

ABSTRACTS FROM BOFSS MEETING 2006

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THE CLINICAL SPECTRUM OF ADULT ACQUIRED FLATFOOT

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Previous studies of adult acquired flatfoot have reported the results of treatment. No study has described the clinical characteristics of a consecutive series.

In a ten-year period we managed 166 patients with adult acquired flatfoot. Forty were male and 126 female. The median age of the men was 56 years and of the women 60 years ($p=0.149$). Twenty-eight had bilateral problems and 78% had gastrocnemius/soleus tightness.

We used the Truro classification. There were 26 stage 1 patients, with a median age of 45 years. Eight were male and 18 female. Eight had features of enthesopathy but rheumatological investigations were negative. There were 84 stage 2 patients, with a median age of 61 years; 23 were male and 61 female. Twenty-five patients were stage 3, with a median age of 59 years; 5 were male and 20 female. 23 patients were in stage 4, with a median age of 67 years; 4 were male and 19 female. Six patients were stage 5, with a median age of 67.5 years; all were female. There were two patients in stage 6, aged 81 and 85 years, both female. The stage 1 patients were significantly younger than the others ($p<0.001$); there were no other significant differences in ages or sex ratios.

Most patients had predominantly soft-tissue problems. However, we identified 33 whose problems related mainly to osteoarthritis. These patients had a higher median age (62.5 years versus 58 years, $p=0.0138$) and stiffer deformities ($p<0.0001$).

Most patients (131, 78.9%) were managed solely with orthotics, shoe adaptations and physiotherapy. Thirty-five patients were offered surgery. Twenty-eight procedures were performed on 23 patients. Surgery was commoner in the arthritic group (15/33 offered surgery versus 20/133, $p=0.001$).

IMPLANT REMOVAL POST ANKLE FRACTURE – A BENEFICIAL PROCEDURE?

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During the period of January 1999 and August 2004 there was a policy in our institution of removal for metalwork from patients who underwent open reduction and internal fixation of an ankle fracture. We were not able to find any evidence in the literature as to whether implant removal confers long-term benefit or disability in these patients.

Between January 1999 to August 2003, all patients who underwent ankle metalwork removal were reviewed.

From our data we were unable to prove any benefit from removing metalwork from asymptomatic patients post ankle fracture. There were no significant complications, except one case of pain, which resolved at nine months.

Most patients with mechanical symptoms were improved by implant removal. The two infections resolved. In those patients with pain, about two thirds found were improved.

Following this study the practice in our institution has changed. We do not feel routine removal of metalwork is warranted unless there are specific indications; mainly mechanical symptoms, infection and pain. We are particularly keen to counsel patients from the latter category, that surgery may not resolve their symptoms.

COMPRESSION STAPLES – COMPRESSION OR DISTRACTION?

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Introduction: Compression staples are becoming increasingly popular for osteotomies and arthrodesis. Their design can be divided into “Mechanical Compression” or “Shape Memory”. However, there are no publications investigating the actual compressive forces achieved or the ideal limb-length to staple width ratio.

Methods and Materials: Compression was compared using a load cell mounted within a previously validated simulated fusion site. Two designs each of “mechanical compression” and “shape memory” staples were tested and filmed. The effect of altering limb length on compression was noted.

Results: Both designs of “mechanical compression” staple splayed open causing either no net compression or even distraction. Distractive forces of up to 23N were recorded. The “shape memory” staples all achieved compression at the fusion site of between 5 and 25N. Limb length did not appear to alter the compression force achieved. The outcome was not affected by the material used.

Discussion: “Mechanical compression” staples act in a similar manner to the AO principle of a 2-hole compression plate used without a lag screw or pre-bending. Although there is compression of the cis-cortex, the limbs of the staple splay open with a fulcrum around the bridge-limb intersection resulting in distraction of the trans-cortex. “Shape memory” staples compress both the cis- and trans-cortices along the length of the limb leading to adequate stability and compression forces across the fusion site.

Conclusion: “Mechanical compression” staples cause a distractive force rather than a compressive force and we therefore recommend that they are not relied upon for fusion and the manufacturers need to modify the product or it’s indications for use. The “shape memory” staples do provide compression and the length-to-width ratio of the staple does not appear to be important.

A CLINICAL TEST TO AVOID SURAL NERVE INJURIES IN PERCUTANEOUS ACHILLES TENDON REPAIRS

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Introduction: Percutaneous repairs of Achilles tendon ruptures has gained popularity due the reduced incidence of wound complications, however its use is still limited by the high incidence of sural nerve injuries associated with these repairs. The only technique described to avoid this adverse event is to surgically expose the nerve peri – operatively.

Materials & Methods: In our study we describe and validate a clinical technique to identify the sural nerve. The technique describes flexing the knee to 90, and supinating the forefoot and inverted the hindfoot. The sural nerve is at its greatest tension in this position and thus the nerve can be palpated along its path. The sural nerve was mapped using this technique both clinically and by US in a cohort of male subjects with intact Achilles tendons.

Results: We demonstrated an excellent correlation between the clinical and US mapping. It also showed excellent inter – observer and intra – observer mapping rates.

Discussion: Sural nerve injuries occur in up to 18% of percutaneous repairs due to the close proximity of the nerve to the tendon along its lateral border. The resultant pain or parasthesia experienced by the patient from sural nerve injuries results in a profound morbidity. This morbidity has lead to the reduced popularity of this procedure. The clinical mapping is a simple easy test, which identifies the nerve along its path and thus the nerve can be avoided during the procedure.

Conclusion: This study demonstrates an accurate and repeatable clinical technique for mapping the sural nerve in conjunction with percutaneous Achilles tendon repairs.

THE ACHILLON ACHILLES TENDON REPAIR - IS IT STRONG ENOUGH?

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Introduction: Open Repair of the Achilles tendon is associated with problems of wound breakdown and infection. Percutaneous methods have been associated with sural nerve injury. The Achillon system avoids these problems. However no studies have assessed the strength of this repair and whether it allows early active rehabilitation.

Materials/Methods: Simulated Achilles tendon ruptures in sheep Achilles tendons were repaired using either the Achillon method or a two strand Kessler technique with a No.2 Ticron Suture. The tendon diameter was measured in all cases, and was matched for both groups (mean 9mm, range 8-10mm). Specimens were loaded to failure using an Instron tensile testing machine.

Results: Mean load to failure for the Achillon method was 153.13N 59.64 (range 65-270), and the mean load to failure for the Kessler Repair was 123.13N 24.19 (range 75-150). This difference was not statistically significant $p=0.209$. A Pearson's correlation coefficient was carried out for each group to see if mean load to failure was related to tendon diameter. There were statistically significant higher mean loads to failure for wider tendon repaired by the Achillon method $p=0.047$, however this was not the case with Kessler repairs $p=0.231$.

Discussion: The Achillon repair had a similar load to failure as the 2 strand Kessler repair. These results support the use of early active rehabilitation following the Achillon repair and we could not demonstrate stretching at the repair site. As this method is minimally invasive and does not grasp the tendon it may also have less effect on disruption of tendon blood supply and allow faster healing.

Conclusion: The Achillon repair has comparable tensile strength to Kessler Repair, and is a biomechanically sound method of repair of the acutely rupture Achilles tendon in suitable patients.

CORRELATION OF MRI WITH ARTHROSCOPY IN DIAGNOSING ANKLE PATHOLOGY:

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Introduction: Ankle sprain is one of the common presentations in Accident and Emergency. Accurate diagnosis is critical and sometime difficult without special investigation such as Magnetic Resonance Imaging (MRI) or arthroscopy.

Aim: The purpose of this project was to evaluate magnetic resonance imaging (MRI) accuracy for diagnosing and defining ankle pathology.

Method: Retrospective review of 36 patients who underwent both MRI and Arthroscopy. All cases were seen by single orthopaedic surgeon with special interest in foot and ankle surgery. MRI scan were reviewed by consultant radiologist at our institute. Arthroscopy was used as a standard for comparing MRI results. Sensitivity and Specificity was calculated by qualified statistician.

Results: For osteochondral lesion the Sensitivity of 85.7 %, Specificity of 93.3% and Accuracy of 89.7% was noticed. Anterior and posterior tibiofibular ligament (ATFL and PTFL) pathology had a Sensitivity of 100 %, Specificity of 100% and Accuracy of 100%, while anterior inferior tibiofibular ligament pathology had a Sensitivity of 66.6 %, Specificity of 95% and Accuracy of 86.6%.

Conclusion: Although MRI is a useful tool in exclusion of pathological condition its sensitivity and accuracy in diagnosing ligament injury is not encouraging.

PHENOTYPIC DRIFT IN HUMAN TENOCYTE CULTURE

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Introduction: Tendon ruptures are increasingly common, repair can be difficult and healing poorly understood. Tissue engineering approaches often require expansion of cell numbers to populate a construct, and maintenance of cell phenotype is essential for tissue regeneration.

Methods: In this study we characterise the phenotype of human Achilles tenocytes and assess how this is affected by passaging. Tenocytes, isolated from tendon samples from 6 patients receiving surgery for rupture of the Achilles tendon, were passaged 8 times. Proliferation rates and cell morphology were recorded at passages 1, 4 and 8. Total collagen, the ratio of collagen types I and III and decorin were used as indicators of matrix formation, and expression of the integrin 'alpha'1 subunit as a marker of cell-matrix interactions.

Results: With increasing passage number, cells became more rounded, were more widely spaced at confluence and confluent cell density declined from 18700 /cm² to 16100 /cm² (P=0.009). No change to total cell layer collagen was observed but the ratio of type III to type I collagen increased from 0.60 at passage 1 to 0.89 at passage 8 (P<0.001). Decorin expression significantly decreased with passage number, from 22.9 ± 3.1 ng/ng DNA at passage 1, to 9.1 ± 1.8 ng/ngDNA at passage 8 (P<0.001). Integrin expression did not change.

Conclusion: We conclude that the phenotype of tenocytes in culture rapidly drifts with progressive passage.

MECHANICAL PROPERTIES OF HUMAN FLEXOR HALLUCIS LONGUS, PERONEUS BREVIS AND TENDO ACHILLES TENDONS

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Introduction: Repair of chronic Achilles tendon rupture is technically complex. Flexor Hallucis Longus (FHL) and Peroneus Brevis (PB) Tendon transfers have been described, but the mechanical properties of these tissues have not been well reported.

Methods: The FHL, PB and tendo Achilles (TA) tendons were harvested from 17 fresh frozen human cadavers free of gross pathology (mean age 69 years). Samples were tested in uniaxial tension at 100% per minute. Samples were secured using special jigs for the bony aspect or by freezing the tendons in cryogrips using liquid carbon dioxide. The peak load (N), linear stiffness (N/mm) and energy to peak load (N*mm) were determined. Mechanical data was analysed using one way analysis of variance (ANOVA) followed by a Games Howell multiple comparison post-hoc test.

Results: 51 tendons were harvested. Mechanical testing was successfully completed in all samples apart from one PB that slipped from the grips during testing (sample was omitted from the analysis). The mean ultimate loads differed for each group, with the TA tendons being the strongest (1724.5 N \pm 514.3) followed by FHL (511.0 N \pm 164.3) and PB (333.1 N \pm 137.2) (P<0.05). Similar results were found with respect to energy, with TA tendons absorbing the most energy followed by FHL and PB (P<0.05). Stiffness for the TA tendons (175.5 N/mm \pm 94.8) was greater than FHL (43.3 N/mm \pm 14.1) and PB (43.6 N/mm \pm 18.9), which did not differ from each other.

Conclusions: FHL is stronger than PB, but have similar stiffness. The mechanical properties of PB and FHL were both inferior to TA. Graft stiffness appears to be an important variable rather than ultimate load based on the clinical success of both techniques.

"WHICH SCREW FOR WHICH BONE?" - A COMPARISON OF MAXIMUM COMPRESSION FORCE OF CANCELLOUS SCREWS IN DIFFERENT BONE DENSITY MODELS

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Purpose: The purpose of the study was to compare the maximum compression force of three different 6.5 mm cancellous screws commonly used in hindfoot fusions.

Materials and methods: Screw 1 was a solid core standard fragment partially threaded cancellous screw (Smith and Nephew).

Screw 2 was a titanium cannulated screw with a medium thread pitch (Asnis III, Stryker).

Screw 3 was also a titanium cannulated screw with a large core diameter but with a small thread pitch (Ace, DePuy).

Four different densities of polyurethane foams were used simulating cancellous bone and the compression force was measured using pressure transducers.

Results: Screw 3 had the highest compression force in tests with the low density foams ($p < 0.05$) and screw 1 performed better in higher density foams ($p < 0.05$). In medium density foams, both screws 1 and 3 showed significantly more compression than screw 2 ($p < 0.05$).

Clinical relevance: The results indicate that the 6.5 mm standard fragment non-cannulated cancellous screw may provide more compression in a normal density bone whereas in an osteoporotic bone a cannulated titanium screw may be preferred for producing better compression during arthrodesis.

PERCUTANEOUS CIRCUMFERENTIAL DECOMPRESSION OF ACHILLES TENDINOPATHY

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Introduction: Achilles tendinopathy is a source of significant pain and disability. While many patients respond to non-operative treatment, a proportion will require operative treatment. Both open decompression and percutaneous longitudinal tenotomy have been described. We describe a new technique and present the results of percutaneous circumferential decompression of the tendon, dividing adhesions between the paratenon and the tendon.

Methods: We followed up 10 patients for a mean of 10 months (5 –19) post operatively. They were scored pre and post operatively using the tegner activity score, the puudu score and an analogue pain score. The functional result was also assessed with the SF12 questionnaire.

Results: All patients reported significant improvements in pain ($p=0.007$), tegner ($p=0.007$) and puudu ($p=0.005$) scores. They would all undergo the procedure again. The SF12 scores were not significantly different from a normal population.

Discussion: We believe that this technique addresses the underlying pathology, giving excellent results without the potential complications of an open decompression.

PLANTAR FIBROMATOSIS – A BENIGN CONDITION

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Plantar fibromatosis is a relatively rare disease compared to its counterpart in the hand. Though it is considered to be a part of Dupuytren's diathesis it has been less exhaustively studied to enable evidence based management strategies.

We followed up all patients presenting with plantar fibromatosis to our institute between 1980 and 2006, identifying 41 patients. 6 patients were lost to followup. Thirty-five patients with 60 involved feet were included in the study. There were 22 males and 13 females, all white Caucasians. The median age at presentation was 45 (19-63 years), and the median follow up was 10 years (2-25 years)

Twenty-one of our patients had palmar Dupuytren's disease, six had knuckle pads, four had Peyronie's disease, four had other superficial fibromatoses and two keloids. Six were diabetic, four had epilepsy of whom two took valproate and one phenobarbitone. Eight patients had a family history of fibromatoses.

The most common presentation was a painful lump (20); 13 patients had a painless lump (13) and two had only pain. All patients reported a proliferative phase of enlarging nodule size, often with pain, which lasted 1-4 years (median 2 years). Thereafter most patients reported improvement in symptoms (size of lump and pain) as well as function. As we came to recognise this, we treated most patients with symptomatic measures and observation only. At review, 17 patients considered their symptoms were improving, 14 were stable and only four had noticed deterioration. Seven patients, mostly early in the series, were treated by wide excision; six had recurrence at review although only one was symptomatic.

Plantar fibromatosis is a benign condition which stabilises and may improve after an initial proliferative phase lasting about two years. Most patients require no intervention.

OPTIMAL CLOSURE OF SURGICAL WOUNDS IN FOOT & ANKLE SURGERY

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Background: A subcuticular suture is an ideal closure method of a surgical wound, in patients undergoing foot & ankle surgery, when the aim is healing by primary intention. However, the addition of adhesive strips over the subcuticular suture has become an accepted method of closure despite being based on anecdotal, rather than experimental evidence.

Methods: We performed a prospective study to compare the postoperative wound complications of combination closure (3/0 Monocryl & steri strips) with subcuticular closure alone (3/0 Monocryl). Patients undergoing foot & ankle surgery were allocated to either group on an alternate basis. The wounds of sixty consecutive patients were assessed clinically for wound complications at one-week post op.

Results: Patients who had a combined closure were more likely to develop a wound discharge (23% vs 7%), friable skin (53% vs 3%) and were more likely to have non-opposed wound edges (60% vs 23%). They were also twice as likely to return to clinic for a further wound check (20% vs 10%).

Discussion: Adhesive strips were originally developed as wound dressings and offer no improvement in the tensile strength of the subcuticular closure. Instead their addition exposes the surgical wound to the possibility of epidermal injury from the adhesive in the tape and increases the likelihood of developing wound complications. We recommend meticulous closure of surgical wounds of the foot and ankle with continuous, absorbable, subcuticular suture without adhesive strips, for an optimal outcome

THE C677T POLYMORPHISM IN THE METHYLENETETRAHYDROFOLATE REDUCTASE GENE (MTHFR), MATERNAL USE OF FOLIC ACID SUPPLEMENTS AND RISK OF ISOLATED CLUBFOOT: A CASE-PARENT TRIAD ANALYSIS

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Introduction: Between 1 and 4 per 1000 births worldwide are affected by clubfoot. Clubfoot etiology is unclear, but both genetic and environmental factors are thought to be involved. Low folate status in pregnant women has been implicated in several congenital malformations and folate metabolism may be affected by polymorphisms in the MTHFR gene.

Methods: Using a case-parent triad design, we investigated whether the MTHFR C677T polymorphism, and maternal peri-conceptual folic acid supplement use, influenced risk of isolated clubfoot. 375 case-parent triads took part.

Results: Among children there was a significant trend of decreasing clubfoot risk with increasing number of Talleles: relative risk (RR) CT vs CC=0.75 (95% CI: 0.57,0.97); RR TT vs CC=0.57 (95% CI: 0.37,0.91); p trend=0.006. This association was not modified by maternal folic acid use.

Conclusion: Maternal MTHFR genotype did not influence risk of clubfoot in the offspring overall, although a possible interaction with folic acid use was found. This is the first report of a specific genetic polymorphism associated with clubfoot. The direction of the association is intriguing and suggests DNA synthesis may be relevant in clubfoot development. However, clubfoot mechanisms are poorly understood and the folate metabolism pathway is complex. Further research is needed to elucidate these relationships.

CONTROLLED, DIFFERENTIAL, DISTRACTION IN RESISTANT, RELAPSED & NEGLECTED CLUBFEET

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Background: In developing countries, many patients are seen with neglected, residual or recurrent CTEV. Treatment of resistant & neglected CTEV has been a subject of much controversy as the pathoanatomy becomes complex & the true cause of disability becomes difficult to ascertain at times. We treated such patients by controlled, differential, distraction using Joshi's external stabilisation system (JESS).

Aim of study : To explore the role & long term results (minimum follow up 3 years) of controlled, differential, distraction using JESS in relapsed & neglected clubfeet.

Methods: 82 patients with 24 bilateral cases (106 feet) treated by JESS at the department of Orthopaedics, KGMU, India from 1992 onwards; followed up for a minimum of 3 years post surgery (average follow up 6.5 years). Patients with non-idiopathic club foot were not included in this study. Outcome evaluation was done by clinical, podographic (footprint), radiological & functional outcomes using Hospital for Joint diseases Orthopaedic Institute functional rating system for clubfoot surgery.

Results: Excellent results were obtained in 63%, good in 30% & poor in 7% of the cases. 21% had a partial relapse with only 5% requiring further surgery for deformity correction. 11% of cases needed further surgery in the form of flexor tenotomies, subtalar & midfoot fusion for persistent pain

Conclusion: Controlled, differential, fractional distraction with JESS is a safe & effective procedure for neglected, resistant & relapsed CTEV. It is effective even in patients after skeletal maturity in correcting the deformity. The procedure is less invasive and the results are good irrespective of the severity of the deformity or age of the patient.

A PROSPECTIVE CLINICAL AND RADIOLOGICAL REVIEW OF 137 AES TOTAL ANKLE REPLACEMENTS OVER A 4-YEAR PERIOD IN A SINGLE CENTRE

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Introduction: We report the clinical and radiological results of 137 AES Total Ankle Replacements (TAR)(Biomet, Europe) over a 4-year period.

Methods: 134 patients underwent 137 Total Ankle Replacements. There were 47 females and 87 males. Three patients underwent bilateral procedures. The mean age of the patients was 64 years (48-78). The main indication for surgery was post-traumatic arthritis other indications included primary arthritis, inflammatory arthritis, haemophilia, haemochromatosis, polio, cavo-varus deformity and revision of a loose STAR. The pre-op coronal deformity ranged from 20 degrees varus to 40 degrees valgus. The same surgeon performed all operations. All patients had a clinical and radiological follow-up at 3, 6 and 12 months then annually, thereafter.

Results: At a mean time to follow up of 18 months the mean AOFAS Hindfoot Score was 79. Excluding those patients with other joint disorders the stratified AOFAS score increases to 81. Four patients experienced post-operative talar subsidence and 8 patients had gaps or lysis around the tibial bone implant interface. Three patients developed soft tissue complications, two of which had to have a split skin graft and one of these developed a deep infection. The third patient required a fascio cutaneous local flap. Thirteen patients required a further procedure for postoperative edge loading. No implant has been revised to date. Two patients feel no better off since surgery and one patient feels worse off. The remainder rate their surgery as good or excellent.

Discussion: The early results of the AES TAR are encouraging. Careful management of the soft tissues and correct soft tissue balancing are important. In our series we have modified the surgical technique so less talar bone is resected.

Conclusion: We feel the AES TAR provides encouraging early results.

EVALUATION OF THE ANKLE SYNDESMOSIS WITH COMPUTERISED TOMOGRAPHY

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Introduction: Ankle syndesmotic injury is currently assessed by radiographic criteria defined by Pettrone. These indices are based on the assumption that the ankle is in the correct rotation when the radiographs are taken. This study shows that computerized tomographic (CT) scans of an ankle in its mortise orientation demonstrate a greater range of values for the tibio-fibular overlap (TFO), and the tibial clear space (TCS) than that proposed by Pettrone. This study also demonstrates how rotation of the ankle in the transverse axis changes the values for the TFO and TCS.

Materials and Method: 20 uninjured ankle CT scans were studied to evaluate the syndesmosis. The images were orientated so that measurements were taken 1cm above the tibial plafond with the ankle in a mortise orientation. Each image was rotated 5° from 15° external rotation to 20° internal rotation. Bony landmarks were confirmed prior to taking measurements. These were taken by 2 orthopaedic surgeons on 2 separate occasions.

Results: The range for the TFO is 0 – 11.6mm; the range for the TCS is 2-6.1mm. The range for the values is greater than that proposed by previous studies. The TFO and TCS change with rotation of the leg.

Conclusion: On the AP radiograph syndesmotic disruption is indicated by a TCS >5mm, a TFO <10mm and on the mortise view a TFO <1mm. A normal ankle should therefore have a TCS less than 5mm and TFO greater than 10mm on the AP and greater than 1mm on the mortise view.

There is a greater normal range of syndesmotic width found on CT scans than suggested by previous studies. Values change with rotation of the leg in its transverse plane. Syndesmotic injury cannot be reliably diagnosed using the current radiological criteria.

INCORRECTLY FITTING FOOTWEAR AND ASSOCIATED FOOT PROBLEMS

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The contribution of incorrectly fitting footwear to the development of foot pain and deformity has been cited as an etiologic factor but is something that has not been fully evaluated. We examined the relationship between footwear characteristics and the prevalence of common forefoot problems in patients attending foot clinic.

Methods:

Prospective study measuring shoe size (width & Length) and foot measurements in 50 patients attending foot clinic with foot problems. Comparison made with 50 random people with no foot complaints. Deformities, medical histories and pain scores were documented.

Results

Clinic patients: Mean age 49 range(19-68). 12 male 38 female. 21 out of 50 wearing shoes half a shoe size too small, 7 patients wearing shoes half a shoe size larger. 32 patients wearing shoes narrower than feet mean 6mm (range 2 - 9mm.) Deformities: 27 hallux valgus, 3 bunions, 6 hammertoes, 5 callosities. Mean pain VAS 5 range (3- 10). 11 patients were diabetic, 6 had peripheral vascular disease. Random patients: Mean age 41 range(19-65). 19 male 31 female. 7 out of 50 wearing shoes half a size smaller, 13 wearing shoes half a size larger, 15 wearing shoes narrower than feet mean 4 mm (range 2-7mm). Deformities: 6 hallux valgus, 3 hammer toes, 8 callosities. Mean pain VAS 1 (1-3). 8 people were diabetic.

Conclusion

A large proportion of patients attending foot clinic wore ill-fitting shoes. Women wore shoes that were shorter and narrower compared to their feet than men. Wearing shoes smaller and narrower than the feet was associated with hammer toes, hallux valgus deformity and foot pain. Incorrectly fitting footwear may be a significant contributing factor associated with forefoot pathology and foot pain. These findings highlight the need for footwear assessment in the management of foot problems.

RETAINED CONTINUOUS INFUSION POPLITEAL CATHETER FOR HINDFOOT SURGERY

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Introduction: Adequate analgesia following hindfoot surgery can be difficult and conventional analgesics have significant side effects. A single bolus popliteal block of the neurovascular bundles is effective but short-lived. We have been using a retained perineural catheter with continuous local anaesthetic infusion for pain relief post-operatively.

Materials and Methods: This 2 cohort observational study compares pain relief following single bolus dose popliteal block and retained continuous infusion perineural catheter. With the patient supine in the anaesthetic room a nerve stimulator identified the tibial and peroneal branches of the sciatic nerve which were blocked with 20mls 0.5% marcaine. In 31 patients a perineural catheter was left in situ and connected to a Stryker "Pain Pump" infusing 0.25% bupivacaine at a rate of 4 ml/hour with 1 ml/hour patient controlled boluses. Following discharge the catheter was removed by the district nurse at 72 hours post-operatively.

Results: Patients were asked to fill in Visual Analogue Scores for 72 hours post operatively. The mean pain score for the single block group was 4.9 (range 0-9). The mean pain score for the popliteal catheter group was 1.03 (range 0-5). One patient had an air-lock in the infusion tubing leading to pain once the initial block wore-off. One patient experienced a patch of numbness in the lower leg which resolved by the 2 week follow-up. There were no other complications, such as infection, from placement of the retained catheter. All patients were satisfied with their post-operative pain control.

Conclusion: We recommend this novel technique as an effective method of pain relief after ankle and hindfoot surgery. To confirm our findings we are running a randomised, double blinded, placebo controlled trial to study this method of pain relief.

HALLUX RIGIDUS: MAL-ALIGNMENT OF THE CENTRE OF ROTATION OF THE 1ST METATARSOPHALANGEAL JOINT OR INTRINSIC PLANTAR MUSCLE TIGHTNESS? A BIOMECHANICAL STUDY

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Introduction: The foot is a very complex structure acting as the platform for all gait patterns. At present, little is known about the exact biomechanics of the foot due to the difficulties in modeling all of the components of the foot accurately. This has made it virtually impossible to develop a complete understanding of the aetiology of many diseases of the foot including hallux rigidus. We hypothesize that sagittal plane incongruity of the rotation of the 1st Metatarsophalangeal Joint (MTPJ), or an increase in the tension of the intrinsic plantar flexors is responsible for the development of hallux rigidus.

Materials & Methods: Ground reaction forces and kinematic data from gait analysis together with anthropometric data from MRI scans of a 24 y.o. female were used to create a Mimics model of the articulation of a normal 1st MTPJ during a gait cycle. The centre of rotation was calculated by triangulating the articular surfaces. Finite element analysis was performed on the model and on similar models with the hypothesized; (a) joint incongruity, (b) an increased tension in the Flexor Hallicis Brevis and (c) an increased tension in the plantar fascia.

Results: The results demonstrated a significant increase in the peak stresses, contact areas and stress distributions between the incongruent models compared to the congruent models.

Discussion: To the best of our knowledge this is the most accurate FE model of the 1st MTPJ calculated. Hallux Rigidus is a very common forefoot disorder, with multiple etiologies and treatments advocated. This model demonstrates that an increased tension in the plantar flexors results in a reduced ROM with increased contact stresses on the joint surface.

Conclusion: While it is known Hallux Rigidus has a multi-factorial etiology, the authors feel the above study demonstrates an important inherent etiology.

OUTCOME OF DISPLACED INTRA-ARTICULAR CALCANEAL FRACTURES AT A MEAN OF 15 YEARS: FOLLOW-UP OF A RANDOMISED CONTROLLED TRIAL

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Aim: The purpose of this study was to report the long-term follow-up (mean of 15 years) of patients with displaced intra-articular calcaneal fractures from a randomised controlled trial published in 1993.

Patients and Methods: 46 patients (82% of patients in the initial study group) were alive at a mean of 15 years post injury. The patients had been randomly allocated to either conservative or operative (Soeur and Remy technique) treatment in the original study. Clinical (AOFAS, FFI and calcaneal fracture score) and radiological (Böhler's angle and calcaneum height) outcome measures were used. The grade of osteoarthritis was also assessed at long-term follow-up.

Results: 26 patients (57%) were reviewed and these patients served as the focus of the study (11 conservative and 15 operative). The clinical outcomes after conservative treatment were not found to be different from those after operative treatment, scores of the AOFAS were 78.5 and 70 respectively ($p = 0.11$); scores of the FFI were 24.4 and 26.9 respectively ($p = 0.66$) and calcaneal fracture scores were 70.1 and 63.5 respectively ($p = 0.41$). The radiological outcomes after conservative treatment were not found to be different from those after operative treatment, Böhler's angles were 10° and 16° respectively ($p = 0.07$) and the height of the calcaneum were 37mm and 36mm respectively ($p = 0.57$). There was no difference in the grade of osteoarthritis between the groups.

Conclusion: The functional and radiological long-term outcomes after conservative treatment of displaced intra-articular calcaneal fractures were equivalent to those after operative treatment. The operative technique showed no benefit compared to conservative treatment at long-term follow-up. There was a trend for higher scores on clinical outcomes with conservative treatment

COBB II PROCEDURE – INTERPOSITION ARTHROPLASTY OF THE METATARSO-PHALANGEAL JOINT

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A dorsal incision is made over the metatarso-phalangeal joint (MTPJ) extending 2cm proximally and distally from the joint line. A routine cheilectomy of the MTPJ is performed. The Extensor digitorum longus (EDL) tendon is identified and divided through a separate incision 5 cm proximal to the MTPJ at the mid-foot level. A 3/0 vicryl stay suture is placed in the divided tendon. The tendon is retrieved from the distal wound and mobilised along with the extensor expansion and the dorsal capsule to expose the proximal half of the proximal phalanx. The transverse fibres of the extensor expansion and the MTPJ capsule are divided medially and laterally with preservation of the collateral ligaments. Extensor digitorum brevis is identified and protected. A groove is created on the dorsum of the proximal phalanx at the centre of the articular surface to stabilise the EDL tendon in its final position. A 3.2mm tunnel is then created at a 45 degree angle through the metatarsal neck beginning dorsally 2.5cm from the metatarsal articular surface and exiting just proximal to the plantar plate. The mobilised EDL tendon, expansion and capsule are then passed down through the MTPJ via a perforation in the plantar plate. The EDL tendon is then passed through the tunnel from plantar to dorsal where it is sutured to the periosteum of the metatarsal using a 3/0 vicryl suture. Hence the EDL tendon, expansion and dorsal capsule form an interposition arthroplasty.

Eleven patients with an average age of 37 years underwent the above procedure for Freiberg's Disease or osteoarthritis of the second or third MTPJ. There were no intra-operative complications and at an average 31 month follow up 70% were pain free. We recommend the Cobb II procedure as a primary management option for MTPJ Freiberg's Disease/osteoarthritis.

OUTCOME OF MOJE'S HALLUX ARTHROPLASTY (FUNCTIONAL AND RADIOLOGICAL OUTCOME)

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We retrospectively reviewed 27 patients who underwent an uncemented total Moje ceramic arthroplasty of hallux rigidus.

Out of 33 patients who had the above procedure, 27 were available for review. Clinical and functional outcome were assessed using the American orthopaedic foot and ankle society (AOFAS) fore-foot score, and the SF-36 health assessment score. All patients had an antero-posterior and a lateral weight bearing radiograph

The primary pathology was oesteo-arthritis (Hallux Rigidus). All procedures were performed by the senior author or under his supervision.

All patients were female with an average age at surgery of 52.6 years (range 45.8-64.7). The average follow up was 39.5 months (range 14-46).

The average post-operative AOFAS forefoot score was 80/100 (range 40-100). The average subscore for pain was 29.39/40 (range 10-40). Twenty five patients 92.5% were satisfied with the outcome, and 22 (81%) were able to wear high heel foot wear.

The functional outcome as assessed using the SF-36 health score was compatible with an age matched population.

The alignments of component were measured in relation to the shaft of the metatarsal and to the proximal phalange. There was no statistical correlation between the alignment and the functional scores.

Although, arthrodesis remains the gold standard procedure, total ceramic first MTP joint arthroplasty has a place in the management of some cases of advanced but not end stage hallux rigidus. Careful patient selection is essential to achieve a favourite outcome.

A RANDOMISED CONTROLLED STUDY LOOKING AT THE USE OF S-MART AND PNEUMATIC TOURNIQUET IN FOOT SURGERY

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Introduction: There are no guidelines for the use of any particular tourniquet in foot surgery. We undertook this prospective randomised study to assess the efficacy of the S-MARTTM tourniquet in foot surgery as compared to the pneumatic tourniquet. A literature review confirms this is the first randomised controlled study objectively measuring the outcomes of this tourniquet system.

Material and Methods: We included 40 consecutive patients who had foot surgery from May 2006 to August 2006. Informed consent with local medical ethics committee approval was obtained. We excluded patients with history of diabetes mellitus, deep vein thrombosis, fractures, limb circumference more than 40 centimetres and smokers. The ease of application of tourniquet, intraoperative bloodless field and ease of removal was scored on a scale of 1-10. Patients were followed up at 2 weeks.

Results: 20 patients were randomised into group one with pneumatic tourniquet (average age 63.36) and 20 patients in group two with S-MARTTM tourniquet (average age 61.25). The average tourniquet placement time in-group one was 144.36 seconds as compared to 12 seconds in-group two. The mean ease of application scores was 4.27 in-group one as compared to 1.46 in-group two. Total tourniquet time was more in-group one. Intraoperative haemostasis was rated higher in-group two.

Discussion: SMARTTM tourniquet provides a good intraoperative haemostasis and is easy to apply. This tourniquet helps to exsanguinate; this frees up theatre personnel, saves resources and decreases tourniquet time for surgery.

The limitation is it cannot be reinflated and cannot be used in patients with fractures.

Conclusion: S-MART tourniquet is a good for foot surgery, provides a good operative field, is easy to apply and saves precious theatre time and resources.

THE DIFFERENCE BETWEEN THE FUNCTIONAL AND MAXIMUM MOVEMENT OF THE FIRST METATARSOPHALANGEAL JOINT

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Aim: One of the issues of metatarsophalangeal joint (MTPJ) replacements is that they do not restore full range of movement (ROM). However, full ROM is not needed for functional walking. The aim of this study was to measure the difference between the functional and maximum ROM of the first metatarsophalangeal joint.

Materials & Method: The functional and maximum ROM of 32 MTPJs in 16 normal adults were measured with a video imaging system. The system first measured the ROM as the subject walked past the camera. It then measured the ROM as standing maximum extension tests were performed.

Results: During functional walking tests the mean ROM was 37.9 degrees (SD 12.2). During maximum standing extension tests the mean ROM was 64.9 degrees (SD 11.3). Therefore the functional walking ROM was only 58% of the maximum standing extension ROM, with a mean difference of 27 degrees. A paired t-test comparison showed $P < 0.0001$.

Discussion: MTPJ arthroplasty has previously been criticised because it does not restore full ROM. However, the results of this study suggest that the functional movements required in normal gait are significantly less than what can be maximally achieved in clinical standing extension tests. Therefore arthroplasty can be a suitable treatment if it can provide an adequate functional ROM.

Conclusion: The results of this study show that the functional range of movement required for walking is only 58% of the maximum extension ROM of the first MTP joint. Therefore, MTP joint replacements do not need to restore maximum extension, as normal gait can be achieved without this.

THE EFFICACY OF COMBINED ANKLE AND POPLITEAL BLOCKS IN FOREFOOT SURGERY - A PROSPECTIVE, RANDOMISED TRIAL

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Background: Postoperative pain following forefoot surgery can be difficult to control with oral analgesia so regional analgesic methods have become more prominent.

Aim: It is the aim of this study to evaluate the efficacy of a combination of popliteal and ankle blocks and decide if they give significantly better postoperative analgesia than ankle block alone in forefoot surgery.

Methods: This is a prospective, randomised, controlled and single blind study. The total number of patients is 80 with 40 patients in the ankle block only group (control) and 40 patients in the ankle and popliteal block group. All patients underwent forefoot surgery. Postoperative pain was evaluated in the form of a visual analogue scale and verbal response form. Evaluations took place four times for each patient: in the recovery room, 6 hours postoperatively, 24 hours postoperatively and on discharge. The pain assessor, who helped the patient complete the pain evaluation forms, was blinded to the number of blocks used. The amount of opiate analgesia required whilst an inpatient was also recorded. On discharge the patient was asked to rate their satisfaction with the pain experienced during their hospital stay. Results were analysed using Mann-Whitney tests.

Results: Results show that pain is significantly less in recovery ($p=0.044$) and after 24 hours ($p=0.0012$) for those patients with combined blocks. Satisfaction with pain relief is also higher for these patients. No complications were found as a consequence of having two peripheral nerve blocks.

Conclusions: A popliteal block in conjunction with an ankle block does reduce postoperative pain significantly more than ankle block alone after forefoot surgery.

TREATMENT OF MORTON'S NEUROMA - WHICH TREATMENT WORKS BEST?

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A prospective study of 72 patients with Morton's neuroma was carried out outlining presenting symptoms, significance of clinical examination and the beneficial effect of various treatment modalities. They were followed up for at least 6 weeks. There were 51 females (70%) and 21 males (30%) with average age of 52 years.

Bilateral symptoms were present in 15% cases with remaining 85% cases having unilateral symptoms.

Commonest symptom observed was pain in the web space, commonest being 3rd space (70%) and others being 2nd space (18%), 4th space (4%) and combination of two spaces (8%). In 90% of these cases, pain was aggravated by walking and wearing closed shoes; and relieved by taking rest.

Paraesthesia in adjacent toes was present in 46% cases. Clinically palpable Mulder's click was seen in 54% cases.

Shoe modification was tried in 33% patients, with little benefit. All 72 patients underwent corticosteroid and local anaesthetic injection in the outpatient clinic. Fair to good pain relief was obtained in 76% cases with average duration of pain relief of 2.8 weeks (range (0-8 weeks)). No pain relief was achieved in 24% cases.

Twenty-eight patients (38%) who either had inadequate pain relief at 6 weeks following injection; or had recurrence of pain eventually underwent surgical excision/decompression using plantar approach. None of them had any complication related to surgery. All patients had excellent pain relief at a minimum of 6 months follow up after the surgery. 90 % of the patients who underwent surgery had VAS pain score of 0 at 6 months follow up.

Thus, single injection treatment is a very useful treatment modality achieving satisfactory results in 76% of patients. Surgical excision/decompression should be reserved for patients with no pain relief/recurrence after the injection.

LONG TERM FOLLOW UP OF ACHILLES TENDINOPATHY IN A DISTRICT GENERAL HOSPITAL

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Introduction: The results of treatment of Achilles tendinopathy are described in the sporting community little is known of the long-term results in the general population. Our aim was to assess these results in a district general hospital setting.

Materials/ Methods: Patients who had undergone treatment for Achilles tendinopathy were identified from hospital records and assessed by postal questionnaire. This consisted of two parts (the VISA-A and a section about occupation, duration of symptoms prior to referral, prior sporting activities, and satisfaction). This was sent out with a stamped addressed return envelope, in the case of non-reply this was followed by a second one, and finally the patient was contacted by phone. Clinical notes of responders were reviewed.

Results: 71 patients were identified and the response rate was 83% with an equal, male to female split. Average age was 45; mean time to follow up was 8 years. Patients had undergone a wide variety of treatments (73% physiotherapy, 45% heel raises, 24% steroid injection {there were no ruptures reported}, and 12% operative). Duration of symptoms prior to referral ranged from 2 weeks to 27yrs. 78% were very satisfied or satisfied. 46% undertook sport prior to onset of symptoms, and at the time of follow up 40% undertook sport. 81% did not change their occupation. Average VISA-A score was 50 (range 10-90).

Discussion: Despite an average VISA-A score of 50 (excellent 90-100, good 75-85, fair 60-70, poor <50), after a follow period up of 8 years, most patients were satisfied with the treatment they had received. We could find no correlation between treatment and eventual outcome

Conclusion: Patients generally have continued symptoms from their Achilles Tendinopathy, many years later, despite standard treatments, which is reflected in poor VISA-A scores.

DO PATIENTS WITH PLANOVALGUS FEET AND MIDFOOT ARTHRITIS HAVE HYPERMOBILITY OF THE FIRST RAY?

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Introduction: Hypermobility is a common finding, however, it lacks diagnostic parameters and is poorly understood, especially in the foot.

Aim: To quantify medial column/first ray mobility in patients with midfoot arthritis and planovalgus feet.

Methods: We compared first ray mobility in patients with radiologically defined midfoot tarsometatarsal osteoarthritis, a radiologically normal first ray and planovalgus feet, with control subjects who had normal feet and first rays. An all female group of 20 patients (mean age of 70) and 20 controls (mean age of 53) met the criteria. Analysis of patients' x-rays identified the site of their arthritis and allowed angular measurements of their flat foot deformity. Patient and control subjects underwent identical examinations, recording hindfoot correctability, medial longitudinal arch appearance, hindfoot pronation and supination, forefoot supination and degrees of flexion/extension and abduction/adduction with an electronic goniometer. Each subject was graded by the AOFAS and SF-36 outcome scores.

Results: There was a significant difference in first ray mobility between the patient and control subjects for all positions adopted ($P < 0.001$), except when dorsiflexed and weight bearing ($P = 0.052$). Patients with a neutral non-weight bearing ankle exhibited greatest mobility of 16.8 ± 4.7 degrees compared to 9.4 ± 2.6 degrees in controls. This was a significant difference, $P < 0.001$, as was the difference between patients adopting the NWB plantarflexed, dorsiflexed and WB neutral positions. $P = 0.002$, $P = 0.014$, $P = 0.001$ respectively. Patients' median score for 5 out of 8 SF36 domains were considerably less than controls, as were patients' AOFAS. Reduced physical and social functioning were shown to be linked to poor foot scores.

Conclusion: Patients with planovalgus feet and tarsometatarsal OA have greater first ray mobility than controls with normal feet. Recognising this may help plan orthotic or surgical treatment.

A MODIFIED BOSWORTH REPAIR FOR CHRONIC RUPTURES OF THE TENDO-ACHILLES - MEDIUM TERM RESULTS

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Chronic ruptures of the tendo-achilles in young individuals pose difficult therapeutic problems. Surgical repair is necessary to achieve optimum functional results. We present our results using a modified Bosworth technique using a 'turn-down' strip of gastrosoleus aponeurosis

Materials and methods: 11 patients (9 Males : 2 Females) Age range: 23-51 (average 36)

Time since rupture: 9:20 weeks (average 13) All had pain, weak or absent push-off and restricted ADL

Technique: Posterior midline incision – rupture exposed, ends debrided – 1” strip of gastrosoleus aponeurosis about 2-3” long – detached proximally ‘turned down’ with fascial surface anterior. This modification was to avoid tissue bulge at proximal end of incision. The fascial strip was approximated with delayed absorbable sutures. The plantaris was used to supplement the repair when possible.

Cast-bracing for 9 weeks

FU – 12-42 months, minimum 12. All patients independently assessed at one year. AOFAS hindfoot scores – Preop and 1 year postop

Results: AOFAS scores: Preop: 49(40-61) Postop: 82(70-94) 2 minor wound problems-no surgical intervention required. Push-off strength returned to about 70-80% in all patients. 7/11 patients returned to preop recreational activities.

We conclude that this is a safe and predictable repair technique in this group of patients. It is technically easy, restores tendon length and provides excellent functional improvement.

THE MODIFIED CHRISMAN SNOOK PROCEDURE FOR CHRONIC LATERAL INSTABILITY OF THE ANKLE - LONG TERM RESULTS

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We present our long-term results using a modified Chrisman-Snook procedure in 12 consecutive patients over a 4 year period. The minimum follow-up was 1 year.

We used this procedure in patients with symptomatic lateral instability of the ankle, with the index injury being 5 years or more prior to surgery. We believe that poor soft tissue at the site of the ligament rupture precludes an anatomical reconstruction (8 patients). 4 patients had had a previous failed Brostrom reconstruction.

Materials and Methods: 12 patients (10 males:2 females) Age: 32-57 (average 48) All patients had a pre-surgery trial of physiotherapy, proprioceptive exercises and bracing was considered unacceptable. 10 patients had pre-surgery MR scans. 10 patients underwent arthroscopy of the ankle at the time of the reconstruction.

Technique: Lateral extensile incision with dorsal half of peroneus brevis used as graft. Suture anchor in the talus and drill tunnels in the fibula and calcaneum.

Results: AOFAS Preop: 69 (range 60-76) Postop: 92 (range 88-97) 11 reported subjective stability, 1 had occasional instability with no objective corroboration. Objectively, 4 had over-tightening with loss of between 20-30% of subtalar movement. There were 2 sural nerve injuries. There were 2 minor wound complications, NOT requiring surgical intervention. All the above complications occurred in the first 6 cases.

Conclusions: We conclude that this is a powerful corrective procedure for chronic lateral ankle instability, but is technically demanding. There are complications in the form of over-tightening and nerve damage which can be minimised with experience.

THE MEDIAL TIBIAL LISS PLATE FOR PILON FRACTURES OF THE TIBIA

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Pilon fractures of the distal tibia pose a difficult therapeutic problem. Various treatment methods exist. We present encouraging early results with the Medial Tibial LISS plate (LCDCP) for these injuries.

Materials and Methods

7 patients (5 male:2 female)

age: 34 (range 26-59)

All closed injuries

3 type 1; 3 type 2; 1 type IIIc

Average time from injury to surgery: 6 days (4-12 days)

Technique

4 patients had preliminary joint-spanning fixator

4 patients had fibular plating through a posterolateral incision

A curved anteromedial incision was used to avoid plate exposure in case of wound breakdown.

Medial Tibial LISS plate with inter-fragmentary screws to reduce main fracture fragments.

Early, non-weight bearing mobilization

Results

Minimum Follow Up: 6 months (range 6-18 months)

Union was obtained in all fractures.

Joint reconstruction was graded as anatomical in 3 patients, mildly non-anatomical in 3 patients, and markedly incongruent in 1 patient (Type IIIc3)

ROM: average 10° Dorsiflexion and 30° Plantarflexion

Pain: None in 4, mild in 2, and severe in 1

Wound healing problems: 1 minor requiring no surgical intervention, 1 requiring debridement of distal tibial wound.

We conclude that this technique offers a viable alternative to other methods in the treatment of these difficult injuries.

THE USE OF A SURGEON-OPERATED X-RAY IMAGE INTENSIFIER (MINI C ARM) IN PERIPHERAL LIMB SURGERY

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Aim: To evaluate intraoperative use of the Mini C-Arm compared with standard X-ray image intensification

Method: Radiation exposure data was collected for patients undergoing orthopaedic operative procedures. Data was collected over a 3 month period using a standard Siemens Siremobil 2000 X-Ray image intensifier (175 procedures) and also from a new smaller surgeon-operated Vertec Fluoroscan X-Ray image intensifier (144 procedures). Skin entrance radiation dose was calculated for the procedures with each X-ray unit.

Results: There were sufficient numbers of wrist procedures to permit comparison of the X-ray units. (Table 1)

Table 1: Number of Procedures

	<i>Wrist manipulation</i>	<i>Wrist K wire</i>	<i>Wrist ORIF</i>
<i>Standard X-Ray Unit</i>	48	22	7
Surgeon-operated Unit	43	14	5

The skin entrance dose of radiation was calculated and found to be lower for all procedures with the surgeon-operated X-ray unit (Table 2)

Table 2: Mean Skin Entrance Radiation Dose (μ Gy)

	Wrist manipulation	Wrist K wire	Wrist ORIF
Standard X-Ray Unit	75	108	117
Surgeon-operated Unit	67	102	67

Discussion: New, small surgeon-operated X-ray image intensifiers are now available and are safer for theatre staff due to reduced X-ray beam scatter. These X-ray units remove the need for a radiographer to be present in theatre. This is also of importance as staff shortages in radiography persist.

Conclusion: Surgeon-operated X-ray image intensification is safe and convenient in the orthopaedic operating theatre without increasing radiation exposure.

MINI FRAGMENT SCREW FIXATION OF SCARF OSTEOTOMY

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Introduction: Various techniques are being currently used for the internal fixation of scarf osteotomies. We conducted a prospective study on 23 consecutive cases of hallux valgus treated with scarf osteotomy, which was internally fixed with AO mini fragment screws. The aim of our study was to evaluate the clinical efficacy of the AO mini fragment screws in these cases.

Method: Sixteen women and one man (twenty three feet) were included in our study. Mean age was 46 years at the time of surgery. The mean follow-up time was 18 months. A single surgeon performed surgery. Patients were assessed by clinical and radiological evaluation. Preoperative and postoperative American Orthopaedic Foot and Ankle Society score was obtained.

Results: All the osteotomies united without any failure of fixation or hard ware problems. One patient developed superficial wound infection, which responded to antibiotics. At the time of follow-up all the patients were very satisfied. The mean AOFAS score improved significantly from 55 points pre-operatively to 91.95 at follow-up ($p < 0.001$). The intermetatarsal and hallux valgus angles improved from the mean pre-operative values of 15.86° and 31.18 degrees to 9.09° and 15.18° , respectively. These improvements were significant ($p < 0.0001$).

Conclusion: We report no failure of fixation in our series and conclude that this is a safe and simple technique. It is cost effective, provides stable fixation and maintains correction till the union of osteotomy.

EXPLORING THE RELATIONSHIP BETWEEN ORTHOPAEDIC SURGEONS AND PODIATRIC SURGEONS – CURRENT OPINIONS AND OPTIONS FOR FUTURE WORKING

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This work aims to quantitatively assess the current opinions of foot and ankle surgery provision by podiatric surgeons within the UK. Three groups were targeted by postal questionnaire; Orthopaedic surgeons with membership to BOFAS, Orthopaedic surgeons not affiliated to the specialist foot and ankle society and surgical Podiatrists. In addition we aim to identify areas of conflict and suggestions for future integration.

A postal questionnaire was sent to all Fellows of the Faculty of Podiatric Surgery, College of Podiatrists (136), members of the British Orthopaedic Foot and Ankle Society, (156), and a randomly selected number of Fellows of the British Orthopaedic Association, who are not members of BOFAS (250).

We have received replies from 99 (73%) of the Podiatric Surgical group, 77 (49%) of the Orthopaedic Foot and Ankle surgeons and 66 (26%) from non-Foot and Ankle Orthopaedic Surgeons.

Respondents were asked to detail their present practice and issues that they considered to restrict closer working between Orthopaedic Surgeons and Podiatric surgeons. Additionally, each surgeon was given a range of surgical procedures and asked to identify the most appropriate surgical profession to undertake the procedure.

The good response rate amongst Foot and Ankle Practitioners (both Podiatric and Orthopaedic) reflects the interest in these issues compared to Orthopaedic Surgeons from other sub-specialties. Poor understanding of Podiatric surgical training, impact on private practice and medical protectionism were areas identified by podiatric respondents. Conflicts over job-title, concerns over training, role boundaries and responsibilities were identified by Orthopaedic respondents as being significant restrictors to further integration.

The paper will present the full results of the survey and discuss the suitability and feasibility of closer working practices between Orthopaedic and Podiatric surgeons.

PRE-OPERATIVE SKIN PREPARATION IN FOREFOOT SURGERY USING IODINE AND ALCOHOL:A PROSPECTIVE STUDY

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The use of effective pre-operative preparation solution is an important step in limiting surgical wound contamination and preventing infection, particularly in forefoot surgery. The most effective way is unknown. In recent studies, >70% of aerobic bacterial cultures of specimens taken from the nail folds following skin preparation with povidine iodine were positive. The aim of the study was to determine the effectiveness of pre-operative Triclosan (Aquasept) shower, skin preparation using povidone iodine and ethyl alcohol in reducing post-operative forefoot infection.

Between February 2005 and August 2005, all patients undergoing forefoot surgery under the care of the senior author were followed prospectively. There were 50 women and 10 men with an average age of 55 years (17-92 years), who underwent 92 forefoot procedures. The surgeries included 35 (38%) osteotomies, 31 (34%) arthrodeses, and 9 (10%) Morton's neuroma excisions and 17 (18%) soft tissue procedures. As a standard protocol, pre-operatively all patients had Triclosan shower on the day of surgery, the foot/feet were painted with povidone iodine and was covered with a sterile towel in the ward. At induction, everyone received cefuroxime 1.5gm (IV); the feet were prepared using povidone iodine and then ethyl alcohol and dried. Patients were followed up in the clinic at 2weeks, 6weeks and 3months, further follow-up if necessary.

None of the patients in the study developed deep infection. Two patients required oral antibiotics for superficial infection (one pin track infection after distal inter-phalangeal joint fusion of second toe, one following scarf osteotomy)

We conclude that the method used in this study was very effective in preventing infection following forefoot surgery.

THE METATARSAL SKYLINE VIEW: A RADIOGRAPHIC ASSESSMENT OF THE TRANSVERSE METATARSAL ARCH

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Introduction: The transverse metatarsal arch is the subject of some controversy as there isn't a clear consensus as to whether there is a transverse arch (TMA) in stance phase. The current treatment options of forefoot pathology focus on the need to harmonise the TMA by the use of osteotomies such as the Weil's.

Materials and Methods: A retrospective study of 75 feet (62 patients) with mean follow up of 19 months. Patients underwent clinical, pedobarographic and radiological assessment. 'Metatarsal skyline Views' (MSV) were procured to assess the plantar profile of the TMA following Weil osteotomy. The feet were assessed using AOFAS, Foot Function Index, SF-36 and Manchester-Oxford Foot Questionnaires.

Results: 69 feet showed good to excellent results with a normal MSV plantar profile. 6 feet had recurrent metatarsalgia with callosities and abnormal MSV profiles. These results correlated well with pedobarography.

Discussion: The angle of Weil osteotomy is usually referenced relative to the floor irrespective of the plantar angulation of metatarsal. As different metatarsals had varying plantar angulations, the weight bearing metatarsal skyline view was used to ascertain the plantar profile of the metatarsals before, during and after surgery. This was also used to determine the amount of dorsal displacement required in addition to shortening in order to harmonise both length and plantar profile.

Conclusion: The use of the Metatarsal skyline view has significantly improved our planning of the angles of the Weil osteotomy. We suggest that the reference for the osteotomy should be the plantar angulation of the metatarsal rather than the floor. It has made the intra-operative assessment of the osteotomy easier and has improved our understanding of the osteotomy and its influence on the forefoot plantar profile.

FIRST METATARSOPHALANGEAL JOINT ARTHRODESIS FOR THE TREATMENT OF HALLUX RIGIDUS: A COMPARATIVE STUDY OF SCREW FIXATION AND DORSAL PLATE FIXATION

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Materials and Methods: Consecutive 39 patients who underwent first metatarsophalangeal joint (MTPJ) arthrodesis for hallux rigidus were assessed clinically, radiographically and functionally at a mean follow up of 21.45 months. Clinical assessment was performed by two blinded assessors in a specially arranged research clinic. Radiological examinations were performed separately by two independent researchers on digitalised weight bearing radiographs. Functional outcome was assessed using American Orthopaedic Foot and Ankle Society (AOFAS) hallux score and a short form-12 (SF-12) questionnaire.

Results: There were 19 patients who had dorsal contoured titanium plates and 20 patients who had single inter fragmentary screw fixation. Both the groups were comparable preoperatively. All except 5 patients achieved radiological fusion at a mean of 7.64 weeks. Over all rate of fusion in the present series is 87.1%. There were 4 non-unions in the plate group and one in screw group. Mean AOFAS score was 74.94 in the screw group and 70.63 in the plate group. There were no hardware problems in the single screw group. However in the plate group one patient with non-union broke the plate and another patient had back out of screws. There were no statistically significant differences in terms of pain-relief, activity-limitation, cosmetic appearance, foot wear requirements, dorsiflexion angle, hallux-valgus angle and inclination angles and SF 12 scores. Four patients in the plate group and one in screw group were unsatisfied with the surgery.

Conclusions : Solid fusion has resulted in good pain relief and patient satisfaction in both groups. In the dorsal plate group 4 patients (21.6%) had non-unions, two patients had metal problems. We have stopped using the plate alone technique for the fixation of first MTPJ fusion.

OUTCOME OF MIDFOOT RECONSTRUCTION FOR POSTERIOR TIBIALIS TENDON DYSFUNCTION (PTTD)

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We retrospectively reviewed 31 patients who underwent reconstruction procedure for PTTD (Type II Johnson). The surgery was mostly performed by the senior author.

Fifty patients underwent 55 procedures, 31 patients were available for review (34 procedures)

Clinical and functional outcome were assessed using AOFAS hindfoot score, and the SF-36 health assessment score.

The patients had a calcaneal medialising (chevron) osteotomy to correct heel valgus, with or without a calcaneal lengthening osteotomy, and transfer of the FDL tendon to the navicular. All patients were immobilized in non-weight (to partial) bearing POP for 5 weeks, followed by CAM for 6 weeks.

There were 7 males and 24 female, with an average age of 60.5 years. The average follow up was 54 months (range 11.5-111.2). The average hindfoot valgus deformity was 15 degrees preoperatively.

Eight patients had and additional procedures including (TA lengthening, Lapidus). Four patients required bone graft for calcaneal column lengthening, and in 5 patients the posterior screw was removed due to continuous discomfort.

The average AOFAS hindfoot score was 74 (47 -100), the average pain score was 31/40 and the average subscore of the heel alignment was 7.9/10.

Nineteen patients (61%) were able to perform single heel raise, and 27 patients (87%) were able to perform bilateral heel raise. 26 patients (83.8%) had no lateral impingement pain post operatively.

The SF-36 health assessment showed similar functional outcome with age matched population. Two patients had superficial wound infection required oral antibiotics

Hindfoot and midfoot reconstructive surgery for type II PTTD after failed orthotic treatment is well established. However, the post operative care and rehabilitation period is lengthy and protracted. This must be emphasized during informed consent in order to fulfil realistic expectations.

MANAGEMENT OF FRACTURES OF THE BASE OF THE FIFTH METATARSAL- A REVIEW OF 300 PATIENTS

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Introduction: Fractures of the tuberosity heal well irrespective of the treatment instituted. Fractures distal to the tuberosity have a high incidence of delayed union and non-union. This could be due to disruption of the vascular supply that enters the bone at the metaphyseal-diaphyseal region. It has also been reported that in these injuries, stress fractures occur at a different anatomic site that is more distal to acute fractures.

We present one of the largest reported series of such fractures in which we have explored the above statements.

Materials & Methods: A retrospective review of 300 closed fractures of the base of the fifth metatarsal- 268 were tuberosity fractures (group 1) and 32 were fractures distal to the tuberosity (group 2).

The patients were followed up in the outpatients clinic for a mean period of 2 months (group 1) and 16 months (group 2).

The distance of the fracture site from the proximal tip of the metatarsal was measured on the radiographs.

Results:

- All group 1 fractures healed well following symptomatic management and none required surgical intervention.
- Acute fractures in group 2 did better with non-weight bearing mobilization. Stress related fractures in group 2 took longer to heal when managed non-operatively.
- In group 2 patients, the difference in the site of acute & stress fractures was not statistically significant.
- No statistically significant correlation between distance from the proximal tip of the fifth metatarsal to the fracture site and union.

Conclusion

- A standardized classification is important because there is great variability in the types of fractures and appropriate treatment.
- Nonunion in fractures distal to the tuberosity is not related to the distance of the fracture from the metaphyseal-diaphyseal region.
- Acute and stress fractures distal to the tuberosity do not occur at different anatomic sites.

CELL SURFACE CHARACTERISATION OF FAT PAD DERIVED STEM CELLS IS NOT AFFECTED BY PASSAGE: IMPLICATIONS FOR ARTICULAR CARTILAGE REPAIR

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Introduction: Articular cartilage is frequently damaged but only shows a limited capacity for repair. Autologous chondrocytes are being used for the repair of focal articular cartilage defects in the ankle but their use has limitations. The use of undifferentiated progenitor cells from other sources is limited by the fact that these cells lose their stem cell characterisation with passage in culture. The fat pad derived stem cells are a possible alternative that maintain multipotentiality at higher passages. We explore the hypothesis that their cell surface characterisation will resemble that of mesenchymal stem cells and will not alter with passage.

Materials and Methods: Cells were isolated from the human fat pad and expanded in monolayer culture. On confluence, they were harvested by digestion and re-plated at a ratio of 1:3. Cells from passage 2, 4, 6, 8 and 10 were stained and analysed using flow cytometry for a panel of stem cell surface antibodies.

Results: Fat pad derived cells stained strongly for CD13, 29, 44 and 90 (markers of mesenchymal stem cells). The cells stained poorly for 3G5 (pericyte marker), CD34 and CD56 (marker for haematopoietic lineage), and LNGFR and STRO1 (markers of bone marrow stem cells). These results suggest that the fat pad cell population has surface expression characteristics of mesenchymal stem cells, but differ from bone marrow derived stem cells. It is also important to note that the expression of these cell-surface markers was maintained up to passage 10.

Conclusion: The consistent pattern of cell surface expression, with little change with passage, shows that the proliferation and expansion of the fat pad stem cell population does not lead to major changes in phenotype of these cells. This can potentially allow a significant increase in number sufficient for clinical applications without losing their multipotentiality.

RECURRENT PERONEAL TENDONS SUBLUXATION

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Background: Recurrent peroneal tendon subluxation is uncommon. We report the results of a delayed anatomic repair using suture anchors. Using a case series we tested the null hypothesis that there are no differences between pre- and post-operative status following anatomical repair of the superior peroneal retinaculum.

Methods: In the period 1996 to 2001, we operated on 14 patients (all males; average age 25.3 ± 6.3 years, range 18-37) with traumatic recurrent unilateral peroneal tendon subluxation, with a followed up of 38 ± 3 (range 22 to 47) months.

Results: No patient experienced a further episode of peroneal tendon subluxation, and all had returned to their normal activities. Maximum calf circumference, functional ability, peak torque, total work and average power of plantar flexion were always lower in the operated leg, but the differences did not reach statistical significance. The AOFAS Ankle-Hindfoot Scale increased significantly from 54.3 ± 11.4 to 94.5 ± 6.4 ($p = 0.03$), with five patients reporting a fully normal ankle.

Conclusion: If an anatomic approach to treating the pathology is utilised, reattachment of the superior retinaculum is a most appropriate technique. It returns patients to a high level of physical activity, and gives high rate of satisfactory results both objectively and subjectively. Randomised control trials may be the way forward in determining the best surgical management method. However, the relative rarity of the condition and the large number of techniques make such a study difficult.

WOUND COMPLICATIONS FROM SURGERIES PERTAINING TO THE ACHILLES TENDON: AN ANALYSIS OF 219 PATIENTS

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Background: The Achilles tendon is commonly operated on, but has associated wound complications, ranging from 7-14% in previously reported series larger than 100 cases.

Methods: A retrospective review of one surgeon's practice was conducted to assess the prevalence of wound complications associated with acute and chronic rupture repair, peritenolysis, tenodesis, debridement, retrocalcaneal exostectomy/ bursectomy, and management of calcific tendinopathy of the Achilles tendon. The study evaluated the incidence of infection, and other wound complications such as suture reactions, scar revision, hematoma, incisional neuromas and granuloma formation.

Results: A total of 219 surgical cases were available for review (140 males, 70 females; average age at the time of surgery: 46.5 ± 12.6 years, range 16-75). Seven patients experienced a wound infection, three had keloid formation, six had suture granulomas, and six had suture abscesses, with an overall complication rate of 22 of 219 surgeries (10.1%). There were no hematomas. Seven patients had additional surgery following their wound

complications; some had simple granuloma excision, while one necessitated a flap.

Conclusion: Knowledge of suture materials, proper incision placement and possibly avoiding tourniquet usage can keep complications low when performing Achilles tendon surgery. Regardless, some complications with Achilles tendon surgery may be unavoidable.

PEDIGREE ANALYSIS AND EPIDEMIOLOGICAL FEATURES OF IDIOPATHIC CONGENITAL TALIPES EQUINOVARUS IN THE UNITED KINGDOM: A CASE-CONTROL STUDY

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Background: Congenital talipes equinovarus (CTEV) is a common developmental disorder of the foot, affecting between 1 and 4.5 babies per 1000 live births. The etiology is not well elucidated. While both genetic and environmental factors are implicated, no specific genes have been identified and little is known about environmental risk factors.

Methods: We conducted a case-control study of idiopathic congenital talipes equinovarus (ICTEV) in the United Kingdom. 194 cases and 60 controls were recruited. Pedigrees were obtained for 162 cases.

Results: The rank of the index pregnancy, maternal education and cesarean delivery were significantly associated with ICTEV risk in a multivariate model. There were suggestions that maternal use of folic acid supplements in the three months before the pregnancy decreased ICTEV risk, and that parental smoking during the pregnancy increased risk. One quarter of pedigrees showed a family history of CTEV, and autosomal dominant inheritance was suggested in some of these.

Conclusion: Uterine restriction did not appear to have a strong influence on ICTEV development in our study. Large population-based studies are needed to clarify the etiology of this common developmental disorder.

BIOMECHANICAL OUTCOMES OF CALCANEAL FRACTURES

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Aims: A study was undertaken using foot pressure analysis, to assess the biomechanical outcomes following calcaneal fractures using the HR Mat and to assess their correlation with function.

Methods: Twenty four individuals who had been treated for unilateral, intra-articular comminuted calcaneal fractures performed 4 walking trials. 14 patients had operative treatment and 10 were treated conservatively.

Results: There was significant restriction in subtalar and ankle movements on the affected side in both groups. Peak pressures in the midfoot and fifth metatarsal head were significantly higher in the injured foot compared to the normal side. Peak values of forces transmitted by the fractured foot were significantly lower (ANOVA < 0.001). Hindfoot movements, foot pressure and force measurements did not correlate with the AOFAS and Bristol scores.

Conclusions: Calcaneal fractures cause significant alteration of loading in the foot. Altered loading patterns do not appear to have an influence on the functional outcome

HALLUX VALGUS SURGERY: COMMON PRACTICE IN THE UNITED KINGDOM

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Hallux Valgus (HV) surgery is the most common surgery performed in the foot. The Cochrane review done in 2004 showed that no osteotomy is superior to another, however, surgery was shown to be superior to conservative or no treatment for Hallux Valgus deformity. We performed a postal survey in August 2005, to determine the most common procedures performed for HV deformity, type of anaesthesia used, and the length of stay for Hallux Valgus surgery across the United Kingdom.

A list of foot and ankle surgeons was obtained from the BOFAS register and a questionnaire was sent. We received 122 (61%) responses from 200 questionnaires sent. Out of which 4 had retired and 118 were available for analysis.

The table below demonstrates the common procedures performed by those who replied. Eight-eight percent of the surgeons used foot block along with GA, 9% used GA only and 3% performed the surgery under regional anaesthesia only. Forty percent of surgeons performed the surgery on an overnight stay basis and 30% performed the surgery as a day case. Twenty-five percent of surgeons mentioned that they performed unilateral surgery as a day case and bilateral surgery on an overnight stay basis. Less than 5% kept the patients for more than 2 days.

From the responses, most surgeons in the United Kingdom perform Scarf osteotomy with or without Akin osteotomy for Hallux Valgus correction. The majority performed it on an overnight stay basis or as a day case. Most commonly, foot block along with NSAID's were used for post-operative pain relief.

Surgery	No. (%)
Scarf with or without Akin	49 (41)
Chevron \pm Akin	16 (13)
Scarf or Chevron	12 (10)
Mitchell	9 (7)
Combination	17 (14)
Other	15 (13)

SCARF OSTEOTOMY WITH NEW MODIFIED MEDIAL CAPSULAR REPAIR FOR HALLUX VALGUS. IS AKIN OSTEOTOMY NECESSARY?

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Hallux valgus is a common condition and surgical correction has remained a challenge. Scarf osteotomy with Akin procedure is well accepted method. Akin procedure gives spurious correction of the distal alignment of big toe.

This study was performed to see alternative way to get best correction without additional phalangeal procedure. Senior author used innovative Y-V medial capsulorrhaphy with standard Scarf osteotomy. This technique allows reduction of MP joint along with correction of pronation deformity and reduction of sesamoids.

We report the use of a modified Y-V medial capsular repair in association with Scarf osteotomy for Hallux valgus in 45 patients (55 feet) aged 18 to 76 years (mean 43 years) between October 2004 and December 2005. Clinical follow up was both subjective and objective. Patients were asked about rating of their satisfaction and objective assessment was done in form of AOFAS score. Using this technique none of the patients required an additional proximal phalangeal osteotomy with metatarsal osteotomy. At six months follow up American Orthopaedic Foot and Ankle Society score improved from 46 to 87. Intermetatarsal (IM) angle and the hallux valgus (HV) angle improved from 16° to 9° and from 31° to 16° respectively ($p < 0.05$). At final follow up 8 patients were very satisfied, 12 were satisfied while 5 were not satisfied.

Of the 55 procedures 51 did not develop any complications. Two had superficial infections, treated successfully with oral antibiotics only. Two patients had recurrence, one was treated with Akin and second patient declined surgery as she was not bothered with it.

We recommend the use of this modified 'Y-V' medial capsular repair to reduce the need for an additional procedure to augment the correction achieved during Scarf osteotomy for hallux valgus. This reduces hallux valgus angle and maintains it.

THREE-DIMENSIONAL CULTURE OF TENOCYTES IN UNIAXIAL MICROMICROCHANNELS FOR TENDON ENGINEERING

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Introduction: Tendon tissue engineering entails the generation of a highly ordered collagen matrix with several organization scales that confer the tendon its mechanical functionality. Endogenous production of proteoglycans account for the typical microscopic organization in bundles of the tendon extracellular matrix, as they prevent lateral fusion of collagen fibril by binding the shaft of the fibres and promoting tip to tip fusion. The approach developed in this study is to rely on this molecular endogenous production and to induce a supramolecular uniaxial alignment of collagen fibres bundles with the help of specially designed scaffolds under continuous fluid shear stress.

Methods: Microchannel chitosan scaffolds were produced by casting 2% chitosan gel on a mould equipped with stainless steel needles array that was imaged by optical coherence tomography with a resolution at ~10microns. From OCT measurements, regularly spaced microchannels with clearly delimited boundaries are obtained inside a microporous core of chitosan. By varying the number and the diameter of needles (from 250 μm (microns) to 500 μm (microns)) different types of microstructure have been produced. Microchannels scaffolds were seeded with primary tenocytes explanted from pig tendons and cultured in static culture, as non-stimulated group, and in a perfusion bioreactor.

Results: There was a general increase in the channels occupation ratio for the group stimulated by perfusion, and inversely proportional to the microchannel diameter. Tenocytes were able to proliferate and to produce collagen extracellular matrix from the inner surface of the microchannel up to the whole channel volume.

Conclusion: The proposed microstructure was appropriate for tendon engineering and its channel structure is adequate for direct OCT monitoring.

OUTCOME MEASURES IN FOOT AND ANKLE SURGERY, VALIDATING WALKING DISTANCES

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Purpose: In the modern political climate our practice is increasingly being compared with that of our peers. Outcome measures will form the basis of this. Good outcome measures have two essential requirements; they should be valid and reliable. Outcome measures are not easy to construct. Traditionally subjective walking distances have formed a portion of the assessment. This has never been validated.

Method: Null hypothesis - patients can accurately estimate their actual walking distance.

After gaining COREC approval we compared the objective to subjective walking distance of patients who had sustained a fractured Os Calcis over the past two years and were allowed to full weight bear. Patients were assessed by a senior physiotherapist and Doctor. Both the American Orthopaedic Foot and Ankle Score and Maryland Score were performed. Patients were asked to estimate their maximum walking distance prior to objective treadmill assessment.

Results: 20 patients, 6 female and 14 male were assessed. Average age was 67yrs (range 46 -83yrs). One patient was excluded as they were breathless at rest. Good correlation was found between the subjective walking assessments of the two scores. All patients' uniformly over estimated their walking ability. This was a highly significant difference, p-value 0.002. Therefore the null hypothesis has been disproved; patients' subjective walking distance is inaccurate.

Significance: Walking distance assessment is used as a measure in many fields of orthopaedics namely foot and ankle outcome measures and lower limb arthroplasty. This study has shown it to be an inaccurate method. It also highlights the need to validate all outcome measures.

COMPARISON OF CONSERVATIVE AND SURGICAL TREATMENT OF DISPLACED CALCANEAL FRACTURES

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Introduction: The aim of our study was to assess any difference in outcome between non-surgical and surgical treatment of displaced calcaneal fractures.

Materials and Methods

We studied 40 patients between 2000 to 2005 with displaced calcaneal fractures. Patients with significant co-morbidities were excluded.

Two groups of 14 patients, surgery *vs.* no surgery were compared for age, sex, length of follow-up, fracture type by Essex-Lopresti classification and SF-36 outcome score. The non-surgical group underwent treatment with rest, ice, compression, elevation and the surgical group underwent fixation with an AO calcaneal plate through an extended lateral approach.

Results: There was no statistically significant difference between the surgical and conservatively treated groups for age, sex, time since injury and fracture type according to Essex-Lopresti but a highly statistically significant difference in SF-36 outcomes between the two groups favouring surgically treated calcaneal fractures.

Summary: Displaced fractures of the calcaneum are a significant injury affecting patients general health. In the literature controversy exists as to whether operative or non-operative treatment is better for this type of fracture.

Conclusion: Although the numbers are small, our study favours operative intervention, if possible, for this controversial fracture.

EXPERIENCE OF PONSETI METHOD IN DELAYED PRESENTATION OD CLUB FEET

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Purpose: To evaluate the effectiveness of the Ponseti method of the treatment i late presentation of clubfeet.

Method: Prospective study comprising 91 patients(141 feet) between August 2003 and September 2005. Age range was from 7 dats to 20 months. Majority of patients belonged to Dimeglio grade 3 (75%) and Pirani grade 4(43%) at presentation.All were treated by Ponseti method of serial casting with or without tendoachillis lengthening.Tendon lengthening was required in 79% of patients.The average duration of follow up was 1.5 years.

Results: Recurrence of deformity was seen in patients who presented late and had severe deformity at time of presentation.The Ponseti technique failed to achieve correction in 4 patients. Follow up at 2 years showed overall correction rate of 95%.In develpoing countries, delayed presentation could signifucantly affect the final outcomes as the joint deformities progressively become fixed.Our study showed that number of corrective casts,recurrence of deformity and the nned for tendoachillis lengthening was inversly related to the time of presentation. This technique can be relable used to correct clubfeet even in delayed present.

SHOULD WE OPERATIVELY FIX CALCANEAL FRACTURES IN SMOKERS?

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Opinions differ among surgeons whether to operatively fix displaced calcaneal fractures in smokers. In a long term follow-up of operatively treated calcaneal fractures, we considered several factors that could affecting outcomes and complications.

Method: 59 calcaneal fractures in 54 patients that underwent operative fixation for displaced intra-articular fractures from April 1995 to January 2006 were reviewed. There were 18 Tongue type and 41 Joint depression fractures on X-rays. Of 38 available CT scans, 25 were Sanders Type II and 13 were Types III and IV fractures.

Average interval to surgery was 6 days. Postoperative mobilisation regime was passive range of motion immediately following surgery with non weight bearing for 6 weeks. Weight bearing was started at 6-8 weeks. On follow-up, patients were assessed with clinical and radiological exam, completed Short Form-36 (SF-36), the American Orthopaedic Foot and Ankle Society (AOFAS) ankle-hind foot scale and Visual Analogue Scale (VAS) scores.

Results: The duration of follow-up was between 6 months to 11.2 years (6.4 years). The pre and post operative Bohler angles were $8^{\circ} \pm 11^{\circ}$ and $29^{\circ} \pm 6^{\circ}$ respectively. There was significant limitation of subtalar movement on the operated side irrespective of the presence of arthritis. The average AOFAS, SF-36 and VAS scores were 79, 58 and 3 respectively. Good results were associated with age < 50 years, ASA grade I, pre-op Bohler angle of $<5^{\circ}$ and Sanders <IIC. 89% of patients returned to their previous level of activity after an average of 6.5 months.

Smoking was not associated with early or late complication rates and did not affect outcome.

Conclusions: We think that smoking is not a contraindication for operative fixation of displaced calcaneal fractures.

CLINICAL OUTCOME OF TENDO ACHILLES REPAIR BY SPECIAL SUTURE TECHNIQUE WITH TWO LOOP PDS

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Introduction: Tendo Achilles repair is a controversial subject. We have treated 19 patients with acute Tendo Achilles rupture with this technique.

Method: Retrospective and Prospective study. Patients with acute Tendo Achilles ruptures were selected for this study. By standard postero-medial incision, Tendo Achilles repair was undertaken with 1 Loop Polydioxone 'suture frame' to maintain the length: tension ratio of the tendon, Tendon edges were approximated without bunching so that the original tendon length is restored. As a consequence of the restoration of tendon length and the strength of the suture frame we are able to immediately place the foot in a plantigrade position. This helps in accelerated rehabilitation programme. Post operatively below knee back slab and non weight bearing for two weeks, followed by full cast, wt bearing as pain allowed.

Results: Sex distribution was Male: Female 12:7, average age 43, average follow-up was 43 months, most common mechanism of injury was sporting activities(78%). All patients were discharged on the next day except one (medical problem). There was no complication before discharge. There was no evidence of re-rupture or Sural nerve damage. The average time taken for surgery was 42minutes. All patients are back to their occupation at an average time of 10 weeks, 70% are back to the sporting activities at 22 weeks. Patient satisfactory score was 9.2 out of 10(VAS), no knot palpability in any patient. Patients have normal ankle movements and all patients are able to stand on the tip toes.

Discussion: This is a new and simple technique and results are encouraging. Early rehabilitation, less complications, high patient satisfaction rate . There was no change in occupation, 100 % were back to work, 70 % have returned to the sporting activities.