTEOTOMY: DOES THE SITE OF OSTEOTOMY INFLUENCE JOINT CONTACT CHARACTERISTICS AND A**

*N Espinosa, A P Molloy, H Tsumura, M S Myerson*

*Institute for Foot and Ankle Reconstruction at Mercy, Baltimore, MD, USA*

**IN SITU ARTHRODESIS FOR THE SEQUELAE OF OS CALCIS FRACTURE**

*N Savva, TS Saxby*

*Brisbane Foot and Ankle Centre*

**SPATIAL ORIENTATION AND MORPHOLOGY OF CALCANEONAVICULAR COALITIONS**

*N Espinosa MD, M Dudda, J Anderson, M Bernadi, J R Casser MD.*

*Department of Orthopaedics, Children's Hospital Boston, MA, USA*

**RESULTS OF PROXIMAL MEDIAL GASTROCNEMIUS RELEASE**

*J A Kohls-Gatzoulis, M Solan*

*Royal County Surrey Hospital*

**OUTCOMES IN ANKLE ARTHRITIS: A COMPARISON OF THE RESPONSIVENESS OF FOUR ESTABLISHED SCORES.**

*C J Topliss, A S E Younger, B Bora, K J Wing, M J Penner*

*Foot and Ankle Service, Vancouver Bone and Joint Clinic, Vancouver, BC, Canada*

**TREATMENT OF MORTON'S NEUROMA WITH ALCOHOL ABLATIVE INJECTION UNDER SONOGRAPHIC GUIDANCE: FOLLOW-UP OF 101 CASES**

*R.J. Hughes, K.Ali, H.Jones, S.J.H. Kendall, D.A.Connell*

*Kingston Hospital NHS Trust and Royal National Orthopaedic Hospital*

**MORTON'S NEUROMA: THE ACCURACY, ECONOMICS AND EFFECT ON TREATMENT TIME OF DIRECT REFERRAL TO ULTRASOUND BY PRIMARY CARE PHYSICIANS.**

*R Rout, H Tedd, S J Ostlere, E G McNally, J L Teh, G Lavis, P H Cooke, R J Sharp*

*Nuffield Orthopaedic Centre, Oxford*

**THE EARLY RESULTS OF A MODIFIED WEIL'S OSTEOTOMY OF THE FIRST METATARSAL FOR HALLUX RIGIDUS**

*J A Kohls-Gatzoulis, M C Solan, M S Davies*

*London Foot and Ankle Centre and Royal County Surrey Hospital*

**MEDIUM TO LONG TERM OUTCOME ASSESSMENT OF THE CERAMIC ON CERAMIC MOJE JOINT REPLACEMENT OF THE METATARSOPHALANGEAL JOINTS.**

*R Kulshreshtha, NK Makwana, PW Laing*

*Wrexham Maelor Hospital, Wrexham; Robert Jones & Agnes Hunt Orthopaedic Hospital, Oswestry*

**FIRST METATARSAL HEAD RESURFACING WITH A CONTOURED ARTICULAR PROSTHETIC**

*C. T. Hasselman*

*University of Pittsburgh, Pittsburgh, PA, USA*

**LONG TERM RESULTS OF MITCHELL'S PROCEDURE FOR HALLUX VALGUS DEFORMITY; A 5- TO 20-YEAR FOLLOW UP IN 204 CASES**

*A Dermon<sup>1</sup>, C Tilkeridis<sup>2</sup>, D Liras<sup>1</sup>, M Tryfonidis<sup>2</sup>, K Kazakos<sup>2</sup>, C Hardouvelis<sup>1</sup>, G Petrou<sup>1</sup>*

*1. "Amalia Fleming" General Hospital, Athens, Greece*

*2. University Hospital of Alexandroupolis, Greece*

**SILASTIC IMPLANT ARTHROPLASTY OF THE GREAT TOE: A RETROSPECTIVE ANALYSIS.**

*S.A. Jain, B.C. Banerjee,*

*Department of Orthopaedics, Good Hope Hospital NHS Trust, Rectory Road, Sutton Coldfield, B75 7RR West Midlands*

**THE USE OF CALCIUM SULFATE AND CALCIUM PHOSPHATE COMPOSITE GRAFT TO AUGMENT SCREW PURCHASE IN OSTEOPOROTIC ANKLES**

*VK Panchbhavi, S Vallurupalli, R Morris, R Patterson*

*The University of Texas Medical Branch*

**MEDIAL ARTERY CALCIFICATION OF THE 1<sup>ST</sup> DORSAL METATARSAL ARTERY AS AN INDICATOR OF DIABETIC PERIPHERAL VASCULAR DISEASE**

*CD Smith, JG Bilmen, S Iqbal, S Robey, MT Pereira*

*The Foot Unit, Alexandra Hospital, Redditch.*

**THE LAPIDUS PROCEDURE FOR THE MANAGEMENT OF HALLUX VALGUS: A DOUBLE EDGED WEAPON?**

*I D M Smith & C S Kumar*

*Glasgow Royal Infirmary*

**TANGENTIAL VIEW OF THE LISFRANC JOINT - A SIMPLE, NOVEL VIEW TO MINIMIZE THE INCIDENCE OF MISSED INJURY**

*D Kumar, P Williams*

*Morrison Hospital, Swansea*

**THE CORRECTION OF THE INTERMETATARSAL ANGLE FOLLOWING FUSION OF THE FIRST METATARSOPHALANGEAL JOINT : WHAT CAN WE EXPECT?**

*S K V Pydah, E M Toh, S P Sirikonda, C R Walker*

*The Royal Liverpool & Broadgreen University Hospital NHS Trust, Liverpool, United Kingdom*

**RESULTS OF 1ST METATARSOPHALANGEAL JOINT ARTHRODESIS USING STAPLES (UNICLIPS)**

*Anwar M, Hashmi RA, Ali F, Sundar MS*

**OUTCOME OF 1<sup>st</sup> MTP FUSION WITH ACUMED PLATE FIXATION**

*K Kanagaraj, Anish Kotecha, U K Debnath, Yogesh Nathdwarwala*

**ANTIBIOTIC PROPHYLAXIS IN FOREFOOT SURGERY – EXPLORING THE MYTH**

*AD Cooney, CS Kumar*

*Glasgow Royal Infirmary*

**THROMBOPROPHYLAXIS IN FOOT AND ANKLE SURGERY**

*A Chipperfield\*, D J Redfern#*

*\*Trauma and Orthopaedics, South East Thames Rotation*

*#Brighton and Sussex Hospitals NHS Trust*

**ORTHOPAEDIC SURGEON OR OPERATIVE PODIATRIST?**

*M A Farndon, R Monkhouse*

*Leeds General Infirmary, Leeds Teaching Hospitals Trust*

**OPTIMISATION OF SCREW THREAD LENGTH AND THE EFFECT ON UNION IN SUBTALAR FUSION.**

*Tryfonidis M, Smith G, Cooke PH, Sharp RJ*

*Nuffield Orthopaedic Centre, Oxford*

**THE ECONOMICS, PERI-OPERATIVE MANAGEMENT ALGORITHMS, OUTCOMES AND COMPLICATIONS OF ANKLE ARTHROSCOPY FOR RELIEF OF ARTHROSIS IN PATIENTS. WITH HAEMOPHILIA A**

*Cooke PA, Sharp RJ*

*The Nuffield Orthopaedic Centre, Oxford.*

**VALIDATION OF THE MOBILITY TOTAL ANKLE REPLACEMENT JIG**

*P Patterson ,D McKenna ,TB Bonner,J Womack, MS Siddique*

*Freeman Hospital, Newcastle-Upon-Tyne*

**ACQUIRED ADULT FLAT FOOT DUE TO ISOLATED PLANTAR CALCANEONAVICULAR (SPRING) LIGAMENT INSUFFICIENCY WITH A NORMAL TIBIALIS POSTERIOR TENDON**

*M Tryfonidis, W Jackson, R Mansour, S Ostlere, J Teh, P H Cooke, R J Sharp*

*Nuffield Orthopaedic Centre NHS Trust, Oxford, UK*

**CAUSES OF REOPERATION IN CONGENITAL TALIPES EQUINOVARUS**

*J. Mihelarakis, N. Markeas, E. Volonakis, E. Valentis,*

*B Orthopaedic Department of Children's Hospital "P. & A. Kyriakou"*

**SURGICAL ANATOMY FOR A NEW MINIMALLY INVASIVE APPROACH TO HARVEST THE FLEXOR DIGITORUM LONGUS TENDON: A CADAVER STUDY**

**V K Panchbhavi , J Yang, S Vallurupalli**  
*University of Texas Medical Branch*

**RELIABILITY OF LINEAR VERSUS ANGULAR MEASUREMENTS IN THE EVALUATION OF HALLUX VALGUS SURGERY**

**Martin E. Hilton, Vinod K. Panchbhavi**

**ANTERIOR T-PLATE FOR ANKLE ARTHRODESIS**

**R Maheshwari, P A Hadjikakou, J F Redden**  
*Doncaster Royal Infirmary, Doncaster. UK. DN2 5LT*

**.INFLUENCE OF TIMING OF SURGERY ON THE CLINICAL OUTCOME IN SURGICALLY TREATED ANKLE FRACTURES**

**A Ahmed, A Z Ahamed, H Zadeh, S Nathan**  
*West Middlesex University Hospital NNS Trust, Twickenham Road, Isleworth, Middlesex TW7 6AF*

**OPTIMISING USE OF THE MINI C-ARM IN FOOT AND ANKLE SURGERY.**

**S Gangopadhyay, B E Scammell**  
*Nottingham City Hospital, Hucknall Road, Nottingham NG5 1PB*

**DIFFERENCES IN THE FOOT PRESSURE BETWEEN CAUCASIANS AND INDIANS**

**A B Putti MChOrth, G P Arnold, L A Cochrane, R J Abboud**  
*Institute of Motion Analysis and Research, University of Dundee, Ninewells Hospital, Dundee.*

**FOOT PRESSURE DIFFERENCES IN MEN AND WOMEN**

**A B Putti, G P Arnold, L A Cochrane, R J Abboud**  
*Institute of Motion Analysis and Research, University of Dundee, Ninewells Hospital, Dundee.*

**STRAIN IN DISTAL TIBIAL OSTEOTOMY STABILISED WITH METAPHYSEAL AND DISTAL TIBIAL LOCKING COMPRESSION PLATES**

**Chezhiyan Shanmugam<sup>1</sup>, Subhojit Ghosh<sup>2</sup>, Aziz Rahmatalla<sup>1</sup>, Nicola Maffulli<sup>1</sup>**  
*1 Bionic Workshop, Hartshill Orthopaedic Unit, Department of Trauma and Orthopaedic Surgery, Keele University School of Medicine, North Staffordshire Hospital, Thornburrow Drive, Hartshill, Stoke on Trent, Staffordshire, ST4 7QB, England.  
2 Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ, United Kingdom.*

**THE ECONOMIC GAINS ACHIEVED BY A SIMPLE CHANGE IN POST OPERATIVE CASTING PROCEDURE**

**B J F Dean, R Sharp, D E Hinsley, P H Cooke, R J Sharp**  
*Nuffield Orthopaedic Centre, Oxford, UK.*

**DOES EARLY DISCHARGE FROM FOLLOW-UP INCREASE POST-OPERATIVE RE-ATTENDANCE RATES (SOS) FOLLOWING FOOT AND ANKLE SURGERY?**

**S Smith, B Yates, D Williamson, S Irby**  
*Orthopaedics Department, Great Western Hospital, Swindon and Marlborough NHS Trust, Wiltshire*

**GENE EXPRESSION AND PROTEIN ANALYSIS IN RUPTURED HUMAN ACHILLES TENDONS**

**A COMPARISON BETWEEN RUPTURED AND HEALTHY AREA OF THE SAME TENDON**

*M Ronga<sup>1,3</sup>, E Karousou<sup>2</sup>, D Vigetti<sup>2</sup>, A Passi<sup>2</sup>, N Maffulli<sup>3</sup>.*

<sup>1</sup> *Department of Orthopaedic and Traumatology, University of Insubria, Varese, Italy*

<sup>2</sup> *Department of Experimental Biomedical and Clinical Sciences (DSBSC), University of Insubria, Varese, Italy*

<sup>3</sup> *Department of Trauma and Orthopaedic Surgery, Keele University School of Medicine, Stoke on Trent, Staffordshire, UK*

**OUTCOME OF OPERATIVE TREATMENT OF LISFRANC INJURIES**

*B Purushothaman, E Robinson, L Spalding, M Siddique*

*Newcastle General Hospital, Newcastle*

**OFF-THE-SHELF IN-SHOE HEEL INSERTS: THEIR EFFECTS ON THE FOREFOOT**

*A K Ramanathan, M C John, G P Arnold, L Cochrane, R J Abboud*

*Institute of Motion Analysis and Research, TORT Centre, Ninewells Hospital and Medical College, Dundee, DD1 9SY, United Kingdom.*

**DOES THE PRESENCE OF SCREW-THREADS ACROSS AN ANKLE JOINT LOWER THE RATE OF FUSION AND THE OPTIMAL CHARACTERISTICS OF SCREW-THREAD LENGTH FOR ARTHROSCOPIC ANKLE ARTHRODESIS**

*R Chau, PH Cooke, RJ Sharp*

*Nuffield Orthopaedic Centre, Windmill Road, Oxford*

**A RETROSPECTIVE ANALYSIS OF THE RADIOLOGICAL OUTCOME OF CHEVRON AND SCARF WITH AKIN OSTEOTOMY FOR HALLUX VALGUS CORRECTION**

*P Patterson , TB Bonner , D McKenna, J Womack, PJ Briggs, MS Siddique*

*Freeman Hospital, Newcastle-Upon-Tyne*

**COMPARISON OF PREOPERATIVE HEALTH STATUS IN PATIENTS UNDERGOING ANKLE, HIP OR KNEE ARTHROPLASTY**

*P Patterson, EA Lingard, J Ramaskandhan and MS Siddique*

*Freeman Hospital, Newcastle Upon Tyne*

**PROSPECTIVE RANDOMISED CONTROLLED TRIAL COMPARING NORMAL INTERRUPTED MATTRESS SUTURES WITH TRACTION LOOP SUTURES IN THE CLOSURE OF SURGICAL WOUNDS IN THE HINDFOOT**

*S D Brookes-Fazakerley, C Atkinson , S P Sirikonda, C R Walker*

*Royal Liverpool & Broadgreen University Hospital Trust Foot & Ankle Unit*

**SETTING UP A “FUSION FORUM” IN FOOT AND ANKLE SURGERY**

*L Patten, D Singh, N Cullen, S Wiggins.*

*RNOH, Stanmore, Middlesex HA7 4LP, UK.*

**IS IMMOBILISATION IN A PLASTER NECESSARY AFTER 1ST METATARSOPHALANGEAL JOINT (MTPJ) ARTHRODESIS USING STAPLES. A BIO-**

**MECHANICAL STUDY**

*Anwar M<sup>1</sup>, Khalid<sup>2</sup> M, Hamilton D<sup>3</sup>, Searle R<sup>3</sup>, Sundar MS<sup>1</sup>*

*<sup>1</sup>Department of Orthopaedics and trauma, Royal Oldham Hospital*

*<sup>2</sup>Department of Orthopaedics and trauma, City Hospital, Birmingham*

*<sup>3</sup>Department of Anatomy, Medical School, Newcastle upon tyne*

**OUTCOME OF BONE BLOCK ARTHRODESIS AS SALVAGE FOR FAILED HALLUX METATARSOPHALANGEAL JOINT SURGERY.**

*J Shanker, HK Sharma, R Sarkar, AP Kadakia*

*Bradford Royal Infirmary, UK*

**ANKLE INSTABILITY AND PAIN FOLLOWING LATERAL LIGAMENT INJURY:  
DOES THE ADDITION OF MRI ALTER CLINICAL DECISION-MAKING**

*R Nanda, V Kolimarala and AO Adedapo*

*The James Cook University Hospital, Middlesbrough UK*

## **STEOCHONDRAL DEFECTS OF THE TALUS: RESULTS OF REPEAT ARTHROSCOPIC DEBRIDEMENT**

**N Savva, M Jabur, TS Saxby**  
*Brisbane Foot and Ankle Centre*

**Introduction:** Arthroscopy to debride osteochondral lesions (OCL) of the talus is an accepted procedure with a good outcome in 70-80% of subjects. The minority of subjects that do not do well present a problem. Further arthroscopy and debridement procedures have been assumed to yield poor results and this has been used as justification for cartilage transplantation. The evidence for this is lacking.

**Methods:** In our unit the routine procedure for OCL is arthroscopic debridement. If this fails a further arthroscopic debridement is performed. We identified all subjects who had had a repeat procedure for failed arthroscopic debridement of an OCL by the senior author and reviewed them clinically. The outcome was scored using the AOFAS hind foot and ankle scoring system.

**Results:** Between 1993 and 2002 808 ankle arthroscopies were performed of which 215 were to treat OCLs. Of these 12 had repeat arthroscopies because of a poor outcome. AOFAS scores improved from a mean of 34.8 to 80.5 at a mean follow up of 5.9 years (range 18 months – 11 years). One subject had already undergone a cartilage transplantation procedure because of a poor outcome. The other 11 subjects scored themselves as fair or good and had returned to previous levels of activity, including two professional sportsmen. It was clear by 6 months in all subjects that their symptoms were significantly improved following the second procedure.

**Conclusions:** This is the first series specifically assessing subjects who have had repeat arthroscopic debridement of OCLs of the talus. Our results disprove the assumption that repeat arthroscopic debridement yield poor results. It provides benchmark results at medium term follow up for cartilage transplantation to be compared to.



## **CORRECTIVE LENGTHENING FIBULAR OSTEOTOMY IN MAL-UNITED ANKLE FRACTURES**

*A. Sinha, S. P. Sirikonda, N. Giotakis, C. R. Walker*

*Royal Liverpool and Broadgreen University Hospital NHS Trust*

**Introduction:** Mal-united ankle fractures are uncommon. When they occur they produce symptoms of pain, joint effusion, limitation of dorsiflexion and are likely to lead to ankle arthritis. In such cases it has been shown that, even many months after the original fixation, correction of the ankle alignment can improve the final outcome.

**Method:** From May 2004 to April 2006, seven patients with a mal-united fibular fracture aged 25-62 years (average 44yrs, male: female ratio 5:2) were treated in the Foot and Ankle unit at the Royal Liverpool University Hospital. All the patients were referred with persistent pain. The range of time delay between injury and secondary surgical intervention was 3 to 16 months (average 6 months). All the patients were assessed using clinical examination, functional scoring using the AOFAS Ankle-Hindfoot score and plain radiographs. They were followed for an average of 11 months (range 6-24 months) after the surgery.

**Surgical procedure:** The surgical procedure involves a transverse fibular osteotomy made just above the ankle joint and below the tibio-fibular syndesmosis. The osteotomy is then distracted and internally rotated to gain the fibular length and to correct talar tilt using an image intensifier. A tri-cortical iliac bone graft and a lateral fibular plate are applied to maintain the reduction. We do not use a syndesmotic screw.

**Results:** We managed to regain the fibular length and reconstruct ankle mortise in all the cases. All patients showed radiological evidence of bony union on follow-up. The average time to bony union was 8 weeks. Talar shift was corrected in all patients and all had good hind foot alignment. Average AOFAS score was 82 (pain: 31.43 function: 40.57 and alignment: 10).

**Conclusion:** We present our early experience with fibular osteotomy aiming to correct ankle joint mal-alignment following fibular fractures. We believe this is a technique with reproducible results in our short term follow-up. It shows satisfactory functional outcome improving pain and function especially in younger patients.

Figures:

Figure 2: X-ray of patient no 1 (Male: 25yr) before and after reconstruction.  
Note the talar shift and short externally rotated fibula which has been corrected.

## **ANKLE ARTHRODESIS IN HIGH RISK PATIENTS. A RADIOGRAPHIC AND CLINICAL STUDY.**

*AP Molloy, MS Myerson, CE Gamba, R Sealey, F Garcia, C Jeng  
Institute for Foot and Ankle Reconstruction at Mercy, Baltimore, USA*

Ankle arthrodesis is a common operation with published fusion rates ranging from 62 – 100%. The literature documents the difficulties of obtaining arthrodesis in certain patients for example with neuroarthropathy, but the risk of non union related to deformity, bone quality, bone defects and systemic disease has not previously been reported.

Between 2002 and 2006 we performed an ankle arthrodesis in 154 patients, and analyzed these patients retrospectively to delineate categories of risk factors for achieving arthrodesis. From this analysis we devised a preoperative radiographic scoring system to grade complexity of pre-operative ankle arthrodesis. The scoring system is based upon 5 categories; size and plane of deformity, presence and size of bone defects, presence and area of avascular necrosis, site of previous fracture in post-traumatic arthritis and predisposing condition causing the arthritis. Each category has potential scores of 1 – 5, apart from the latter which is scored up to 6, with higher scores being more severe. The grade of complexity is derived from a cumulative score from all 5 categories.

Statistical analysis revealed good intra and inter- observer correlation. Multivariate regression analysis demonstrated that this scoring system correlates with the techniques used for arthrodesis as well as outcome. This study demonstrated that if the method of arthrodesis is altered according to the relative risk of non –union then there is no significant difference in outcome between patients of high and low risk for non-union

We present a new scoring system for severity of pre-operative condition in ankle arthrodesis patients and introduce an algorithm for surgical correction based upon this pre-operative scoring system. The surgical techniques for the arthrodesis are presented, ranging from simple screw fixation to more complex bone grafting techniques, bone stimulation and alternative methods of fixation.

## **RANGE OF MOTION OF THE HINDFOOT FOLLOWING ANKLE ARTHRODESIS: A PROSPECTIVE ANALYSIS.**

*R J Sealey , M S Myerson, AP Molloy, CE Gamba, C Jeng.*

*Institute for Foot and Ankle Reconstruction at Mercy, Baltimore, USA*

**Introduction:** Gait analysis studies of patients following ankle arthrodesis have demonstrated a functional gait, largely due to tarsal hypermobility compensating for lost tibio-talar motion. We present a prospective radiographic study comparing the pre and post-operative range of motion of the foot following ankle arthrodesis. In this study, we introduce a radiographic technique using reliable anatomic landmarks to measure sagittal range of motion of the foot after ankle arthrodesis.

**Materials and Methods:** Between 2002 and 2007, we performed 154 arthrodesis procedures of the ankle. Patients were suitable for inclusion in this study if an isolated arthrodesis of the ankle was performed for post traumatic arthritis with a minimum of 1 year follow-up without any additional hindfoot operations. Preoperative and post-operative passive plantar flexion and dorsiflexion radiographs were obtained in a standardized fashion . Anatomic landmarks were then used to measure and compare tibio-talar, mid-tarsal, and subtalar movement.

**Results:** There were 48 patients who met the inclusion criteria for this study. Preoperatively, the mean measured motion was as follows: total sagittal motion  $35^{\circ}$ , tibio-talar motion  $18^{\circ}$ , mid-tarsal (transverse tarsal + naviculo cuneiform + tarsometatarsal joints) motion  $12^{\circ}$  (34% of pre-op sagittal arc), subtalar motion  $5.5^{\circ}$  (15% of pre-op sagittal arc), and mid-tarsal + subtalar motion  $17.5^{\circ}$  (49% of pre-operative sagittal motion). These changed post operatively to a mean motion as follows: total sagittal motion  $18.5^{\circ}$ , (52% of preoperative sagittal motion), mid-tarsal motion  $10^{\circ}$  (28% of pre-op sagittal arc), subtalar motion  $10.5^{\circ}$  (27% of pre-op sagittal arc), and mid-tarsal + subtalar motion  $20.5^{\circ}$  (54% of pre-operative sagittal motion).

**Discussion:** This study presents an accurate and reproducible means of measuring the sagittal plane range of motion of the hindfoot and ankle, and documents the presence of increased motion in the subtalar and talonavicular joints after ankle arthrodesis.

## **EARLY OUTCOMES AND SURGICAL LEARNING CURVE OF THE MOBILITY TOTAL ANKLE REPLACEMENT COMPARED TO THE STAR ANKLE REPLACEMENT**

*Jackson WFM, Cooke, PH, Sharp RJ*

*Nuffield Orthopaedic Centre, Oxford*

In 2004, our centre has changed from the “STAR” to the “Mobility” Total Ankle Replacement device and a study was undertaken in order to ascertain if there was a learning curve to useage of this new device and perform a comparison in terms of survival, function, additional proceduress and complications.

The indications were 55% osteoarthritis, 30% Rheumatoid and 8% JIA with the remainder being haemophilic, haemochromatosis and ankylosing spondylitis.

One third of TARs in this unit are combined with additional procedures such as subtalar fusion. Only isolated TARs were considered in this study and the tourniquet time, wound problems, length of stay and known complications for the last 20 STAR TARs was compared to the first 20 Mobility TARs .

68 Mobility TARs have been implanted since Oct 2004 and survival data was collected for this entire cohort and compared to a similar number of STARS.

**Results:** There was no significant difference in operative time (63 vs 65 mins) between the prostheses, no difference in intra-operative complications (0), no difference in deep infections (0% ) and a minimal difference in hospital stay (4.3 vs 5.1 days) due to non-surgeon factors.

The survival curve of the mobility and STAR shows no loss of the Mobility due to revision at up to 3 years. Clinical outcome scores will be presented.

**Summary:** There is no learning curve for an experienced Foot and Ankle Surgeon in changing prosthesis and no apparent effect on morbidity for the patient. All 40 TARs are in situ and functioning acceptably at up to 3 years.

The early results for this new prosthesis show no cause for concern and surveillance is ongoing.

## **AN INTERMEDIATE TERM REVIEW OF AGILITY ANKLE REPLACEMENTS USED IN A SINGLE CENTRE IN THE UK**

**D J M Macdonald, N Logan, F Harrold, C S Kumar**

*Department of Trauma and Orthopaedics, The Glasgow Royal Infirmary*

**Introduction:** Ankle Arthroplasty is an alternative to arthrodesis for patients with disabling ankle arthritis. It aims to remove pain and preserve joint motion. We aimed to review the outcome of all total ankle replacements carried out in our institution between 2002 and 2006.

**Materials and Methods:** We retrospectively reviewed the results of all patients who underwent the Agility ankle replacement performed by a single surgeon. Case notes and radiographs were reviewed and outcome assessment included standardised questionnaires.

**Results:** 30 arthroplasties were performed in 30 consecutive patient. 11 males, 19 females, Pre operative diagnosis was rheumatoid arthritis (16), primary osteoarthritis (12) and post-traumatic osteoarthritis (2) with a mean age of 61.8 yrs. 8 patients required an additional procedure at the time of arthroplasty : tendo-achilles lengthening (6); Calcaneal osteotomy (2); triple arthrodesis (2); tip post reconstruction (1). Intra operative technical complications included: Fracture of medial malleolus (3); nerve injury (3); tendon injury (1). 8 patients had wound problems: Delayed healing >3/52 (8); Superficial infection (2); Deep infection (2). 1 patient had delayed union of the syndesmosis (>6 months) and 6 had non-union (>12 months).

After a mean follow up of 3.2 years 2 patients had died and 9 patients had required further surgery: Implant removal for infection (1); Talar revision for loosening (1); Re-fusion of the syndesmosis (4); Removal of syndesmosis screws (3); Calcaneal osteotomy for valgus hindfoot (1).

**Discussion:** We found a high rate of complications which may be related to the surgeons learning curve, although some are specific to the design of implant which requires a tibio-fibular fusion.

**Conclusion:** The first 30 agility ankle replacements performed in our centre demonstrates several potential complications and shows that there is often a need for subsequent surgery. Short term survivorship of the implant is acceptable and long term review is required.

## PERFORMANCE OF TOTAL ANKLE REPLACEMENT IN ANKLES WITH SIGNIFICANT PRE-OPERATIVE HIND FOOT DEFORMITY

*S Hobson., S Dhar.*

*Queens Medical Centre, Nottingham.*

**Introduction:** Total ankle replacement is proving a reliable procedure for ankle arthrosis. Some authors have recommended that significant hindfoot deformity should be a contraindication. This study aims to provide guidance on the management of this difficult problem.

**Methods:** 170 consecutive total ankle replacements were performed in 147 patients, aged 32-83 (mean 65) between 1999 and 2006 by a single surgeon. All surviving patients (5 deaths) were followed up prospectively on an annual basis, for a mean of 3 years (1-8 years). Comparison was made between Group A (45 ankles with a hindfoot deformity of  $>10^\circ$  varus or valgus) and Group B (the remaining 120 ankles).

**Results:** There was no statistical difference between the 2 groups for age, sex or indication for surgery (osteoarthritis in 81%). Group A comprised 8 valgus and 36 varus ankles. 23/36 varus ankles had a deformity of  $>20^\circ$ .

6 revisions (13%) were performed in Group A (5 of these related to instability - all preoperatively varus of  $>20$  degrees). 10 revisions (8%) were performed in Group B (2 related to instability).

6 ankles underwent intra-operative deltoid release and 6 had pre or post-operative calcaneal osteotomy. Only one of these required revision for instability. 4 ankles underwent post-operative lateral ligament reconstruction. These ankles all failed due to instability.

The mean postoperative American Foot and Ankle Society score in Group A was 85, compared to 78 in Group B.

**Discussion:** Our study reveals that patients with significant hindfoot deformity may benefit from total ankle replacement. However, the risk of revision due to instability and need for further surgery is higher, especially with a varus deformity of  $>20^\circ$ . Almost a quarter of these ankles required revision. Potential solutions may be to correct the deformity with additional calcaneal osteotomy or medial release, whereas lateral ligament reconstruction alone is inadequate.

## **ANALYSIS OF BONE MINERAL DENSITY AROUND THE ANKLE BEFORE AND AFTER TOTAL ANKLE REPLACEMENT**

*B Purushothaman, P Lakshmanan, D Rowlings, P Patterson, M Siddique  
Freeman Hospital , Newcastle*

**Introduction:** There is limited literature available looking into circumstances surrounding the development of stress fracture of the medial and lateral malleoli after ankle replacement. We present the preliminary results of a prospective study examining the effect of ankle replacement upon local bone mineral density and the phenomenon of stress shielding.

**Aim:** To assess the effect of ankle replacement loading of the medial and lateral malleoli, by analysing the BMD of the medial and lateral malleoli before and after Mobility total ankle replacement.

**Methodology:** Ten consecutive patients undergoing Mobility total ankle replacement for osteoarthritis had pre-operative bone densitometry scans of the ankle, repeated at 6 months after surgery. The bone mineral density of a 2 cm square area within the medial malleolus and lateral malleolus was measured. The pre-operative and post-operative bone densitometry scans were compared. The relation between the alignment of the tibial component and the bone mineral density of the malleoli was also analysed.

**Results:** The mean preoperative BMD within the medial malleolus improved from  $0.57\text{g/cm}^2$  to mean 6 months postoperative BMD of  $0.62\text{g/cm}^2$ . The mean preoperative BMD within the lateral malleolus decreased from  $0.39\text{g/cm}^2$  to a mean 6 months postoperative BMD of  $0.33\text{g/cm}^2$ . The mean alignment of the tibial component was  $88.5^\circ$  varus (range  $85^\circ$  varus to  $94^\circ$  valgus). However, there was no correlation between the alignment of the tibial component and the bone mineral density on the medial malleolus ( $r = 0.09$ ,  $p = 0.865$ ).

**Conclusion:** The absence of stress shielding around the medial malleolus indicates that ankle replacements implanted within the accepted limits for implant alignment, load the medial malleolus. However, there was stress shielding over the lateral malleolus resulting in decreased BMD in the lateral malleolus.

# **FINITE-ELEMENT-MODEL ANALYSIS OF THE EVANS OSTEOTOMY: DOES THE SITE OF OSTEOTOMY INFLUENCE JOINT CONTACT CHARACTERISTICS AND ALTER PEAK JOINT PRESSURES**

*N Espinosa, A P Molloy, H Tsumura, M S Myerson*

*Institute for Foot and Ankle Reconstruction at Mercy, Baltimore, MD, USA*

**Background:** The Evans osteotomy has been proven to be very effective in treating flatfoot deformity in adults. However, it has not been shown whether the site of osteotomy influences the contact areas and peak pressures within the subtalar joint. It is hypothesized that the posterior facet of the calcaneus rotates posteriorly and laterally resulting in altered contact characteristics and peak pressures in the subtalar joint.

**Material Methods:** We used a finite-element model (FEA) of the hindfoot. Computed tomography slides of patients who suffered from adult flatfoot deformity were prepared by means of open-source software and converted into a three-dimensional model of the hindfoot. The FEA model allows the virtual performance of an osteotomy and simulates force transmissions through the hindfoot and calculates joint contact characteristics and peak pressure alterations as well. Two different kind of osteotomies were tested: 1) an osteotomy 10mm proximal to the calcaneo-cuboid joint line and 2) an osteotomy performed adjacent to the posterior calcaneal facet.

**Results:** There were small but significant differences found between osteotomies done either close to the calcaneocuboid joint or directly adjacent to the posterior facet. At both sites the posterior calcaneal facet rotated posteriorly and laterally. However we found a significant decreases in contact areas and raises in peak pressures within the subtalar joint in cases where the osteotomy was performed close to the posterior calcaneal facet.

**Summary:** This study presents the effects of virtual Evans osteotomies on the subtalar joint and their dependence upon the site of the osteotomies.



## IN SITU ARTHRODESIS FOR THE SEQUELAE OF OS CALCIS FRACTURE

*N Savva, TS Saxby*

*Brisbane Foot and Ankle Centre*

**Introduction:** Distraction bone block arthrodesis has been advocated in the literature to treat the late sequelae of os calcis fracture with loss of heel height including the prevention of anterior impingement. We have studied a consecutive series of subjects who have had in situ arthrodesis for subtalar arthrosis as a consequence of os calcis fracture with marked loss of talocalcaneal height paying particular attention to range of movement and anterior impingement.

**Materials and Methods:** Between 1997 and 2003 31 consecutive subjects underwent subtalar arthrodesis. Five subjects who had undergone ORIF, two non-unions and three subjects with bilateral injuries were excluded. Two subjects who had marked coronal displacement that required additional surgery at the time of arthrodesis were also excluded. Two subjects were lost to follow up leaving 17 for assessment. AOFAS hind foot scores improved from 29.8 (range 13-48) preoperatively to 77.8 (range 48-94) postoperatively. Mean loss of talocalcaneal height was 10.3mm and the mean talar declination angle was 6.7 degrees which was 35% of the normal side. One subject suffered anterior ankle pain but none had anterior impingement. Two subjects complained of difficulty ascending slopes and stairs and four of difficulty descending. Mean ankle dorsiflexion was 11.6 degrees (range 0-24) compared to 14.7 degrees on the normal side: A reduction of 21.1%. Mean plantarflexion was 35.5 degrees (range 24-60) compared to 44.6 degrees on the normal side: A reduction of 20.4%.

**Discussion:** Our results suggest that anterior impingement is not a significant problem in os calcis fracture, even when loss of talocalcaneal height is marked. We recommend ISA combined with lateral wall ostectomy for all cases of subtalar arthrosis as a result of os calcis fracture, without marked coronal deformity, regardless of the degree of talocalcaneal height loss.

## **PREDICTION OF SPATIAL ORIENTATION AND MORPHOLOGY OF CALCANEONAVICULAR COALITIONS**

*N Espinosa MD, M Dudda, J Anderson, M Bernadi, J R Casser MD.*

*Department of Orthopaedics, Children's Hospital Boston, MA, USA*

**Background:** Calcaneonavicular coalitions (CNC) have been reported to be associated with anatomical aberrations of either the calcaneus and/or navicular bones. These morphological abnormalities may complicate accurate surgical resection. Three-dimensional analysis of spatial orientation and morphological characteristics may help in preoperative planning of resection.

**Material Methods:** Sixteen feet diagnosed with CNC were evaluated by means of 3D CT modeling. Three angles were defined that were expressed in relation to one reproducible landmark (lateral border of the calcaneus): the dorsoplantar inclination, anteroposterior inclination and socket angle. The contact surface area was determined from the depth and width of the coalitions. Three-dimensional reconstructions of the calcanei evaluated the presence and morphology of the anterior calcaneal facet and of a navicular beak. The inter-observer correlations were assessed for the accuracy of the measurement methods. Sixteen normal feet were used as controls for comparison of the socket angle and anatomy of the anterior calcaneal facet and of the navicular beak.

**Results:** The dorsoplantar inclination angle averaged  $50^{\circ}$  ( $\pm 17$ ), the anteroposterior inclination angle  $64^{\circ}$  ( $\pm 15$ ), and the pathologic socket angle  $98^{\circ}$  ( $\pm 11$ ). The average contact area was  $156\text{mm}^2$ . Ninety-four percent of all patients in the CNC group revealed a plantar navicular beak. In 50% of those patients the anterior calcaneal facet was replaced by the navicular portion and in 44% the facet was totally missing. In contrast, the socket angle in the control group averaged  $77^{\circ}$  ( $\pm 18$ ), which was found to be statistically different than the CNC group ( $p=0.0004$ ). Only 25% of the patients in the control group had a plantar navicular beak. Statistically significant inter-observer correlations were found for all measured angles.

**Conclusions:** Computer aided CT analysis and reconstructions help to determine the spatial orientations of CNC and provide useful information in order to anticipate morphological abnormalities of the calcaneus and navicular.

## **RESULTS OF PROXIMAL MEDIAL GASTROCNEMIUS RELEASE**

*JA Kohls-Gatzoulis, M Solan*

*Royal County Surrey Hospital*

**Introduction:** Gastrocnemius contracture, as demonstrated by Silfverskiold's test, is increasingly recognised as an underlying cause of painful disorders of the foot and ankle. Elevated pressure beneath the forefoot and symptoms in the hindfoot and ankle are produced as a result of the biomechanical imbalance. Adaptive shortening of the gastrocnemius can be treated by a supervised stretching program. Night splintage and serial casting are other useful non-operative treatments. Refractory cases may be considered for surgical release of the gastrocnemius.

**Materials and Methods:** The purpose of this study was to follow-up all those patients who were treated with a medial proximal gastrocnemius release with a minimum follow-up of six months.

**Results:** Eighty procedures were performed in sixty-five patients. There was one post operative infection. One patient has diminished sensation in the distribution of a branch of the saphenous nerve. There was an improvement in ankle dorsiflexion with the knee extended in all patients. Those patients with heel pain felt their symptoms had improved in the majority of cases.

Discussion:

Release of the gastrocnemius aponeurosis at the gastro-soleus junction may be performed open or endoscopically. Both techniques place the sural nerve at risk of injury. Proximal release of the gastrocnemius is an alternative technique. Proponents of this method release both the medial and lateral heads through a single transverse skin incision over the popliteal fossa. It has been postulated that release of the medial head alone is sufficient to overcome the muscle contracture. Advantages of this approach include a smaller skin incision and a surgical field more distant from neurovascular structures.

**Conclusion:** The proximal medial gastrocnemius release is a safe, well tolerated, and effective procedure for those patients who fail an appropriate stretching program. In selected patients it can be performed under local anaesthetic and light sedation.

## **OUTCOMES IN ANKLE ARTHRITIS: A COMPARISON OF THE RESPONSIVENESS OF FOUR ESTABLISHED SCORES.**

*C J Topliss, A S E Younger, B Bora, K J Wing, M J Penner*

*Foot and Ankle Service, Vancouver Bone and Joint Clinic, Vancouver, BC, Canada*

**Summary:** The SF-36, FFI, AOS and the AOFAS AHS were recorded pre and post-operatively in patients with end-stage ankle arthritis. Comparison of responsiveness shows the AOFAS score to be completely unresponsive.

**Introduction:** Outcome studies should include both general health and disease specific measures. The Short Form 36 (SF36) is validated and widely used in musculoskeletal disease. A number of disease specific scores are available for the foot and ankle but, at present there is no widely agreed and validated score used specifically in end-stage ankle arthritis (EAA).

**Methods:** 555 sets of pre and post-operative data on 239 EAA patients undergoing definitive treatment have been collected. The SF36 and three widely used Foot and Ankle scores (Foot Function Index (FFI), AOFAS Ankle Hindfoot Score (AHS) and Ankle Osteoarthritis Scale (AOS)) were recorded. We assessed the responsiveness (Standardized Response Mean (SRM) and Effect Size (ES)) and correlation (Spearman Rank Correlation) of each of the above scores.

**Results:** The SF36, FFI and AOS responded to change and correlated in sub-scale and total scores. The AHS did not respond to change in pain or total scores and did not correlate with any other score. Using the three responsive scores there was a significant improvement in outcome with operative intervention ( $p < 0.0001$ ) with each score. Using the SRM and the ES, the AOS showed the highest level of responsiveness. It also showed an increased response rate suggesting that patients find it more useable.

**Conclusion:** In future studies we would recommend the use of the SF36 and the AOS for assessment of patients with EAA. We would also discourage use of the AOFAS Ankle Hindfoot Score which we have demonstrated to be unresponsive to change.

## **TREATMENT OF MORTON'S NEUROMA WITH ALCOHOL ABLATIVE INJECTION UNDER SONOGRAPHIC GUIDANCE: FOLLOW-UP OF 101 CASES**

*R.J. Hughes, K.Ali, H.Jones, S.J.H. Kendall, D.A.Connell*

*Kingston Hospital NHS Trust and Royal National Orthopaedic Hospital*

**Introduction:** Morton's neuroma is a common cause of foot pain. For this study, we assessed the efficacy of a series of sonographically guided alcohol injections into the lesion.

**Method:** One hundred and one consecutive patients with Morton's neuroma were included in this prospective series. An average of 4.1 treatments per person were administered, and follow-up images were obtained at a mean of 21.1 months after the last treatment (range, 13-34 months).

**Results:** Technical success was 100%. Partial or total symptom improvement was reported by 94% of the patients, with 84% becoming totally pain-free. The median visual assessed pain score decreased from 8 before treatment to 0 after treatment ( $p < 0.001$ ). Transitory increased local pain occurred in 17 cases (16.8%). There were no major complications. Thirty patients underwent sonography at 6 months after the last injection and showed a 30% decrease in the size of the neuroma.

**Discussion and Conclusion:** We conclude that alcohol injection of Morton's neuroma has a high success rate and is well tolerated. The success rate is acceptable at 84% whilst being associated with a low morbidity. The treatment avoids surgery and allows continued mobility with patients being able to weight bear and perform their usual activities of daily living. We advocate reserving surgical management for non-responders.

## **MORTON'S NEUROMA: THE ACCURACY, ECONOMICS AND EFFECT ON TREATMENT TIME OF DIRECT REFERRAL TO ULTRASOUND BY PRIMARY CARE PHYSICIANS.**

*R Rout, H Tedd, S J Ostlere, E G McNally, J L Teh, G Lavis, P H Cooke, R J Sharp*  
*Nuffield Orthopaedic Centre, Oxford*

**Introduction:** The first line treatment in our centre for Morton's neuroma (MN), sufficient to warrant intervention, is a peri-neural Ultrasound guided injection of corticosteroid (USI).

The NHS will soon implement 18 week referral to treatment targets.

A prospective study was performed whereby from 2004-6, referral letters from General Practitioners suggesting a diagnosis specifically of Morton's neuroma, resulted in randomised assignment to either direct referral for USI or to the specialist Foot and Ankle outpatient clinic.

Patients with less specific referral letters were evaluated in clinic and referred for USI as appropriate.

A comparison was made of the sensitivity and specificity of the referral pathways, financial implications and the time to treatment (TTT).

**Results:** 121 patients were referred for USI.

Of 57 patients for whom the GP had diagnosed a MN, 40 (70%) had the diagnosis confirmed on USI (other diagnoses were: 7 NAD, 3 ganglions, 2 bursae, 2 degenerative change, 1 glomus tumour, 1 angioleiomyoma, 1 SOL); this was comparable to the overall number referred to radiology with a suspected MN (69%) (Fig 1).

In the directly referred group, the mean TTT was 115 days (95%CI = 89 – 141), compared to 241 days (95%CI = 223 – 259) for those patients who went via a Foot and Ankle clinic.  $P < 0.0001$  (Fig 2).

**Conclusion:** For patients with features highly suggestive of a Morton's neuroma, direct referral from primary care for USI has a similar sensitivity and specificity to referral from a specialist hospital clinic and the TTT is significantly shorter.

The mean wait of this group is within the 18 week government target without any changes to our current radiology protocols. Using this direct referral protocol we saved 29 outpatient appointments; if followed for all eligible patients we would have saved 57 outpatient appointments.

## **THE EARLY RESULTS OF A MODIFIED WEIL'S OSTEOTOMY OF THE FIRST METATARSAL FOR HALLUX RIGIDUS**

*J A Kohls-Gatzoulis, M C Solan, M S Davies*

*London Foot and Ankle Centre and Royal County Surrey Hospital*

**Introduction:** A long first metatarsal is a recognized contributing factor to the development of hallux rigidus. It is possible to identify a sub-group of patients with a long first metatarsal and early hallux rigidus. L.S. Barouk & P. Barouk have recently described the use of a modified Weil shortening osteotomy for the treatment of this sub-group of patients. The purpose of the study was to evaluate the early results of a modified Weil's osteotomy of the first metatarsal in selected patients with hallux rigidus.

**Materials and Methods:** Fifteen patients with mild to moderate OA of the first MTP joint in whom the first metatarsal was at least as long as the second underwent a shortening and plantar-displacing Weil's osteotomy.

**Results:** At a minimum follow-up of six months all patients' symptoms improved dramatically and the range of motion was improved in all cases. One patient, a 19 year old professional footballer, developed a stress fracture of the second metatarsal which went on to heal and he was able to return to professional football. One patient developed transfer metatarsalgia. There were no cases of AVN and all patients were satisfied with the outcome of surgery.

**Discussion:** There are many treatment strategies for hallux rigidus. Fusion surgery provides excellent pain relief but joint preserving surgery is preferable. Cheilectomy is reliable but has a significant failure rate. Joint replacements remain experimental. Debridement of the joint in combination with longitudinal decompression of the first MTPJ provides greater range of motion than cheilectomy alone in the subgroup of patients who have a long first metatarsal.

**Conclusions:** These early results suggest that in selected individuals with hallux rigidus associated with a long first metatarsal, a modified Weil's osteotomy can improve the range of motion of the first MTP joint and result in significant pain relief.

## **MEDIUM TO LONG TERM OUTCOME ASSESSMENT OF THE CERAMIC ON CERAMIC MOJE JOINT REPLACEMENT OF THE METATARSOPHALANGEAL JOINTS.**

*R Kulshreshtha, NK Makwana, PW Laing*

*Wrexham Maelor Hospital, Wrexham; Robert Jones & Agnes Hunt Orthopaedic Hospital, Oswestry*

**Introduction:** The treatment of stage 3 hallux rigidus is controversial. Cheilectomy, fusion and total joint replacement have all been advocated. No consensus is agreed on the best optimal management. We present our results of a ceramic on ceramic MOJE metatarsophalangeal (MTP) joint replacement.

**Aim:** To find out the medium to long term outcome following MOJE MTP joint replacement.

**Material and Methods:** A sample of 95 patients was identified, between January 1999 to July 2006 from our data base who underwent MOJE metatarsophalangeal joint replacement. We divided these patients into three groups. First group had screw fit ceramic MOJE joint replacement; second group Mark 1 ceramic on ceramic press fit MOJE joint replacement and third group Mark 2. Indications of the surgery were osteoarthritis (primary or secondary), osteochondral defects, inflammatory arthropathy, previous infections and previously failed surgery. The outcome was analysed clinically, radiologically and functionally (using AOFAS and QALY scoring system).

**Results:** This study shows that the early results are promising but the medium and long term results show early radiological loosening. The significance of this is not known but based on these results we would advise caution on the use of these implants and further long term studies are required.



# FIRST METATARSAL HEAD RESURFACING WITH A CONTOURED ARTICULAR PROSTHETIC

*C. T. Hasselman*

*University of Pittsburgh, Pittsburgh, PA, USA*

**Introduction:** Advanced stages of first metatarsophalangeal (MTP) arthritis have traditionally been treated with resection arthroplasty or arthrodesis. Total- and hemiarthroplasty using various prosthetic replacements of the MTP joint, or phalangeal base, have been reported with variable success. A new metatarsal resurfacing system allows for intraoperative joint geometry mapping and placement of a contoured prosthetic.

**Methods:** Twenty-five patients with advanced stage hallux rigidus were included in this investigation and have undergone metatarsal head resurfacing (HemiCAP<sup>®</sup> Prosthesis, Arthrosurface Inc., Franklin, MA). The average age of the patients was 51 years. All patients were assessed with the Short Form 36 Health Survey (SF-36) and the American Orthopedic Foot and Ankle Society (AOFAS) clinical rating system for the Hallux, physical examination and radiographic evaluation. The average follow up was 20 months (range: 8 to 28 months).

**Results:** Postoperative passive dorsiflexion increased on average by 31 degrees from 34 degrees at baseline to 65 degrees at last follow-up. The mean AOFAS score improved from 44.1 to 82.1. The average SF-36 score improved from 81.2 to 96.1. The preoperative visual analogue pain score was reduced from 6.8 to 1.4 at last follow-up. No radiographic evidence of implant loosening, subsidence, or periprosthetic radiolucency has been found to date. No device failures have been encountered. All patients stated they would undergo the procedure again. One patient had a superficial wound break down which resolved with conservative care.

**Conclusion:** Although long term follow up is still necessary, the current results are very promising providing effective pain relief and improvement in range of motion. Proper implant placement does not affect the sesamoid groove. The procedure is performed with minimal joint resection and preserves viable bone stock, therefore conversion to arthrodesis or resection arthroplasty is possible should the need for further treatment arise.

Key Words: hallux rigidus, first MTP joint, resurfacing, HemiCAP, hallux limitus

## LONG TERM RESULTS OF MITCHELL'S PROCEDURE FOR HALLUX VALGUS DEFORMITY; A 5- TO 20-YEAR FOLLOW UP IN 204 CASES

*A Dermon<sup>1</sup>, C Tilkeridis<sup>2</sup>, D Liras<sup>1</sup>, M Tryfonidis<sup>2</sup>, K Kazakos<sup>2</sup>, C Hardouvelis<sup>1</sup>, G Petrou<sup>1</sup>*

*1. "Amalia Flemig" General Hospital, Athens, Greece*

*2. University Hospital of Alexandroupolis, Greece*

**Introduction:** We present the long term results in 204 cases of Hallux Valgus deformity correction using a modified Mitchell's osteotomy.

**Methods:** 168 patients (204 feet) that had Mitchell's osteotomies between 1986 and 2001 were recalled for clinical and radiological evaluation. The patients had hallux valgus angles of up to 50<sup>o</sup> and intermetatarsal angles of up to 20<sup>o</sup>. They all had a modified procedure using two crossed Kirschner wires to fix the capital fragment into plantar displacement and angulation. Lateral soft tissue release was performed when deemed necessary during the procedure. Mild to moderate arthritis of the 1<sup>st</sup> metatarsophalangeal joint was not a contra-indication. The AOFAS scores as well as any complications were recorded and the Xrays were used to measure hallux valgus and intermetatarsal angles. Mann-Whitney U test was used to analyze data.

**Results:** The mean follow up was 12.9 years. The mean AOFAS score improved from a preoperative of 49.6 to a postoperative of 87.9 points (p=0.004), due to improvement in the pain (14.2 Vs 37.6, p=0.001) and function (30.6 Vs 39.8, p=0.043) parameters. 57 cases (27.9%) had Hallux Valgus angles >40<sup>o</sup>. Lateral soft tissue release was performed in only 16 of these cases with no significant difference in the postoperative Hallux Valgus angle compared to the ones not requiring soft tissue release (21.3<sup>o</sup> Vs 20.8<sup>o</sup>, p=0.08). There was a decrease in the pre-operative Vs post-operative incidence of lateral metatarsalgia and symptomatic callosities (18.33% Vs 11.8%, p=0.023). We had only one case of avascular necrosis.

**Discussion/Conclusion:** Mitchell's osteotomy is a reliable technique with successful outcomes and minimal complications when performed with accurate surgical technique, stable fixation and lateral soft tissue release when appropriate. It may also be successfully performed for Hallux Valgus angles >40<sup>o</sup>. We believe that it has still got a role in the treatment of Hallux Valgus.

## **SILASTIC IMPLANT ARTHROPLASTY OF THE GREAT TOE: A RETROSPECTIVE ANALYSIS.**

*S.A. Jain, B.C. Banerjee,*

*Department of Orthopaedics, Good Hope Hospital NHS Trust, Rectory Road, Sutton Coldfield ,  
B75 7RR West Midlands*

**Background:** Arthrodesis is still the recommended treatment for end-stage hallux rigidus in young and active patients. Silicone implant arthroplasty of great toe was first described back in 1979 by Swanson et. al. Over the years, total joint replacement arthroplasty has taken over, as the apparent complication rate with silicone appeared high.

**Objective:**

The objective of this retrospective study was to analyse medium to long-term clinical outcomes and patient satisfaction of patients with silastic implant arthroplasty of great toe.

**Methods:** Between May 1996, and December 2004, 65 patients totalling 76 first metatarsophalangeal silastic implants were evaluated both subjectively and objectively. The group comprised of 25 males and 40 females with average age 56 years (26-86). The average time of follow-up was 6 years (2-11). 12 patients (18%) has previous metatarsal osteotomy with bunionectomy for hallux valgus.

Outcomes were assessed by overall subjective satisfaction, Visual Analogue Scale (VAS) for pain, functional scores, range of motion and radiographic evaluation.

**Results:** Overall success rate was over 80%. 90% patients reported good pain relief after the operation. All patients regained satisfactory range of movement in the joint. The average flexion was  $11^{\circ}$  ( $5-20^{\circ}$ ) and extension  $20^{\circ}$  ( $10-30^{\circ}$ ). None of the patients reported difficulty in walking or slow running.

6 patients (9%) complained of persisting mild to moderate pain and swelling in the joint. 2 patients (3%) were not happy with the level of deformity correction. All the above 8 patients declined to have joint arthrodesed. 2 patients (3%) had deep infection requiring implant removal. 1 patient had osteolysis on the x-rays but remain asymptomatic. Although radiographic deterioration of the implant was demonstrated in a lot of implants, this deterioration did not correlate with patient satisfaction.

We conclude that silastic first metatarsophalangeal joint replacement is a proven procedure that not only provides long- term pain relief but also satisfactory range of movement. Therefore it should still be considered as an option in patients with end-stage hallux rigidus.

## **THE USE OF CALCIUM SULFATE AND CALCIUM PHOSPHATE COMPOSITE GRAFT TO AUGMENT SCREW PURCHASE IN OSTEOPOROTIC ANKLES**

*VK Panchbhavi, S Vallurupalli, R Morris, R Patterson*  
*The University of Texas Medical Branch*

**Introduction:** Screws placed in the fibula do not have a satisfactory purchase during internal fixation of an osteoporotic ankle fracture. Tibia-pro-fibula screws that extend from the fibula into the distal tibial metaphysis provide additional purchase. The purpose of this study is to investigate if purchase of these screws can be enhanced further by injecting calcium sulfate and calcium phosphate composite graft in the drill holes prior to insertion of the screws.

**Methods:** Bone density was quantified using DEXA scan in paired cadaver legs. One leg from each pair was randomly selected for injection of composite graft into screw holes before insertion of the screws. Two screws were inserted through the fibula into the distal tibial metaphysis in each leg, at the level of the syndesmosis under fluoroscopy in a standardized fashion using a jig.

The screws were pulled out using a materials testing machine. Stiffness, force, displacement, and energy required were recorded.

**Results:** After testing 4 pairs of cadaver legs, a statistically significant difference was noted in displacement, failure load, and failure energy between augmented and non-augmented screws, with the augmented screws being considerably stronger. Of the two screws the distal, when compared to the proximal one, required more displacement, higher force and energy to fail whether augmented with composite graft or not.

**Conclusion:** Screws augmented with composite graft provide significantly greater purchase in an osteoporotic distal tibial metaphysis than non-augmented screws.

Clinical relevance:

Use of composite graft to augment purchase of the screws inserted in the distal tibial metaphysis may enhance the stability of the internal fixation of an osteoporotic ankle fracture. This will enable early weight-bearing mobilization and return to function which is important in elderly patients.

## **MEDIAL ARTERY CALCIFICATION OF THE 1<sup>ST</sup> DORSAL METATARSAL ARTERY AS AN INDICATOR OF DIABETIC PERIPHERAL VASCULAR DISEASE**

*CD Smith, JG Bilmen, S Iqbal, S Robey, MT Pereira*

*The Foot Unit, Alexandra Hospital, Redditch.*

**Introduction:** Mönckeberg sclerosis or medial artery calcification (MAC) is a well known phenomenon associated with the diabetic and other altered blood parameters. However its consequence within the foot and specifically the 1<sup>st</sup> dorsal metatarsal artery has not previously been studied.

**Materials and Methods:** Nearly 1000 foot x-rays were studied over a nine month period in a busy District General Hospital to identify the prevalence of first dorsal metatarsal artery calcification. The electronic medical notes for all the patients were reviewed to confirm which patients were known to be diabetic. The patients with positive findings were then identified and their HbA1c, creatinine, and previous foot interventions recorded.

**Results:** 1.4% of the population studied had medial artery calcification of the 1<sup>st</sup> dorsal metatarsal artery. 93% were known diabetics and 100% had impaired glucose tolerance (a glucose plasma concentration of >7.8mmol/l two hours post glucose loading). 79% have required previous podiatric care for foot ulceration and 64% had required surgical intervention for their diabetic feet. MAC has a high positive predictive value (92.9% (95% CI 69.2-98.7)) for diabetes, with a good specificity (99.9% (95%CI 99.4-100)) and low false positive rate (0.1% (05%CI 0.0-0.6)).

**Discussion:** Medial artery calcification in the first dorsal metatarsal artery is characteristic of impaired glucose metabolism, and if seen on routine x-ray should be an indication for screening of the patient. It should also be considered as a foot at risk sign in the established diabetic due to the high incidence of foot ulceration and need for surgical intervention in this group.

**Conclusion:** The prevalence of MAC seen on routine foot x-rays has been demonstrated in a large cohort of patients. The specificity and positive predictive value for diabetes has been calculated and the prevalence of these patients requiring surgical or specialist podiatric care recorded.

## **THE LAPIDUS PROCEDURE FOR THE MANAGEMENT OF HALLUX VALGUS: A DOUBLE EDGED WEAPON?**

*I D M Smith & C S Kumar*

*Glasgow Royal Infirmary*

**Introduction:** The Lapidus procedure is a fusion operation of the 1<sup>st</sup> tarso-metatarsal joint for the treatment of moderate to severe hallux valgus (HV) in association with first ray hypermobility. This procedure has been shown to produce excellent correction of the deformity but is associated with complications such as prolonged healing and non-union. This study aims to determine the effectiveness of the procedure in correcting the HV deformity; record patient satisfaction and the incidence of complications.

**Materials and Methods:** Patients who underwent a Lapidus procedure at Glasgow Royal Infirmary between November 2001 and October 2006 were reviewed. Gender, age, previous surgery for HV, complications and outcome were investigated. Pre and post-operative HV and intermetatarsal (IM) angles were obtained from weight-bearing radiographs.

**Results:** 24 Lapidus procedures were performed on 21 patients, all female. 3 underwent bilateral procedures. The average age was 50.9 years. 7 feet (29%) had been operated on previously for HV. The HV angle improved from a pre-operative mean value of 44.3° to 15° post-operatively (average reduction 29.4°). The IM angle improved from 13.4° to 8.1° (average reduction 5.2°). There were 7 (29%) non-unions. 10 patients (42%) had minor transient complications. 12 patients (57.14%) were happy with the outcome while 7 patients (33.33%) expressed dissatisfaction. 2 patients remain under review.

**Discussion:** Excellent anatomical correction of the HV deformity can be achieved with the Lapidus procedure. It is, however, a technically challenging procedure and only just over half of the patients were satisfied with the results. In addition, we encountered higher non-union rates than previous studies.

**Conclusion:** The Lapidus procedure is extremely effective in correcting severe HV deformities but patient satisfaction is low and the complication rate is significant. In our view, the role of this procedure in HV corrective surgery requires further evaluation.

## **TANGENTIAL VIEW OF THE LISFRANC JOINT - A SIMPLE, NOVEL VIEW TO MINIMIZE THE INCIDENCE OF MISSED INJURY**

*D Kumar, P Williams*

*Morrison Hospital, Swansea*

**Introduction:** Up to 20% of Lisfranc injuries can go unrecognised with resultant long-term morbidity. Spontaneous relocation may mask the injury. Standard AP, lateral and oblique views of the foot are the primary radiological views. Weight bearing views may not be possible acutely and stress views may require anaesthesia. The standard AP view does not show the tarso-metatarsal joint clearly with alignment of the medial border of the second metatarsal to the medial border of the intermediate cuneiform all important.

**Materials and methods:** We used a tangential AP view of the tarso-metatarsal joint taken by tilting the x-ray beam cephalad. The degree of tilt was dictated by the declination angle of the first metatarsal seen on the lateral view of the foot (20-25 degrees for most people). Sixteen patients had standard AP, lateral and oblique views of their foot at the time of injury and were not diagnosed to have a Lisfranc injury. They remained symptomatic for an average period of 5 weeks (range, 2 to 15 weeks) before they had the tangential view of the Lisfranc joint.

**Results:** In all 16 patients the first and second tarso-metatarsal joint and the first inter-metatarsal space were more clearly visible. Thirteen patients had abnormal findings to confirm the diagnosis of Lisfranc injury and for 2 surgical treatment would have been appropriate if identified earlier than 14 and 15 weeks respectively.

**Discussion and conclusion:** This view confirmed the diagnosis in 13 patients who would have otherwise been discharged as a minor soft tissue injury.

We have also used this view successfully for injecting local anaesthetic in the tarso-metatarsal joints to elucidate the exact source of pain.

We recommend this simple view should be routinely used in addition to the standard AP, lateral and oblique views of the foot for mid foot injuries.

## THE CORRECTION OF THE INTERMETATARSAL ANGLE FOLLOWING FUSION OF THE FIRST METATARSOPHALANGEAL JOINT : WHAT CAN WE EXPECT?

*S K V Pydah, E M Toh, S P Sirikonda, C R Walker*

*The Royal Liverpool & Broadgreen University Hospital NHS Trust, Liverpool, United Kingdom*

**Introduction:** Standard arthrodesis of the first metatarsophalangeal joint (MTPJ) is often carried out for degenerative disease in the presence of a hallux valgus without a first metatarsal corrective osteotomy. Despite this there is an improvement in the intermetatarsal angle (IMA) as well as the position of the tibial sesamoid. We attempt to quantify the amount of correction in this study.

**Method:** A cohort of 30 (35 feet) consecutive patients (10 males, 20 females) treated from May 2006 to May 2007 were reviewed. The mean age was 61.6 years (39 to 78 years). All patients underwent a standard primary fusion of the first MTPJ with a low profile plate and compression screw. There was no attempt to free the sesamoids, perform a lateral release or medial reefing of the medial capsule. We measured the hallux valgus angle (HVA), IMA as well as the position of the tibial sesamoid pre and postoperatively using a digital radiology imaging system.

**Result:** The mean improvement in IMA was  $3.38^\circ$  ( $p < 0.001$ ) with a mean correction of  $2.5^\circ$  ( $p = 0.02$ ),  $6.5^\circ$  ( $p = 0.02$ ) and  $5.8^\circ$  ( $p = 0.06$ ) in the mild, moderate and severe groups respectively. A greater correction is expected with a more severe initial IMA ( $r = 0.688$ ). A similar trend is seen with the severity of the initial HVA ( $r = 0.640$ ). The tibial sesamoid position also tends to improve by one station (spearman correlation 0.861) post operatively.

**Conclusion:** There is an improvement in the IMA when the first MTPJ is fused. This improvement is proportional to the severity of the initial HVA and IMA. There is also an improvement in the resting position of the tibial sesamoid. We conclude that with a mobile first metatarsal medial cuneiform joint, the IMA corrects spontaneously when the first MTPJ is arthrodesed negating the need for a separate corrective osteotomy of the first metatarsal.



## **RESULTS OF 1ST METATARSOPHALANGEAL JOINT ARTHRODESIS USING STAPLES (UNICLIPS)**

*Anwar M, Hashmi RA, Ali F, Sundar MS*

**Introduction:** Arthrodesis of 1<sup>st</sup> metatarso-phalangeal joint is a reliable procedure for the treatment of symptomatic arthritis. Various techniques are in use to facilitate arthrodesis. We evaluated our results using a new and simple construct of two staples applied perpendicular to one another.

**Material and Methods:** Prospective observational study. A total of 29 patients (26 females, 3 males), Mean age 59yrs. 34 Hallux MTP joint fusions, 5 of them bilateral. Pre-operative diagnosis was Osteoarthritis in 27 and Rheumatoid arthritis in 2.

**Technique:** Medial incision, planar cuts using saw. Staples placed dorso-ventrally and medio-laterally. Patients were mobilised in heel weight bearing post op shoe for 4-6 weeks. All patients had regular clinical and radiological assessment. Mean followup was 24 months.

**Results:** Pre-op mean AOFAS score was 31 (Modified AOFAS score, total value 90

Portion of MTP joint motion was not included). Post-op mean AOFAS (modified) score was 81. 26 patients were very satisfied with the outcome of surgery, 2 were satisfied with reservation and one patient was not satisfied. 28 out of 29 patients would recommend this procedure to others. Ability to wear shoes improved in 26, same in 2 and worse in one patient. There were two mal-unions, one superficial wound infection treated with antibiotics and 6 patients had prominent staples requiring removal. There was no radiological non-union

**Conclusion:** Our technique of 1<sup>st</sup> MTP joint arthrodesis using 2 staples applied perpendicular to each other provides a reliable and stable construct that does not require use of plaster post-operatively. This has resulted in painfree post-op period without any need for plaster thus saving time and avoiding complications of plaster i.e stiffness and DVT. We strongly recommend the use of this type of fixation.

## OUTCOME OF 1<sup>st</sup> MTP FUSION WITH ACUMED PLATE FIXATION

*K Kanagaraj, Anish Kotecha, U K Debnath, Yogesh Nathdwarwala*

**Background:** First MTP joint arthrodesis is a well established and very common procedure for painful arthrosis. Plate fixation method has been used with successful outcome (97-100%) by few authors but it is yet to be accepted universally for fear of complications.

**Aim:** To evaluate clinical and radiological outcome of first MTP fusion using low profile Acumed plate.

**Methods:** We retrospectively reviewed 125 patients who had 1<sup>st</sup> MTP arthrodesis (over 6 year period) for painful Hallux Rigidus not relieved by conservative means and for rheumatoid forefoot reconstruction. The preoperative evaluation included a subjective questionnaire, physical exam, AOFAS hallux score and radiographic measurements. Post-operatively, all patients were mobilised with heel weight bearing shoes for six weeks. All patients had follow up of minimum 6 months (range 6 months to 6 years). At the final follow-up all patients had answered a questionnaire which evaluated any limitations of daily activity and restrictions in footwear. Radiological measurements included union of the arthrodesis and various angles (valgus, intermetatarsal and dorsiflexion) .

**Results:** Of the 125 patients we had final reviews for 103 patients. The mean AOFAS improved from 40 to 82. The individual components of AOFAS i.e. pain, walking ability and alignment improved significantly. All patients but one had radiological evidence of fusion at mean of 6 weeks (range 6-8weeks) allowing them to walk with normal footwear. The mean dorsiflexion angle was 15° (range 13 ° -18 °). The patient with non-union had re-arthrodesis with bone grafts using the revision plate. Two patients with rheumatoid arthritis required removal of plate for infection and wound breakdown. No plate failure occurred in any of the patients.

**Conclusion:** The plate fixation is a reliable method for 1<sup>st</sup> MTP joint fusion that allows for a predictable fusion in a satisfactory alignment with low complication rate. The stability of the fixation allows for early mobilization without need for plaster immobilization and early return to functional activities.

## ANTIBIOTIC PROPHYLAXIS IN FOREFOOT SURGERY – EXPLORING THE MYTH

*AD Cooney, CS Kumar*

*Glasgow Royal Infirmary*

**Introduction:** Hallux valgus corrective surgery is frequently performed, often with the administration of prophylactic antibiotics, although opinion is divided as to whether these antibiotics confer any benefit with little being published on the subject. The few papers that have been published suggest that there is no difference in infection rates, with the overall rate 1-2%.

Furthermore, the increasing incidence of multi-resistant bacteria is a concern to all. The Scottish Health Executive has identified the rationalisation of antibiotic prescribing as one of the principal means of reducing the development of these organisms.

**Materials and Methods:** All patients undergoing hallux valgus surgery via a first metatarsal osteotomy were included, excluding repeat surgery to the same foot. The operation performed, the use of prophylactic antibiotics and the incidence of postoperative infection were all prospectively recorded. Infection was defined using the Scottish Surgical Site Infection Surveillance criteria.

In addition, Orthopaedic Consultants in the west of Scotland were contacted asking whether they use antibiotics in hallux valgus surgery and what their perception of infection risk was.

**Results:** The study is currently ongoing. Currently, we have completed data for 64 patients (43 with prophylactic antibiotics, 21 without). Two patients developed a post operative infection both of whom had received prophylactic antibiotics.

Thirty-five consultants replied, of which 15 regularly performed surgery for hallux valgus. Prophylactic antibiotics were used by seven, with the average perception of infection risk 4%.

**Discussion:** The current results appear to support the literature in suggesting there is no difference in the incidence of infection between those receiving prophylactic antibiotics and those not. We aim to continue this study, aiming for over 100 patients.

**Conclusion:** Antibiotic prophylaxis during hallux valgus surgery does not appear to lower the risk of postoperative infection, with the overall risk of infection lower than what is generally perceived.

## THROMBOPROPHYLAXIS IN FOOT AND ANKLE SURGERY

*A Chipperfield\*, D J Redfern#*

*\*Trauma and Orthopaedics, South East Thames Rotation*

*#Brighton and Sussex Hospitals NHS Trust*

**Introduction:** In April 2007, NICE published guidance on reducing the risk of venous thromboembolism. Immobilization of a limb in plaster was identified as a risk factor for thromboembolism. NICE recommend that all orthopaedic patients with risk factors are offered low molecular weight heparin (LMWH) whilst an inpatient. There was no cost effective evidence to continue treatment as an outpatient in foot and ankle patients. Foot and ankle surgery often requires prolonged periods of immobilization postoperatively. This study aims to provide a snapshot of current practice amongst foot and ankle surgeons in the UK, highlighting any differences between current practice and NICE guidelines.

**Materials and Methods:** A random sample of the 267 members of the British Foot and Ankle Surgery Society listed in the 2007 BOA Handbook was obtained. In order to have a 90% confidence level, the sample size was calculated to be 71. The specialist teams identified were contacted by telephone and questioned on their use of thromboprophylaxis for elective patients in plaster. The results were collated and compared to NICE guidelines.

**Results:** 94% of foot and ankle surgeons prescribe LMWH to post operative elective inpatients in plaster. 65% of specialists continue thromboprophylaxis for outpatients. The duration and agent of thromboprophylaxis varied markedly. The commonest agents were LMWH and aspirin. The length of treatment ranged from ten days to the duration of plaster immobilization.

**Discussion:** The results highlight a trend amongst foot and ankle surgeons to exceed current NICE guidelines for thromboprophylaxis, continuing treatment for an extended outpatient period. Although there was shown to be no cost effective evidence to continue treatment, the practice continues.

**Conclusion:** The vast majority of UK foot and ankle surgeons fulfill the NICE recommendations on thromboprophylaxis. There is a clear need for a policy statement from BOFAS on the extended use of thromboprophylaxis for outpatients immobilized in plaster.

## ORTHOPAEDIC SURGEON OR OPERATIVE PODIATRIST?

*M A Farndon, R Monkhouse*

*Leeds General Infirmary, Leeds Teaching Hospitals Trust*

**Introduction:** In 2005, 88 patients (19M / 69 F, mean age 55) initially referred by their GP to a Consultant Orthopaedic Surgeon were seen by an Operative Podiatrist as a waiting list initiative. The mean delay between GP referral and clinic appointment was 632 days. The majority of patients were listed for a surgical procedure. The podiatrist left the Trust before any listed surgery was performed. The cohort was subsequently reviewed by a Consultant Orthopaedic Surgeon prior to surgical intervention, creating a unique opportunity to compare podiatric and orthopaedic input in one patient group

**Materials & Methods:** Casenotes and clinic correspondence were identified by merging clinic datasets & retrieved in 86/88 cases. Medical records and documentation of peripheral vascular status were examined

as a standard of care. Correlation of surgical decision making was examined qualitatively

**Results:** Circulatory status was found to be documented in 0/58 (0%) records available for patients seen by the podiatrist and 70/74 (95%) seen by the orthopaedic surgeon respectively. Vascular investigation or referral was initiated by the orthopaedic surgeon in 8 patients listed for surgery by the podiatrist. The listed procedure was postponed or cancelled by the orthopaedic surgeon in a further 11 patients (5 medically unfit for listed surgery, 4 treated conservatively & 2 unable to obtain valid consent). No written or dictated contemporaneous records were made for 23/88 (26%) of index podiatric consultations. Clinically significant drug history was documented by the podiatrist in 1/13 (8%) cases recorded by the orthopaedic surgeon

**Discussion:** Reasonable correlation was observed between proposed surgical interventions for forefoot problems. Poor correlation was observed for mid- and/or hind foot problems. Avoidable adverse outcomes might have been anticipated in 19/88 (22%) patients listed for surgery by the Operative Podiatrist

**Conclusion:** The employment of unsupervised non-medical surgical practitioners in hospital based orthopaedic practice is not appropriate.

## **OPTIMISATION OF SCREW THREAD LENGTH AND THE EFFECT ON UNION IN SUBTALAR FUSION.**

**Tryfonidis M, Smith G, Cooke PH, Sharp RJ**  
*Nuffield Orthopaedic Centre, Oxford*

**Introduction:** An ideal screw for subtalar fusion would be designed such that screw thread length in the distal bone would be maximised but without distal perforation, whilst having no threads across the fusion site that would inhibit compression.

**Method:** Radiographs and clinical assessment of 100 patients who had undergone subtalar fusion were analysed and correlated with the presence or absence of non-union.

In addition, using the characteristics of the inserted screw as a scaleable marker, it was calculated what would have been the optimum length of screw thread in order to maximise screw thread length in the target bone whilst preventing the screw threads being across the fusion site.

**Results:** There is no correlation between the presence of screw threads across the fusion site and non-union.

Currently available screws have thread lengths that are either too long (breaching the fusion site) or too short for ideal fixation and we propose a different thread length to those currently available.

However, even with current screws, we found no correlation between thread length, thread positioning across the fusion site and non-union.

## **THE ECONOMICS, PERI-OPERATIVE MANAGEMENT ALGORITHMS, OUTCOMES AND COMPLICATIONS OF ANKLE ARTHROSCOPY FOR RELIEF OF ARTHROSIS IN PATIENTS. WITH HAEMOPHILIA A**

**Cooke PA, Sharp RJ**

*The Nuffield Orthopaedic Centre, Oxford.*

Between 1998 and 2007, fifteen patients with haemophilia A underwent 21 ankle arthroscopies+/- arthroscopic cheilectomy in order to attempt symptomatic relief of arthrosis and to increase the range of motion. All patients had severe degenerative changes radiologically.

Perioperative management was shared with our local dedicated Haemophilia service and the management algorithm will be presented.

Outcome data for pain and range of motion shows only moderate benefits.

Two patients had good relief of symptoms for 6 months. Two patients however chose to return for arthroscopies to the contralateral ankle and two had arthroscopies to the same ankle .

Follow up data is not currently available for 4 patients and the rest required fusion with a median time to fusion of 1 year.

Two patients had a documented increased range of motion, but one of these patients had an increased level of pain associated with the increased mobility.

There was 1 major complication, namely an aneurysm of the tibialis anterior artery.

Two patients had recurrent bleeds following surgery requiring ongoing and prolonged factor VIII treatment.

Average patient stay was 3.1 days , range 2 to 5 days and this stay is shorter for later years than earlier years.

The post-operative requirement for extra factor VIII ranged from 4 postoperative doses to 3 weeks ongoing treatment, median 10 doses. The average cost per dose was approximately £1128, giving a median cost of £11280 per case.

In summary, this procedure seems to be expensive in terms of QALY gains and has low rates of success in terms of function and pain relief.

## VALIDATION OF THE MOBILITY TOTAL ANKLE REPLACEMENT JIG

*P Patterson ,D McKenna ,TB Bonner,J Womack, MS Siddique*

*Freeman Hospital, Newcastle-Upon-Tyne*

**Aim:** To validate the accuracy of the MobilityTotal Ankle Replacement alignment jig.

**Method:** The early radiological alignment outcomes (angles 'A, B, C') of 35 Mobility ankle replacements were determined from weight bearing X rays.

These radiological outcomes were compared with alignment outcomes for 'Star' total ankle replacement, as published by PLR Wood. (Total Ankle Replacement JBJS April 2003 85B, pg 334)

**Results:** Indication: osteoarthritis 25, posttraumatic osteoarthritis 6, rheumatoid arthritis 4.

Table 1

Pre-op alignment	Varus 19/35	Valgus 16/35
Congruent	11	11
Incongruent	8	5

Key to table 2:

Column 1: Alignment angle.

Column 2: Results mean

Column 3: Results range

Column 4: Published mean

Column 5: Published range

Column 6: Published accepted range

Table 2

1	2	3	4	5	6
A	87.3 <sup>0</sup>	81 <sup>0</sup> -95 <sup>0</sup>	85 <sup>0</sup>	75 <sup>0</sup> -100 <sup>0</sup>	85 <sup>0</sup> -95 <sup>0</sup>
B	89.9 <sup>0</sup>	82-96 <sup>0</sup>	88 <sup>0</sup>	70 <sup>0</sup> -100 <sup>0</sup>	80 <sup>0</sup> -90 <sup>0</sup>
C	28.11 <sup>0</sup>	22 <sup>0</sup> -39 <sup>0</sup>	22 <sup>0</sup>	6 <sup>0</sup> -40 <sup>0</sup>	20 <sup>0</sup> -40 <sup>0</sup>

32/35 Angle A were within the published accepted range (85<sup>0</sup>-95<sup>0</sup>).

23/35 Angle B were within the published accepted range (80<sup>0</sup>-90<sup>0</sup>).

35/35 Angle C were within the published accepted range (20<sup>0</sup>-40<sup>0</sup>)

No statistical difference between the distribution of angle A, B and C and the means for A, B and C for the published results.

**Discussion:** Results for angle B are skewed toward the upper limit of the current accepted range (80<sup>0</sup>-90<sup>0</sup>). The author (MSS) attempts to reproduce this, to place the anterior margin of the tibial component on subchondral bone.

A lower angle B positions the implant on metaphyseal bone with a risk of subsidence. Comparing Angle B with a modified acceptable range (85<sup>0</sup>-95<sup>0</sup>) 31/35 fell in the new range.

**Conclusion:** Early radiological alignment for Mobility is reproducible and compares favourably with published data.





## **ACQUIRED ADULT FLAT FOOT DUE TO ISOLATED PLANTAR CALCANEONAVICULAR (SPRING) LIGAMENT INSUFFICIENCY WITH A NORMAL TIBIALIS POSTERIOR TENDON**

*M Tryfonidis, W Jackson, R Mansour, S Ostlere, J Teh, P H Cooke, R J Sharp*  
*Nuffield Orthopaedic Centre NHS Trust, Oxford, UK*

**Introduction:** Acquired pes planus is caused by mechanical uncoupling of the bones of the tarsus due to failure of the osseo-ligamentous complex that maintains the medial longitudinal arch of the foot. The most common cause of acquired flat foot deformity in adults is posterior tibialis tendon dysfunction. A solitary previous case report has documented an alternative aetiology of acquired flat foot in adults due to isolated spring ligament rupture; in that case diagnosis was made intra-operatively.

**Materials and Methods:** We present 9 cases of acquired flat foot deformity that were caused by isolated spring ligament insufficiency, mainly presenting after an eversion injury of the ankle. We present the clinical sign of ability to single leg tiptoe, but with persistent forefoot abduction and heel valgus, that allows differentiation of this diagnosis from posterior tibialis tendon dysfunction. In addition we illustrate the radiological features of this condition which have not been previously described and allow confirmation of the diagnosis non-operatively.

**Results:** Six patients have been managed with orthotics and three underwent surgery; one patient who presented early had an isolated repair of the spring ligament complex and has done well. The remaining two patients required a calcaneal osteotomy and Flexor Digitorum Longus transfer as for a PTT reconstruction. In all these three patients the spring ligament was found to be completely ruptured during surgery.

**Discussion:** This type of injury may not be as rare as previously thought and demonstrates the importance of the spring ligament on its own in maintaining the medial longitudinal arch. Awareness of this condition could lead to earlier diagnosis and better prognosis with earlier treatment.

**Conclusion:** We propose that early diagnosis (with ultrasound confirmation) and management of this condition would offer a better prognosis and allow less interventional surgery.

## CAUSES OF REOPERATION IN CONGENITAL TALIPES EQUINOVARUS

*J. Mihelarakis, N. Markeas, E. Volonakis, E. Valentis,  
B Orthopaedic Department of Children's Hospital "P. & A. Kyriakou"*

**Aim:** This study was carried out in order to clarify the causes that are mainly responsible for the necessity of reoperation after the initial correction of the deformity in congenital talipes equinovarus. The cases, which had been treated surgically with the same method and recurred later, were studied retrospectively in order to be ascertained epidemiological data related to the disease, to be isolated operative findings related to its pathology and to be estimated the surgical results based on clinical and radiological criteria.

**Material-Methods:** During the 15-year-period from 1990 to 2004, 123 infants (196 feet) with congenital talipes equinovarus have been treated operatively. There were 88 males and 35 females. Seventy three patients (59.3%) had the deformity bilaterally, 20 patients in right foot and 30 in left. Family history was positive in 5 infants. Other congenital anomalies coexisted in 12 infants (9.7%). Preoperative application of successive plasters was started into the first week for 93 infants (75.6%) and its duration was 3 months for 83.7% of cases. All the patients have been operated on with posteromedial approach, extensive ligament division and generous release of soft tissues during the first year of age. Two thirds of cases (67.4%) were treated surgically into the first 6 months of age.

**Results:** Anatomical variations were revealed during the operation in 14 feet (7.1% of the cases). The clinical results as well as the radiological signs into the first 6 postoperative months were satisfactory, but a reoperation was necessary in 21 feet (in 14 infants) for correction of part of the initial deformity into the following 2-5 years. The clinical criteria were related to the manner of standing and walking, the range of motion of the foot joints and block test. The radiological criteria were related to anteroposterior and lateral talocalcaneal angles and the angle between the longitudinal axis of the talus and that of the first metatarsal in the anteroposterior view as well as the position of the calcaneus in the lateral view. The causes that led to recurrence were related to imperfect correction with the plasters, to incomplete release of soft tissues during the initial operation and to some likely predisposing congenital and environmental factors.

**Conclusions:** The prevention of recurrence of the initial deformity, in the operative correction of congenital talipes equinovarus, is mainly related to the attentive preoperative application of plasters, the careful leg artis surgical technique and the early diagnosis and treatment of the predisposing factors.

## **SURGICAL ANATOMY FOR A NEW MINIMALLY INVASIVE APPROACH TO HARVEST THE FLEXOR DIGITORUM LONGUS TENDON: A CADAVER STUDY**

*V K Panchbhavi , J Yang, S Vallurupalli*

*University of Texas Medical Branch*

**Introduction:** The purpose of this cadaver study was to test feasibility and safety of a new technique for harvesting the FDL tendon through a plantar incision placed directly overlying the FDL division and to define the relevant surgical anatomy.

**Materials and Methods:** In eight cadaver feet the FDL tendon was exposed in the midfoot through a plantar incision. The FDL tendon was divided and pulled proximally through a wound in the hindfoot. All the tissues superficial to the FDL tendon were then reflected to check for any inadvertent damage to adjacent neurovascular structures.

**Results:** The FDL division lies midway between the back of the heel and the base of the second toe and about 3.7 cm medial to the lateral border of the foot. The medial and the lateral plantar neurovascular bundles are respectively about 0.43 cm and 0.86 cm away from the FDL division.

**Conclusions:** The FDL tendon can be harvested through a plantar incision. The adjacent neurovascular structures remained undamaged. Plantar surface anatomy guides placement of the plantar incision so that the incision can overlie directly over the FDL division.

## RELIABILITY OF LINEAR VERSUS ANGULAR MEASUREMENTS IN THE EVALUATION OF HALLUX VALGUS SURGERY

*Martin E. Hilton, Vinod K. Panchbhavi*

**Introduction:** Hallux valgus (HV) deformity increases width of the forefoot. Criteria for a successful outcome after surgery include resolution of pain, a narrower forefoot and ability to wear conventional shoes. Skeletal width of the forefoot can be objectively measured on radiographs by a recently introduced parameter called the metatarsal span (MS). Reduction in MS can therefore be used as an outcome indicator. It is however not known if MS can be measured reliably. It is hypothesized that MS which is a linear parameter can be measured as reliably as the HV and intermetatarsal (IM) angular parameters.

**Methods:** Digitized pre and postoperative weight bearing radiographs of twenty patients with HV were evaluated by six observers. HV and IM angles and the MS were measured using digital techniques. ANOVA was used to study inter-observer and intra-observer reliability. A 95% confidence interval was determined.

**Results:** Inter and intra-observer agreement was present for all measurements. 95% CI for intra-observer pre and post operative measurements were  $\pm 5^\circ$  and  $\pm 5^\circ$  for HV angle,  $\pm 2^\circ$  and  $\pm 3^\circ$  for IM, and  $\pm 1.0\text{mm}$  and  $\pm 3.0\text{mm}$  for MS. 95% CI inter-observer pre and post operative measurements were  $\pm 4^\circ$  and  $\pm 4^\circ$  for HV angle,  $\pm 3^\circ$  and  $\pm 2^\circ$  for IM angle, and  $\pm 1.0\text{mm}$  and  $\pm 2.1\text{mm}$  for forefoot width, respectively.

**Conclusion:** Digital measurements of the linear parameter MS can be obtained as reliably as angular parameters HV and IM angles.

One of the criteria associated with success after hallux valgus surgery is reduction of the forefoot width. A new parameter called the metatarsal span can be a reliable objective measure to assess reduction of forefoot width and outcome after surgery for hallux valgus.

## ANTERIOR T-PLATE FOR ANKLE ARTHRODESIS

*R Maheshwari, P A Hadjikakou, J F Redden*

*Doncaster Royal Infirmary, Doncaster. UK. DN2 5LT*

**Introduction:** The long term results of Total Ankle Arthroplasty still remain largely unsatisfactory and Ankle Arthrodesis remains the gold standard treatment for severe degenerative ankle joint disease resulting from trauma and other causes. We describe the method and results of ankle fusion performed with a single anterior midline incision using the standard AO T-Plate.

**Material and Methods:** 18 patients underwent fusion of the tibio-talar joint with this technique over the past 6 years with a follow up range of 10 months to 5 years (mean-19 months). Though the commonest indication was post-traumatic degenerative joint disease (this included 6 patients who had previous internal fixation), other causes included primary osteoarthritis, rheumatoid arthritis, neuropathic joint (Charcot's) and failed arthrodesis with other methods. The mean age was 65.5 yrs (range 37-91). The patients were assessed clinically and radiologically.

**Results:** There was radiological union in all 18 patients. Excellent clinical results were finally achieved in 16 (89%). Complications included persistent pain(1), delayed union(2), infection(2, including one deep) and 2 underwent removal of plate with good final result.

**Discussion:** This technique is a modification of that described previously by Rowan and Davey. In our practice the plate is contoured to the surface of talus and distal screws are directed more vertically towards the sustentaculum talus. We found it helpful to obtain more compression of adjacent surfaces.

**Conclusion:** With the use of an anterior T-plate not only a better stability in biomechanical terms is achieved, better soft tissue cover of the metalwork help in overall patient satisfaction. Though we have performed ankle arthrodesis with different methods with satisfactory results, with this particular technique we have achieved excellent results and radiological union in all patients.

## **INFLUENCE OF TIMING OF SURGERY ON THE CLINICAL OUTCOME IN SURGICALLY TREATED ANKLE FRACTURES**

*A Ahmed, A Z Ahamed, H Zadeh, S Nathan*

*West Middlesex University Hospital NNS Trust, Twickenham Road, Isleworth, Middlesex TW7 6AF*

**Introduction:** Ankle fractures are one of the most common injuries treated by the orthopaedic surgeon. The general recommendation is if surgical treatment is not carried out within the first 24 hours from injury, then it should be delayed for about 5-7 days to reduce the risk of wound complications associated with limb swelling. The aim of our study was to see whether timing of surgery affects the relative risk of skin complications following internal fixation of ankle fractures.

**Method:** We analysed medical records of 102 patients with closed ankle fractures admitted to the orthopaedic department at our hospital between May 2003 and May 2005. The fractures were classified according to the Weber-AO classification. Open reduction and internal fixation was performed according to the techniques of the AO Group.

**Results:** The mean age of patients was 43 years (range 13-87). According to the AO classification, 3 were type A (A1-3), 77 were type B (B1-16, B2-42, B3-16), 17 were type C (C1-2, C2-11, C3-4), 4 were isolated medial malleolus and 1 was Salter-Harris type 2 fractures. The mean delay before surgery was 3 (0-18) days. The mean length of hospital stay was 6 (1-44) days. Out of 102 patients, 53 of the patients were operated within 24 hours, 22 were operated from 24-72 hours, 15 within 4 to 7 days and the rest were operated within 7-18 days. The main reasons for delay were either failed initial conservative management or late presentation.

There was one case of superficial wound infection, deep vein thrombosis, neuroma and delayed union of medial malleolus each.

**Conclusion:** We conclude that for ankle fractures that are not operated on within the initial 24 hours from the injury, delayed treatment could be instituted as soon as patient and limb factors permit and rigid adherence to waiting times of 5-7 days is not necessary.

## **OPTIMISING USE OF THE MINI C-ARM IN FOOT AND ANKLE SURGERY.**

*S Gangopadhyay, B E Scammell*

*Nottingham City Hospital, Hucknall Road, Nottingham NG5 1PB*

**Introduction:** The mini C-arm is a compact, user-friendly device with the advantage of reducing exposure to ionising radiation compared to the conventional C-arm. Optimising radiation exposure is not only desirable, but also a legal requirement and protocols should be in place to achieve this. The purpose of this paper is to review our use of the mini C-arm for elective foot surgery and to suggest guidelines for optimising its use.

**Materials and Methods:** Between 2004 and 2006, all elective foot surgery requiring intraoperative imaging were performed using the mini C-arm unit. Procedures performed included ankle, midfoot and hindfoot arthrodeses and joint injections or aspirations. Screening times and radiation doses were recorded for each procedure.

**Results:** Following an initial learning curve, the screening times stabilised around the median value for the individual procedures. For a subtalar or triple arthrodesis this was less than 60 seconds, for ankle arthrodesis, less than 90 seconds and for hindfoot arthrodesis using a nail, less than 100 seconds. Other single joint arthrodeses had a screening time under 30 seconds and injections or aspirations, under 12 seconds.

**Discussion:** As screening time is the main variable that can be controlled by the surgeon, assuming that all other precautions are followed, screening time can be used as a useful audit tool to measure optimum use of the mini C-arm. A protocol is presented which includes completion of an audit form for every operation where the mini C-arm is used. The above times can be used as a guide to enable hospital trusts to formulate their own protocols to regulate radiation exposure.

**Conclusion:** The mini C-arm is well suited for foot and ankle surgery. Having a protocol in place and periodic audit is essential to optimise its use. Apart from being good clinical practice, this is now a legal requirement.



## DIFFERENCES IN THE FOOT PRESSURE BETWEEN CAUCASIANS AND INDIANS

*A B Putti MChOrth, G P Arnold, L A Cochrane, R J Abboud*

*Institute of Motion Analysis and Research, University of Dundee, Ninewells Hospital, Dundee.*

**Introduction:** Indians are the largest single ethnic minority group in Britain forming more than one million of UK population. Studies have found differences in the feet of various ethnic races. No studies have looked at foot pressure differences between Caucasians and Indians.

**Materials and Methods:** The study included 28 Caucasians and 22 Indians. Peak pressure (PP), contact area (CA), contact time (CT), pressure-time integral (PTI), force-time integral (FTI), instant of peak pressure (IPP), maximum force (MaxF) and mean force (MeanF) were recorded.

**Results:** The Caucasians had higher PP in the heel (289 kPa vs. 249 kPa;  $P < 0.001$ ), 1st metatarsal head (276 kPa vs. 231 kPa;  $P = 0.009$ ) and the 2nd metatarsal head (268 kPa vs. 235 kPa;  $P = 0.01$ ) compared to the Indians. The heel had a mean CA of 38.3cm<sup>2</sup> in Caucasians compared to 44.3cm<sup>2</sup> in the Indians ( $P = 0.001$ ). The CA in the 1st and 2nd metatarsal head was 11.1cm<sup>2</sup> and 11.5 cm<sup>2</sup> respectively in the Caucasians and 13.4 cm<sup>2</sup> and 13.7 cm<sup>2</sup> respectively in the Indians ( $P < 0.001$ ). The CT was statistically longer in the Indians compared to the Caucasians in the heel, mid foot and the great toe. There were no significant differences among PTI, FTI, IPP, MaxF and MeanF among them.

**Conclusion:** The Indian feet have larger CA than their Caucasian feet. The higher PP in the heel, 1st and 2nd metatarsal head in the Caucasians could be the cause of more foot problems in this region compared to the Indians. The threshold for morbidity could be lower in the Indian feet due to lower initial pressures.

## FOOT PRESSURE DIFFERENCES IN MEN AND WOMEN

*A B Putti, G P Arnold, L A Cochrane, R J Abboud*

*Institute of Motion Analysis and Research, University of Dundee, Ninewells Hospital, Dundee.*

**Introduction:** Women and men are different in a number of ways. Women have greater valgus at elbow and knee and greater varus at hip compared to males. There are considerable differences in the foot bones of either sex in anthropometric studies. The aim of the study was to investigate foot pressure differences between males and **females using the Pedar® in-shoe foot pressure system.**

**Materials and Methods:** 17 females and 36 males were recruited. Peak pressure (PP), contact area (CA), contact time (CT), pressure-time integral (PTI), force-time integral (FTI), instant of peak pressure (IPP), maximum force (MaxF) and mean force (MeanF) were recorded.

**Results:** In males CA was significantly larger in all regions of the foot than in females. There were no significant between sex differences in PP, CT and PTI. FTI was significantly greater in males than females for most regions in the foot. IPP was earlier in females. MaxF was also significantly higher in males in all the regions except the 2nd toe. MeanF was also higher in males.

**Conclusion:** There were no PP differences; however the plantar surface area of the male foot was larger than females.

## **STRAIN IN DISTAL TIBIAL OSTEOTOMY STABILISED WITH METAPHYSEAL AND DISTAL TIBIAL LOCKING COMPRESSION PLATES**

*Chezhiyan Shanmugam<sup>1</sup>, Subhojit Ghosh<sup>2</sup>, Aziz Rahmatalla<sup>1</sup>, Nicola Maffulli<sup>1</sup> §*

*1 Bionic Workshop, Hartshill Orthopaedic Unit, Department of Trauma and Orthopaedic Surgery, Keele University School of Medicine, North Staffordshire Hospital, Thornburrow Drive, Hartshill, Stoke on Trent, Staffordshire, ST4 7QB, England.*

*2 Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ, United Kingdom.*

**Background:** Locking plates are used frequently in distal tibial fractures. We tested two different types of locking compression plates (LCP): the metaphyseal plate (MP) and the distal tibial plate (DTP). We evaluated the strain imposed on an experimental tibial osteotomy, and the stability of plate-tibia (composite bone) construct using LCP-MP and LCP-DTP.

**Materials and methods:** Twin strain gauged special composite tibial bones were used to simulate the human tibiae. We tested 5 tibiae: one was used as control, two tibiae were tested using LCP-MP, and two with LCP-DTP. Strain was measured by subjecting each construct to a cyclic load of 700 N at 3 Hz in neutral, flexion, extension and torsion to simulate the normal walking cycle.

**Results:** When compared with the control tibia, strain during the neutral moment at the proximal and distal strain gauge site in the LCP-MP and LCP-DTP constructs decreased by 6.4%/-41.5% and -39%/-47%, respectively. In flexion, the strain increased consistently in both the proximal and distal strain gauge sites using the LCP-MP by 34% and 109%. Using the LCP-DTP, the strain at the proximal strain gauge site decreased by 0.2% and increased by 18% at the distal strain gauge site. In extension, strain decreased by 25% at the proximal strain gauge site, and by 60% at the distal strain gauge site in the LCP-MP construct. In the LCP-DTP construct, the strain decreased by 13% at the proximal strain gauge site, and by 21% at the distal strain gauge site. There were no statistically significant torsional differences between LCP-MP and LCP-DTP group ( $P=0.121$ ). In this experimental setup, the LCP-DTPs offer greater control of strain than LCP-MPs. They also confer greater resistance to fracture macro-movements, and improved stiffness consistently in neutral, flexion, and torsion than LCP-MPs.

**Conclusion:** The strain from osteotomised tibiae stabilised with LCP-MPs and LCP-DTPs were close to the strain of the control tibia. Both these locking plates were equally good and conferred greater stiffness in all loading positions.

## THE ECONOMIC GAINS ACHIEVED BY A SIMPLE CHANGE IN POST OPERATIVE CASTING PROCEDURE

*B J F Dean, R Sharp, D E Hinsley, P H Cooke, R J Sharp*  
*Nuffield Orthopaedic Centre, Oxford, UK.*

**Introduction:** In June 2006, the post-operative plaster immobilisation protocol for patients undergoing foot and ankle surgery at our institution changed from multiple plaster changes to the immediate application of a definitive reusable split synthetic cast. This study aims to assess the savings following this change in practice.

**Materials and Methods:** A retrospective analysis of plaster room records from June 2005 to June 2007 was performed.

The original procedure involved application of a plaster backslab following surgery, change of cast on day 1 post operatively, suture removal and plaster change at two weeks post-operation and cast removal or bi-valving six weeks post-operation, following outpatient review.

The new procedure utilised a reusable cast applied in theatre which allowed suture removal and wound inspection in the community and outpatient review at six weeks without plaster change.

**Results:** Two hundred and twenty-two patients from 2005-6 were managed with the plaster procedure at a cost of £344.98 per patient and a total cost of £76,586.56. While 203 patients from 2006-7 were managed with the new procedure at a cost of £147.10 per patient and a total cost of £29,861.30. The net saving to the hospital of this change in practice was £197.88 per patient and £40,169.64 in total. There were no referrals back to the hospital as a consequence of this change in practice.

**Discussion:** Plaster changes and hospital outpatient appointments add cost to surgical procedures. This simple change in the post-operative casting of foot and ankle patients resulted in less outpatient visits and plaster changes without compromising the standard of medical care.

**Conclusions:** In the current political and financial climate it is important that economic efficiency, at a local level. This study demonstrates how small changes in local practice can result in significant financial savings for hospitals.

## **DOES EARLY DISCHARGE FROM FOLLOW-UP INCREASE POST-OPERATIVE RE-ATTENDANCE RATES (SOS) FOLLOWING FOOT AND ANKLE SURGERY?**

*S Smith, B Yates, D Williamson, S Irby*

*Orthopaedics Department, Great Western Hospital, Swindon and Marlborough NHS Trust, Wiltshire*

**Introduction:** Long waiting times for surgery and government targets places added pressure on the administration of surgical units. In an effort to decrease waiting times from initial referral to surgery and to meet new to follow-up patient ratios set by the government, a policy of early discharge from follow-up was introduced for many procedures involving the foot and ankle. This audit assessed whether this policy increased procedure morbidity and patient dissatisfaction.

**Methods:** A 12-month retrospective audit was performed (October 2005 – September 2006) on the foot and ankle surgery cases performed at the Great Western Hospital, Swindon and Marlborough Trust, UK. Procedure and out-patient appointment data was accessed including new, follow up and ‘SOS’ patient attendances. Appointments were considered SOS if a patient sought consultation with a surgeon following discharge in the post operative setting.

**Results:** A total of 1128 foot and ankle procedures were performed on 639 patients. Eighty five percent (958) procedures met the early discharge from follow-up criteria. There were 2750 appointments for the respective period. Twelve hundred and seven (44%) were new patient appointments and 1543 (56%) were follow-up appointments. There were 84 SOS attendances related to a surgical episode, comprising 2% of appointments and 6% of procedures. Sixty-seven of the SOS attendances (80%) were related to an early discharge from follow-up procedure. A high proportion of SOS attendances were associated with joint stiffness, digital malposition and dysesthesia relating to Hallux Valgus correction, lesser digit arthrodesis and intermetatarsal neurectomy respectively.

**Discussion:** In this series, the aforementioned complications are consistent with those reported in the literature and we conclude they were not a consequence of early discharge. Early discharge from follow-up following selected common surgical procedures for the foot and ankle can potentially increase productivity of the out patient department without impact on procedure morbidity and patient satisfaction.

**GENE EXPRESSION AND PROTEIN ANALYSIS IN RUPTURED HUMAN ACHILLES TENDONS**  
**A COMPARISON BETWEEN RUPTURED AND HEALTHY AREA OF THE SAME TENDON**

*M Ronga<sup>1,3</sup>, E Karousou<sup>2</sup>, D Vigetti<sup>2</sup>, A Passi<sup>2</sup>, N Maffulli<sup>3</sup>.*

<sup>1</sup> *Department of Orthopaedic and Traumatology, University of Insubria, Varese, Italy*

<sup>2</sup> *Department of Experimental Biomedical and Clinical Sciences (DSBSC), University of Insubria, Varese, Italy*

<sup>3</sup> *Department of Trauma and Orthopaedic Surgery, Keele University School of Medicine, Stoke on Trent, Staffordshire, UK*

**Introduction:** We studied the extracellular matrix (ECM) of 19 ruptured human Achilles tendons, comparing the tissue composition of specimens taken from area close to the rupture with specimens harvested from an apparently healthy area in the same tendon. The hypothesis was that the metabolism of these molecules is altered in patients with Achilles tendon rupture.

**Materials and Methods:** We compared the gene expression and the protein localization of the main ECM molecules (collagen type I, decorin and versican) including enzymes involved in their metabolism as matrix metalloproteases (MMP2 and 9) and tissue inhibitory of metalloproteinase (TIMP 1 and 2) using a Real Time PCR, zymography and FACE analysis.

**Results:** The gene expression of proteoglycans core protein, collagen type I, MMPs and TIMPs is more represented in the area close to the tendon rupture ( $p < 0.05$ ). The expression of MMPs was confirmed by zymography analysis, showing a marked increase of gelatinolytic activity in area close to the tendon rupture ( $p < 0.05$ ). The chemical composition of tendon changes showing that in the healthy area the carbohydrate content is higher than the ruptured area ( $p < 0.05$ ).

**Discussion/Conclusions:** In the ruptured area, the tenocytes tried to restore the normal proteoglycan pattern increasing the core protein synthesis but without the normal glycosaminoglycan production. Our data support the hypothesis that, in human tendons, the tissue in the area of rupture undergoes marked rearrangement at molecular levels based on the MMP2 activity, and support the role of MMPs in the tendon pathology.

## **OUTCOME OF OPERATIVE TREATMENT OF LISFRANC INJURIES**

***B Purushothaman, E Robinson, L Spalding, M Siddique***

*Newcastle General Hospital, Newcastle*

**Introduction:** Lisfranc injuries account for 0.2% of all fractures. Around 20% of these injuries are missed or misdiagnosed leading to long term problems with the foot. Early recognition and treatment of these injuries are crucial in restoring the function of the foot.

**Aim:** To review the functional outcome of patients following surgery for lisfranc injuries.

**Methodology:** This is a retrospective review of patients treated surgically for lisfranc injury in our hospital between January 2000 and January 2007. There were 13 patients whose records were reviewed and data including age, mechanism of injury, associated injuries, surgery performed, and peri-operative complications were collected. A telephonic survey was conducted to find out the current functional and employment status. AOFAS mid-foot score was used to evaluate the outcome.

**Results:** 13 patients were included in the study. Mean age was 31 years at the time of injury. 5 patients were female and 8 male. 10 had injury on the left foot while 3 had on the right. 11 were closed lisfranc injury. 10 patients had isolated lisfranc injury. Seven patients had sustained lisfranc injury following a fall, while three had a road traffic accident. Six patients had a homo-lateral, four had isolated and two had divergent type. Nine patients had trans-articular fixation, seven of whom had open reduction and internal fixation while two had K-wire fixation. Extra-articular fixation was done in four patients. Average AOFAS mid foot scoring was 80 ranging from 47 to 100. Lower scores were related to pain. Nine patients were pain free at follow up and returned to work. Average follow-up period was 32.6 months (range 5-77 months)

**Conclusion:** Two thirds of patients with a Lisfranc fracture dislocation return to work and extra-articular fixation may result in superior outcomes compared with the traditional methods.

## **OFF-THE-SHELF IN-SHOE HEEL INSERTS: THEIR EFFECTS ON THE FOREFOOT**

*A K Ramanathan, M C John, G P Arnold, L Cochrane, R J Abboud*

*Institute of Motion Analysis and Research, TORT Centre, Ninewells Hospital and Medical College, Dundee, DD1 9SY, United Kingdom.*

**Introduction:** Off-the-shelf heel inserts are used widely without adequate scientific information regarding their effects under the forefoot and this study was aimed to fill this paucity.

**Materials and Methods:** Thirty-five asymptomatic volunteers consented to participate. Six brands of off-the-shelf heel inserts were tested. Subjects walked along a ten metre walkway with no inserts and then with each pair of inserts, in a randomised order. The Pedar<sup>®</sup> in-shoe pressure system was used to record data. The five areas of interest were the heel, lateral three and medial two metatarsals, lateral three and medial two toes.

**Results:** The mean peak pressure (PP) under the heel was significantly reduced with inserts whereas PP recorded under the medial and lateral metatarsal heads was higher. With inserts, the contact time (CT) and pressure time integral (PTI) had increased under the medial toes, lateral and medial metatarsal heads; while under the heel, the CT had increased and PTI had decreased. The percentage roll over process of beginning of contact (BoC) showed a generalized decrease in the values under the metatarsal heads and medial toes with inserts. Although the general trend was a decrease in contact area (CA) with inserts, little difference was seen in the areas of interest among both feet.

**Discussion:** A comparable CA and increased PP, CT and PTI under the metatarsal heads and a decreased PP under the toes suggest that the metatarsal heads are prone to increased risk of injury while using inserts. This is complimented by the hastened BoC of the forefoot. The decreased PTI and PP under the heels can be attributed directly to the use of inserts.

**Conclusion:** The heel inserts should be used with caution inspite of their beneficial effects under the heel. The classification of these inserts as an “over-the-counter” product may need to be reviewed.



# **DOES THE PRESENCE OF SCREW-THREADS ACROSS AN ANKLE JOINT LOWER THE RATE OF FUSION AND THE OPTIMAL CHARACTERISTICS OF SCREW-THREAD LENGTH FOR ARTHROSCOPIC ANKLE ARTHRODESIS**

*R Chau, PH Cooke, RJ Sharp*

*Nuffield Orthopaedic Centre, Windmill Road, Oxford*

**Introduction:** Arthroscopic ankle arthrodesis is an effective treatment for end-stage arthritis.

A screw that has any thread across the fusion site can not offer any compression and may be postulated to lower the rate of fusion. Similarly, maximal screw thread in the target bone would optimise fixation.

This retrospective study calculates the ideal characteristics of a screw used for ankle arthrodesis, and assesses the correlation between the lack of compression and non-union.

**Method:** Fifty-one consecutive patients(102 screws) who have had arthroscopic ankle fusions were studied. Either AO(n=38) or ACE(n=64) screws were used. We calculated the screw-thread distance that crossed the talo-tibial(TT) or the subtalar(ST) joints on digitised images, and recorded the outcomes of the fusions.

**Result:** Of the 38 AO screws, only one (2.6%) had threads across the TT joint(thread-length into the joint = 1.2mm). None of the ST joints had been breached.

Of the 64 ACE screws, 8(12.5%) had threads across the TT joint, representing 7(21.9%) of all posterior screws and 1(3%) of all anterior screws in the study. The mean length of screw-threads into the TT joint was 2.1mm(range 0.53 to 4.06 mm). The ST joints were breached by 4(6.25%) screws(all posterior). The mean length of protrusion was 1.8mm(range 0.28 to 3.89mm). No screw thread crossed both TT and ST joints simultaneously.

No non-unions were recorded in either group.

**Discussion:** In our study the use of ACE screws for arthroscopic arthrodesis increases the risk of screw-threads breaching either the TT or ST joints when compared to the use of AO screws.

**Conclusion:** We conclude a thread length of 19-20mm would optimise fixation/compression. However no clinical correlation was demonstrated between reduced compression and non-union in this study.

# A RETROSPECTIVE ANALYSIS OF THE RADIOLOGICAL OUTCOME OF CHEVRON AND SCARF WITH AKIN OSTEOTOMY FOR HALLUX VALGUS CORRECTION

**P Patterson , TB Bonner , D McKenna, J Womack, PJ Briggs, MS Siddique**

*Freeman Hospital, Newcastle-Upon-Tyne*

**Introduction:** The Scarf osteotomy for the treatment of hallux valgus is achieving popularity, but no comparative study has proven the efficacy of this procedure over other first metatarsal osteotomies.

We present a retrospective comparative review of the radiological outcomes of Chevron and Scarf with Akin osteotomy in the treatment of hallux valgus.

**Materials and Methods:** The radiological outcomes of 40 first metatarsal osteotomies, 20 Chevron and 20 Scarf with Akin are presented. The radiological parameters studied included hallux valgus angle, hallux interphalangeus, intermetatarsal angle, sesamoid station and foot width.

**Results:** The mean post-operative hallux valgus angles (HVA's) were: Chevron mean HVA  $17.9^{\circ}$ , standard deviation  $7.36^{\circ}$ , standard error 1.65. Scarf with Akin osteotomy mean HVA  $9.55^{\circ}$ , standard deviation  $6.6^{\circ}$ , standard error 1.4. The difference in postoperative HVA between the two operations was statistically significant ( $p < 0.001$ ).

The mean post-operative intermetatarsal angles (IMA) were: Chevron mean  $8.05^{\circ}$ , standard deviation  $2.56^{\circ}$ , standard error 0.57. Scarf with Akin mean  $7.22^{\circ}$ , standard deviation  $2.56^{\circ}$ , standard error 0.57. The difference in postoperative IMA between the two groups did not achieve statistical significance.

The mean change in IMA for each was: Chevron mean increment  $4.9^{\circ}$  Standard deviation  $2.29^{\circ}$ , standard error 0.51. Scarf with Akin mean increment  $6.68^{\circ}$ , standard deviation  $4.13^{\circ}$ , and standard error 0.88. The difference in alteration of IMA between the two groups did not achieve statistical significance.

**Discussion and Conclusion:** We conclude that as there was no difference in the distribution of post-op IMA for Scarf and Chevron osteotomies that the added affect of an Akin osteotomy may contribute to the Scarf to produce the better correction in hallux valgus angle.

## COMPARISON OF PREOPERATIVE HEALTH STATUS IN PATIENTS UNDERGOING ANKLE, HIP OR KNEE ARTHROPLASTY

*P Patterson, EA Lingard, J Ramaskandhan and MS Siddique*

*Freeman Hospital, Newcastle Upon Tyne*

**Introduction:** There is relatively little known about patient-reported health status in patients with ankle arthritis awaiting arthroplasty. This study aims to compare the preoperative health status of patients awaiting ankle, hip and knee arthroplasty.

**Materials and Methods:** Patients admitted for primary ankle, hip or knee arthroplasty to an NHS teaching hospital were invited to participate. Preoperative questionnaire included the WOMAC, SF-36 and self-reported height and weight providing body mass index (BMI). Comparisons of WOMAC and SF-36 data were adjusted for age, gender and BMI.

**Results:** A total of 2,196 patients were recruited between July 2003 and May 2007; including 35 ankle arthroplasty (TAA), 899 hip arthroplasty (THA) and 1,262 total arthroplasty (TKA) cases. There was no significant difference in age across the 3 groups but a significantly higher proportion of TAA patients were male (69 percent vs. 38 percent for THA and 43 percent for TKA,  $p=0.0002$ ). BMI of the TKA patients was significantly higher than the THA patients (29.4 vs. 27.3,  $p<0.0001$ ). Multivariate analysis which adjusted for age, gender and BMI demonstrated that THA patients were significantly worse ( $p<0.05$ ) than the TKA patients on all domains except for WOMAC stiffness and the SF-36 general health and mental health domains. TAA patients were not significantly different from either group on any measure.

**Conclusions:** Patients awaiting TAA reported similar WOMAC and SF-36 scores as the TKA patients. Patients awaiting THA report worse pain and function related to their hip and worse SF-36 scores except for general health and mental health domains.

# PROSPECTIVE RANDOMISED CONTROLLED TRIAL COMPARING NORMAL INTERRUPTED MATTRESS SUTURES WITH TRACTION LOOP SUTURES IN THE CLOSURE OF SURGICAL WOUNDS IN THE HINDFOOT

*S D Brookes-Fazakerley, C Atkinson , S P Sirikonda, C R Walker*

*Royal Liverpool & Broadgreen University Hospital Trust Foot & Ankle Unit*

**Introduction:** Closure with interrupted mattress sutures is useful where careful skin apposition is required following hindfoot surgery. However, suture removal around the hindfoot can be awkward and painful. Modification with an additional loop creates a “traction loop suture”. We hypothesise this technique makes removal easier and reduced tension placed on sutures during their removal reduces pain.

**Materials:** 17 patients undergoing elective hindfoot surgery were included. Nylon suture was used for all wound closures. Suturing and removal techniques were standardised. Ethical approval and patient consent was obtained.

**Methods:** Half of each wound length was sutured normally and the other with traction loop sutures (both interrupted mattress type). Follow-up was at 2 and 6 weeks. Comparison of time taken for suture removal and associated wound complications were noted for both. Pain scores during suture removal were recorded using a screen to “blind” the patient and a visual analogue pain score (VAPS) was obtained. Statistical analysis calculated p-values at the 5% significance level and 95% confidence intervals (CI).

**Results:** Traction loop sutures were 20% faster to remove than normal interrupted sutures (mean difference 19.3 seconds, CI 5.39 to 33.1 seconds, p-value 0.004). Traction loop sutures were also 20% less painful during removal (mean difference 1.05 on VAPS, CI 0.021 to 2.085, p-value 0.027. At 2 weeks, 1 normally sutured wound suffered complications. At 6 weeks, no complications were noted in either group.

**Discussion:** Traction loop sutures provide a statistically significant method of reducing pain and time during suture removal. The study method could be applied to comparisons of other skin closures where removal is required. The technique is novel and requires minimal change in suturing.

**Conclusion:** Pain levels and time taken for removal of interrupted mattress sutures are significantly reduced using the traction loop suture technique in hindfoot surgery. The study is continuing.

## **SETTING UP A “FUSION FORUM” IN FOOT AND ANKLE SURGERY**

*L Patten, D Singh, N Cullen, S Wiggins.  
RNOH, Stanmore, Middlesex HA7 4LP, UK.*

In the belief that many of the barriers that patients face when deciding upon an ankle or hindfoot fusion procedure stem from inadequate information about the procedure and its outcomes, the novel concept of a “Fusion forum” has been developed: a nurse-led informal group meeting to facilitate patients’ understanding and perception of fusion procedures. The aims were to provide more in-depth information than it is possible to deliver during the limited time of an initial doctor-patient consultation, to get the patient to meet and question a guest (an ex-patient who has previously had a fusion procedure) and to allow patients time to reflect upon their choices

The value of the fusion forum has been evaluated by a questionnaire which was completed by the first 48 patients who attended the forum. 96% (46/48) of respondents felt that the quality of information that they were given was excellent or good. No respondent thought that the information was unsatisfactory. Patients were asked how valuable they had found meeting the guest. Four patients did not respond to this question. All of the respondents thought that meeting another patient who had already undergone the procedure was excellent or good

The mechanics of setting up a foot and ankle fusion forum is discussed, along with the lessons learnt from the first cohort of patients. This process has been found to greatly increase patient understanding of arthrodesis. It has been found during the consent process in pre-admission clinic that patients demonstrate a more in-depth understanding of the operative procedure, a more comprehensive knowledge of what the whole process involves, as well as the relative risks and benefits and the expected time of recovery.

# IS IMMOBILISATION IN A PLASTER NECESSARY AFTER 1ST METATARSOPHALANGEAL JOINT (MTPJ) ARTHRODESIS USING STAPLES. A BIO-MECHANICAL STUDY

*Anwar M<sup>1</sup>, Khalid<sup>2</sup> M, Hamilton D<sup>3</sup>, Searle R<sup>3</sup>, Sundar MS<sup>1</sup>*

<sup>1</sup>*Department of Orthopaedics and trauma, Royal Oldham Hospital*

<sup>2</sup>*Department of Orthopaedics and trauma, City Hospital, Birmingham*

<sup>3</sup>*Department of Anatomy, Medical School, Newcastle upon tyne*

**Introduction:** Arthrodesis of 1st MTPJ is performed using various fixation techniques including lag screws, dorsal plate and screws, K-wiring. We evaluated the strength of fixation using two staples placed at right angles.

**Methods:** Ten pairs of cadaveric feet were dissected to harvest the hallux MTPJ. Planar cut of articular surfaces using a micro-sagittal saw. The bony ends were then approximated with an intervening blade and fixed using 2 staples placed at right angles. The specimen was supported on either ends and subjected to 3 point loading using a materials testing machine (Instron). The load at which the joint opened up sufficiently to let the blade fall was recorded. The load at which the construct failed was then recorded

**Results:** The joint opened up at an average of 41 Newtons. The load to failure was 130 Newtons. The corresponding average values in kilograms were 4.19 kilograms for the opening of the joint and 12.61 kilograms for the failure of the construct. On full weight bearing using the heel weight bearing shoes that we normally use post-operatively, the forces going through the forefoot were 0 newtons/ kilograms, calculated using a TEK SCAN (measures the foot pressure on walking)

**Conclusion:** It is safe to walk patients using a heel weight bearing shoe (Benefoot post op wedge shoe) following 1st MTPJ fusion using staples (uniclip-NewDeal). This is a major advantage compared to other methods of fixation that require plaster cast immobilisation thus reducing inconvenience, plaster expenses and possible complications like DVT.

## **OUTCOME OF BONE BLOCK ARTHRODESIS AS SALVAGE FOR FAILED HALLUX METATARSOPHALANGEAL JOINT SURGERY.**

*J Shanker, HK Sharma, R Sarkar, AP Kadakia*  
*Bradford Royal Infirmary, UK*

**Introduction:** Management of surgical failures of 1st MTP joint is complex. We present a series of 9 patients treated with bone block arthrodesis of the 1st MTP joint.

**Materials and Methods:** 9 patients who underwent bone block arthrodesis of the hallux MTP joint over a three year period were retrospectively identified. Most of the patients had failed fusions and kellers arthroplasty. All 9 patients had pain and deformity of the hallux, 8 patients had limitation of mobility and 6 patients had gait and shoe wear problems. All patients underwent 1st MTP arthrodesis with interpositional tricortical bone blocks, to restore 1st ray length, with additional cancellous bone graft used in three patients. The construct was held with K-wires which were buried under the skin. 3 patients were put in plaster postoperatively.

**Results:** The average age of the patients was 59 years with average follow up of 15 months. The hallux MTP score postoperatively was 78 out of the possible 90. The 1st MTP joint angle improved from 29.17 to 15.33. All the nine patients were satisfied (four rated it excellent and five rated it good) with their outcome, of which six would readily undergo similar operation and three would undergo the operation if there was no other option. Postoperative complications were mostly metalware related with 8 patients having shoe wear problems for which they underwent K-wire removal (usually under a local anaesthetic in the clinic). 4 patients had minor paraesthesia, 3 patients had superficial infection treated with antibiotics and 1 patient had persistent non-union (but was pain free).

**Conclusion:** The results with bone block arthrodesis are satisfactory and have added advantage of restoring the length of the 1st ray.

## **ANKLE INSTABILITY AND PAIN FOLLOWING LATERAL LIGAMENT INJURY: DOES THE ADDITION OF MRI ALTER CLINICAL DECISION-MAKING**

**R Nanda, V Kolimarala and AO Adedapo**

*The James Cook University Hospital, Middlesbrough UK*

Following ankle sprain, there can be many causes of disability including ligament injuries, soft tissue or bony impingement, Peroneal tendon tears, osteochondral defects (OCD), synovitis and Osteoarthritis (OA)

**Aim:** To assess the use of Ankle MRI in clinical decision-making in patients with pain and / or chronic instability following ankle sprains.

**Method:** A retrospective case note review was undertaken for all ankle scopes performed and all Ankle MRI ordered by a single surgeon (AOA) over a three-year period (April 2004 – April 2007).

**Results:** During this period 54 Ankle arthroscopies were performed. 24 had pre op MRI scans (16 ordered by AOA and 8 by others who then referred the patient) and 30 had no MRI. 8 case notes were not available. In 43 of the 46 available notes the patients presented with either chronic ankle pain or instability following ankle sprain. 32 had Anterolateral soft tissue impingement on arthroscopy. Of these 24 had MRI scans with only 3 reporting a soft tissue impingement.

13 patients had lateral ligament reconstruction. All 13 of these patients showed signs of instability on examination under anaesthesia (EUA). Of these 9 had MRI scans with 4 reporting a ligamentous injury. Five other patients had MRI scans that showed a lateral ligament injury but had a normal EUA and did not undergo a ligament reconstruction.

10 patients had moderate to severe OA on arthroscopy of the ankle. Of these 4 had MRI scans with 2 reporting OA changes but 2 reported as OCD.

**Conclusion:** Analysing the available data suggests that the indication to perform an arthroscopy is not dependent on the results of the MRI scan but is a clinical one. The decision to reconstruct / repair the lateral ligament complex is a clinical one dependent on patient symptom and the EUA findings.