

**ABSTRACTS FROM BOFSS MEETING Wirral 14/15 November 2002**

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

OPERATIVE REPAIR AND EARLY MOBILISATION OF ACHILLES TENDON  
RUPTURE

T. Bishop; S. Molloy; M. Solan; D. Elliott; and K. Newman

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Traditionally, immobilisation following achilles tendon rupture has been for 10 to 12 weeks.

We have previously published a series of 71 consecutive repairs with no re-ruptures, using a lateral surgical approach. The latter part of this cohort were immobilised for six weeks instead of 12, with early weight bearing. The lack of any re-ruptures encouraged us to pursue the accelerated rehabilitation.

This study documents a further 34 cases followed prospectively for 6–24 months (mean 15.9 months). All were repaired with a single Kessler-type suture using loop PDS, through a lateral approach. Patients were partial weight-bearing immediately in an Aircast boot with three cork heel wedges. At two-weekly intervals the wedges were reduced, and the boot abandoned after six weeks.

There have been no re-ruptures. Thirty of the 34 patients returned to pre-injury activity levels. All patients were satisfied or very satisfied with the immobilisation device and the accelerated rehabilitation regime. Cost savings were also made through use of a single removable orthosis rather than sequential casts.

We advocate this regimen of careful operative achilles tendon repair and accelerated weight bearing rehabilitation with a removable orthosis.

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#### ANKLE ARTHRODESIS WITH ANGLE BLADE PLATE

K.N. Subramanian; A.I. Zubairy; N.P. Geary; M.S. Hennessy; and M. Lwin  
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#### Introduction

The existence of various techniques of ankle arthrodesis shows that there are pros and cons in each method. We describe our experience of ankle arthrodesis using a paediatric angle blade plate.

#### Materials and methods

10 ankle arthrodeses were performed in nine patients. All patients were reviewed independently in special clinics. The objective assessment was performed by detailed clinical examination and the subjective assessment was made including overall patient satisfaction. The American Orthopedic Foot and Ankle Society ankle/hind foot scoring system was used. The technique of ankle arthrodesis was similar in all patients using an anteromedial or anterolateral incision, preparation of articular surface and paediatric angle blade plate fixation with or without bone grafting. Time to union was assessed by clinical and radiological examinations.

#### Results

Radiological union was achieved in nine patients in a mean time of 16 weeks. Fibrous union occurred in one patient. Eight patients were very satisfied with their treatment. The patient with fibrous union had a marginal improvement of symptoms with pain score improved from nine to seven. The mean AOFAS score was 84.

#### Conclusion

Ankle arthrodesis with a paediatric angle blade plate is a useful method of managing intractable cases of ankle arthritis. The technique is simple and effective with

excellent success rate.

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### BEST FOOT FORWARD

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#### Introduction

Inclusion of foot dominance in clinical examination of foot disorders is not routinely practised. The existence of foot dominance is not reported in the orthopaedic literature. We have evaluated foot dominance in a normal population and correlated it with hand dominance to highlight its existence and also to bring it into common practice.

#### Materials and methods

Demographic data was obtained from 468 healthy adult subjects. Those with pre-existing lower limb pathology were excluded from the study. Hand dominance was noted and each subject was then assessed for foot dominance by a blinded method. During the study all subjects were invited to come and stand on a set of weighing scales, and the leading foot was regarded as the dominant one. This was repeated three times for each subject.

#### Results

Two hundred and fifteen (46%) were males. Two hundred and fifty-three (54%) were females. Three hundred and ninety (83%) were right handed and 78(17%) were left-handed. Three hundred and fifty (75%) were right footed and 118 (25%) were left footed. Eighty-four per cent (328) of the right-handed lead with their right foot and 16% (62) lead with their left foot. Seventy-seven per cent (60) of the left-handed lead with their left foot and 23% (18) lead with their right foot.

#### Conclusion and Discussion

Foot Dominance seems important to recognise in the same way that we always ask about hand dominance. Further study obviously needs to be carried out to relate foot dominance with lower limb pathology. Are we more likely to injure or stress the dominant lower limb and is this reflected in the incidence of conditions such as fractured necks of femur, lower limb arthritis or foot disorders? We would certainly expect a correlation with the speed of rehabilitation of lower limb disorders depending on which limb is affected, and some existing evidence and the experiences of our physiotherapists support this. Further research is being undertaken to investigate this.

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## AO CANNULATED BLADE FOR TIBIOTALOCALCANEAL ARTHRODESIS

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### Introduction

To achieve tibiotalocalcaneal arthodesis, implants described range from external fixator, compression screws and anterior plate and the more recent retrograde calcaneal locked intramedullary nail. Our aim is to assess the outcome of the AO cannulated blade plate for tibiotalocalcaneal arthodesis.

### Patients and methods

Four tibiotalocalcaneal arthrodeses were performed in three patients. The operative technique involves lateral approach to the distal fibula that was osteotomised and used as bone graft. The articular cartilage of ankle and subtalar joint was removed using an osteotome and congruent surfaces achieved. AO cannulated blade plate was applied on the lateral aspect to achieve compression. The postoperative protocol included a plaster cast for three months, followed by mobilization out of plaster.

### Results and discussion

At the mean follow up of 10 months (range five to fourteen months) all patients were pain free on full weight bearing. The union was achieved at three months which was confirmed clinically and radiologically. There was no infection, wound breakdown, or loss of position at the ankle or subtalar joints. Mean preoperative American Orthopaedic Foot and Ankle Society ankle/hindfoot score was 21 and postoperative score 83. We conclude that the cannulated blade plate is an alternate technique for tibiotalocalcaneal arthodesis, with no moulding of the implant required to attain satisfactory alignment.

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## INTRA-ARTICULAR FRACTURES OF THE CALCANEUS: SHOULD WE BE OPERATING ON THEM ?

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Controversy exists regarding the management of intra-articular fractures of the calcaneus. We present medium-term outcome data on 37 consecutive patients who underwent open reduction and internal fixation for comminuted intra-articular calcaneal fractures.

Operations were performed by one surgeon, CRW, following CT assessment of the fracture. All procedures were performed using an extensile lateral approach and early physiotherapy was standard. Case notes were reviewed retrospectively between three



months and five years post-operatively. Patients were also invited to attend a follow-up clinic where outcomes were assessed using the American Orthopaedic Foot and Ankle Society Hind Foot Score and were questioned regarding on-going problems, change in shoe size and return to work.

Complete data is available for 16 patients, with additional information from other patients. Results show average AOFAS scores for type II fractures to be 59/100, type III to be 81/100 and 79/100 for type IV fractures. We have shown low rates of complications – one infection, three patients requiring a change in shoe size and an average return to work of seven months.

We have shown good medium-term outcome results for the operative management of displaced intra-articular fractures and to answer our question, we believe we should be operating on them.

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**DISTAL WEDGE OSTEOTOMY OF THE FIRST METATARSAL WITH K-WIRE  
SPLINTAGE FOR HALLUX VALGUS DEFORMITY. A RETROSPECTIVE  
REVIEW**

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The Kramer osteotomy for hallux valgus deformity was described in 1990 and has been performed by the senior author in our unit since 1999. The procedure involves a wedge excision of bone and lateral displacement of the first metatarsal head. The osteotomy is splinted by a K-wire passed medially to the phalanges and metatarsal head into the metatarsal diaphysis.

During the period October 1999 to December 2001 this procedure was performed on 26 feet in 24 patients. Case notes were reviewed retrospectively to assess the subjective outcome following the operation. Patients were invited to attend a follow up clinic to assess the outcome using the Hallux Metatarsal-Interphalangeal Scale (HMIS) of the American Orthopaedic Foot and Ankle Society and weight bearing radiographs of the foot. Twelve patients (13 feet) were seen at this follow up.

Discharge from hospital was on the day following surgery in 20/24 patients with three days maximum stay. K-wires and plaster boots were left in situ for 41 days on average (30–50 days range). From the case notes, using absence of hallux pain, deformity, hallux stiffness and footwear problems as outcome measures, 20 feet (77%) had a good outcome, five feet (19%) had a fair outcome and one foot (4%) had a poor outcome. At the follow up clinic at a mean time from operation of 134 weeks (range 56–153 weeks), the average HMIS score was 86/100 (Range 60–100) with 77% scoring 85 or more out of 100. Average postoperative intermetatarsal, hallux valgus and distal metatarsal articular angles were 6.9, 15.8 and 11 degrees respectively. Other than six cases of minor infection of skin, treated empirically with antibiotics, no other complications were seen. All patients were happy they had received this treatment.

In conclusion the Kramer osteotomy is a technically simple operation which gives good results with few complications.

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**EXTENSOR HALLUCIS LONGUS TO EXTENSOR DIGITORUM COMMUNIS TENDON TRANSFER: A TREATMENT FOR EXTENSOR HALLUCIS LONGUS DYSFUNCTION**

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An inability to extend the hallux following trauma is most often observed after direct laceration to the Extensor Hallucis Longus [EHL]. Primary repair, subsequent splinting and appropriate rehabilitation best deal with this type of injury. Damage to either the EHL muscle belly or the motor nerve to EHL are uncommon causes of the dropped hallux and present difficult reconstructive problems. Damage to the motor nerve branch to EHL in isolation is an uncommon problem and as far as we are aware surgery to address this pathology has not previously been described in the literature. This problem can occur after a penetrating injury, high tibial osteotomy or intramedullary nailing of a fractured tibia. We describe the operative procedure, technique and outcome in two cases of extensor hallucis longus to extensor digitorum communis (EDC) transfer to overcome this problem. A longitudinal skin incision is made just lateral to the tibia in the distal anterior part of the leg. The extensor retinaculum is divided and the EHL tendon identified and divided just distal to the EHL musculotendinous junction. The extensor digitorum communis (EDC) is then identified and the proximal stump of EHL woven into the EDC. A Pulvertaft weave technique is used and secured with 3/0 Ethibond suture. The appropriate amount of tension is placed on the repair by simulating weight bearing on the foot, ensuring the great toe remains in the neutral position. The extensor retinaculum is then repaired with 2/0 Vicryl and the skin closed with interrupted nylon sutures. The wound is infiltrated with 0.5% Marcaine to aid postoperative pain relief. A protected active motion rehabilitation program follows the surgery. We have used this technique in two cases, both have regained active extension of the hallux.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

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**THE FLEXOR HALLUCIS LONGUS TENDON TRANSFER FOR THE TREATMENT OF CHRONIC TENDO-ACHILLES RUPTURES**

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Although it is generally accepted that surgical treatment is the treatment of choice in

chronic TA ruptures, therapeutic options are difficult. Traditional options include grafts (natural, allografts and synthetic grafts) and end to end repair. Natural grafts described include fascia lata and plantaris tendon. Synthetic materials such as Dacrongrafts, Marlex mesh and carbon fibers have been used. There are significant complications from graft and end to end repair. These include wound necrosis, delayed union, infection, foreign body reaction and devastating tissue loss. Also functional results are suboptimal after delayed reconstruction.

Tendon transfer is another method that has been described for the treatment of these injuries. The tendons used were the flexor hallucis longus, flexor digitorum longus and the peronei. The FHL tendon transfer is considered advantageous to other tendon transfers because it is stronger, its axis of force is close to that of the TA and harvesting the tendon is easy and unlikely to cause any complications.

We report excellent results following four operations in three patients treated with flexor hallucis longus tendon transfer for chronic Achilles tendon ruptures. All patients were on long term steroid treatment and an end to end repair would have been associated with a high complication rate.

We believe that FHL transfer to replace the TA is a low morbidity alternative which gives good to excellent results in individuals with low to moderate demand.

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President – Mr Nick Geary

**HALLUX VALGUS: IS THE RADIOGRAPHIC ASSESSMENT RELIABLE?**

A.S. Aster; M.C. Forster; R.A. Rajan; K.J. Patel; and R. Asirvatham

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The five different methods of measuring hallux valgus (HVA) and intermetatarsal angles (IMA) and the diagnosis of congruency of first MTP joint were studied on 50 pre-operative standing foot radiographs, to test if these methods were reliable and the results reproducible enough to be used in a treatment algorithm for hallux valgus.

Analysis of variance (ANOVA) was used to examine the difference between the five methods and between the five observers. Kappa test was used to measure agreement in diagnosing congruency between two occasions.

The mean IMA and HVA varied significantly ( $p < 0.00001$ ). The ANOVA model showed that method and observer variations were both significant for IMA; there was no significant difference between measurement methods for HVA. Congruency had good ( $k = 0.608$ ) intraobserver and fair ( $k = 0.261$ ) interobserver reliability. A second IMA measurement will lie between  $4.2^\circ$  less and  $4.6^\circ$  more than the first IMA measurement 95% of the time. A second HVA measurement will lie between  $6^\circ$  less and  $5.6^\circ$  more than the first HVA measurement 95% of the time.

Overall, there was no advantage to any of the measurement methods, although some observers were better than others. All methods had considerable inter- and intra-observer variability that makes these measurements unreliable.

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**INTERPHALANGEAL JOINT FUSION OF THE GREAT TOE**

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A retrospective analysis was done on 20 cases of interphalangeal joint fusion of the great toe utilizing longitudinal cortical screw fixation. The purpose of this study was to present a series of interphalangeal joint fusion great toe done in both paediatric and adult patients using 3.5mm cortical screws. Most of the patients had interphalangeal joint fusion along with Jones transfer and other associated procedures with a mean follow up period of 19 months. Arthrodesis was successfully achieved in all the patients. No one had pain at the interphalangeal joint of the great toe. A literature review on interphalangeal joint arthrodesis was done and advantages of cortical screw fixation over other techniques have also been presented.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

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**PERIPHERAL NERVE BLOCKS IN FOOT & ANKLE SURGERY**

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The use of peripheral nerve blocks for postoperative pain relief following foot & ankle surgery is not widespread. We conducted a prospective study evaluating the efficacy and safety of such blocks in 30 patients who underwent foot & ankle surgery over a period of three months. Sciatic/popliteal nerve blocks were carried out for hindfoot operations and ankle blocks were used in forefoot surgery. All the ankle blocks were administered preoperatively by us while the sciatic nerve blocks were administered by the anaesthetist. Postoperative pain was assessed using visual analog scales and a record was also made of the analgesic requirements at fixed time intervals. Ninety-three percent of the patients were satisfied with their pain control and recorded a pain score of 0 – 1. Only seven percent required analgesics in the immediate postoperative period and a further 30% requested analgesia after 7 – 12 hours. Sixty-three percent had good pain relief at an average of 18 hours postoperatively and did not use any additional analgesics.

We conclude that peripheral nerve blocks are very effective in post-operative pain management and this may allow many of the commonly performed foot and ankle procedures to be done as day case surgeries.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

## A COMPARISON OF ARTHROSCOPIC AND MRI FINDINGS IN OSTEOCHONDRITIS DISSECANS OF THE TALUS

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### Introduction

Osteochondritis dissecans (OCD) is a localised disorder of subchondral bone and the overlying articular cartilage. The most commonly used classification systems involve arthroscopy and MRI.

### Aim

To investigate the correlation between arthroscopic and MR findings in patients with OCD of the talus.

### Methods

16 ankles in 14 patients with radiographically proven OCD were reviewed. Nine were male and five female. Mean age was 35yrs (range 18–64yrs). The lesions were staged independently using the Guhl1 arthroscopic and Dipaola2 MR classification systems.

### Results

Arthroscopically there were eight stable and eight unstable lesions. Of the eight stable lesions, MRI staged five as stable and three as unstable. Of the eight unstable lesions, MRI staged six as unstable and two as stable. This gives a sensitivity of diagnosing unstable lesions as 0.75, with a specificity of 0.63.

### Conclusions

This small study demonstrates that MR scans may have some limitations in classifying OCD lesions of the talus. Possible explanations are discussed. We propose that MRI findings, of OCD of the talus, should not be taken in isolation, but correlated with the patients symptoms and signs to avoid unnecessary arthroscopy.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

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### SUBJECTIVE OUTCOME ANALYSIS OF TENDOACHILLES INJURY

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The subjective functional outcome and factors affecting patient satisfaction were assessed following tendo Achilles injury which was treated either by conservative (42.4%) or surgical (57.6%) methods.

This is a retrospective study on 35 patients treated for tendo Achilles injury at

Airedale General Hospital with a mean follow up time of 2 years (range nine months to four years). A questionnaire ascertained pre and post injury leisure time activity level, occupational change and overall satisfaction with treatment. Case-notes were reviewed for mechanism of injury, time of referral to specialist, previous tendon pathologies, treatment details and complications. Fifty-two patients were contacted and 35 responded. The mean age was 52.7 years (range 33 to 90); 27.3% are involved in office work, 27.3% doing manual work, 15.2% doing job which involves standing most of their time (teacher), 27.2% were leading a retired life and remaining were house wives.

Nobody has changed their occupation. Seventy percent were very satisfied with treatment (analogue score 7–10). The remaining patients complained of pain, stiffness and weakness of ankle and they could not fully get back to their previous leisure time activities. Statistically the operative and conservative groups did not show any difference in the level of satisfaction. The age, sex, occupation and level of sports activities undertaken did not have any significant bearing on satisfaction level. Decreased post injury leisure time activities significantly affected the satisfaction score ( $p=0.003$ ). Sixty percent of subjects took less than six months to reach there pre-injury activity level. Another significant finding was that the group who presented late for treatment (range 15 days to 1.4 years) was less satisfied ( $p=0.015$ ). There was some evidence ( $p=0.034$ ) from regression analysis that physiotherapy intervention increased post injury activity and the satisfaction level. There were 2 reruptures in the conservative group but no other major complications.

To conclude, there were no differences in satisfaction following surgical or conservative management. The reduced post injury leisure time activities, delay in treatment and physiotherapy determined the final outcome.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

#### TITANIUM HEMIARTHROPLASTY FOR THE HALLUX METATARSOPHALANGEAL JOINT

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In five years 55 joints in 46 patients were treated surgically with a titanium implant for arthritic hallux meta-tarsophalangeal joints. There were 35 women and 11 men. The pathological indications were hallux rigidus (74%), rheumatoid arthritis (10%) and degenerative changes associated with hallux valgus (16%). Six cases were done as a revision of silastic to titanium prosthesis due to severe silicone synovitis.

The mean age was 60 (range 43–76) years, and the mean follow up was 56 (range 28–86) months. The mean time taken to get back to normal activities is 36 (range 21–90) days. The mean range of motion achieved was 32 degrees (range 20–64) and the relief of pain was excellent or good in 86% of the patients. There were no surgical complications in the form of infection, osteolysis or instability. The synovitis in the revision group has subsided.

The clinical results of titanium hemiarthroplasty were good. The advantages of this procedure were preservation of joint movement and good pain relief.

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President – Mr Nick Geary

#### THE POSITION OF THE TOURNIQUET FOR FOREFOOT SURGERY

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Our aim was to determine if a tourniquet placed on the ankle has any advantage in forefoot surgery over the position on the midcalf. We randomised 30 patients who were undergoing forefoot surgery under local anaesthesia into two groups. One had a tourniquet on the ankle and the other on the mid calf. All calf and ankle tourniquets were inflated to 100 mm Hg above the systolic pressure, just before the surgical procedure.

The blood pressure, pulse and level of pain were recorded at intervals of five minutes during the operation. The surgeon evaluated the quality of the anaesthesia, the bloodless field, and the site of the tourniquet.

The patients tolerated the tourniquet on the ankle much more. Both the tourniquet positions gave good operative fields, however the use of the ankle tourniquet was less painful at 5,10,20 and 30 minutes after the operation had started ( $p<0.01$ ). Physiological parameters were better in the ankle group.

We conclude that the ankle tourniquet gives a good bloodless field and provides improved pain tolerance for forefoot surgery carried out under local anaesthesia.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

#### PRELIMINARY RESULTS OF WEIL OSTEOTOMY FOR INTRACTABLE PLANTAR KERATOSIS

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We present the results of the first two years of experience with the Weil osteotomy at The Royal Oldham Hospital and endeavour to define its role in the management of intractable plantar keratosis (IPK) and complication rate.

All patients undergoing Weil osteotomy in 2000 & 2001 were included in this prospective study. A total of 21 consecutive patients, having 61 lesser metatarsal osteotomies were reviewed (95% female). The mean age was 62 years (range 12 to 86). The mean follow-up period was 17 months (range seven to 28 months). Fourteen patients (66%) had no previous foot surgery. In 11 patients (53%) only Weil

osteotomy was performed; in the other 10 patients (47%) the procedure was combined with surgery to the first ray for the correction of hallux valgus deformity.

There were no major complications. Superficial wound infections in four (19%) patients were treated successfully with antibiotics. No screws needed to be removed and no non-union / avascular necrosis were seen. Only one patient was left with residual pain and stiffness on ambulation but the rest (95%) were able to walk comfortably in either normal shoe wear or trainers.

We found that the patients consistently reported pain relief although some stiffness of the toes may remain. The majority of patients were satisfied with the outcome in terms of symptoms and function when evaluated by using the American Orthopaedic Foot and Ankle Society scoring system. Excellent results (90–100 points) were achieved in 10 patients (47%), good (80–89 points) in six patients (28%), fair (70–79 points) in four (20%) and poor (less than 70 points) in only one patient (5%). We conclude that although there is a considerable learning curve that must be overcome the Weil osteotomy can be a reliable procedure that effectively reduce the load under the lesser metatarsal heads.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**WILSON'S OSTEOTOMY 12 YEARS ON**

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This small study was a pilot for a larger ongoing study to look at the long-term results of Wilson's osteotomy.

Eight patients and thirteen feet were reviewed at a minimum of twelve years post operatively (twelve to eighteen years).

Photographs were obtained of their feet, also pedographs, and pre and post op X-rays. Clinical assessments were done and the patient outcome was quantified using the American Academy of Foot and Ankle Surgeons scoring system which includes a shoe comfort score.

The findings show that in the younger population (less than 40 years old) there were minimal symptoms (pain and stiffness), all showed callosity formation and none had a recurrence. The older group (over 40 at operation) were more symptomatic, all showed callosity formation and there was a recurrence rate of more than 40%.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**INSTABILITY OF THE TIBIO-FIBULAR SYNDESMOSIS: HAVE WE BEEN PULLING IN THE WRONG DIRECTION?**

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Syndesmotic stability in ankle fractures is usually assessed by pulling on the fibula with a bone hook in the coronal plane ("hook test"). Our clinical observations have suggested that instability may be more marked in the sagittal plane.

Our aim was to compare movement at the tibio-fibular syndesmosis in the sagittal and coronal planes after sequential ligament division in a cadaver model.

Seven specimens were used. A blinded subject was asked to perform the hook test both in the sagittal and coronal planes. Movement was assessed by measuring the displacement of parallel k-wires three consecutive times. In all specimens, the anterior tibio-fibular, interosseous and posterior tibio-fibular ligaments were sequentially divided and movement tested. In three specimens the deltoid ligament was then divided and the interosseous membrane in another three.

After division of all three syndesmosis ligaments the mean displacement was 8.8mm ( $\pm 3.9$ ) in the sagittal plane and 1.5mm ( $\pm 0.4$ ) in the coronal plane. When the deltoid ligament was then divided, the displacement increased to 11.7mm ( $\pm 2.4$ ) and 3.2mm ( $\pm 0.5$ ) respectively. When the interosseous membrane was divided the measurements were 12.7mm ( $\pm 4$ ) and 3.1mm ( $\pm 1.5$ ).

We conclude that distal tibio-fibular instability should be assessed in the sagittal plane.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

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**CALCANEOFIBULAR LIGAMENT DEFICIENCY IN CHRONIC LATERAL HINDFOOT INSTABILITY. A NEW DYNAMIC ULTRASOUND SIGN AND COMPARISON WITH CADAVERIC, CLINICAL AND SURGICAL FINDINGS.**

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The role of the subtalar joint in patients with chronic hindfoot instability remains controversial. We have made an attempt at quantifying subtalar instability clinically and comparing this with findings at dynamic ultrasound. As a result of this study we have been able to demonstrate and test for reliability a new ultrasound sign for calcaneofibular ligament (CFL) deficiency.

A preliminary dissection of four cadavers was undertaken to determine the role of the CFL in providing subtalar stability and the effect of sectioning this ligament. Fifteen patients with symptomatic hindfoot instability were examined by two orthopaedic surgeons and subsequently had dynamic ultrasound examination of their ankle and subtalar joints on both the affected and unaffected sides. Ten control ankles were also examined. It was found that in a subset of these, with positive clinical signs of subtalar instability, the CFL failed to elevate the overlying peroneal tendons and alter

their roundness on ultrasound cross section (suggesting that the CFL was deficient) whilst in normal hindfeet and those without a positive clinical test for subtalar instability the tendons were elevated in a reproducible manner. There was perfect correlation with the findings (in terms of the presence or absence of the CFL) at surgery in 5 patients undergoing lateral stabilisation procedures.

We believe this new sign is reliable and demonstrates the integrity of the CFL in patients with chronic hind-foot instability.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

#### THE LOADS IN THE RETROCALCANEAL BURSA- A DYNAMIC CADAVERIC STUDY

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Insertional Achilles tendonitis is an inflammatory disorder affecting mainly active young patients. The etiology is multifactorial and include the combination of anatomical and biomechanical characteristics. One fifth of the tendon injuries in athletes are insertional complaints which includes bursitis and insertion tendinitis. The complex of the insertion of the Achilles tendon includes three main components of fibrocartilage sesamoid, periosteum and entheses. A conservative regime is recommended as the first line of treatment. In case of failure a surgical decompression of the posterior margin of the calcaneus is indicated.

Nine cadaveric legs were used for the experiment. The leg was mounted on an MTS machine and was axially loaded 360 N. The foot was attached to a plate which enabled dorsal and plantar flexion. The Achilles was sutured twice in an Ethibond No. 5 using the Krakow technique in order to anchor the tendon to an actuator. A thin pressure sensor plate (Teckscan) was inserted into the retrocalcaneal bursa to measure the force, pressure and contact area of the Achilles to the calcaneus in various positions of the foot. The conditions included 90 degrees of the foot, 15 and 30 degrees of dorsiflexion while the tension that was applied on the Achilles was 0, 200 N and 300 N. After resection of the posterior surface of the calcaneus in a 20 degrees inclination.

The mean peak force, pressure and area did not change in Achilles tensioning while the foot was in 90 degrees and were close to zero. In 15 degrees of dorsiflexion there was increase in the mean peak force, pressure and area when the Achilles was tensed to 200 and 300 Newton. Larger increase in these parameters was achieved by further dorsiflexion of the foot to 30 degrees.

After resection of the posterior margin of the calcaneus in an angle of 20 degrees the mean peak force, pressure and area dropped close to zero and remained almost unchanged during the various conditions of the experiment.

Dorsiflexion and tension of the Achilles tendon increases the mean peak force,

pressure and area in the Achilles retrocalcaneal bursa. These data may explain the mechanism for insertional Achilles tendinosis. Resection of the posterior surface of the calcaneus in 20 degrees efficiently decompresses the retrocalcaneal bursa in various angles of the foot and in various tensions of the Achilles.

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President – Mr Nick Geary

**OPERATIVE REPAIR AND EARLY MOBILISATION OF ACHILLES TENDON RUPTURE**

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Traditionally, immobilisation following Achilles tendon rupture has been for 10 to 12 weeks.

We have previously published a series of 71 consecutive repairs with no re-ruptures, using a lateral surgical approach. The latter part of this cohort were immobilised for six weeks instead of 12, with early weight bearing. The lack of any re-ruptures encouraged us to pursue the accelerated rehabilitation.

This study documents a further 34 cases followed prospectively for 6–24 months (mean 15.9 months). All were repaired with a single Kessler-type suture using loop PDS, through a lateral approach. Patients were partial weight-bearing immediately in an Aircast boot with three cork heel wedges. At two-weekly intervals the wedges were reduced, and the boot abandoned after six weeks.

There have been no re-ruptures. Thirty of the 34 patients returned to pre-injury activity levels. All patients were satisfied or very satisfied with the immobilisation device and the accelerated rehabilitation regime. Costs savings were also made through use of a single removable orthosis rather than sequential casts.

We advocate this regimen of careful operative achilles tendon repair and accelerated weight bearing rehabilitation with a removable orthosis.

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President – Mr Nick Geary

**PROSPECTIVE STUDY OF THE ACHILLON SUTURE SYSTEM FOR MINI-OPEN REPAIR OF RUPTURED ACHILLES TENDON**

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Percutaneous repair of a ruptured Achilles tendon has been shown to reduce wound healing problems but it has a high incidence of injury to the sural nerve. The Achillon

Suture System is a new method utilising a small longitudinal incision. It passes a suture through the Achilles tendon leaving the suture purely within the tendon. The aim of this prospective study was to investigate the results of a new mini-open technique utilising a horizontal incision and early active mobilisation.

Following ethical committee approval 25 patients underwent repair of their ruptured Achilles tendon using the Achillon System. Rather than the longitudinal incision we used a horizontal incision and an accelerated rehabilitation program with a brace for six weeks post-operatively. Patients were followed up at six weeks, three and six months and one year post-op using the AOFAS and Leppilahti scoring systems.

There were no wound complications, re-ruptures or sural nerve injuries. All patients returned to work or their previous daily activities by six weeks (mean 22 days) post op. All patients had returned to driving by six weeks. One patient had 10° restriction in dorsiflexion at three months, which prevented her return to running. She was back to running and had a full range of movement at six months. All other patients returned to sporting activities at three months but jumping sports such as basketball were discouraged until six months post-op.

We suggest that this modification of using a horizontal incision and early mobilisation enhances wound healing and allows early return to normal activities and sports. It is technically simple, utilises a small incision (still enabling visual confirmation that the tendon ends have been approximated) and reduces the risk of sural nerve injury seen in other mini-open or percutaneous techniques.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

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**DELAYED RUPTURE OF THE ACHILLES TENDON: RECONSTRUCTION USING SLIDING GRAFT TECHNIQUE.**

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We wish to report a technique for the reconstruction of the late presenting Achilles tendon rupture.

A proximal intra muscular Z lengthening through a separate incision facilitates distal translation of the proximal tendon stump, allowing direct repair distally with minimum tension. Post operatively, a below knee cast is applied for six weeks, with progressive dorsiflexion at two weekly intervals. A dorsiflexion restriction splint accompanies early physiotherapy for a further six weeks, with unprotected weight bearing commencing at three months.

There were eleven patients in the study group with an average follow up of 24 months. All tendons united. There were no re-ruptures. Two distal wound breakdowns occurred and one of these healed by secondary intention. Good single stance power returned in patients with smaller separations but greater calf wasting and weakness was observed in those patients with large separations.

We conclude that this technique can be employed for the reconstruction of late presenting Achilles tendon ruptures, but great care is required with soft tissue dissection distally. Consideration could be given to deep flexor transfers in the widely separated case.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

#### VACUUM ASSISTED THERAPY TO HELP ASSIST WOUND CLOSURE IN FOOT AND ANKLE SURGERY

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#### Aims

The aims of this study were to determine if vacuum assisted closure (VAC) therapy affords quicker wound closure in diabetic and ischaemic wounds or ulcers than standard treatment, if it helps debride wounds and if it prevents the need for further surgery.

#### Materials and methods

We retrospectively reviewed 12 patients, average aged 52.1 yrs (22 to 67) at an average of 6.3 months (1 to 12 months). Seven had diabetes and three had chronic osteomyelitis. All wounds or ulcers were surgically debrided prior to application of the VAC therapy. The VAC therapy was applied according to the manufacturers instructions. The main outcome measures were the time to satisfactory healing and the change in the wound surface area.

#### Results

Satisfactory healing was achieved in six patients (50%), seven were diabetic and one patient had peripheral vascular disease. The average time to satisfactory healing was 2.5 months, (1 to 6 months). The average size of the wound /ulcer was 7.41 cm<sup>2</sup> prior to treatment and 1.58 cm<sup>2</sup> following treatment for an average 2.5 months in those in whom the wound/ulcer was still present. VAC therapy helped debride all wounds which remained sloughy following surgical debridement. In 8 patients the need for further surgery, such as soft tissue flaps or more radical surgery was avoided.

#### Conclusion

VAC therapy is a useful adjunct to the standard treatment of chronic wound /ulcers in patients with diabetes or peripheral vascular disease. Its use in foot and ankle surgery leads to a quicker wound closure and in some cases, avoids the need for further surgery. There are significant economic cost savings with its use in foot and ankle surgery.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**RESULTS OF 46 ISOLATED LISFRANC INJURIES AND THE EFFECT OF  
COMPENSATION CLAIMS**

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The aim of this study was to investigate the long-term outcome of isolated, displaced Lisfranc injuries requiring operative intervention and identify whether results of treatment are influenced by workers compensation.

This retrospective study reviewed all patients who underwent operative intervention for Lisfranc injuries. Patients with concomitant injuries were excluded from further investigation so that the outcome of purely isolated Lisfranc injuries could be assessed. The minimum follow-up was two years and the senior author performed all the operations. Patients were contacted and their employment status recorded. Ordinal regression analysis was performed to identify which factors influenced the outcome.

Forty-six patients were studied and 24 had pursued medico-legal claims. The average Workcover payment was Aus\$25,000 (£10,000). Thirteen of forty-six patients had a poor outcome. Eleven of these patients had compensation claims ( $p < 0.01$ ) and 11 had greater than a three month delay in treatment following diagnosis ( $p < 0.05$ ). Although 12/33 men and 1/13 women had a poor outcome this difference was not statistically significant. The need for secondary fusion was not associated with a poor outcome. There was no significant difference between outcome and mechanism of injury or previous occupation. There was no correlation between the outcome and age at the time of injury.

This series of 46 patients has a long follow-up of a rare injury. We believe that this study has medico-legal implications on reporting prognosis for such injuries and highlights the importance of prompt diagnosis and treatment for such injuries.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**CHARCOT NEUROARTHROPATHY IN THE FOOT: A 12-YEAR REVIEW**

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Charcot neuroarthropathy is a progressive, destructive process occurring in the presence of neuropathy. We report the outcome of neuropathic foot joints presenting to our clinic over a 12 year period.

Methods

Cases were identified from the Diabetic Foot Clinic Register, 1989–2001. We studied patient demographics, clinical presentation, distribution, treatment and outcome.

## Results

Twenty-eight episodes of arthropathy occurred in 23 patients. Age at onset ranged from 40 to 79 years. Presentation was acute in 14 and subacute in the others. Sites affected included 23 mid foot, 4 ankle and 1 MTP. Nine feet were ulcerated at presentation, eight had a history of ulcer, nine have no ulcer history. Infection complicated the Charcot process in 15. Mean HbA1c at presentation was 9.3%.

## Treatments

Total contact casting 23, 4 "scotch cast" boots and 1 Air-cast walker. Pamidronate was given to 10 patients.

## Outcomes

Three patients died. Two had below knee amputations. Casts were required for up to 12 months. Three required orthopaedic foot reconstructions. All ulcers present initially healed.

## Conclusion

Charcot arthropathy remains uncommon. In our series treatment was successful in all but two patients in terms of preserved limbs, mobility and freedom from ulceration.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

### A COMPARISON OF OUTCOME SCORES FOR THE ANKLE

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There are numerous ankle and hindfoot scores in existence, which have been devised and used to assess surgical interventions. All have in common that there has been little or no work done to demonstrate their validity, reliability or sensitivity to change.

Which score one chooses to use for the assessment of outcome will at present depend largely on personal preference.

We have undertaken a study to assess four of the most commonly used scores, those of Mazur (1978), Takakura (1990), AOFAS (1994) and Kofoed (1995) as well as a little used but well designed score, The Foot Function Index (1991).

A cohort of twenty patients who had undergone a unilateral total ankle replacement (STAR) for rheumatoid or osteoarthritis were assessed by a single observer. The time following operation ranged from six to 48 months. All completed the above scores as well as a SF36 questionnaire. Using the SF36 as a "Gold standard" the scores were

compared, both in terms of their overall results and also more specifically in terms of subsections such as pain and function.

Our results, though not to be interpreted as validation, do give some rational basis for the choice of score to use in assessing total ankle replacements.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**EARLY RESULTS OF AUTOLOGOUS CHONDROCYTE IMPLANTATION IN THE TALUS**

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Patients with osteochondral lesions of the talus have traditionally been difficult to treat. Autologous chondrocyte implantation (ACI) may provide predictable repair through restoring an articular surface. We reviewed our results of Ankle ACI in eight ACI plus two ACI and mosaicplasty combined with an average age of 40 years (32 to 62) performed over four years.

The patients were assessed with a modified Mazur ankle score, patient satisfaction score and Lysholm knee score, pre- and post-operatively. Ankle arthroscopic assessment was performed in patients at 12 months post surgery. The average time to follow up was 24 months (range two to 52). The osteochondral lesions were post traumatic in seven cases, with seven lesions situated medially and three anterolaterally. The average size of the talar defects at surgery was 2.25cm (range 1 to 4 cm.)

Patient satisfaction scores in eight patients were either "extremely pleased" or "pleased" with the operation which was sustained in the patients at up to four years follow up. The Mazur scores increased by 23 points at mean 24 months follow up. Six patients with over 12 months follow up maintained a markedly improved ankle score. Patients were noted to rehabilitate twice as quickly as patients receiving ACI to the knee.

The Lysholm knee scores returned to the preoperative level in four patients, with the remaining six patients showing a reduced score (mean 12 points), suggesting there may be some donor site morbidity. Five had ankle arthroscopy at one year and were shown to have filled defects and stable cartilage. A biopsy taken from the graft site showed hyaline like cartilage and fibrocartilage to be present. These early results suggest that ankle ACI is an appropriate treatment for large symptomatic osteochondral lesions in the talus.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**THE TREATMENT OF OSTEOARTHRITIS OF THE ANKLE BY INTRA-**



## ARTICULAR SODIUM HYALURONATE INJECTIONS

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The treatment of OA of the ankle is similar to any other large joint and includes conservative and surgical treatment. The surgical treatment is fusion or replacement but conservative treatment is limited and include mainly ankle supports and physiotherapy. Hyaluronic acid was discovered by Meyer and Palmer in 1934 and recently is widely used in the treatment of knee osteoarthritis. We evaluated the efficacy of intra-articular preparation containing Sodium Hyaluronate, in the treatment of OA of the ankle.

A group of 16 patients suffering from ankle osteoarthritis were selected for the study. The mean age was 43 years (range 31–79 years) and the duration of pain from nine months to 27 years. Twelve patients had ankle fractures and four had no trauma history. The clinical presentation included at least one or more of the following conditions of the ankle joint: pain in motion or at rest, swelling and tenderness for over than nine months. The radiographic severity of the ankle osteoarthritis was grade II, III or IV according to Kellgren and Lawrence. Intra-articular injections of 25 mg Sodium-hyaluronate (Adant) were administered on five consecutive weeks. Follow-up visits were performed one, two, three, four and seven months post treatment and included clinical evaluation and score scale.

Global assessment showed, in 13 out of 16 patients, improvement in the range of motion by 20%. Significant reduction of the OA symptoms according to the score: two to three points improvement on each scale. According to the osteoarthritis ankle score scale: up to 20 points. Improvement continued for seven months follow-up after the treatment; no decrease in the treatment efficacy has been shown. Global assessment of two patients did not show any significant improvement after the treatment. One patient dropped off the study due to other operation.

Symptomatic relief of OA of the ankle can be achieved by injection of intraarticular preparation containing Sodium Hyaluronate.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

## ARTHROSCOPIC ANKLE FUSION USING TWO MEDIAL CANNULATED SCREWS WITH DISHED WASHERS.

M.K. Lwin; N.P. Geary; A.I. Zubairy; and M.S. Hennessy

Wirral Foot & Ankle Unit, Liverpool, UK.

Numerous techniques have been described for ankle arthrodesis. Arthroscopic arthrodesis with internal fixation has evolved to reduce the complications associated with open arthrodesis. We present our technique of arthroscopic ankle fusion using two medial cannulated screws with specially designed dish washers

The tibiotalar joint is debrided arthroscopically and internal fixation is achieved with two medial cannulated screws with designed dished washers. Seven ankle arthrodeses were performed on six patients; one underwent bilateral arthrodesis.

All the patients suffered from OA (four post traumatic) and were aged between 53–61 (mean 55.4). There were four males and two females. The follow up ranged from 8–18 months (mean 10).

All the patients achieved ankle fusion. Time for fusion ranged from 6 to 18 weeks, five fused within 12 weeks. Pre operative pain scores improved from 6–10 out of 10 (mean 7.2) to 1–3 out of 10 (mean 1.4) post-operative. Post-operative AAFOS ankle hind foot score ranged from 74–89 out of 100 (mean 81.8). One patient required further operations for adjustment of fixation and one suffered a stress fracture at the level of the proximal screw.

This method of arthroscopic ankle fusion provides an effective alternative to open arthrodesis for selected patients with OA achieving good initial results.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**TIBIO-TALO-CALCANEAL (HINDFOOT) ARTHRODESIS BY  
INTRAMEDULLARY NAILING. RESULTS OF 54 CASES**

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#### Aim

To report the clinical and radiological results of patients undergoing hindfoot fusion using an intramedullary nail.

#### Methods

Retrospective review of notes and radiographs of the patients of 2 surgeons who perform combined ankle and subtalar arthrodesis using retrograde intramedullary nailing with an ACE® humeral nail. The procedure is performed mainly for the treatment of combined ankle and subtalar arthritis or complex hindfoot deformities. Outcome was assessed by a combination of notes review, clinical examination and telephone questionnaire.

#### Results

Between 1995 and 2001 54 arthrodeses in 51 patients have been performed. The average follow up is 3 years. Approach to the joints was via a vertical anterolateral incision unless previous surgery dictated otherwise. All cases utilised an ACE® humeral nail which was locked proximally and distally. Most procedures utilised bone graft from the fibula, proximal tibia, iliac crest or allograft femoral head. Mean tourniquet time was 122 mins. Intra operative complications included one fractured tibia and one fractured medial malleolus. Postoperative management generally

consisted of 3 months plaster immobilisation. Only 3 cases were immobilised significantly longer than this. Postoperative complications included deep infection, amputation, stress fracture, non-union & prominent metalwork. At review almost 78% of patients were satisfied with the results of surgery and approximately 80% felt the pain level & function of their foot had improved. Average postoperative AOFAS hindfoot score was 73.

## Conclusion

Hindfoot fusion by intramedullary nailing is an effective technique in complex cases of deformity and in many cases is the only alternative to amputation. Patient satisfaction appears to be high but the procedure is demanding and the complication rate can be significant.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

## OPEN TREATMENT OF ANTERIOR ANKLE IMPINGEMENT: MINIMUM FIVE-YEAR FOLLOW UP

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The long term outcome of open debridement for the treatment of anterior impingement in the ankle in 27 patients was assessed. Using pre-operative radiographs, patients were grouped according to both the McDermott and the van Dijk scoring systems for anterior impingement. The accuracy of these classifications in predicting outcome was assessed. Clinical outcome was evaluated using the Ogilvie-Harris scoring system, a visual analogue of patient satisfaction, time to return to full activities, and the ability to return to sports at the pre-morbid level. Follow-up radiographs were used to assess the recurrence of osteophytes. The incidence of talar osteochondral lesions at surgery was assessed.

At a mean follow-up of 7.3 years, 23 of 25 (92%) patients without joint space narrowing had a good or excellent result. Improvement in the Ogilvie-Harris score was seen in all patients. In athletes, 19 of 24 (79%) were able to return to sports at the pre-morbid level. Two patients with pre-operative joint space narrowing had poor results.

Recurrence of osteophytes was the norm and most patients did not feel their range of dorsiflexion ever returned to normal, but symptomatic relief enabled most patients to return to high level sport.

Our results for non-arthritic joints suggest that this is a safe and successful procedure.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

## PATHOANATOMY OF THE DISTAL TIBIAL PILON FRACTURE

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Tibial Pilon fractures pose a difficult management problem. For logical fracture treatment, precise understanding of the 3-D anatomy is essential.

We have studied a consecutive series of 126 pilon fractures. Digitised X-rays and CT scans were analysed using a CAD programme.

We have defined six main fragments at the articular surface, their relative frequency and their proportion: Anterior (A) present in 89%, 28% of area. Posterior (P) present in 89%, 40% of area. Medial (M) present in 74%, 29% of area. Anterolateral (AL) present in 34%, 8% of area. Posterolateral (PL) present in 21%, 9% of area. Die-punch (DP) present in 43%, 4% of area.

The primary fracture line varied in orientation from coronal (93%) to sagittal (7%), in contrast to the classic description.

Within those cases where the primary fracture line was coronal we found hitherto undescribed variations in the articular pattern, there being 'T', 'V', 'Y' and pure split fractures with respect to the medial fragment. Fractures which displace into varus show a "T" configuration, those in valgus a "Y" or "V" configuration, ( $p < 0.001$ ). Fractures with no coronal mal-alignment produce a talo-fibular joint disruption.

Once recognised these different articular patterns require individual techniques for anatomic reduction and fixation.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**PRE-OPERATIVE ASSESSMENT OF DISTAL TIBIAL PHYSEAL FRACTURES**

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## Introduction

Distal tibial physeal fractures are the commonest cause of growth arrest and deformity secondary to failure to achieve and maintain an accurate reduction. Our study compared assessment of displacement and screw placement using X-Ray alone compared to CT scans.

## Method

Sixty-two consecutive fractures over a four-year period were used. Displacement was measured on 18 Salter Harris III and IV fractures by seven surgeons separately using X-rays alone. These were compared to measurements from the CT scans. Screw placement was drawn onto outlines of single cuts of CT scans by four surgeons for all 62 fractures using X-Rays alone. This was repeated one week later using the CT

scans. Ideal screw placement was considered to perpendicularly bisect the fracture line. Differences between the ideal and observer measurements were analysed using the paired t-test.

## Results

The surgeons were incorrect in determining whether there was more or less than 2mm of displacement in 33.3 – 50% of cases (mean = 38.9% ). There was a statistically significant difference ( $p < 0.0001$ ) in accuracy of screw placement between using X-Rays and CT scans for all surgeons.

## Conclusions

We recommend that CT scans are essential for accurate pre-operative assessment of distal tibial physeal fractures.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

## THE DIRECT SURGICAL APPROACH TO THE DISTAL TIBIAL PILON FRACTURE

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Optimal treatment of articular fractures is open anatomic reduction and rigid internal fixation. In pilon fractures, this has been associated with unacceptable complication rates.

The cutaneous blood supply of the anterior aspect of the distal tibia is from short direct radial vessels which themselves arise from arteries closely adherent to the deep fascia. On the anteromedial aspect of the leg the deep fascia is fused with the periosteum. We hypothesise that shearing associated with displaced fractures divide these short radial vessels, rendering the skin critically ischaemic. Standard extensile approaches lead to further devitalisation and wound breakdown. It follows that a direct approach onto the fracture line should do minimal extra damage to the blood supply.

Of 97 pilon fractures, 53 have required an open reduction. Median age 43, 39 male. Mechanism of Injury: fall-41, RTA-10, other-two. 19% open (60% IIIB). Time to surgery nine days.

A longitudinal incision with full thickness flaps is based directly over the fracture, not necessarily following internervous planes.

Anatomic reduction was achieved in all cases. There was only one complication of wound breakdown (2%).

This technique affords a safe and reliable approach to the fractured articular surface. Lack of wound breakdown may rely on the use of fine-wire circular frame external

fixators for stabilisation of the proximal fracture. Whether this approach will allow plate fixation, remains to be seen.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**PERCUTANEOUS REMOVAL OF METALWORK AROUND ANKLE: OUR EXPERIENCE WITH FIRST 12 CASES**

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Up to 75% of patients develop metalwork related problems following ankle fracture fixation and require further open surgery to remove them. This second procedure can lead to significant morbidity. To minimise these complications, we developed a technique, for removing the metalwork percutaneously. This technique was used in 12 patients with metalwork problems related to malleolar implants. The majority of problems occurred with the distal fibular plate and the screws.

One stab incision was placed mid way between every two screws so that two screws could be removed through one incision. The plate was stripped from the distal fibula using a narrow osteotome and extracted through the distal or proximal stab wound. Lag screws were also removed through an anterolateral stab incision. When we were unable to palpate the screw head, we used a guide wire under image intensifier to locate the screw head and railroaded a cannulated screwdriver over the wire to lock into the head of the screw. Medial malleolar screws were removed in a similar fashion. The technique was undertaken as day case surgery. No complications were encountered. All patients remained symptom-free postoperatively.

We conclude that percutaneous removal of metalwork around ankle joint is a safe and effective technique, allowing the patient to quickly regain their preoperative level of activity.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**BIOMECHANICAL EVALUATION OF INTRAMEDULLARY FIXATION FOR FIRST METATARSOPHALANGEAL JOINT FIXATION**

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Aims and methods

To compare the mechanical stability of an intramedullary (IM) screw with two crossed interfragmentary compression screws for fixation of the 1st MTPJ in ten pairs of cadaveric feet. One foot underwent fixation with two crossed 4.0-mm cannulated

cancellous screws. The contralateral foot was fixed with an IM 1.6-mm Kirschner wire and an IM 6.5-mm partially threaded cancellous lag screw. A plantar-to-dorsal load was applied to the distal end of the proximal phalanx at a rate of 1 mm/sec. Failure was defined as gross actuator displacement of 5 mm. Stiffness was defined as the slope of the force versus deformation curve between 10 and 60 N. Strength was defined as the load at failure. The differences in stiffness and strength parameters between the two fixation techniques were checked for significance ( $P < 0.05$ ) with a paired t-test.

## Results

The intramedullary MTP joint fixation was significantly stiffer ( $18.7 \pm 10.1$  N/mm) than control group fixation ( $10.2 \pm 6.1$  N/mm). Similarly MTP joint fixation in the IM group was stronger ( $149.2 \pm 88.2$  N) than that of the control group ( $100.2 \pm 70.8$  N), but this was not significant ( $P = 0.07$ ).

## Conclusions

The IM technique resulted in a stronger stiffer fixation when compared with the standard crossed lag screw technique.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

## BIOMECHANICAL EVALUATION OF THE INTEROSSEOUS MEMBRANE AND THE INTEROSSOEIOUS LIGAMENT

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## Introduction

The distal part of the interosseous membrane (IM) may contribute to ankle joint stability and therefore partly explain the results of a study that reported no difference in outcome in patients with low Weber C fractures treated with or without a syndesmotic screw. The aim of the current study was to compare the strength of the IM to the interosseous ligament (IL).

## Method

Six paired cadaveric lower extremities were stripped, leaving only the IM and the IL intact. The tibia was fixed and a load was applied via a steel plate to the lateral surface of the fibula to displace it with respect to the tibia along the line of the fibers of the IM and IL. In group one the interosseous ligament was sectioned and the interosseous membrane was mechanically tested until failure. In group two, the interosseous membrane was sectioned and the interosseous ligament was tested.

## Results

The interosseous membrane was 30% stronger than the interosseous ligament ( $1040 \pm 183$  N versus  $798 \pm 322$  N, respectively; mean  $\pm$  SD).

## Conclusion

The current biomechanical study found that the IM was 30% stronger than the IL. The interosseous membrane has considerable strength and may play a role in ankle stability.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**HALLUX VALGUS SURGERY: WHAT ARE THE PATIENTS' EXPECTATIONS?**

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## Background

Various clinical outcome studies have consistently reported high dissatisfaction rate (25–33%) among the patients after hallux valgus surgery. We believe that a patient's pre-operative expectations may play a major role in post-operative satisfaction.

## Patients & Methods

Questionnaires were sent to 104 patients anonymously who were given a list of reasons and asked which they hoped to improve by having the surgery. They were also asked to list, in the order of priority, goals that they hoped to achieve from surgery.

## Results

Overall, improvement in the ability to walk was the most important reason. Most patients also wished to reduce pain over bunion and to regain the ability to wear daily shoes. However, the expectations of patients vary significantly according to age. Patients under 40 placed more importance on their ability to wear dress shoes and improvement in functional activities. Patients between the age of 40 and 60 were more interested to improve physical appearance. Pain on other toes, and the abilities to squat and climb stairs are the main concerns for patients above 60. For the male patients, to be able to continue work is the second most important reason after improvement in walking ability. This is in contrast to the female group where the ability to wear shoes of their choice is more important. Occupation did not make any significant difference.

## Conclusions

This study shows that patients have different expectations that can influence the choice of operation. We believe that understanding patients preoperative expectation is crucial in achieving better patient satisfaction, and it should be an important consideration in planning appropriate operation for the patients.



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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**PREOPERATIVE SENSORY DYSFUNCTION OF THE GREAT TOE IN HALLUX VALGUS**

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Injury to the dorsomedial cutaneous nerve has been identified as a potentially frequent occurrence after hallux valgus surgery. The existence of pre-operative pressure neuropathy is also described but remains largely unexplored. This study was performed to investigate the incidence of pre-operative sensory deficit in the hallux valgus toe, and to examine to what extent any deficit was related to the degree of joint angulation.

A cohort of 43 patients (61 hallux toes) presenting for consideration of surgical correction had their sensation tested in pre-designated sensory zones using a five-filament set of Semmes-Weinstein monofilaments. These allowed good inter-observer reliability with an ICC (intra-class correlation coefficient) of 0.84 overall.

Whilst sensory symptoms were self reported in only 21% of the feet, a measurable reduction in sensation by one monofilament grade or more was found in an additional 44% of the feet. No relationship was found between the degree of sensory loss and degree of angulation.

Patients with symptomatic hallux valgus may have sensory loss of the toe despite not being aware of the deficit. Normal subjective sensation does not reliably predict normal sensory function. Given the potentially high rates of intra-operative nerve damage in hallux surgery we recommend objective sensory testing as part of routine pre-operative assessment.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**SCARF OSTEOTOMY FOR CORRECTION OF HALLUX VALGUS: CLINICAL AND RADIOLOGICAL EVALUATION**

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**Introduction**

The scarf osteotomy is a z-osteotomy of the first metatarsal. This is a technically demanding procedure which allows early ambulation without cast and early return of function. This study was conducted to evaluate clinical results following this procedure in a district general hospital.

## Method

We prospectively collected the data from 67 feet in 53 consecutive patients followed up for six months. Four patients were lost to follow up. We collected the AOFAS score preoperatively, and at three and six months. Hallux valgus angle, first-second intermetatarsal angle and sesamoid subluxation were measured from weight bearing radiographs taken preoperatively and at six weeks and six months.

## Results

Total AOFAS score increased from 43.1 preoperatively to 85.0 at three months postoperatively ( $p < 0.0001$ , 95% CI of 44.5 to 35.5). The AOFAS scores at three and six months also showed significant difference ( $p < 0.0001$ , 95% CI of 4 to 10). All the components of AOFAS showed similar improvement postoperatively. The hallux valgus angle decreased from 30.1 to 9.9 degrees at six weeks post operatively ( $p < 0.0001$ , 95% CI of 22.21 to 18.27). The first-second intermetatarsal angle decreased from 12.6 to 6.4 at 6 weeks post operatively ( $p < 0.0001$ , 95% CI of 5.1 to 7.14). Sesamoid subluxation was reduced in the majority of cases. We had two fractures of the metatarsal head, three wound infections and six cases of transient neuropraxia of the cutaneous nerves.

## Conclusion

With Scarf osteotomy, we achieved good correction of the hallux valgus deformity and significant improvement of AOFAS score. It is a versatile and reliable procedure in the management of hallux valgus.

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**SCARF OSTEOTOMY FOR CORRECTION OF HALLUX VALGUS:  
PEDOBAROGRAPHIC EVALUATION**

S. Prasad; A. Lake; and M. Hennessy

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## Introduction

Hallux Valgus was thought to alter the forefoot function with defunctioning of the first ray with a resulting overloading of the second ray. The scarf osteotomy is a z-osteotomy of the first metatarsal and is proposed to correct anatomical and functional deformities of hallux valgus. This study was conducted to evaluate forefoot pressures using the Musgrave foot print system following this procedure in a district general hospital.

## Method

We prospectively collected the data from 43 feet in 31 consecutive patients. We evaluated the forefoot function using peak pressure, force time integral and pressure

time integral parts of pedobarographs (Musgrave) pre-operatively, three and six months postoperatively.

## Results

The mean peak pressure under the first metatarsal head was reduced from 3.09 (95% CI 2.49–3.70) to 2.25 (95% CI 1.80–2.71) at six months. The mean peak pressure under the second metatarsal head was reduced from 6.29 (95% CI 5.44–7.13) to 5.01 (95% CI 3.98–6.05) at six months. Force time integral under the first metatarsal head was reduced from 1.34 (95% CI 1.06–1.62) to 0.97 (95% CI 0.74–1.19) at six months. Force time integral under the second metatarsal head also reduced from 2.66 (95% CI 2.27–3.06) to 2.41 (95% CI 1.98–2.85). Pressure time integrals also showed similar changes.

## Conclusion

Scarf osteotomy produced decrease in the forefoot pressures under the medial part of forefoot. We have not noticed significant alteration of forefoot pressures under the lateral part of forefoot.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**SILASTIC METATARSOPHALANGEAL ARTHROPLASTY: VERY LONG TERM RESULTS OF SINGLE STEM IMPLANTS IN DEGENERATIVE JOINT DISEASE**

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Concern over long term outcomes in patients with silastic metatarsophalangeal implants prompted an assessment of such patients. We reviewed 21 single-stemmed silastic metatarsophalangeal arthroplasties in 18 patients with a mean follow-up of 18 years and 9 months. Eight operations were performed for hallux valgus, and 13 for hallux rigidus. Patients were assessed by clinical scoring, patient satisfaction, and radiographic grading. Patients treated for hallux rigidus achieved higher clinical scores than those treated for hallux valgus. This difference was statistically significant ( $p < 0.02$ ). There was no correlation between radiographic appearance and clinical score, patient satisfaction, or time since implantation. Long-term changes to the bone stock did not cause clinical detriment, and in no case was late revision surgery necessary.

There has been widespread concern regarding silicone synovitis associated with early clinical detriment, together with progressive erosive bony changes seen with these implants. In our very long term review outcomes were surprisingly good, particularly in the surgical treatment of hallux rigidus in the over fifty age group.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

## THE SCREW FIT CERAMIC MOJE TOE JOINT REPLACEMENT. THE INITIAL UK EXPERIENCE

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This implant seemed to overcome the failings of previous designs. It is a ceramic bearing screwed into a titanium screw, which bonded to bone. The bearing surface was also coated with calcium phosphate to enhance secondary stability.

An initial study examined 40 patients over three years. No patients had any loosening, screw breakages, fractures, or local osteoporosis. The patient satisfaction was good with only two dissatisfied. On the basis of this, Orthosonics introduced it to the UK in 1999. Following problems with the device we conducted a survey with Orthosonics and the MDA.

In total 160 implants were implanted by 46 surgeons. We received replies from 33 surgeons representing 119 patients. There were 93 implants with a successful outcome but 17 had failed and been revised. The commonest mode of failure was osteolysis secondary to metallic wear debris. Also six implants showed radiographic loosening with symptoms, but had not been revised. There were three that showed radiographic loosening, but were symptom free.

A failure rate of 19% at one year is unacceptable. We are of the view that products of this type should be introduced in a controlled fashion as part of a prospective trial.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

## EARLY RESULTS OF CERAMIC/CERAMIC 1ST METATARSOPHALANGEAL JOINT REPLACEMENT

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Total joint arthroplasty of the first metatarsophalangeal joint is an acceptable modality of treatment for hallux rigidus. We set out to evaluate the early outcome of ceramic/ceramic (MOJE) prosthesis, in the treatment of painful hallux rigidus.

Between March 2000 and June 2002, 13 patients (14 implants) with painful hallux rigidus were treated with ceramic/ceramic (MOJE) prosthesis. The hallux metatarsophalangeal-interphalangeal scoring scale, by the American Orthopaedic Foot and Ankle Society, was used to assess these patients, pre-operatively and at follow up. A total score of 100 is possible in a patient with no pain, full range of MTP joint movement and good alignment.

The average follow up was for 12 months. At six months, 12 patients had no pain post operatively. The average AOFAS score pre-operatively was 43.07, compared to 95.28 post-operatively ( $p=0.0001$ ). Ten of the patients subjectively described the out come of the procedure as excellent. Two patients described it as satisfactory. One patient

with significant hallux valgus pre-operatively, developed subluxation of the prosthesis at 6 months. At revision, the prosthesis was noted to be loose and a distraction arthrodesis was carried out. Pre-operatively, all patients had a combined dorsiflexion and plantarflexion range of between 30 and 74 degrees. Post operatively this was improved to greater than 75 degrees in 10 patients. Seven out of the eight female patients were able to wear fashionable foot shoes with high heels comfortably. Twelve of the patients experienced audible squeaking, which improved after six months. One patient developed a superficial infection, which was treated successfully.

The ceramic/ceramic (MOJE) total arthroplasty gave excellent results in 77% of patients. Patients were happy with the fact that they could continue wearing fashionable shoes. The early outcome is encouraging, with a statistically significant improvement in the AOFAS scoring system.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

#### DISTAL PHALANGECTOMY FOR MALLEET TOE

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#### Introduction

Mallet toe is a flexion deformity of the distal interphalangeal joint of the lesser toe. It causes pain and callosity in the toe tip and the dorsum of the distal interphalangeal joint. Campbell refers to the "terminal Syme's amputation" for this condition but the results of this have not previously been reported.

#### Material and Methods

This is a retrospective review of 35 toes in 22 patients that underwent distal phalangectomy. Sixteen patients were aged over 70. Patients were interviewed by an independent observer regarding the pain relief, cosmetic acceptability and satisfaction with the procedure and were examined for callosity, stump tenderness, sensitivity and neuroma.

#### Results

All patients were satisfied including pain relief and cosmetic acceptability at an average follow up of 4.6 years. One patient had mild wound infection. One patient had asymptomatic nail growth. No stump tenderness, sensitivity or neuroma was noted.

#### Discussion and Conclusion

Coughlin reported a satisfaction rate of 89% and 86% following successful fusion and excision arthroplasty respectively. In this series all patients were satisfied. We feel that distal phalangectomy is an option in a selected group of elderly patients where pain

relief and functional outcome is the priority.

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**British Orthopaedic Foot Surgery Society Wirral 14/15 November 2002**

President – Mr Nick Geary

**AMPUTATION OF THE SECOND TOE IN THE PRESENCE OF HALLUX VALGUS**

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Hallux valgus deformity may cause overriding of the second toe. Hallux valgus correction surgery in the elderly can be debilitating and patients may suffer a long period of morbidity. We show the outcomes of amputation of over-riding second toe caused by gross hallux valgus in the elderly. Eight patients underwent amputation of their overriding second toe, one of these patients underwent bilateral second toe amputations. All surgery was performed as a day case. Six patients had surgery under a local anaesthetic, two patients had surgery under a general anaesthetic. Patients selected had asymptomatic or minimally symptomatic hallux valgus with an overriding second toe and did not want hallux valgus correction surgery. A disease specific questionnaire using a Visual Analogue Scale (VAS) was implemented measuring pain, discomfort, deformity and walking distance. Patients were followed up for a minimum nine of months.

Eight patients (nine feet) underwent amputation of their second toe. There were seven females and one male. The age range was 63–90 years (median 83 years). All patients had a painful second toe on wearing footwear. Skin ulceration occurred on the dorsum of second toe in two patients. The mean VAS for pain, deformity, discomfort and walking distance before and after surgery are:- (before/after); pain = (7.00/0.94), deformity = (7.44/2.78), discomfort = (7.78/1.22) and walking distance = (6.89/6.44). There were no cases of post-operative infection, wound dehiscence, bleeding or deep vein thrombosis. One patient complained of a painful neuroma after one year.

Amputation of the second toe significantly reduces pain, discomfort and the appearance of deformity ( $p < 0.01$ ), there was no difference in the patient's walking distance after surgery. We recommend this type of surgery as an alternative to hallux valgus correction surgery in the elderly if the first ray is not causing significant symptoms.