

Poster Session

P1

Can enhanced recovery reduce length of stay after ankle replacement surgery?

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Background: Enhanced recovery is well established in knee replacements. No study has investigated the results of enhanced recovery (ER) after ankle replacements. The aim of this study was to compare the length of stay, postoperative pain, nausea and sedation, complications and readmission rates in patients undergoing ankle replacements with and without enhanced recovery.

Methods: Enhanced recovery (pre-op education, health optimisation, discharge planning, intra-op local infiltration analgesia, postop early mobilisation, nonopioid analgesia and discharge when safe) was followed for all primary total ankle replacements from 01 December 2014 onwards. 30 patients in the enhanced recovery cohort were compared with a previous consecutive 30 patients (Jan - Nov 2014). Pain, nausea and sedation were scored from 0 to 3 in all patients prospectively with 0 being none, 1 being mild, 2 being moderate and 3 being severe. The mean scores were compared using Student T test.

Results: The mean ages in the ER and control groups were 64 and 65 years respectively. There was no difference in pre-operative diagnoses between the 2 groups. There was a significant difference in the mean Day0 and Day1 pain scores for the two groups (Day0: ER:Control 0 v 0.6; p=0.003) and (Day1: ER:Control 0 v 0.7; p=0.005). There was no statistically significant difference in the nausea and sedation scores. There was significant reduction in the mean length of stay from 4.1 days in the control group to 1.7 days in the ER group (p = 0.02). There was no difference in the readmission and complication rates.

Conclusions: Postoperative length of stay and pain scores are significantly improved in the ER cohort compared to the non ER cohort.

P2

Post-traumatic osteoarthritis patients can expect good 5 year outcomes following mobile-bearing total ankle replacement

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Background: Little long term data is available on patient-reported outcome measures (PROMs) following total ankle replacement in patients with posttraumatic osteoarthritis (PTOA), osteoarthritis (OA) and rheumatoid arthritis (RA). Patients with post-traumatic osteoarthritis have previously been felt to have poorer short and long term results following total ankle replacement, due to younger age, higher activity levels and greater patient expectations. We report the 3 and 5 year outcomes for patients who underwent total ankle replacement with a mobile bearing prosthesis, comparing prospectively collected PROMs data for PTOA patients with those with OA and RA.

Methods: We analysed patient demographic data, American Orthopaedic Foot & Ankle Society (AOFAS) scores, Foot and Ankle Outcome Scores (FAOS), the SF-36 Health Survey, and patient satisfaction scores, collected preoperatively and up to five years postoperatively.

Results: The study included 109 consecutive patients who underwent total ankle replacement between March 2006 and December 2009 (58 OA, 21 RA, 30 PTOA). At one and two years postoperatively, the PTOA group reported significantly better scores on the general health domain of the SF-36. At three and five years postoperatively, there was a trend for better scores in the PTOA group for all domains of the SF36, however none of these reached significance (P>0.05). At one year postoperatively, the PTOA group and the RA group had better FAOS results for pain than the OA group. There were no significant differences in FAOS scores between groups at three or five years. There were no significant differences in AOFAS scores or in patient reported satisfaction at any measured time point.

Conclusions: Our findings suggest that patients with posttraumatic osteoarthritis of the ankle can expect comparable five year outcomes after total ankle replacement with a mobile bearing prosthesis as patients with osteoarthritis and rheumatoid arthritis.

P3

Cement Arthroplasty as a salvage for failed infected ankle replacement or ankle fusion. Is it a get out of jail card?

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Aim: To assess the outcome of antibiotic impregnated cement arthroplasty for failed infected total ankle replacement or fusion.

Methods: From Jan 2012 till January 2015 there were seven patients who underwent cement arthroplasty due to intractable infection following failed ankle replacement or fusion. Of the seven patients; six patients had an infected total ankle replacement and one patient an infected failed ankle fusion. The mean age was 71 years (55-84years) with an average follow up period of 9 months (6-22 months). The primary outcome measure was duration of the cement arthroplasty. The secondary outcome measures were American Orthopaedic Foot and Ankle Scores (AOFAS), Visual analogue Score (VAS). Patients subjective assessment of the overall improvement compared to pre cement arthroplasty were recorded as well as walking aid use and pain killers consumed.

Results: The cement spacer was retained without breakage for a mean of nine months (5-22months). The mean AOFAS score improved from twenty (11-55) preoperatively to fifty-seven (50-75) postoperatively and VAS pain score from eight (5-9) to three-point-nine (1-4.5). At the latest follow-up five patients were satisfied, using small amounts of pain killers, functioning within their limits and had improved compared to preoperatively. Indeed two had resumed normal activities. One patient had died due to complications from surgery. One patient was dissatisfied and undergone a conversion to a TTC nail.

Conclusions: Primary cement arthroplasty may be an effective salvage procedure for failed infected ankle replacement or fusion. For intractable infection where patients are possibly facing a below knee amputation cement arthroplasty is an alternative procedure worth considering.

P4

Radiographic severity of arthritis predicts outcome following total ankle replacement

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It has been previously demonstrated that radiographic severity of osteoarthritis (OA) predicts outcome following knee and hip replacement. In certain circumstances patients may undergo arthroplasty without severe radiographic disease. An example may be the patient with significant chondral damage unsuccessfully treated with arthroscopy. This patient may proceed to joint replacement when their radiographs would not normally merit such intervention. We investigated whether these findings were also applicable to total ankle replacements (TAR).

We retrospectively reviewed a single-surgeon, single-implant series of 124 TAR with minimum 2 year follow up. Pre-op X-rays were graded using the Kellgren-Lawrence classification. Outcome was measured using the FAOS, SF-36 Score and validated Patient Satisfaction Score. 96 patients with Grade 4 OA had the biggest improvement in FAOS ($p < 0.047$). Only half of 28 patients with Grade 3 or less were satisfied at 2 yrs, compared to 91.1% of Grade 4 patients ($p < 0.001$). 93.9% of patients with Grade 4 disease felt that their quality of life was improved by surgery, versus 47% of patients with grade 3 or less ($p < 0.001$). 77.3% of Grade 4 patients said they would have the operation again, versus just 52.2% of patients with grade 3 or less ($p = 0.014$). Satisfied patients had an average grade of 3.9, while dissatisfied patients had an average grade of 2.9 ($p < 0.05$).

While this study does not explain all of the dissatisfaction in TAR, radiological severity is an important factor that the surgeon must consider when planning how best to treat their patients. This study does not allow us to answer the question of how to manage with patients who have significant chondral lesions and MRI findings of subchondral bone oedema, but it does highlight the fact that caution must be used when considering patients for arthroplasty who have low radiographic severity of OA.

P5

Arthroscopic stabilisation of the ATFL ligament of the lateral ligament complex of the ankle using Arthrex Internal Brace. Introduction

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Lateral ligament complex injuries to the ankle are common. Patients with chronic injuries present with lateral ankle pain +/- instability. Radiographs frequently show no bony injury. There is often a delay for patients to be referred to the Orthopaedic Foot and Ankle Surgeon. Multiple surgical techniques for repair or reconstruction of the anterior talo-fibular ligament (ATFL) have been described, with varying post-operative rehabilitation regimens.

Aim: To assess the short term outcome of arthroscopic anterior talo-fibular ligament (ATFL) repair using the Arthrex *Internal Brace*TM system.

Method: All patients had exhausted conservative treatment.

Pre-operatively patients were assessed clinically and radiologically (x-ray and MRI scan).

MRI confirmed torn/stretched/abnormal ATFL or if negative, very high clinical suspicion

Patients were then consented for arthroscopy + ATFL repair

Pre-operative questionnaire

(approved by Scottish Foot and Ankle Surgeons)

AOFAS, MOXFQ, EDQ-5, Visual Analogue Score

- Day case: General anaesthetic with popliteal block
- Antibiotics at induction
- Anterior ankle arthroscopy performed through 2 standard anterior portals
- Arthrex *InternalBrace*TM System:

3.5mm BioComposite SwiveLock with FiberTape placed into fibula

Distal end of FiberTape passed through 4.75mm BioComposite

Ankle plantarflexed to gain appropriate tension on the *InternalBrace*TM

SwiveLock / FibreTape placed into the talar neck drill hole

- Post-op mobilisation in a moonboot for 7-10 days
- Commence physiotherapy at 10 days
- Biomechanical podiatric assessment at 6 weeks
- Telephone follow-up at 6 months PROMS

Results: 14 patients reported pre-op instability with 16 patients stating moderate/severe pain on daily activity..Post-operatively 13 patients were satisfied or very satisfied with surgery. 10 reporting good/very good/excellent improvement in their pain scores. 12 patients stated that they would definitely have the surgery again. At six months, there were no post-operative infections or implant failures.

Conclusion: Arthroscopic ATFL repair with *InternalBrace*TM allows early post-operative rehabilitation fully weight bearing with high patient satisfaction.

P6

Randomised controlled trial comparing corticosteroid injection for Morton's neuroma with or without ultrasound guidance - results at 12 months post-intervention

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The objective of this double-blind RCT was to assess whether ultrasound guidance improved the efficacy of corticosteroid injections for Morton's neuroma.

50 feet (40 patients) were recruited for this study. 5 cases declined further participation and were excluded.

The mean age was 57.8 years with a female preponderance (33F:12M) and patients were followed-up for 12 months. Cases were randomised to receive an ultrasound guided (Group A) or non-ultrasound guided (Group B) injection of 40mg triamcinolone acetonide and 2ml 1% lignocaine.

The mean VAS pain score improved significantly in both groups (Group A - from 64 to 29mm; Group B - from 69 to 37mm) with no statistical difference between them at all time-points. The failure rate within 12 months of treatment was 48% and 55% in Groups A and B respectively (p=0.458). The improvement in MOxFQ-Index and patient satisfaction favoured Group A in the short-term (3 months) that almost reached statistical significance (p=0.059 and 0.066 respectively). However, this difference was not observed beyond 3 months.

In conclusion, this study had shown that US guidance did not demonstrably improve the efficacy of corticosteroid injections in patients with MN.

P7

First MTPJ arthrodesis is it fused and how do we know?

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Introduction: First MTPJ arthrodesis is a treatment of arthritis, hallux valgus and hallux rigidus. However, non-union is a common complication (3.2-12%). Post-operative management of patients requires assessment of healing to guide post-operative rehabilitation and recovery. This demands radiographical assessment of union be both reliable and reproducible.

Aim: To determine the complication and non-union rate in patients undergoing first MTPJ arthrodesis at the Robert Jones and Agnes Hunt Hospital and to determine most reliable method of assessing union on plain radiographs.

Method: 124 patients undergoing isolated primary first MTPJ arthrodesis between 2008 and 2013 were identified. Clinical data of all follow up and outcomes were collected until the patient was discharged. The union rate was compare to the standard reported in the literature (3.2-12%). Post operative radiographs were reviewed independently by two orthopaedic registrars and scored according to the criteria proposed by Hammer et al (1984). An unweighted Cohens Kappa for 2 raters was used to assess interobserver reliability.

Results: 80% of patients achieved MTPJ arthrodesis with no significant complications and the average patient is discharge at 5 months. The non-union rate was 9.7 % (7% required revision surgery) and a further 8.9% required further surgery to remove metalwork. Radiographic assessment of union at 6 weeks shows only moderate inter-observer agreement. At 12 weeks the clinician's general impression or the number of cortices with a fracture line evident show substantial inter- observer agreement.

Conclusion: First MTPJ arthrodesis is a reliable treatment option however, it is important to counsel patients

about the possible complications and the recovery period (approx. 5 months). Clinicians should use the 6 weeks radiographical assessment alone to determine ongoing rehabilitation. 12 weeks radiographical assessment provide a more reliable assessment of union. This study would, therefore, strongly support all patients receiving a 12 week radiographical assessment prior to discharge.

P8

Metatarsal length in metatarsalgia: does size matter?

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Introduction: Maestro's arc has proven an invaluable tool when planning surgical correction of metatarsal (MT) length in the treatment of metatarsalgia (MTA). But 20% of patients remain symptomatic are we being presumptuous in thinking that the MT arcade is universal?

We propose a study to answer the following questions. Is the Maestro arc applicable to our population? Is there a significant difference in MT lengths when comparing those with and without metatarsalgia? Are there other significant factors responsible?

Materials and methods: Data collection was retrospective, plain radiographs and clinical notes were reviewed for elective foot and ankle clinic attendances between 2012 and 2014. Exclusion criteria were hallux valgus angle over 15°, previous surgery and gross deformity. Data analysis: parametric tests showed non-parametric data. Means were compared using Mann Whitney test for bivariable and Kurskal-Wallis tests for multivariants groups. Graphpad Prisme 5.0 software was used and 5% p value was considered significant.

Results: 173 patients were analysed (140 without MTA & 33 with MTA). Overall relative MT lengths were different between the two groups ($p < 0.01$). Dunn's post-test to compare the metatarsal length-difference between the same metatarsals in the two groups showed significant difference between 1-2 MT, 3-4MT and 4-5 MT (P was 0.025, 0.024 and 0.01 respectively). There was no difference in the 2-3 MT length ($p = 0.241$). There was no difference between the two groups in HVA ($p = 0.66$). Females had significantly higher risk of MTA when compared with males ($p = 0.015$)

Discussion: Respective metatarsal length is significant in metatarsalgia - size does matter. Female gender was also found to be associated. Our cross section of 'normal' feet without metatarsalgia yielded an arc of metatarsal lengths significantly different to maestro's arc. This may suggest we need to rethink our pre-operative planning.

P9

A comparison of postoperative footwear following forefoot surgery. A randomised control trial

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Introduction: Following forefoot surgery patients are put into an accommodative shoe for 6 weeks. Although there are various postoperative shoes available, no studies have compared these shoe for patient satisfaction, effectiveness of pain relief or relative cost. This study looks at three types of footwear, testing the null hypothesis that there is no difference in patient satisfaction or performance between post-operative shoes.

Method: NREC permission was granted for this Prospective Randomised Control Trial (12/yh/0110). Eligible patients (aged over 18, undergoing straightforward 1st ray surgery and independently mobile) were recruited from clinic by senior authors. Thirty of each footwear type (Procure Med/Surg Shoe, Darco shoe, Podalux shoe) were randomly allocated to 90 envelopes. Patients completed a pre-operative MOXFQ and were allocated a study number. Post surgery, each patient was randomly allocated one of the envelopes and fitted with the respective shoe prior to discharge. Patients were seen 6 weeks post-operatively and completed a post-operative MOXFQ and Surgical Shoe Questionnaire. Statistical analysis was carried out with a significance level set at $p < 0.05$.

Results: There was no significant difference between postoperative means, for the MOXFQ walking/standing domain ($p = 0.6789$), pain ($p = 0.5204$) or social interaction ($p = 0.6740$). There was no significant difference between the mean values for each shoe for the Surgical Shoe Questionnaire ($p = 0.2980$), nor in willingness of patients to wear the shoe again ($p = 0.3681$).

Conclusion: We accept our null hypothesis that there is no difference in patient satisfaction or performance between post-operative shoes. Patients were found to be equally satisfied with wearing any of the post-operative shoes. Provided that clinical outcome is not affected by wearing any particular shoe, the clinician is free to choose the most cost effective option or the shoe they feel is best suited to their patient.

P10

Multi centre service evaluation of the Roto-glide 1st MTP joint replacement

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Joint replacement in the 1st mtp joint remains controversial as 1st mtpj fusion yields good results but at the expense of a stiff joint. 1st mtpj replacement continues to be developed and has a place for patients who wish to retain movement and for the difficult problem of dual arthritis of the ipj and mtpj. The Roto-glide is a cementless 3 component titanium HA coated device which was developed in Denmark and has been in use there for over 14 years with reported good results. New devices should be evaluated in controlled trials so, prior to introduction into the UK, a prospective multi centre service evaluation audit was set up with a defined protocol, registered in Oswestry and conducted in 6 centres around the UK. The results of 43 Roto-glides in 43 patients, with a minimum follow up of one year, are presented. There were 14 male and 29 female patients. The minimum age was 45 and maximum 80 years with an average of 59.6 years. Follow up was from 12-29 months with an average of 16.9 months. The pre-operative AOFAS scores ranged from 17 to 67 with an average of 39.5. The post operative AOFAS scores ranged from 29 to 100 with an average of 77. Post operatively one patient developed a superficial wound infection, one developed medial sesamoiditis and one developed a 1st metatarsal stress fracture at 18 months which healed with non operative treatment. No loosening have been seen and no revisions performed. A satisfactory post operative range of movement was obtained by ensuring the components were not put in tight and mobilising the joint early and regularly. The early results encourage the longer term evaluation of the prosthesis.

P11

Silastic metatarsophalangeal joint replacement in the lesser toes: a successful salvage procedure

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Introduction: The surgical options for the degenerative lesser metatarsophalangeal joint (MTPJ) or chronically dislocated MTPJs are limited and have traditionally included metatarsal shortening procedures where minimal degenerative change is present, or excision arthroplasty with more advanced changes. Although these procedures are successful in relieving pain, they may leave the patient with a short and/or floppy toe and transfer metatarsalgia. In our institution, we offer the patient a silastic MTPJ replacement. We present our case series.

Method: We retrospectively analysed data on consecutive patients undergoing lesser MTPJ silastic replacement using the Tornier Futura™ implant under the care of one Consultant Foot and Ankle surgeon over a five year period from May 2009 to June 2014. Demographic data, complications and patient satisfaction were recorded. Patient follow-up was performed at a single point in time by telephone and patients were asked if they were overall, satisfied with the procedure and secondly if they were experiencing any pain from the replaced joint.

Results: Data was collected on 25 toes of 23 feet in 20 patients. There were 3 males and 17 females. Median age was 59 (31-85). Diagnoses included 16 chronic MTPJ dislocations, 4 congruent arthritic MTPJs, 4 joints with avascular necrosis and secondary degenerative change and 1 dropped toe from a previous attempt at excision arthroplasty. 7 patients had undergone previous forefoot surgery. No patient experienced complications. 15 patients (75%) were available for follow-up. 14 (93%) patients were satisfied with the procedure. 10(67%) patients were completely pain free, 3 patients (20%) reported occasional pain and 2 (13%) reported problems with ongoing pain.

Conclusion: Treatment of the chronically dislocated lesser toe and advanced congruent degeneration at the MTPJ can be difficult to treat especially in an isolated digit. We believe that silastic replacements offer high patient satisfaction and satisfactory pain relief.

P12

2-3 year outcomes of the Primus silastic joint replacement for degenerative disease of the 1st metatarsal phalangeal joint

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Background: Arthritis of the 1st MTPJ is common. It may occur in isolation or associated with deformity such as hallux valgus. Silastic implants have been used with good patient satisfaction but reported complications include synovitis, lymphadenopathy and implant fracture. The Primus implant (Tournier) is composed of silicone elastomer and is designed specifically for the geometry of the first MTPJ. We report the 2-3 year outcomes of

27 cases performed in our unit.

Methods: We examined 27 arthroplasties of the 1st MTPJ using the Primus implant, performed between January 2012 and March 2013. 18 were performed for isolated hallux rigidus. 5 had associated hallux valgus. 4 had associated lesser toe deformities which were also corrected. All patients had degenerative change of the joint consistent with at least grade 3.

The Manchester-Oxford foot and ankle questionnaire (MOXFQ) was obtained reflecting the preoperative period and at a minimum of 2 years post operatively.

Results: The mean pain score was 60.3 pre-operatively (range 10-80). Post operatively the mean pain score was 16.1 (Range 0- 60). The main walking /standing score preoperatively was 54.8 (range 0-84.3). Post operatively the mean score was 14.8 (range 0-50.1). The mean social score preoperatively was 40.9 (range 0-68.8). Postoperatively this fell to a score of 25.1 (range 0-62.5).

There were 2 superficial infections treated with antibiotics and dressings. There were no deep infections. There were no failures due to synovitis or cases of lymphadenopathy. One case failed due to recurrence of valgus deformity and implant failure.

Conclusion: Use of the Primus implant for arthroplasty of the 1st MTPJ can produce excellent results. Many patients reported complete resolution of symptoms. Some patients still had some pain and difficulty walking. This case series should be the basis for randomised controlled trials comparing this to other treatments.

P13

A prospective, randomised controlled trial to determine the efficacy of night splints versus the Strassburg Sock™ in the relief of heel pain in plantar fasciitis

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After a pilot study and power analysis to calculate the sample size required, a prospective, randomized controlled study of 32 patients with plantar fasciitis was performed to determine the efficacy of a dorsiflexion night splint compared with the Strassburg Sock™ in relieving heel pain. All patients were referred to physiotherapy for an eccentric stretching regime and were randomized to receive either the dorsiflexion night splint or Strassburg Sock™.

The primary outcome measure was the visual analogue score for pain (VAS) on first standing in the morning. Secondary outcomes were VAS scores for the worst pain the patient had experienced that week, Manchester/Oxford Foot Questionnaire (MOXFQ) and a patient satisfaction score. Data were recorded at 0, 6, 12 and 24 weeks.

Two patients dropped out of the study. The VAS and MOXFQ scores showed that all patients were significantly better by the end of the study. Patient satisfaction was high in both groups. There was no significant difference in any of the scores at any time point between the splint or the Strassburg Sock™ group. Either the Strassburg Sock™ or the splint can be considered as a secondary treatment in addition to eccentric stretches for initial treatment of plantar fasciitis.

P14

The effect of active toe movement (AToM) on asymptomatic deep vein thrombosis in patients with acute foot and ankle injury treated with cast - a prospective randomised controlled trial

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Patients with lower limb trauma and cast treatment are at risk of venous thromboembolism (VTE). Active toe movement reduces venous stasis with a below knee cast in situ, which may influence rates of deep vein thrombosis (DVT). Our aim was to determine the effect of an active toe movement protocol (AToM) on asymptomatic DVT rates in patients with acute foot and ankle trauma treated with below knee cast.

In this prospective randomized controlled study, 100 adult patients with acute foot or ankle trauma treated with below knee cast were recruited at the University Hospital of Wales. In accordance with NICE guidance, all patients were assessed for risk of VTE. If patients had permanent risk factors for VTE they were ineligible for the study and provided with low molecular weight heparin thromboprophylaxis. After enrolment, patients who were randomized to AToM were advised to perform regular daily toe movement exercises according to a defined protocol. On discharge from fracture clinic all patients underwent bilateral lower limb venous ultrasound to identify DVT.

78 patients of mean age 36 years (range 16-60) completed the study. 65% (n=51) were male. 59% (n=46) of patients were treated with cast for ankle fractures. 21 (27%) patients were found to have deep vein thrombosis on ultrasound examination. All of these occurred in the lower limb that had been injured and treated in cast. The DVT rate was 13/39 (33.3%) in intervention group and 8/39 (20.5%) in control group. These differences were not statistically significant (p=0.202).

Although venous stasis may be reduced by performing regular active toe movements with a below knee cast in situ, this does not appear to influence rates of DVT. Local endothelial dysfunction due to trauma may influence

the pathogenesis of DVT to a greater extent than venous stasis.

P15

Stability of Lisfranc injury fixation in their cadavers: is fixation of the third ray necessary?

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There is debate whether a home run screw (medial cuneiform to 2nd metatarsal base) combined with k-wire fixation of 4th & 5th rays is sufficient to stabilise Lisfranc injuries or if fixation of the 3rd ray is also required to fully stabilise the medial column. Unlike the 4th and 5th TMTJs, stabilisation of the 3rd ray requires either intra-articular screw fixation or bridge plating, which both risk causing chondrolysis and/or OA.

In eight Theil embalmed specimens, measurements of 1st - 2nd metatarsal gaping and TMTJ dorsal displacement were made at each ray (1st to 5th) during simulated weight bearing with sequential ligamentous injury and stabilisation to determine the contribution of anatomical structures and fixation to stability.

At baseline, the mean dorsal TMTJ displacement of the intact specimens during simulated weight bearing (mm) was: 1st: 0.14, 2nd: 0.1, 3rd: 0, 4th: 0, 5th: 0.14. The 1st-2nd IM Gap was 0mm. After transection of the Lisfranc ligament *only*, there was 1st-2nd intermetatarsal gaping (mean 4.5mm), but no increased dorsal displacement. After additional transection of all the TMTJ ligaments dorsal displacement increased at all joints (1st: 4.5, 2nd: 5.1, 3rd: 3.6, 4th: 2, 5th: 1.3). Stabilisation with the home run screw and 4th and 5th ray k-wires virtually eliminated all displacement. Further transection of the 3rd/4th inter-metatarsal ligaments increased mean dorsal displacement of the 3rd ray to 2.5mm. K-wire fixation of the 3rd ray completely eliminated dorsal displacement. The results suggest that stabilising the medial cuneiform to 2nd metatarsal base and 4/5th TMTJs with K wires will stabilise the 3rd TMTJ if the inter-metatarsal ligaments are intact. Thus 3rd TMTJ stability should be checked after stabilisation with a home run screw and k wires to the 4/5th rays. Provided the 3rd-4th intermetatarsal ligaments are intact the 3rd ray does not need to be stabilised.

P16

The effect of pre-operative tibio-talar alignment on patient reported outcomes in the mid-term following total ankle joint replacement for osteoarthritis

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Background: There is debate whether pre-operative tibio-talar (TT) mal-alignment in the coronal plane should be a contra-indication to total ankle joint replacement (TAR). This study aims to determine if, in the mid-term, there is a statistically significant difference between perceived levels of pain and function following TAR for osteoarthritis (OA) dependant on pre-operative TT alignment.

Methods: This retrospective cohort study identified 65 eligible individuals who underwent primary TAR for OA, without adjunct realignment procedure, in 2008 and 2009 at a specialist orthopaedic centre. Ethical procedures were followed, informed consent gained and participants grouped according to pre-operative alignment using a novel approach to measuring the radio-graphic TT angle (neutral group = < 5°, valgus group = >5° & varus group >5°). The EQ 5D-5L, Manchester-Oxford Foot Questionnaire (MOXFQ) and a visual analogue scale (VAS) of pain were used as patient reported outcome measures (PROMs) collected via postal questionnaire.

Results: Response rate was 67%. Mean TT angles within the groups were 2° neutral, 9° valgus and 9° varus. Median scores for the neutral, varus and valgus groups were as follows: EQ5D-5L index score = 0.71, 0.74 and 0.86, EQ5D-5L health score = 80, 75 and 70, MOXFQ = 16, 8 and 6.5 with VAS = 2.6, 1.2 and 1.3 respectively. PROM data was analysed using a non-parametric Kruskal-Wallis one-way analysis of variance test with a p value of < 0.08, in which the EQ5D-5L index score = 0.301, EQ5D-5L NRS = 0.874, MOXFQ = 0.294 and VAS = 0.452. No statistically significant difference was observed between the 3 groups. Inter-rater reliability of measuring TT angle was excellent with a correlation coefficient of 97%.

Conclusion: Moderate coronal plane pre-operative TT mal-alignment does not have a significant impact on patient reported outcomes in the mid-term following TAR should not be considered a contra-indication to surgery.

P17

The locked intramedullary fibula nail: a biomechanical cadaveric evaluation

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Introduction: Locked intramedullary nail fixation of fibula fractures has many attractive qualities. Not only is it a minimally invasive procedure but, as a consequence of its location, there is little prominent metalwork.

Hypothesis: To date there are no biomechanical studies assessing the strength of fixation in a rotational torque where previous generations of smooth, unlocked intramedullary devices have failed. Prior to recommending this treatment modality we aimed to assess whether there is a biomechanical advantage to fixing the most common unstable ankle fracture - the OTA 44-B2 - with an intramedullary device in a cadaveric model.

Methods: Twenty cadaveric lower limbs (ten cadavers) had an OTA 44-B2 type injury created surgically with a fibula osteotomy and appropriate soft tissue release. The deep deltoid was preserved to represent fixation of the medial side. One leg was randomly allocated to fixation with a locked intramedullary fibula nail and the other a lag screw (3.5mm) and neutralisation plate (one-third tubular). A tensile tester subjected all samples to an axially loaded (800Nm) supination external rotation force (30deg/s) to failure (point of sudden downturn in torque).

Results: Superior ultimate tensile strength and energy absorption were seen in the nail group (Students't-test, $p=0.03$ and 0.07 respectively). This equated to a mean improvement in biomechanical properties of approximately 20%.

Conclusion: Enhanced biomechanical attributes are of particular advantage when managing osteoporotic ankle fractures. The results of this study complement the growing body of research recommending the fibula nail.

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Timely recognition and reduction of ankle fracture-dislocation may have an impact on mid-term patient reported outcomes

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Introduction: Significantly displaced ankle fractures frequently suffer a delay to manipulation whilst waiting for x-rays, with the potential for worsening soft tissue trauma.

The purpose of this study was to establish how often ankle fracture-dislocations presenting to the emergency department (ED) are identified and reduced on clinical assessment alone; and does performing an x-ray before reduction lead to a less favourable patient reported outcome.

Method: Radiographs were assessed for all patients who had an ankle fracture fixation at the Leicester Royal Infirmary between March 2012 and February 2013. Ankle fractures with significant displacement or those already in a cast (after manipulation) on the initial radiographs were selected for further analysis. In addition the patient reported outcomes measured were Lower Extremity Functional Scale (LEFS) and Olerud-Molander Ankle Scores (OMAS).

Results: One hundred and nineteen patients were identified for analysis. 62 patients had significantly displaced ankle fractures not in a cast on initial radiographs, whilst 57 were. There was no difference in the likelihood of the initial fracture manipulation being successful between these two groups. ($P=0.8507$). On average, from the time of arrival to hospital, it took over an hour longer for a patient, who was initially sent to x-ray, to have a radiograph confirming an adequately reduced ankle mortice post manipulation ($p=0.0024$). 67 of 119 patients responded to the postal questionnaires. LEFS and OMAS scores at 2 years were better in patients who underwent early reduction that was successful on the first attempt, without pre-manipulation radiographs.

Conclusion: Pre-manipulation x-rays did not improve the chance of a successful initial attempt at fracture reduction. However, the time to achieve a reduced ankle mortice was significantly longer when x-rays were first performed. The delay appears to have an impact on mid-term patient reported outcomes.

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Weight-bearing CT delineates the anatomy of the syndesmosis

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The syndesmosis is critical to ankle stability. Syndesmotic injuries are common and frequently undetected. Historically, radiographic measurements have been undertaken to assess the integrity of the syndesmosis, but have been shown to be unreliable. The advent of cross-sectional imaging has enabled better visualisation of the syndesmosis. Several previous studies have described the normal syndesmotic anatomy on CT. These, however, all describe non-weight-bearing information, and may not simulate the true functional anatomical pattern of the syndesmosis.

The pedCAT standing CT scanner (Curvebeam, USA) is a novel technology that allows 3D CT imaging in the axial, sagittal and coronal planes with full weight-bearing. This study aims to assess and describe the normal anatomy of the syndesmosis during weight-bearing on standing CT scan. This has not been done before. It also reports the inter-and intra-observer reliability of the measurements taken.

Weight-Bearing CT scans were assessed in 25 randomly selected subjects (50 feet), with an equal gender split. The scans were taken for forefoot pathology unrelated to the ankle, hindfoot or syndesmosis. Measurements were taken according to the validated method described by Nault (2013). These were performed 9.45mm

proximal to the tibial plafond. Six measurements and two angles were identified to assess the antero-posterior and medial-lateral translations of the fibula relative to the incisura, and the fibula rotation. Images were independently reviewed by two observers. Measurements were taken twice by each investigator at six weekly intervals. Inter- and intra-observer reliability were high, thus validating the methodology used. This is the first study to assess the ankle syndesmosis on weight-bearing CT, and provides a comparison with existing non-weight bearing studies. Weight-Bearing CT may enable subtle changes at the injured syndesmosis to be identified, by comparing affected and unaffected ankles, or as a post-operative tool to assess accurate reduction of the injured syndesmosis.

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Outcome of operatively treated os calcis fractures - the Southampton experience

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This is a retrospective review of 80 intra articular calcaneal fractures treated by open reduction and internal fixation by a single surgeon in a tertiary centre between 2005 and 2014. The fractures were evaluated with plain radiographs and CT scan and graded using Eastwood Atkins classification. A lateral approach was used and all fractures were fixed with calcaneal plates.

All cases had clinical and radiological follow up. Clinical assessment included Foot and Ankle Disability Index and SF 36 scores.

The mean follow up was 63 months (3-121). Average age of patients was 49 (17 - 73) There were 3 open fractures and 8 patients had other injuries. The mean Bohler's angle improved from 6 degrees preoperatively to 26 degrees post operatively. Mean Foot and Ankle Disability index scores were 78.62 and SF 36 scores were 45.5 (physical component) and 52.6 (mental component).

Early complications included 1 case of screw in subtalar joint, 1 Sural Nerve injury and 1 wound breakdown, which healed with non operative measures. 12 patients had symptomatic subtalar joint osteoarthritis out of which 4 had subtalar fusion. These results compare favourably with peer-reviewed literature. We recommend prompt osteosynthesis in intra articular calcaneal fractures to restore hind foot shape and Bohler's angle.