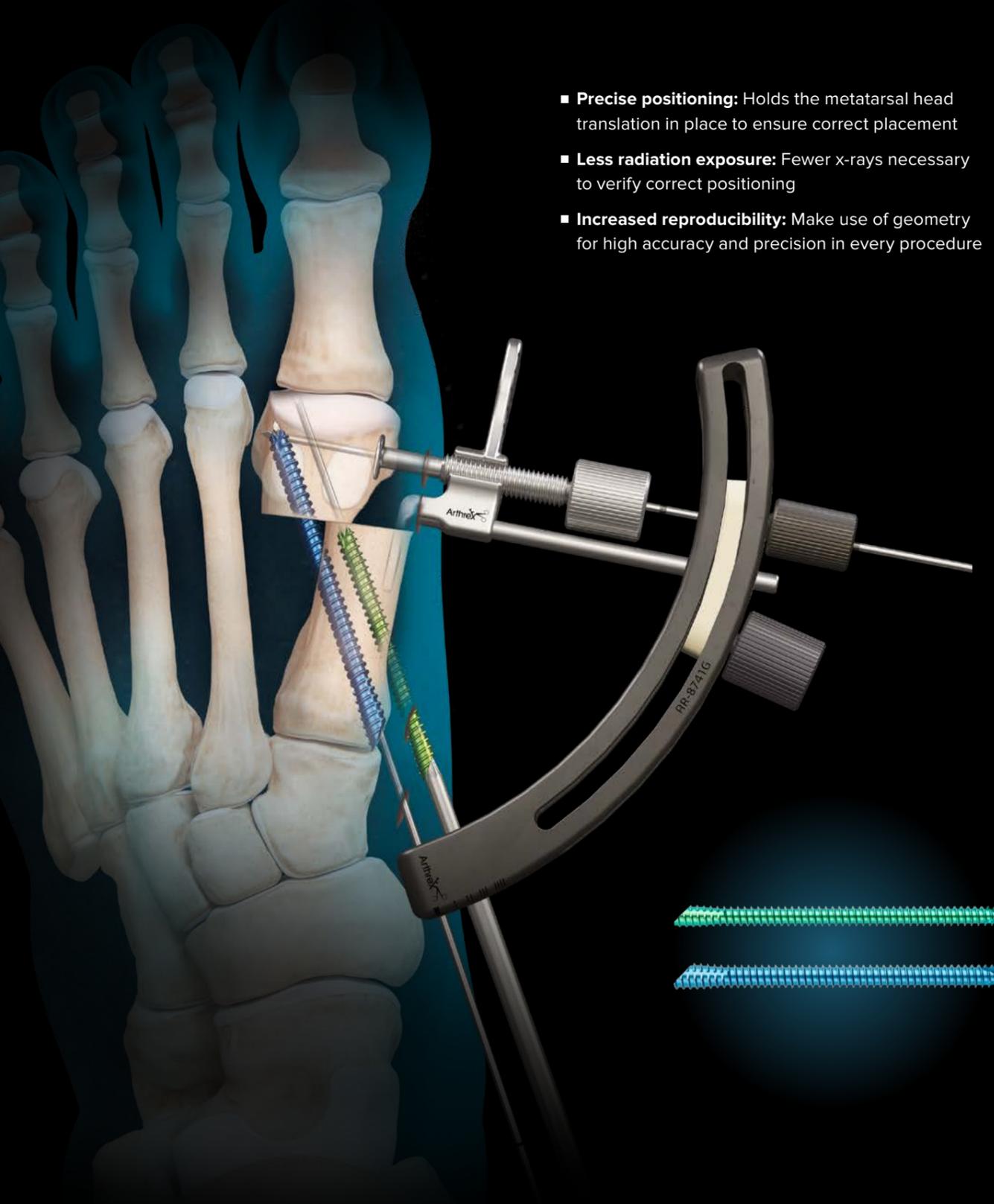


MIS Bunionectomy

On-Point Correction

- **Precise positioning:** Holds the metatarsal head translation in place to ensure correct placement
- **Less radiation exposure:** Fewer x-rays necessary to verify correct positioning
- **Increased reproducibility:** Make use of geometry for high accuracy and precision in every procedure



B FAS

FREE PAPERS ABSTRACT DETAILED

FREE PAPER SESSION 1

Wednesday 8th March 2023

FP1

Incidence, demographics, characteristics and management of acute Achilles tendon rupture

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Introduction: Achilles tendon rupture (ATR) account for 10.7% of all tendon and ligament injuries and causes lasting muscular deficits and have a profound impact on patients' quality of life^{1,2}. The incidence, characteristics and management of ATR in the United Kingdom is poorly understood.

Method: Data was collected prospectively from University Hospitals of Leicester Emergency Department (ED) between January 2016 and December 2020 and analysed retrospectively. The medical records were reviewed to determine management protocols (surgical/non-surgical) and limited mobilisation (VACOPed™ boot) duration. Leicestershire population data was taken from Leicestershire County Council demography report³.

Findings: 277 individuals were diagnosed with an ATR during the 4-year period. The mean (SD) annual incidence was 56 (±6) ATR. An incidence rate of 8.02 per 100,000 people per annum. The average characteristics of those experiencing an ATR is male (78.3%), 46.8yrs old (±14.4), body mass index 29.1 (±6.3). Median (IQR) number of comorbidities 1 (2) and duration to present to ED was 0 days (1). The main mechanism of rupture was sporting activity (62.1%).

97.4% were non-surgically managed using a limited mobilisation boot (VACOPed). The boot was worn for an average of 62.6 days (±8.9).

94 participants provided pre-ATR Achilles symptoms data. 16% (n=15/94) of participants reported a previous contralateral ATR. 7.4% reported a re-rupture (n=7/94). 15.4% (n=14/91) reported an Achilles tendinopathy on the ipsilateral side prior to ATR. 7.7% (n=7/91) reported bilateral Achilles tendinopathy and 1.1% (n=1/91) reported contralateral Achilles tendinopathy prior to ATR.

Conclusion: The incidence of ATR is 8.02 cases per 100,000 people per annum. This is the first UK data on ATR incidence. Most ATR were managed non-surgically in this cohort. The majority of ruptures occurred during sporting activity. Those that had previous Achilles symptoms (24.2%) indicate tendons are not always asymptomatic prior to ATR.

FP2

Partial Achilles Tendon Tear – a figure of our IMAGination?

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Aim: Our collaborative study aims to demonstrate that acute partial Achilles Tendon Tears (ATTs) are not separate diagnostic entities from full ATTs. and should be thought of as a continuum rather than binary partial or full.

Methods: We pooled anonymised data from four hospitals, identifying patients with acute partial ATTs on USS reports from 2019-2021. Patients were only included if they had an acute injury and no previous background Achilles tendinopathy.

Results: 91 patients had acute partial ATTs reported on USS. 74/91 (81%) of patients had clinical findings in keeping with a full ATT (positive Simmonds test, palpable gap). 88/91 (97%) of patients were managed according to local full ATT protocols. 2 patients had MRIs – one showed no tear, the other showed a full rupture. 2 patients underwent surgical repair and both intra-operatively were found to have full ATTs.

Conclusion: Our regional data suggests that a significant proportion (81%) of USS diagnosed partial ATTs may in fact be misdiagnosed full ATTs. All injuries clinically suspicious for an ATT should be managed according to local Achilles Protocol. USS is useful to diagnose the presence or absence of a tear but is not good at differentiating partial vs full tear. There is significant tendon end fibrillation and overlap on USS of an acute full ATT, which can give the impression of a partial ATT. More research is needed into whether any threshold exists to support the current distinction of "partial" and "full" as relates to management and outcomes.

FP3

PATH-2 trial: platelet rich plasma for acute Achilles tendon rupture, two-year follow-up of the randomised, placebo-controlled, superiority trial

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Background: The PATH-2 trial found no evidence of a benefit of Platelet Rich Plasma (PRP) injection versus a placebo after Achilles tendon rupture (ATR) at six-months. ATR often leave longer-term functional deficiencies beyond six-months. This study aim is to determine if PRP affect tendon functional outcomes at two-years after ruptu

Study design: Randomised multi-centre two-arm parallel-group, participant- and assessor-blinded, superiority trial.

Methods: Adults with acute ATR managed non-surgically were recruited in 19 UK hospitals from 2015 to 2019. Exclusions were insertion or musculotendinous injuries, leg injury or deformity, diabetes, haematological disorder, corticosteroids and anticoagulation therapy. Participants were randomised via an online system 1:1 to PRP or placebo. Primary outcome was Achilles Tendon Rupture Score (ATRS) at two-years. Secondary outcomes were pain, Patient-Specific Functional Scale (PSFS), SF-12 and re-rupture. Assessors were blinded. Intention-to-treat and Compliance Average Causal effects (CACE) analyses were carried out. Consistency of effects across subgroups age, BMI, smoking and gender were assessed using Forest plots. Pearson's correlation was used to explore ATRS correlation with blood and growth factors.

Results: 216/230 (94%) participants completed the 6-months follow-up were contacted. 182/216 (84%) completed the two-year follow-up. Participants were aged mean 46 (SD 13.0), 57 female/159 male. 96% received the allocated intervention. Two-years ATRS scores were 82.2 (SD 18.3) in the PRP group (n=85) and 83.8 (SD 16.0) in the placebo group (n=92). There was no evidence of a difference in the two-years ATRS (adjusted-mean difference -0.752 95%CI -5.523 to 4.020, p=0.757), or in any secondary outcome, and no re-rupture between at two-years. Neither PRP cellular or growth factors correlated with the two-year ATRS.

Conclusion: PRP did not improve patient-reported function or quality of life two-years after acute Achilles tendon rupture, compared with placebo, indicating that PRP offers no patient benefit in the longer term.

FP4

Is Internal Brace Augmentation (IBA) better than isolated Modified Brostrom Gould (MBG) repair for chronic lateral ligament injury: a retrospective analysis

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Introduction: Acute ankle injuries are commonly seen in musculoskeletal practice. Surgical management is the gold standard for lateral ligament injury in those with failed conservative treatment for a minimum of six months. Several studies have shown good functional outcome and early rehabilitation after MBG repair with an internal brace augmentation which is a braided ultrahigh molecular weight polyethylene ligament used to enhance the repair that acts as a secondary stabiliser. Hence the aim of the study was to compare the results with and without augmentation.

Methods: A single centre retrospective review conducted between November 2017 and October 2019 and this included 172 patients with symptomatic chronic lateral ligament instability with failed conservative management. The diagnosis was confirmed by MRI. All patients had an ankle arthroscopy followed by open ligament repair. Patients were grouped into isolated MBG and internal brace groups for analyses and all had dedicated rehabilitation.

Results: A total of 148 patients were available for final follow up with 87 patients in the MBG group and 61 patients in the IBA group. Mean Age was 38 years and mean follow up was 22 months. The internal brace group showed better Manchester Oxford foot and ankle score (19.7 vs 18.2) and more patients returning to preinjury activity levels (73 vs 55) as compared to isolated repair.

Conclusion: Internal brace augmentation with MBG repair facilitated early rehabilitation and return to pre injury activity level in majority of patients compared to isolated MBG repair.

FP5

Effect of fibula shortening on medial clear space and lateral translation of the talus: an anatomical cadaveric study

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Introduction: Fibula shortening with an intact anterior tibiofibular ligament (ATFL) and medial ligament instability causes lateral translation of the talus. Our hypothesis was that the interaction of the AITFL tubercle of the fibula with the tibial incisura would propagate lateral translation due to the size differential.

Aim: To assess what degree of shortening of the fibula would cause the lateral translation of the talus.

Methodology: Twelve cadaveric ankle specimens were dissected removing all soft tissue except for ligaments. They were fixed on a specially-designed platform within an augmented ankle cage allowing tibial fixation and free movement of the talus. The fibula was progressively shortened in 5mm increments until complete ankle dislocation. The medial clear space was measured with each increment of shortening.

Results: The larger AITFL tubercle interaction with the smaller tibial incisura caused a significant increase in lateral translation of the talus. This occurred in most ankles between 5-10mm of fibular shortening. The medial clear space widened following 5mm of shortening in 5 specimens (mean=2.0725, SD=±2.5338). All 12 specimens experienced widening by 10mm fibula shortening (Mean=7.2133mm, SD=±2.2061). All specimens reached complete dislocation by 35mm fibula shortening. Results of ANOVA analysis found the data statistically significant (p<0.0001).

Conclusion: This study shows that shortening of the fibula causes a significant lateral translation of the talus provided the ATFL remains intact. Furthermore, the interaction of the fibula notch with the ATFL tubercle of the tibia appears to cause a disproportionate widening of the medial clear space due to its differential in size. Knowledge of the extent of fibula shortening can guide further intervention when presented with a patient experiencing medial clear space widening following treatment of an ankle fracture.

FP6

HARnT-2 hindfoot nail or pro-tibial screw fixation for early mobilisation: multi-centre comparative study of utilisation & outcomes in complex ankle fractures

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Introduction: Hindfoot intramedullary nail fixation (HFN) or fibula pro-tibial screw fixation (PTS) are surgical options for ankle fractures in patients with multiple co-morbidities; we compared their outcomes.

Methods: A retrospective review of 135 patients who underwent HFN fixation (87 patients) or PTS fixation (48 patients) for ankle fractures (AO/OTA A/B/C) from 5 major trauma centres. Patient demographic data, co-morbidities, Charlson Co-morbidity Index Score (CCIS), weight-bearing, and post-operative complications were recorded. Radiographs were assessed for non-union and anatomical reduction.

Results: HFN estimated 10-year survival was 27±31% and was 48±37% for PTS (p<0.001). Average time to full weightbearing (FWB) in the HFN group was 1.7±3.3 weeks compared to 7.8±3.8 weeks in the PTS group (p<0.001). Despite this, HFN fixation carried a greater VTE risk (p=0.02). HFN accompanied by joint preparation had greater risk of infection (p=0.01), metalwork failure (p=0.02) and wound breakdown (p=0.01). The overall complication rate in diabetic patients was 56%, but 76% in HFN patients. In the HFN group 17 (20%) patients died at 1 year. Patients with open fractures (p=0.01), dementia (p<0.05), and a higher CCIS (p=0.04) were more likely to die after HFN surgery. Age and co-morbidity matched data showed a higher rate of complications and mortality in those above 75 years fixed with a HFN, irrespective of CCIS. In those between 60-75 years, there was a greater risk of superficial infection and mortality after HFN, irrespective of CCIS. These complications were not seen after PTS.

Conclusion: HFN carries a greater risk of superficial infections, VTE and mortality compared to PTS, independent of age and CCIS. Diabetes leads to a greater comparative risk of deep infections, wound breakdown and non-union in HFN. Alternative methods of fixation (e.g. PTS) should be considered before HFN. HFN may be suitable in selective indications where other methods are not appropriate.

FP7

The acute management of pilon fractures (ENFORCE) study: a trainee led national collaborative evaluation of practice

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Introduction: Tibial Pilon fractures are potentially limb threatening, yet standards of care are lacking from BOFAS and the BOA. The mantra of “span, scan, plan” describes staged management with external fixation to allow soft tissue resuscitation, followed by a planning CT-scan. Our aim was to evaluate how Tibial Pilon fractures are acutely managed.

Methods: ENFORCE was a multi-centre retrospective observational study of the acute management of partial and complete articular Tibial Pilon fractures over a three-year period. Mechanism, imaging, fracture classification, time to fracture reduction and cast, and soft tissue damage control details were determined.

Results: 656 patients (670 fractures) across 27 centres were reported. AO fracture classifications were: partial articular (n=294) and complete articular (n=376). Initial diagnostic imaging modalities were: plain radiographs (n=602) and CT-scan (n=54), with all but 38 cases having a planning CT-scan. 526 fractures had a cast applied in the Emergency Department (91 before radiological diagnosis), with the times taken to obtain post cast imaging being: mean 2.7 hours, median 2.3 hours, range 28 mins – 14 hours). 35% (102/294) of partial articular and 57% (216/376) of complete articular (length unstable) fractures had an external fixator applied, all of which underwent a planning CT-scan. Definitive management consisted of: open reduction internal fixation (n=495), fine wire frame (n=86), spanning external fixator (n=25), intramedullary nail (n=25), other (n=18).

Conclusion: The management of Tibial Pilon fractures is variable, with prolonged delays in obtaining post cast reduction radiographs, and just over half of length unstable complete articular fractures being managed with the gold standard “span, scan, plan” staged soft tissue resuscitation. A BOFAS endorsed BOAST (British Orthopaedic Association Standard for Trauma) for Tibial Pilon fractures is suggested for standardisation of the acute management of these potentially limb threatening injuries, together with setting them apart from more straightforward ankle fractures.

FP8

Lateral column midfoot injury. Do they all need fixation?

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Background: Research on midfoot injuries have primarily concentrated on the central column and the Lisfranc ligament without amassing evidence on lateral column injuries. Lateral column injuries have historically been treated with Kirschner wire fixation when encountered.

Objective: Our aim in this study was to analyse lateral column injuries to the midfoot, their method of treatment and the radiological lateral column outcomes. Our null hypothesis being that fixation is required to obtain and maintain lateral column alignment.

Methods: Data was retrospectively collected from four centres on surgically treated midfoot fracture dislocations between 2011 and 2021. Radiographs were analysed using departmental PACS. All statistics was performed using SPSS 26.

Results: A total of 235 cases were diagnosed as having a lateral column injury out of the 409 cases included. On cross tabulation, there was a significant association with having a central column injury (234/235, p<.001) and 70% of cases (166/235) also had an additional medial column injury.

Of the 235 lateral column injuries, data was available regarding fixation radiographic alignment on 222 cases. There were 44 cases which underwent Kirschner wire fixation, 23 plate fixations and 3 screw fixations. Lateral column alignment loss was seen in 2.84% (4/141) of those which didn't undergo fixation, 13.64% (6/44) which underwent K wires, and 0 % in those fixed by screws or K wires.

Conclusion: Lateral column injury occurs in over half of midfoot fractures in this study. It rarely occurs alone and is most commonly related to three column injuries. Nevertheless, following stabilisation of the central column, additional fixation of injuries to the lateral column do not appear beneficial. The use of a bridge plate to fix the central column appears protective and purely ligamentous injury was a higher risk than an injury that included the bone.

FP9

Long term follow-up of complex calcaneal osteomyelitis treated with modified Gaenslen approach

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Background: The treatment of chronic calcaneal osteomyelitis is a challenging and increasing problem because of the high prevalence of diabetes mellitus and operative fixation of heel fractures. In 1931, Gaenslen reported treatment of hematogenous calcaneal osteomyelitis by surgical excision through a midline, sagittal plantar incision. We have refined this approach to allow successful healing and early mobilization in a modern series of complex patients with hematogenous, diabetic, and postsurgical osteomyelitis.

Methods: Twenty-eight patients (mean age 54.6 years, range 20-94) with Cierny-Mader stage IIIB chronic osteomyelitis were treated with sagittal incision and calcaneal osteotomy, excision of infected bone, and wound closure. All patients received antibiotics for at least 6 weeks, and bone defects were filled with an antibiotic carrier in 20 patients. Patients were followed for a mean of 31 months (SD 25.4). Primary outcome measures were recurrence of calcaneal osteomyelitis and below-knee amputation. Secondary outcome measures included 30-day postoperative mortality and complications, duration of postoperative inpatient stay, footwear adaptations, mobility, and use of walking aids.

Results: All 28 patients had failed previous medical and surgical treatment. Eighteen patients (64%) had significant comorbidities. The commonest causes of infection were diabetes ± ulceration (11 patients), fracture-related infection (4 patients), pressure ulceration, hematogenous spread, and penetrating soft tissue trauma. The overall recurrence rate of calcaneal osteomyelitis was 18% (5 patients) over the follow-up period, of which 2 patients (7%) required a below-knee amputation. Eighteen patients (64%) had a foot that comfortably fitted into a normal shoe with a custom insole. A further 6 patients (21%) required a custom-made shoe, and only 3 patients required a custom-made boot.

Conclusion: Our results show that a repurposed Gaenslen calcanectomy is simple, safe, and effective in treating this difficult condition in a patient group with significant local and systemic comorbidities.

FREE PAPER SESSION 2

Thursday 9th March 2023

FP10

What do BOFAS members perceive to be the barriers and facilitators of day-case surgery for major foot and ankle procedures? A scoping survey of surgeons

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Introduction: Recent advances in minimally invasive surgery and improved post-operative pain management make it possible to perform major foot/ankle operations as day-case. This could have significant impact on length of stay, saving resources and is in keeping with government policy. However, there are theoretical concerns about complications and low patient satisfaction due to pain.

Methods: The survey was developed following review of the literature and was approved for distribution by the BOFAS (British Orthopaedic Foot & Ankle Society) scientific committee. An online survey (19 questions) was sent to UK foot and ankle surgeons via the BOFAS membership list. Major foot/ ankle procedures were defined as surgery that is usually performed as an inpatient in majority of centres and day-case as same day discharge, with day surgery as the intended pathway.

Results: A total of 132 surgeons responded, 80% from Acute NHS Trusts. The majority (78%) thought that more procedures could be performed as day-case at their centre. Currently 45% of respondents perform less than 100 day-case surgeries per year for these procedures. Despite post-operative pain and patient satisfaction being theoretical concerns for day-case surgery in this population; these outcomes were only measured by 34% and 10% of respondents respectively. The top perceived barriers to performing more major foot and ankle procedures as day-case were: Lack of physiotherapy input pre/post-operatively (23%), Lack of out of hours support (21%).

Conclusions: There is consensus among surgeons to do more major foot/ ankle procedures as day-case. Despite theoretical concerns about post-operative pain and satisfaction this was only measured by a third of those surveyed. Out of hours support and physiotherapy input pre/ post-op were perceived as the main barriers. There is a need to scope the provision of physiotherapy pre/post-operatively and out of hours support at sites where this is a perceived barrier.

FP11

Towards understanding Müller-Weiss disease: a universal platform

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Background: The only existing classification of Müller-Weiss Disease (MWD), based solely on Méary's angle, serves neither as guide for prognosis nor treatment. This accounts for lack of gold standard in its management.

Methods: Navicular compression, medial extrusion, Kite's angle and metatarsal lengths were measured on all radiographs of 95 feet with MWD. Joints involved, presence and location of navicular fracture were recorded.

Results: We identified three distinct groups.

Group 1 comprises 11 "early-onset" MWD feet, aged 9 to 29 years. These had the greatest compression and medial extrusion, and lowest Kite's angles. All except 1 were index minus and had a lateral navicular fracture. None has required surgery to date. Only 1 has moderate talonavicular joint (TNJ) degeneration.

Group 2 comprises 23 "Müller-Weissoid" feet with radiologically normal navicular in their fifties and developing MWD, on average, 4.5 years later. These had the lowest compression and extrusion, and highest Kite's angles. None had complete fracture. All had TNJ arthritis, with early changes at lateral naviculocuneiform joint (NCJ) in 43%.

Group 3 "late-onset" MWD, presenting in the sixth decade, is subdivided into 3 sub-groups. Only TNJ is involved in group 3A (16). Group 3B denotes affection of TNJ more than NCJ (20). In group 3C "reverse Müller-Weiss disease", which affects NCJ more than TNJ (25), second metatarsal overlength is highest of all groups. No difference in age, compression, extrusion and Kite's angle exists among the 3 subgroups. No fracture occurred in group 3A compared to 65% and 32% in groups 3B and 3C, respectively.

Conclusions: With a need to compare like-for-like pathology, the proposed classification provides a common platform for reporting outcomes of different treatment modalities, operative or nonoperative. We theorize pathogenetic pathways in the different groups and propose systematic surgical approaches for each category.

FP12

Outcomes of tenosynovial giant cell tumour of the foot & ankle

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Background: Tenosynovial giant cell tumour (TGCT) is a benign proliferative disease affecting synovial membranes. There are two forms, localised and diffuse, which although histologically similar are managed differently. It is locally invasive and is treated in most cases by operative excision. The aim of this study was to assess outcomes from the largest single-centre experience to date in patients with this condition.

Methods: A retrospective analysis of 123 cases was performed in patients treated between 2003 and 2019 with TGCT of the foot and/or ankle. Data was collected on age at presentation, radiological pattern of disease, location of disease, treatment provided and recurrence rates. The minimum follow-up was 2 years with a mean of 7.7 years.

Results: 47 male and 76 female patients with a mean age at diagnosis of 39 (range, 11-76) years were identified. 85 (69.1%) cases were categorised as localised and 38 (30.9%) were diffuse. Half of the cases presented in the ankle (62/123, 50.4%). 89% (110) of patients underwent open operative excision of the lesion. Radiotherapy was used in 2 cases for recurrent disease. Pain was the most common postoperative symptom which developed in 20% (22/110) of cases). 13 cases were managed nonoperatively where symptoms were minimal, with one case requiring surgery at a later date. Disease recurrence was 3.5% (3/85) in localised disease and 36.8% (14/38) in diffuse disease giving an overall recurrence rate of 13.8% (17/123).

Conclusion: The outcomes of TGCT management are dependent on the type of disease, the extent of preoperative erosive changes and the presence of pre-operative pain. We present a summary of recommended management based on the experience from this single tertiary centre.

FP13

The importance of anatomical Charcot reconstruction utilising standardised osteotomies to improve surgical outcomes

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Introduction: Charcot neuroarthropathy is a debilitating condition that frequently leads to skeletal instability, and has an increased risk of ulceration leading to infection and amputation. However, surgical reconstruction may offer limb salvage and restauration of an ulcer-free, plantigrade stable foot for functional weight-bearing. We report on our case series according to a prospective protocol and analyse factors leading to a favourable outcome.

Methods: We report a prospective follow-up of 62 patients undergoing Charcot reconstruction, May 2014- Jan 2022, by two surgeons. Peripheral vascular disease was routinely assessed using Duplex scan and major arterial disease was treated before reconstruction. Utilising 3D modelling, pre-operative planning and standardised osteotomies, we performed anatomical correction with radiological evidence. Definitive fixation was undertaken with internal fixation to stabilise the hindfoot. Multivariate analysis was performed to assess risk factors for failure (P>0.05 statistical significance).

Results: 59 feet were included, 3 patients did not progress to definitive surgery and 3 patients had bilateral surgery. 62.7% patients were male with an average age of 56, 88.13% had Type 2 diabetes, 56% were hypertensive, 14% were on dialysis. Twenty (54.1%) single stage reconstructions had pre-operative ulceration, 3 pts had ischaemic heart disease and 36 pts had evidence of peripheral arterial disease.

81% of patients achieved normalisation of the 3 out of 4 anatomical angles (P<0.05). Two patients (3.1%) required metalwork removal for infection and limb salvage, 11 (18.6%) had delayed wound healing. Survivorship was 97% at 3yrs, and 94% at 6yrs, however if pre-existing vascular disease was present, it was 94% at 3yrs 85.3% at 6yrs. All patients were mobile at a 3 years mean follow up.

Conclusion: Careful patient selection, multidisciplinary team and anatomic reconstruction led to predictable outcomes and functional limb salvage. Pre-operative vascular compromise led to a slight reduction in survivorship, but no major amputation.

FP14

Neglected and relapsed clubfoot in adults, the functional outcome of acute surgical correction

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Background: Neglected clubfoot in this series is defined as untreated equino-cavo-adducto-varus in older children, or adults. Relapsed clubfoot is the residual deformity that remains after single or multiple surgical interventions. Severe neglected clubfoot rarely exists today in developed countries, except in some emigrants from low- and middle-income countries. Acute surgical management with corrective mid-foot osteotomy and elongation of the Achilles tendon has excellent functional outcome.

Objective: To assess the functional outcome of acute correction of neglected Talipes-quino-varus deformity in adults.

Methods: This is cross sectional, hospital-based study that took place in Khartoum, Sudan. Forty patients were included in this study. Midfoot osteotomy and elongation of the Achilles tendon were performed to all patients. Data was collected using a questionnaire and the functional outcome has been assessed using the American Orthopaedic Foot and Ankle Society Score (AOFAS). This score was measured before surgery and one years after surgery.

Results: The mean age was 19.9±4.7 years. Males were 25 (62.5%) and females were 15 (37.5%). The mean preoperative AOFAS score was 37.7±7.1 (poor). This score improved to 80.7±13.7 (good to excellent), two years after surgery. However, this indicates significant change in the functional outcome after the operation (P value < 0.05). Excellent post-operative functional outcome was found among patients aged 18 – 23 years 18 (50%) P. value: 0.021. The majority of patients 36(90%) were fully satisfied with the operation, 2(5%) partially satisfied and 2(5%) were unsatisfied.

Conclusion: Acute correction of neglected and relapsed TEV with elongation of the Achilles tendon and single midfoot osteotomy has excellent functional outcome as assessed by AOFAS Score. The satisfaction with this procedure is impressive. The younger age population showed better outcomes with this procedure.

FREE PAPER SESSION 3

Friday 10th March 2023

FP15

Structural validation of the Manchester-Oxford Foot Questionnaire (MOxFQ) for use in foot and ankle surgery

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Background: The Manchester-Oxford Foot Questionnaire (MOxFQ) is a condition specific patient reported outcome measure (PROM) for foot and ankle surgery. It consists of 16 items across three subscales measuring distinct, but related traits: walking/standing ability, pain, and social interaction. Although it is the most used foot and ankle PROM in the UK, initial MOxFQ validation involved analysis of only 100 individuals undergoing hallux valgus surgery. This project aimed to establish whether an individual's response to the MOxFQ varies with anatomical region of disease (measurement invariance), and to explore structural validity of the factor structure (subscale items) of the MOxFQ.

Methods: This was a single-centre, prospective cohort study involving 6640 patients (mean age 52, range 10-90 years) presenting with a wide range of foot and ankle pathologies between 2013 and 2021. Firstly, to assess whether the MOxFQ responses vary by anatomical region of foot and ankle disease, we performed multi-group confirmatory factor analysis. Secondly, to assess the structural validity of the subscale items, exploratory and confirmatory factor analyses were performed.

Results: Measurement invariance by pathology was confirmed suggesting the same model can be used across all foot and ankle anatomical regions. Exploratory factor analysis demonstrated a 2-3 factor model, and suggested that item 13 (inability to carry out my work/everyday activities) and item 14 (inability to undertake social/recreational activities) loaded more positively onto the walking/standing subscale than their original social interaction subscale.

Conclusions: This large-cohort study supports the current widespread use of the MOxFQ across a broad range of foot and ankle pathologies. Items 13 and 14 might be better moved from the "social interaction" to the "walking/standing" subscale and this may have future implications for deriving/analysing subscale scores.

FP16

Clinical outcomes of autologous osteochondral transplantation for osteochondral lesions of the talus: an age-based multivariable analysis

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Introduction: The purpose of this study was to examine trends in patient characteristics and clinical outcomes that occur with age as a statistical variable when performing autologous osteochondral transplantation (AOT) for the treatment of osteochondral lesions of the talus (OLT).

Methods: A retrospective cohort study for AOT procedures on 78 patients from 2006 to 2019. was conducted Clinical outcomes were evaluated via FAOS scores. A multivariable linear regression was used to assess the independent factors predictive of the first post-operative FAOS after AOT. The independent variables included pre-operative FAOS, age, defect size, shoulder lesion, cystic lesion, prior traumatic injury, and history of microfracture surgery. A p-value <.05 was considered significant and 95% confidence limits (95% CL) for regression coefficient estimates (est.) were calculated.

Results: 78 patients were included with a mean age of 35.5 ± 13.6years at a mean follow-up was 54.4 ± 18.9 months. The mean pre-operative FAOS was 54.3 ± 19.4 and the mean post-operative FAOS was 83.4 ± 13.6. The mean defect size was 109.3±62.4 mm². The multivariable linear regression showed that the pre-operative FAOS was associated with a higher post-operative FAOS (est., 95% CL: 0.16, 0.012 - 0.307; p=0.034). Defect size (est., 95% CL: -0.05, -0.097 - -0.003; p=0.0358), having a shoulder lesion (est., 95% CL: -9.068, -15.448 - -2.688; p=0.006), or having a prior microfracture surgery (est., 95% CL: -7.07, -13.118 - -1.021; p=0.0226) were associated with a lower post-operative FAOS.

Conclusion: Patient age was not an independent risk factor for inferior clinical outcomes after AOT for OLT. Additionally, cystic lesions, or lesions with a traumatic aetiology were not significantly associated with post-operative FAOS. Having a shoulder lesion had the largest marginal effect on post-operative FAOS. These findings provide important information for providers when counseling and selecting patients for AOT procedure for treatment of OLT.

FP17

The 10-year patient-reported and clinical outcomes of a series of 156 mobile-bearing total ankle replacements and the effects of patient age

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Background: Total Ankle Replacement (TAR) is an established treatment option for end-stage ankle arthritis. We analysed at minimum, 10-year patient-reported and clinical outcomes of 156 TARs from a single centre. We specifically compared outcomes between patients under 60 and over 60 at time of surgery.

Methods: Data was collected retrospectively from our departmental patient database. It included all patients who underwent a TAR by a single surgeon between 2006 and 2010 and patients were divided into those under 60 and those over 60 at the time of surgery. Patient reported outcomes (PROMs), including WOMAC, SF-36 and patient satisfaction scores and complications were analysed preoperatively and at one, two, five and over 10 years postoperatively.

Results: There were 156 patients included in this analysis, 61 were under 60 (mean age 50.29) and 95 were over 60 (mean age 69.12). A total of 12 patients had revision surgery, (nine in the under 60 group) and 52 patients were deceased at the time of analysis (10 in the under 60 group). At one year the over 60 group had less pain and better functional scores ($p=0.02$, $p=0.017$). At two, five and ten years there was no statistical difference in pain and function between groups. At two years the over 60s reported less stiffness and quicker return to activities of daily living ($p=0.007$, $p=0.001$). However, at five and 10 years there was no statistical difference in any domain.

Conclusions: This study demonstrates that age does not correlate with a significant difference in pain or functional outcomes in patients who have TAR, at over 10 years follow up. The higher revision rates in the younger group may correlate with higher functional demand and lower mortality rate.

FP18

Metal debris release may be under-recognised in total ankle replacement

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Despite advancements, revision rates following total ankle replacement (TAR) are high in comparison to other total joint replacements. This explant analysis study aimed to investigate whether there was appreciable metal particulate debris release from various contemporary TARs by describing patterns of material loss.

Twenty-eight explanted TARs (9 designs: 3 fixed and 6 mobile bearing), revised for any reason, were studied. The articulating surfaces of the metal tibial and talar components as well as the polyethylene insert were assessed for damage features using light microscopy. Based on the results of the microscopic analysis, scanning electron microscopy with energy dispersive X-ray spectroscopy was performed to determine the composition of embedded debris identified, as well as non-contacting 3D profilometry.

Pitting, indicative of material loss, was identified on the articulating surfaces of 54% of tibial components and 96% of talar components. Bearing constraint was not found to be a factor, with similar proportions of fixed and mobile bearing metal components showing pitting. More cobalt-chromium than titanium alloy tibial components exhibited pitting (63% versus 20%). Significantly higher average surface roughness (Sa) values were measured for pitted areas in comparison to unpitted areas of these metal components ($p<0.05$). Additionally, metallic embedded debris (cobalt-chromium likely due to pitting of the tibial and talar components or titanium likely from loss of their porous coatings) was identified in 18% of polyethylene inserts. The presence of hard 3rd body particles was also indicated by macroscopically visible sliding plane scratching, identified on 79% of talar components.

This explant analysis study demonstrates that metal debris is released from the articulating surfaces and the coatings of various contemporary TARs, both fixed and mobile bearing. These findings suggest that metal debris release in TARs may be an under-recognised issue that should be considered in the study of painful or failed TAR moving forwards.

FP19

A comparison of functional outcome scores for primary and revision ankle replacements

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Background: Patients who undergo either primary or revision total ankle replacement (TAR) expect improvements in pain, function and quality of life. The goal of this study was to measure the functional outcome improvements and the difference in patient-reported outcomes in patients undergoing primary total ankle replacements compared to revision TAR.

Methods: A single-center prospective cohort study was undertaken between 2016 and 2022. All patients were followed up for a minimum of 6 months. Patients undertook the Manchester Oxford Foot Questionnaire (MoxFQ) and EQ-5D health quality questionnaires pre-operatively, at 6 months and yearly for life. The Mann Whitney test was undertaken for statistical analysis.

Results: A total of 165 primary and 71 revision ankle replacements were performed between 2016 and 2022. The mean age was 71 years for primary replacements and 69 years for revisions. The INFINITY was utilized in the majority of primary total ankle replacements. Revision replacements were either the INBONE II or INVISON and they were most often revising the MOBILITY implant. The main indication for revision was aseptic loosening (83%). Other causes included infection, malalignment and insert wear. The overall MoxFQ improved by a mean of 46.5 for primaries and 40.2 for revisions. The EQ-5D score also showed overall improvements with the mean difference in mobility increasing by 1.6.

Conclusion: Both primary and revision ankle replacements result in improved functional scores at 6 months, 1 year and 2 years. In this cohort with the implants used, both primary and revision ankle replacements demonstrate similar improvements in functional scores.

Level of evidence: Level II, prospective cohort study.

FP20

Survival of revision ankle replacements after a failed primary ankle replacement: a data linkage study using the National Joint Registry and NHS Digital

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Introduction: The number of revision ankle replacements is increasing. There are limited numbers of publications on survivorship.

The primary objective was to analyse the survival of revision ankle replacements using a large dataset from the National Joint Registry. Secondary aims were to summarise patient demographics, indications, further operations and predictors of survival.

Methods: A data linkage study combined National Joint Registry (NJR) Data and NHS Digital data. The primary outcome of failure is defined as a revision fusion procedure, conversion to ankle replacement or amputation. Life tables and Kaplan Meier survival charts were used to illustrate survivorship. Cox proportional hazards regression models were fitted to compare failure rates.

Results: 228 patients underwent revision ankle replacement. The mean follow-up was 2.6 years. The mean time from primary to revision was 2.3 years. 77.2% were for aseptic causes. 56.6% of implants were the Inbone ankle replacement.

29 (12.7%) failed. 9 underwent a further revision, 19 conversion to fusion and 1

The 1-year survivorship was 95.4% (95% CI 91.6% to 97.5%), 3-year survivorship in 124 was 87.7% (95% CI 81.9% to 91.7%), and the 5-year survivorship in 57 was 77.5% (95% CI 66.9%-85.0%). Revision specific implants has better survivorship than primary implants used for revisions. In total 50 (21.9%) patients had further surgery of which 19 (8.3%) underwent re-operations in the first 12 months.

Cox regression models were undertaken. In crude analysis the only significant risk factors for failure were the use of cement (HR 3.02, 95% CI 0.65-1.25) and time since primary ankle replacement (HR 0.67, 95% CI 0.47-0.97). In multivariable Cox regression modelling no risk factors for failure were identified

Conclusion: Revision ankle replacements have good medium term survivorship and low rates of further surgery. New modular revision implants appear to have improved survivorship compared to traditional ankle replacement implants.

FP21

Long term follow up, re-operations and patient reported outcomes following revision surgery for failed total ankle replacements

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Introduction: Primary ankle arthroplasty (TAR) is increasingly used to treat end-stage ankle arthritis. Reported revision rates of TAR vary from 8.5% to 11.1% at 9 years. Revision surgery remains technically challenging with options ranging from simple joint debridement to tibio-talar-calcaneal fusion. The efficacy of these procedures remains unclear and there is no consensus on optimal revision options.

Methods: A retrospective cohort study was performed of all patients undergoing surgery for a failed primary TAR at the Nuffield Orthopaedic Centre (2004-2021). TAR failure was determined by clinical assessment, serial radiographs and CT scans. Primary outcome measures included type and time of index surgery post TAR. Secondary outcomes included frequency of re-operations, post-operative complications, patient reported outcomes and union rate (for revision arthrodesis procedures).

Results: 70 failed TARs in 69 patients (35M:34F, mean 65.7 years, s.d.=11.6) underwent re-operation a mean of 6.24 years (range 1-30) post primary. In total, 107 operations were performed including revision fusion (n=50), revision arthroplasty (n=14), bearing exchange (n=9) and joint clearance (n=9). The overall revision fusion union rate was 73.5% over a mean of 12.5 months (s.d.=7.6). 16/23 (69.6%) Tibio-Talo-Calcaneal and 9/12 (75%) ankle fusions (previous subtalar/triple fusion) using a hindfoot nail united over a mean 11.4 months (s.d.=6.0) and 15 months (s.d.=9.48) respectively. Only 64% of ankle fusions using screws alone united (mean=10.6 months, s.d.=8.14). The average post-operative MOXFQ score was 28.3 (s.d.=19.3). 73% said the operation improved their function and would recommend it to a friend/family member.

Conclusion: Despite low post-operative MOXFQ scores, over 70% of patients were satisfied with re-operation for a failed TAR. Over 26% of all TAR revision fusions fail to unite with the highest non-union rates observed post ankle arthrodesis with screws alone (36.4%).

FP22

Salvage ankle fusion after a failed primary ankle replacement - a data linkage study using the National Joint Registry and NHS Digital

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Introduction: When a total ankle replacement fails it can be converted to an ankle fusion or a revision ankle replacement. Despite the increased numbers of undertaken there is limited research on the management of patients undergoing a conversion to fusion following a failed ankle replacement.

The primary aim of this study was to analyse the survival of ankle fusions following a failed ankle replacement using a large dataset from the National Joint Registry.

Methods: A data linkage study combined National Joint Registry (NJR) Data and NHS Digital data. The primary outcome of failure is defined as a revision fusion procedure, conversion to ankle replacement or amputation. Life tables and Kaplan Meier survival charts were used to illustrate survivorship. Cox proportional hazards regression models were fitted to compare failure rates.

Results: 131 underwent conversion to fusion as a salvage procedure. The mean age was 65.7 and 55.7% were males. The mean follow-up was 47.5 months. The mean time from primary ankle replacement to revision to an ankle fusion was 5.3 years. 50 (38.2%) patients required further surgery. Of the 131 patients, 32 patients (24.0%) underwent reoperations other than revision and 29 (22.1%) required revision. 24 (18.3%) underwent re-revision to another fusion and 5 (3.8%) underwent a below-knee amputation. No cases were converted back to a TAR. Failure tended to occur in the first three years with 1-year survival of salvage ankle fusion in 131 patients being 96.0% (95% CI 90.7 to 98.3) and 3-year survival in 69 patients being 77.5% (95% CI: 68.3 to 84.4).

Conclusion: Salvage ankle fusion after a failed ankle replacement demonstrates high rates of failure and re-operations. 38.2% of patients undergo further surgery and 23% require revision within 3 years. Further studies are required to further analyse the outcomes of failed ankle replacements.

FP23

Management of failed total ankle replacement and massive bone cysts using impaction bone grafting and the Invision total ankle replacement system

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Objective: The purpose of this study was to determine the outcomes of revision ankle replacements, using the Invision implant and impaction allograft for massive talar dome defects following primary ankle replacement failure. Outcomes were assessed in terms of bone graft incorporation; improvement in patient reported outcome measures (PROMs); and survivorship of the revision ankle arthroplasty.

Methods: A retrospective review of prospectively collected data identified eleven patients who had massive bone cysts and underwent revision of a failed primary total ankle replacement to the Invision revision system, combined with impaction grafting using morselized femoral head allograft. These revisions occurred at a single high volume ankle arthroplasty centre. Computed tomography (CT) scans were used to assess bone graft incorporation and the Manchester-Oxford Foot Questionnaire (MOXFQ) and EQ-5D scores were used pre and post operatively to assess PROMs.

Results: The mean follow up was 18 months (12-48months). In all eleven patients, improvement was reported in the post-operative MOXFQ and EQ-5D scores. CT scans showed bone graft incorporation in all cases. None of the patients have required further surgery and are continue to do well clinically at latest follow up.

Conclusions: In the short term, this study confirms revision ankle replacements with the Invision prosthesis and impaction with morselized femoral head allograft is a suitable revision option for primary ankle replacement failure with massive talar bone loss. Long term follow up continues of these complex patients.

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BOSFAS

POSTERS ABSTRACT SUMMARY

P1

Opposing flanks versus parallel flanks – the influence of headless screw design on compression and pull-out resistance

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Introduction: Screws generate and maintain compression against distracting forces when performing osteotomy or fusion surgery. Headless screws with opposing flank angles (OFA) between the threads of the head and shaft are purported to achieve better compression. The purpose of this study was to compare OFA designs against traditional parallel flank angle (PFA) headless screws and headed screws to determine differences in compression and pull-out resistance (POR).

Methods: In this biomechanical in-vitro study, four screw designs were compared: headless screws with OFA (Screw_A and Screw_B), headless screws with PFA (Screw_C), and headed screws (Screw_D). All screws were 4.0x50mm partially threaded cannulated screws. Screw_B had a 1.4mm shorter head length and 0.5mm narrower head thread diameter than Screw_A and Screw_C, which were similar. A custom apparatus was designed for measuring compression and POR. Osteotomies were created on synthetic bone blocks (density 0.32g/cm³) simulating cancellous bone. Screws were inserted perpendicular to osteotomies in accordance with manufacturer guidance and maximum compression recorded. Increasing distracting forces were then applied to the blocks until the screws pulled out. For each screw type, five screws were tested.

Results: There was no significant difference in maximum compression between screw designs: Screw_A=38.7N±14.2N, Screw_B=48.7N±15.6N, Screw_C=51.9N±36.4N, Screw_D=32.0N±9.2N; p=0.921. When assessing POR, all screws failed at the head-bone interface (screw heads subsided into block). Pull-out forces significantly differed between all groups: Screw_A=466N±29.0N, Screw_B=310N±22.0N, Screw_C=399N±46.0N, Screw_D=183N±12.9N; p<0.001 (ANOVA). Screw_A had the highest POR but the other OFA design (Screw_B) had significantly lower POR.

Conclusion: Screw design, whether headless (OFA or PFA) or headed did not appear to influence compression generated. However, headed screws had significantly lower POR than headless designs. Within headless designs, OFA may increase POR, but other screw head features (number / diameter of threads) had an apparently greater influence than flank angle.

P2

A guide for surgeons to orientate the ideal trans-syndesmotic fixation – a novel technique based on CT

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Introduction: Correctly orientating a syndesmotic screw can be challenging particularly for inexperienced surgeons. Failures can lead to longer term morbidity therefore there is a demand for reproducible techniques to guide surgeons. Techniques reliant on leg rotation can be disorientating. We propose a technique to orientate fixation using identifiable soft tissue landmarks independent of leg rotation. This study uses cross-sectional computed tomography (CT) to validate the technique.

Methods: 40 CT scans of uninjured ankles were studied. Fixations were planned 15mm above the joint line to provide both stabilisation and ease of palpating tendon structures. Axial images were studied with entry points for the screw on the fibula extrapolated into the tibia – ideal screws bisect both tibia and fibula in the transverse plane. Entry points were measured from the lateral ridge of the fibula. Exit points were measured as both distance from the tibialis anterior tendon (D1) and tibialis posterior tendon (D2). Exit points were also calculated as a percentage of the distance from the tibialis anterior tendon to the tibialis posterior tendon using the formula $(D1/(D1+D2))*100$.

Results: The ideal entry point was calculated as 0.11±0.72mm posterior to the lateral ridge. The mean distance between the ideal exit point and the tibialis anterior tendon was 24.9±4.2mm. The mean distance between the ideal exit point and the tibialis posterior tendon was 26.6±4.2mm. The mean ideal exit point was calculated as 48.3±4.8% of the distance from tibialis anterior to tibialis posterior.

Discussion: This study shows via CT analysis that the ideal entry point for a syndesmosis screw is the lateral ridge of the fibula and the ideal exit point is 48.3±4.8% of the distance from the tibialis anterior tendon to the tibialis posterior tendon. This is an easily reproducible technique which is independent of leg orientation.

P3

One stop MDT foot and ankle clinic: our experience and results

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Introduction: Management of foot and ankle pathology often require patients to attend multiple visits to healthcare institutions for various assessments, investigations and interventions. We envisioned a “One stop foot and ankle clinic” model to offer our patients all of this in the same visit, aiming to improve patient experience whilst reducing cost to the Trust.

Methods: We set up a monthly multidisciplinary outpatient clinic with three foot and ankle consultants, a BOA fellow, a Specialist registrar, a Physiotherapist, a nurse practitioner, a Radiologist for Ultrasound diagnostics and interventions, an Orthotist and an Orthopaedic Practitioner providing Electro-shock wave therapy along with image guided injections.

We measured the service improvement by counting the additional services offered to attending patients on the same day thus reducing repeated patient attendances. We measured patient satisfaction by a special feedback form assessing their experience of the clinic. Cost savings were recorded through reduction of follow up visits, increased surgical conversion rates and decreasing DNA rates.

Result: We saw between 40 and 50 patients per event. The same day referral rate for investigations/ treatments averaged 58% (range 52%-66%). Both discharge rates and booking for surgery rates were increased as compared to the previous model by 12%.

There was an overwhelming positive patient feedback .96% thought it was a better and efficient experience and 92% preferring this clinic model .

Cost analysis showed an overall saving of costs incurred with this model by decreasing overall DNAs and increasing discharge and surgery conversion rates.

Conclusion: “One stop clinic model” has been an enormous service improvement with great increase in patient satisfaction and overall cost savings. It aligns with the national drive to reduce follow ups and .making the service more patient centred. We would want to promote this as a model for the future of f&a clinics.

P4

Salvage of failed total ankle replacement using a custom 3D printed titanium truss cage: a case series and suggested treatment pathway

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Background: The management of failed total ankle replacements, with significant loss of bone stock, is challenging with high rates of complications and associated morbidity. Recent technological advances have enabled the development of patient-customized 3D-printed titanium truss arthrodesis implants which potentially offer an alternative salvage option for failed total ankle replacements.

Methods: A prospective observational study of five cases of failed total ankle replacements which were managed using custom patient-specific 3D-printed titanium truss arthrodesis implants. Technical tips, classification and a treatment algorithm were developed based on our initial experience.

Results: Between November 2018 and February 2020, 5 patients underwent arthrodesis for failed total ankle replacements. Follow up was available for 4 cases. The mean follow up was 2.0 years. The mean MOXFQ Index improved from 73.8 to 31.6 (p<0.05). The mean EQ-5D-5L Index improved from 0.310 to 0.730 and the EQ-VAS also improved from 48.8 to 83.8. The mean VAS-Pain score at final follow up was 25.7. There were no cases of non-union.

Conclusion: Custom patient-specific 3D-printed titanium truss arthrodesis implants are a viable alternative treatment option for failed total ankle replacements.

P5

A modular augmented arthroplasty system to manage larger bone defects in the ankle: a case series

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Introduction: Large bone defects such as those encountered after failed total ankle arthroplasty have previously been a relative contraindication to revision arthroplasty due to inadequate bone stock. We describe our early experience and patient reported outcomes with a novel modular ankle replacement system that includes tibial and talar augments.

Methods: This is a retrospective case series of patients who underwent a total ankle arthroplasty using the INVISION system across two centres between 2016 and 2022. Local approvals were granted. Patients completed the Manchester-Oxford Foot Questionnaire (MOXFQ), Ankle Osteoarthritis Scale (AOS) and EQ-5D-5L pre-operatively and then post-operatively at 6 months, 1 year, 2 years, 3 years and 5 years. Medical records were reviewed for complications and re-operations. Radiographs were reviewed for cysts or radio-lucencies and alignment.

Results: 17 patients were included in the study; 14 men and 3 women with an average age of 67.9 years (range 56 years to 80 years). The average follow up post operatively was 40.5 months (range 7 to 78) at the time of this study. The indication for surgery was revision of failed TAR in 16 and revision of failed ankle fusion in 1. An augmented tibia was used in 3, an augmented talus in 9, and both augmented tibia and talus in 5 cases.

There was one post-operative medial malleolar fracture and one patient underwent debridement and implant retention for late deep infection. No implants have been revised.

The average MOXFQ score improved by 19.3 points at most recent follow up. The average AOS score improved by 25.2 points.

Conclusion: The early results of a modular augmented ankle arthroplasty system have shown satisfactory patient outcomes with a low complication and re-operation rate and presents a viable option for patients with larger bone defects. Longer term follow up is required to determine implant survivorship.

P6

The outcomes of complex primary Inbone total ankle replacement

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Introduction: The Inbone prosthesis is a third-generation total ankle arthroplasty (TAAs), consisting of modular stem components inserted into the tibia and talus. In comparison to other prostheses, the Inbone offers increased stability, structural support and improved correction of malalignment and revisions. This is at the expense of more bone excision compared to resurfacing type of prosthesis. We present the radiological, functional and operative outcomes of all consecutive patients operated with the Inbone prosthesis at our institute.

Methodology: All patients with a primary Inbone prosthesis operated at our trust, from June 2013 to June 2021, were included. Patient demographics, indications using the Canadian Orthopaedic Foot and Ankle Society (COFAS) ankle arthritis classification system, complications and radiological outcomes were recorded. Functional outcomes reported by the patients included: Manchester-Oxford Foot Questionnaire (MOXFQ), EuroQoL-5 Dimension (EQ-5D) and the Visual Analogue Score (VAS).

Results: Total of 69 patients underwent primary Inbone TAA (M:F 47:23; average age = 71 years; range: 48 to 90 years). According to the COFAS grading system, patients included in the study were Grade 1 (1 patient) Grade 2 (13 patients) Grade 3 (20 patients) Grade 4 (29 patients). The minimum follow-up was 1 year (range: 1 to 8 years). Overall, there was a statistically significant improvement in the average outcome score (pre/post-operation): 62/29 in MOXFQ, EQ5D Index value of 0.39/0.69, and VAS scores of 26.7/10.0. However EQ5D VAS score of 69.9/70.5 was not statistically significant (p=0.82). The average improvement in the coronal deformity correction was 9 degrees. There were no implant revisions. Complications included a periprosthetic fracture of the distal tibia and two cases of DAIR procedure.

Conclusion: The Inbone TAA is a safe and successful procedure for end stage ankle arthritis with deformities around the foot and ankle.

P7

Retrospective cohort study of union rate in tarsometatarsal joint arthrodeses

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The aim of this study was to assess type of fixation on success of tarsometatarsal joint arthrodesis. Primary outcome was union at 3 and 12 months.

Medical records were reviewed for demographics, diabetes and smoking status, implant, and indication for surgery. There were 139 consecutive tarsometatarsal joint (TMTJ) fusions in 134 patients. 27 male:111 female, average age 60.9. 75 were isolated TMTJ fusions, 64 multiple TMTJ fusions. 70 used compression plates (43 Stryker Claw2, 27 Synthes VA), 22 used compression screws across the joint, 47 used a combination of the above.

The overall union rate at 3 months and 12 months was 85% (118/139) and 89% (124/139) respectively. The overall rate of broken metalware was 8% (11/139), and revision rate was 2% (4/139). Diabetes was a predictor of non-union (3 months OR 3.78 p=.034; 12 months OR 3.77 p=.023 respectively). The rate of union was greater in single joint fusion vs multiple joint fusion (3 months OR 5.0 p=.003, 12 months OR 6.1 p=.003 respectively). There was no significant difference in the rate of union for the use of bone graft (3 months OR 0.29 p=0.09, 12 months OR 0.2 p=0.11 at 12 months), or smoking (OR 0 at 3 and 6 months), as independent variables. We found no significant difference in rate of union based on indication for surgery. Claw2 used in isolation were found to have a higher rate of non-union at 3 months and at 12 months compared to other methods (10/35 and 8/35 respectively; chi square= 3.87 and 4.90 respectively; p=.049 and 0.026 respectively). We found no significant difference in union rates between other methods of fixation.

In this series, multiple TMTJ fusion, diabetes, and the use of the Claw 2 system without adjunct compression screws were independent predictors of non-union.

P8

COSMIC feasibility study - comparing open scarf osteotomy and minimally invasive chevron osteotomy for hallux valgus correction

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Background: Minimally invasive surgery (MIS) has gained popularity for hallux valgus correction. Current evidence shows similar outcomes to scarf osteotomy (SO), however there are limited randomised controlled studies (RCT). The aim of this study was to assess the feasibility of conducting a RCT to compare the patient recorded and clinical outcomes for the surgical management of Hallux Valgus between SO and MIS.

Methods: Patients suitable for surgical correction of moderate hallux valgus were invited to participate. Patients completed a validated questionnaire (Manchester Oxford Foot questionnaire and EQ-5D-5L) preoperatively and post-operatively at 6 months and 1 year. Radiological parameters and range of motion (ROM) were measure pre and post operatively.

Results: 31 patients were recruited between Dec 2017 and June 2022. 17 patients were randomised to MIS (15 female, mean age 51) and 14 to SO (13 female, mean age 51). Both groups had a significant improvement in all MOXFQ parameters at 6m and 12m, as well as radiological parameters. VAS improved for SO at 6m (p=0.048) and 12m (p=0.025) but only improvement at 6m was seen for MIS (p=0.059). There was no significant improvement in EQ-5D in either group at 12 months and no significant difference in surgical time (p=0.53). Higher number of complications were seen in MIS with 5 removal of metalwork (29.4%) and 2 superficial infections (11.8%) vs none in SO. The dorsiflexion significantly improved in the SO group at 6months (p=0.04). No patients were lost at follow up.

Summary: Both surgical options show similar clinical results, but higher complication rates were seen with MIS. A larger study is needed to evaluate further. This was a difficult study to recruit to. Challenges included: surgeon equipoise, patient preference, prior approval ticket restriction, training requirement and Covid 19- pandemic which could be mitigated in a larger multicentre study.

P9

A retrospective comparison of single screw vs dual screw fixation of Medial Malleolus Fractures on rate of non-union and malreduction

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Background: Medial Malleolus Fractures (MMF) are frequently managed by orthopaedic surgeons and are one of the most treated fractures of the ankle. Currently, there is a lack of consensus on the number of screws used in fixation when attempting lag-screw fixation of MMF.

Aim: To compare the outcomes of MMF with patients which have either undergone single-screw (SS) or dual-screw (DS) fixation.

Methods: Patients who had undergone surgical fixation of their MMF were identified from 2012 to 2022. Analysis of their pre-operative, intra-operative and post-operative radiographs was performed to determine the initial type of injury and surgical outcomes.

Results: A total of 653 patients were identified across a 10-year period. There were 271 patients (41.50%) in the SS group and 382 patients in the DS group (58.50%).

When comparing the outcomes of SS to DS, a non-union rate of 19.19% (52/271) was found in the SS group as compared to 18.85% (72/382) in the DS group. Re-operation occurred in 14.76% (40/271) in the SS group and 13.02% (44/382) in the DS group. These comparisons were not statistically significant. There was a malunion rate of 11.07% (30/271) in the SS group as compared to 3.93% (15/382) in the DS group, which was statistically significant ($p < .001$).

On multi regression analysis, factors which gained significance for development of non-union was non-fixation of syndesmosis ($p = .039$), ankle dislocation on arrival ($p < .001$) and non-restoration of fibular length ($p < .001$). Other factors which showed significance for failure to achieve medial anatomical reduction was non fixation of syndesmosis ($p < .001$).

Conclusion: Use of a SS, rather than DS showed a significant increase in anatomical reduction but did not increase non-union or reoperation rate. Syndesmosis fixation has clear impact on the stresses on the medial malleolus, and surgeons should have a low index of suspicion of injury and fixation.

P10

Outcomes from tibiototalcaneal nailing versus open reduction internal fixation for high-risk fragility ankle fractures: a single-centre matched retrospective cohort study

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Introduction: Tibiototalcaneal nailing (HFN) is a proposed solution to successfully treating high-risk ankle fragility fractures. We aimed to determine whether outcomes in our trauma centre reflect those previously reported and support that HFN and open reduction internal fixation (ORIF) demonstrate equal results in this demographic.

Methods: Outcomes for fragility ankle fractures treated with HFN (without joint preparation) or ORIF were compared via retrospective cohort study. 64 patients were matched 1:1 based on gender, age, Charlson Comorbidity Index (CCI) and ASA. Fracture classification, complications, discharge destination, union rates, FADI scores and patient mobility were recorded.

Results: Cohorts were well matched; mean age was 78.4 (HFN) versus 78.3 (ORIF), ASA 2.9 (HFN) versus 2.8 (ORIF) and CCI equal at 5.9. Median follow up duration was 26 months.

Time to theatre from injury was 8.0 days (HFN) versus 3.3 days (ORIF). There was no difference in 30-day, 1-year, or overall mortality. Kaplan-Meier survivorship analysis showed the mean time to mortality in deceased patients was shorter in the HFN group (20.3 months versus 38.2 months, $p = 0.013$). There was no significant difference in the overall complication rate (46.9% versus 25%, $p = 0.12$). The re-operation rate was twice as high in HFN patients; however, this was not statistically significant. There was no statistical difference in FADI scores 72.1 ± 12.9 (HFN) versus 67.9 ± 13.9 (ORIF) nor post-operative mobility status.

Conclusion: HFN demonstrated broadly equivalent results to ORIF in high-risk ankle fragility fractures. Mean survival was however shorter in the HFN group. This may be due in part, to delay to theatre, as HFN was treated as a sub-specialist operation in our unit at the time. We propose that both HFN and ORIF are satisfactory options in frail patients and the priority should be expedient operating. Further randomised control studies are needed to guide a working consensus.

P11

Readmissions and complications following total ankle replacements: a data linkage study using the National Joint Registry and NHS Digital

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Introduction: There is a risk readmissions and complications following ankle replacements. Despite the increase in the numbers performed, there is limited evidence on the number of these complications.

The aim of this cohort study was to determine the 30 day and 90 day readmission rates following total ankle replacement. Secondary aims were to determine the incidence of pulmonary embolism, surgical procedures and the risk factors for readmission.

Methods: A data linkage study combined National Joint Registry (NJR) Data and NHS Digital data. 30 day and 90 day readmissions were recorded. Multivariable logistic regression was performed to analyse potential risk factors for failures for readmissions.

Results: A total of 5562 underwent an ankle replacement between between 1st April 2010 and 31st December 2018. The 30 day readmission rate was 3.2% and the 90 day readmission rate was 7.6%. The 30 day re-operation rate was 0.4% and 90 day re-operation rate was 1.13%. The incidence of pulmonary embolism was at 0.13% at 90 days.

Conclusion: There is a 3.2% 30 day readmission rate following total ankle replacement. The risk of medical complications including pulmonary embolism is low. This study demonstrates the safety of total ankle replacements.

P12

Risk factors for failure of total ankle replacements: a data linkage study using the National Joint Registry and NHS Digital

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Introduction: Despite the increasing numbers of ankle replacements there remains debate about which patients should undergo an ankle replacement and there are limited studies analysing risk factors for failure of an ankle replacement.

The primary aim of this study is to analyse the risk factors for failure of total ankle replacements.

Methods: A data linkage study combined National Joint Registry (NJR) Data and NHS Digital data. The primary outcome of failure is defined as the removal or exchange of any components of the implanted device. Kaplan Meier survival charts were used to illustrate survivorship. Multivariable Cox proportional hazards regression models were fitted to analyse potential risk factors for failures or ankle replacements.

Results: The overall 5-year survival was 90.2% (95% CI 89.2%-91.1%). In multivariable (adjusted) Cox regression models only age (HR 0.96, 95% CI 0.94 to 0.97), BMI (HR 1.03, 95% CI 1.01 to 1.06) and indication (HR 0.88, 95% CI 0.80 to 0.97) were associated with an increased risk of failure.

Conclusion: This study has demonstrated an overall 5 year survivorship of 90.2% and that younger patients, and those with an increased BMI have an increased risk of failure. We also showed that rheumatoid patients appeared to do better than those with osteoarthritis.

P13

Outcomes following extracorporeal shockwave therapy for the treatment of insertional and non-insertional Achilles tendinopathy at 2 year follow-up: a retrospective review

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Introduction: The purpose of this retrospective clinical study was to evaluate outcomes following extracorporeal shockwave therapy (ESWT) for the treatment of Achilles tendinopathy.

Methods: This retrospective cohort study included clinical data from 95 patients who underwent ESWT for insertional (IAT) or non-insertional (NAT) Achilles tendinopathy between 3/3/2017 to 2/8/2022 with a minimum of 1 year follow-up. Data regarding patient demographics, subjective clinical outcomes, radiographic outcomes, treatment characteristics, complications and failures were recorded. Failure was defined as no improvement in VISA-A nor VAS scores and/or surgical intervention. Subgroup analysis was conducted to identify predictors of poor outcomes. Paired student's t-tests and Welch's t-tests were calculated. Regression analysis was carried out to identify predictors of poor outcomes.

Results: In total, 95 patients (109 ankles) with a mean age of 54.1 ± 14.0 years underwent ESWT for Achilles tendinopathy at a mean follow-up of 25.7 ± 15.0 months. Thirty-nine patients were in the NAT cohort and 56 patients were in the IAT cohort. Both NAT and IAT cohorts had a similar improvement in VISA-A score (p=0.365), VAS scores (p=0.65) and demonstrated a similar return to play time (p=0.34). There was a higher failure rate in the IAT cohort (51.8%) than the NAT cohort (23.1%). Patients who received platelet-rich plasma (PRP) had a higher failure rate (71.4%) than those who did not receive PRP (19.6%). Regression models found that treatment with PRP, MRI severity and female sex were associated with worse outcomes.

Conclusion: This retrospective study demonstrated a high failure rate at short-term follow-up in patients who underwent ESWT for insertional Achilles tendinopathy. Predictors of poor outcomes included treatment with PRP, MRI severity and female sex. Further studies with larger patient cohorts and longer follow-up are necessary to determine the role of ESWT in the treatment of Achilles tendinopathy.

P14

Ankle fusion and ankle replacement - variations in surgical practice across England

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Introduction: The definitive surgical treatment of end stage ankle arthritis is either an ankle fusion (AF) or total ankle replacement (TAR). It is anticipated that patients' exposure to treatments differs depending on their post code and access to services. The aim of this study was to determine the variation in practice for the surgical treatment of ankle arthritis across England.

Methods: A retrospective cohort study was performed by searching hospitals episodes statistics (HES) from NHS Digital for all admissions in England between 1st April 2017 and 31st September 2022. OPCS-4.9 codes were used to determine the surgical procedure performed. Basic statistical analysis was undertaken

Results: Overall 12,801 patients underwent surgery for end stage ankle arthritis. Of these there were 9013 (70.4%) AF and 3,788 (29.6%) TAR. Of the 9013 AF, 7034 (77.8%) were isolated AF and 1979 (15.5%) were combined with fusion of additional hindfoot joints.

There was a significant variation in the proportion of AF and TAR with the ratio of AF:TAR varying more than two-fold.

The number of patients that underwent surgery was 19.2% lower in 2022 compared to 2017 (2242 v 2774).

Expressed as a percentage of total volume of cases, the proportion of TAR performed for end stage arthritis was significantly higher in 2022 than in 2017 (31.0% v 26.3%, p<0.001)

Conclusion: Patients with end-stage ankle arthritis are twice as likely to have an AF over a TAR. Numbers of TAR were increasing year on year but fell during Covid. Despite return to normality, the number of surgeries in 2022 have still not caught up with pre-Covid numbers. The proportion of TAR of total surgeries is increasing. Large variations in surgical practice were found based on geographical location. This data should be useful in the development of foot and ankle services nationally.

P15

Wasting everyone's time – an observational study of current practice after injections

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Introduction: Injections are offered to thousands of patients suffering with a range of musculoskeletal conditions every year. Most are cortisone injections.

Each injection serves both a diagnostic and a therapeutic purpose. The initial response to injection (Local Anaesthetic) helps confirm the clinical diagnosis. The duration of pain relief (steroid) is unpredictable.

These dual goals make planning follow-up appointments difficult. A delayed appointment might affect patient recall about the extent of initial benefit. At an early review, the benefits will usually still be apparent, precluding useful planning.

As a prelude to improving efficiency, we sought to establish current practice in our region of the UK, and among the BOFAS membership.

Method: An online questionnaire was administered to clinicians who treat patients with injections.

Results: 256 responses were included in the analysis. These included 138 foot & ankle surgeons and 119 other specialists.

Foot & ankle surgeons mostly administer injections in theatre (40.5%) or the imaging department (35.7%). In other specialties outpatient department injections predominate (54%). This may reflect the diagnostic intent and anatomical complexity of injections in the foot and ankle setting.

Routine follow-up appointments were given in >80% of cases for first injections and >50% of subsequent injections by all clinicians.

Routine appointments are almost all at six to twelve weeks post-injection. This is the case for first and subsequent injections.

At follow-up, the vast majority of injections were still working.

Immediate pain relief and duration of effect are the most influential factors when planning further treatment.

Conclusion: This data shows that the traditional six to twelve week follow-up appointment after injection is inefficient, and therefore a waste of both clinician and patients' time. Strategies to record pain scores and invite review only when the benefits of injection have faded have the potential to save millions pounds of healthcare costs.

P16

Rivaroxaban vs LMWH after elective foot and ankle surgery – audit and experience from a tertiary referral centre

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Background: In the UK, NICE recommends injectable low-molecular weight heparin (LMWH) for chemical prophylaxis of venous thromboembolism (VTE) after elective foot and ankle surgery (NG89-2018). However, due to challenges surrounding administration, monitoring and compliance, our trust switched to oral anti-coagulants (Rivaroxaban) in 2022. The aim of this audit was to compare Rivaroxaban and LMWH, looking at VTE rate and complication profile.

Methods: This was a retrospective audit at a single, tertiary centre. Adult patients undergoing elective foot and ankle surgery and treated with chemical anticoagulation were included. We compared patients treated with Tinzaparin (6-month period in 2019) and Rivaroxaban (6-month period in 2022). Patients on pre-existing alternative anti-coagulants were excluded. At our centre complications data is collected prospectively, and a review of this database and clinic notes was conducted. A chi-squared test was used to assess significance of differences.

Results: In the Tinzaparin group there were 110 patients and 20 had minor complications (18.2%): 4 superficial wound infections (3.6%), and 16 patients required excessive dressing changes due to persistent exudate or slower healing (14.5%). There were no haematomas, returns to theatre, or VTE. In the Rivaroxaban group there were 107 patients and 23 had complications (21.5%): 1 superficial wound infection (0.9%), 1 case of post-operative bleeding followed by haematoma (0.9%), 19 cases with increased dressing changes (17.8%), and one case of VTE two weeks after completing treatment (deep vein thrombosis, 0.9%). None of these differences were statistically significant. Amongst those with wound complications, there were more cases performed for revision / infection in the Rivaroxaban group.

Conclusion: Overall, Rivaroxaban appears effective and safe, with a comparable complication profile to LMWH. The small differences between groups may be explained by differences in the sampled cohorts. Larger scale studies are required to determine whether observed differences are truly non-significant.

P17

Tibialis posterior tendon entrapment in posterior malleolar and pilon injuries of the ankle: a retrospective analysis

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Background: The Tibialis Posterior tendon (TPT) is the only tendon to come into contact with the distal tibia and is therefore at greatest risk of injury in fractures of the distal tibia. Although TPT injury has been reported rarely with injuries around the ankle they often have been missed and present late.

Aim: Our aim was to analyse the rate to TPT entrapment in fractures involving the posterior tibia i.e. Pilon and posterior malleolar fractures (PMF).

Methods: A retrospective analysis of Pilon and PMFs over a 10-year period was undertaken. Patients who had undergone surgical fixation of their PMF or Pilon fractures were identified from our prospectively collected database between 2012 and 2022. Any fracture which had undergone a preoperative CT was included. Analysis of their pre-operative CT imaging was utilised to identify TPT entrapment, where if $\leq 50\%$ of the tendon cross section was present in the fracture site this was denoted as a minor entrapment and if $>50\%$ of the tendon was present in the fracture site was denoted as major.

Results: A total of 207 patients were identified for further analysis, 158 had a Pilon injury and 56 who had a PMF. The incidence of TPT entrapment was 20.77% (n = 43) with 39 minor and 4 major entrapments. If the fracture entered the TPT sheath, there was a 43.30% (42/97) of entrapment as compared to 0.91% (1/110) in fractures not entering the sheath (p<.001). TPT was significantly more common in PMF as compared to Pilon fractures (p=.001).

Conclusion: In our assessment, there was a significant risk of TPT entrapment when the CT images display the fracture line entering the tendon sheath. We recommend that surgeons consider pre-operative imaging in Pilon and PMFs and to actively look for TPT entrapment intraoperatively where entrapment does occur on CT.

P18

The arterial risk posed by the posterolateral approach to the ankle. An anatomical cadaveric observational study

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Introduction: The most commonly used approach for posterior malleolar access is the posterolateral approach. This approach gives good access to the fibula and lateral aspect of the posterior tibia, however; there is little known on the vascular risks with this approach.

Aim: The aim of this study was to assess and describe the anatomy of the peroneal artery and its branches at the ankle region.

Methodology: Eleven cadaveric foot and ankle specimens were dissected in layers, preserving the peroneal artery, anterior tibial artery (ATA) and posterior tibial artery (PTA).

Results: The peroneal artery was consistently found between the peroneal compartment and deep muscular compartment of the posterior leg. A wide range of anatomical variation was found in the peroneal artery, in its location, muscular branches, anastomosis and anterior perforating branch. A variable anterior perforating branch of the peroneal artery (36.36%), a superficially located peroneal artery (27.27%), a variable anastomosis between the peroneal artery and PTA (27.27%), and a variable anastomosis between the ATA and peroneal artery (45.45%). The peroneal artery was the largest diameter artery in one specimen.

The mean proximal distance between the medial malleolus and the posterior communicating branch of the peroneal artery was 37.93mm (range: 19.03- 85.43mm). The mean proximal distance from the medial malleolus to the anterior peroneal perforating artery was 44.23mm (range:35.44-62.32mm). Distal to the anterior perforating branch of the peroneal artery, the peroneal artery was immobile.

Conclusion: Understanding the common variations within the ankle's arterial anatomy can help surgeons protect these vessels from damage during the surgical approach. The posterolateral surgical approach, specifically puts the peroneal artery at risk and knowledge of its anatomy and variability is important when undertaking this approach.

P19

Medium term results of open Autologous Matrix-Induced Chondrogenesis (AMIC) procedure in osteochondral lesions of the talus

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Introduction: The osteochondral lesions of the talus are majorly traumatic and talus is commonly affected, as 60 % of it is covered by cartilage. There is limited potential to heal due to poor regenerative capacity and paucity of blood supply. This study aims to evaluate medium term functional outcome of AMIC procedure for osteochondral lesions of the talus and to correlate the relationship between the size of the lesion, age, functional outcomes and failures. The patients with displaced or partially displaced lesions were included along with those where conservative management failed.

Methods: It was a retrospective study from Jan 2015-March 2019. 25 patients were included from a single centre (Single surgeon), standing radiographs and MRI-pre and post operative were taken for all patients. During the procedure micro fracture was combined with application of Chondro-guide, a porcine collagen type I/III matrix & fibrin glue application Pre and post operative American Orthopedic Foot and Ankle Score (AOFAS) and Visual analogue (VAS) score were done for analysis and follow up- 3 months, 6 months, 12 months.

Results: Mean age was 36 years and etiology was 23 traumatic, 2 non traumatic, mean follow up was 24months (95% CI-19.80-28.28), Mean size of the osteochondral lesion was 1.74 cm² Mean difference between preoperative and post operative AOFAS score was 49.40 (CI-53.21-45.59)(p<.05) and VAS score was 5.36CI (4.75-5.97) (p<.05).

Conclusion: AMIC with Chondro-gide matrix procedure for >1 cm² osteochondral lesions of talus is a one-step surgical technique with excellent to good results.

P20

5th metatarsal fractures; who do we need actually need to see? A single centre experience

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Introduction: 5th metatarsal fractures are a common injury of the foot, however the literature on how to manage them is conflicting. Our department protocol states Zone 3 fractures should have face-to-face review, with other zones planned for discharged following virtual review. We sought to investigate whether our practice was consistent and the burden of 5th metatarsal fractures on our clinics.

Methods: Patients referred to our virtual fracture clinic (VFC) with a suspected or confirmed 5th metatarsal fracture were identified from our electronic database. Data was collected on VFC outcomes including telephone review, clinic reviews and requirement of surgery. Plain AP radiographs were reviewed for fracture morphology. Fractures were defined as Zone 1.1, 1.2, 1.3, 2, 3, diaphyseal shaft, distal metaphysis and head. A univariate linear regression model was used (SPSS v.27).

Results: 1391 patients were identified. 447 (32.1%) were planned for clinical review following VFC, however 568 (40.8%) were sent clinic appointments (McNemar p<.001). Only fractures in Z1.1 were significantly associated with a plan to discharge from VFC (OR 2.851, p<.001), with Z3 associated with a plan to review in person (p<.001). Following telephone review, Z2 (OR 1.387, p=.034) and Z3 (OR 3.285, p<.001) fractures were the only fractures significantly associated attending a face-to-face clinic appointment, with Z1.1 (OR 0.573) and Z1.2 (OR 0.642) negatively associated. Z3 (OR 4.639, p<.001) retained significance for attending >1 clinic appointment and requiring surgery (OR 3.895, p=.037). Surgery was required in only 1.1% of patients, with 60% of these for non-union.

Conclusions: Fractures of Z2 and 3 require the most face-to-face input. Whilst rare, Z3 is the most likely to require surgery, often for non-union. Based on these results, all Z2 and 3 fractures should be considered for at least one face-to-face review and it may be appropriate for this to be a delayed.

P21

Is there improvement in plantar pressures patterns following total ankle replacement? – A prospective novel 1 year follow up study

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Introduction: The aim of this study was to investigate plantar pressures changes with gait in patients presenting with ankle arthritis pre and post TAR.

Patients and methods: 11 patients were recruited to this study. Patients who were listed for a primary TAR with a 3 component mobile bearing prosthesis were included. Exclusion criteria included refusal of consent, previous surgery to foot, h/o infection, peripheral vascular disease, neurological disease and other LL joint replacements. Gait analysis was carried out using Tekscan™ plantar pressure analysis system and plantar pressures were recorded pre-operatively and 1 year post-operatively. Gait asymmetries were recorded in Percentage for ST parameters.

Results: 11 patients were recruited. Mean age were 70.5 years. Improvement centre of pressure pattern restoration and Force percentage curve (FP) patterns from pre-op to 1 Year. Improvement in foot progression angle was seen in 6 out of 11 patients (54.5%).

Plantar pressure analysis showed deviation from reference ranges for 1) differences in centre of pressure (COP) 2) changes to hindfoot vs. forefoot loading ratio 3) change in loading pattern at heel in KPa ($p < 0.05$) 4) differences in gait parameters (reduction in cadence, walking velocity, increase in active propulsion time; $p < 0.05$) 5) changes to foot progression angles. These findings correlate with MOX-FQ scores (Positive Correlation $p > 0.565$) for pain, difficulty with walking/ standing and difficulty with social activities. Gait asymmetries improved significantly ($p < 0.05$) from pre-op to 1 year for step velocity (76.1 to 93.4 in 6/11 patients) and mid stance time (76.04 to 93.5% in 8/11 patients).

Conclusion: This study shown that TAR surgery helps in restoring centre of pressure, force percentage curve patterns and reduces asymmetries in step velocity and mid stance times during gait at 1 year post surgery. Plantar pressure analysis is a useful tool to study improvement in function in this patient group.

P22

Total ankle replacement: the effect on gait and physical activity – a prospective 1 year follow up study

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Introduction: Total Ankle Replacements (TAR) is performed to optimise biomechanical function and facilitate improved mobility. However, there is little data on how spatiotemporal parameters and activity levels change post-surgery. We aimed to study improvement in Gait parameters and its association with Physical activity in patients who underwent TAR.

Methods: This was a prospective observational clinical study carried out with ethics permission and approvals for a single centre cohort. Patients who underwent TAR during the period of 2015 – 2018 were approached for study participation. Spatio-temporal parameters were measured by instrumented Gait Analysis (Tekscan™ Walkway system) with a recording of 6 x 5 meter walking trials preoperatively and 1-year post op. Patients completed a questionnaire containing the International Physical Activity Questionnaire (IPAQ). The change between pre and post-operative values was calculated and tested for significance.

Results: 10 patients were recruited for the study. Mean age of patients were 70.4 years. There were improvement in spatiotemporal and IPAQ parameters as whole group changes in one measurement domain did not achieve statistical significance ($P = < 0.05$). However, there were areas where subject specific changes in spatiotemporal data positively correlated with IPAQ data changes. This was in the area of bilateral stride time (Pearsons = 0.9074 and 0.9109) (IPAQ 19) and stride length on the operated side (IPAQ 14) [0.7686], 15a [0.8564], 26 [0.932] and 27 [0.932]). These domains concerned increased days and hours spend doing vigorous physical activity outdoors and moderate physical activity indoors. Stride length was also positively correlated with time-spent sitting down.

Conclusion: TAR helps in improving Gait and Physical activity parameters in patients at 1 year post-operatively. There were subject specific changes in spatiotemporal data that meant it would not be appropriate to homogenise the data. There were positive correlations with bilateral stride time and operated stride length with physical activity measures.

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Does total ankle replacement help to improve physical activity in patients 2 year post-operatively? A pilot activity monitoring study

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Introduction: Step count and activity monitoring are objective tools to measure improvement in functional ability in patients undergoing Total ankle replacement (TAR); this area is underexplored in literature. Activity monitoring sensors provide additional information on physical activity and energy expenditure in addition to step counts. These carried out in a real-life environment helps us to understand the impact of intervention in improving physical activity.

The aim of this study was to study physical activity patterns in the community in patients who underwent TAR surgery.

Patients and methods: 10 patients who underwent a TAR between 2017 and 2019 were recruited. Exclusion criteria included previous reconstructive surgery, h/o infection, PVD, neurological disease and other joint replacements. Written consent was obtained. Patients were provided with ActivPAL™ activity monitor to wear over a 7-day period along with a self-reported diary to record activity patterns. This was carried out pre-operatively and 2 years. Data from sensors were downloaded and activity patterns were analysed with SPSS IBM 28 statistical package.

Results: 10 patients (7 males, 3 females) were recruited. Mean age of patients were 65.16 years (52.4 to 78.1yrs).there was a trend for improvement in Sitting / Lying (hours) from 121.36 to 132.56 ($p = 0.367$) and Standing (hours) 25.53 to 33.23 ($p = 0.411$), although this did not achieve statistical significance. Step count (in hours) improved from 8.8 hrs to 10.8 hrs ($p = 0.05$); Step count increased from 38544 to 47074 ($p = 0.041$) from pre-op to 2 years. Energy expenditure (metabolic equivalents) improved from 192.3 to 219.5 ($p = 0.033$).

Conclusion: At 2 years post-operatively, TAR patients showed considerable improvement in step count and energy expenditure compared to pre-operative levels. The results of this novel study helps us to understand the functional improvements in terms of physical activity and energy expenditure gained from TAR surgery.