

ROUNDUP³⁶⁰

Foot & Ankle

For other Roundups in this issue that cross-reference with Foot & Ankle see: [Research Roundup 3](#).

Mobility, ankles and fractures

■ As the post-war 'baby boomer' generation is hitting their 70s, we are faced with more elderly patients than ever before. While these patients are mentally and physically more alert than in previous generations, they often sustain more fragility fractures and as such, the tidal wave of fragility fractures in the older person has started to hit. This injury often results in a degree of functional limitation, particularly in older patients. Researchers in **Oxford (UK)** sought to assess the functional limitation associated with ankle fractures in this patient group, and particularly how outcomes affect mobility in the absence of peripheral vascular disease, which is also common in this population. Using an observational cohort study model, the research team included all patients over the age of 60 with an ankle fracture and no pre-existing arterial disease prior to injury. Outcomes were assessed using the timed 'up and go' (TUG) test and the strength of association test with a number of co-variables (ankle brachial pressure index (ABPI), age, pre-morbid functional status (Olerud-Molander score)] and fracture severity). Only complete cases were included (n = 76/90) and both multivariate and univariate analysis were undertaken to establish potential interactions and adjusted for confounders. The authors were unable to find any association

between the TUG and ABPI in both adjusted and unadjusted analysis. Of all the potential co-variables tested, only pre-morbid function and age were seen to be associated with an extended TUG in these patients.' Certainly based on these results, we can conclude that both peripheral vessel function and vascular status have no significant impact on mobility outcomes in older patients with ankle fractures.

Hindfoot nailing: not such a bad option after all?

■ In the second Foot & Ankle paper to cross our desks at 360 this edition, researchers in **Gloucester (UK)** have endeavoured to establish the utility of the hindfoot nail in the very elderly and frail ankle fracture population. Arguing that there are disadvantages in the very immobile elderly patients of both ORIF and conservative treatment in plaster, the researchers aimed to review the outcomes of a reasonable number of patients managed with a hindfoot nail in the trauma setting for an ankle fracture. The study team were able to assemble a large cohort of 31 patients having had their ankle fracture treated with a hindfoot nail and evaluate their outcomes in a retrospective cohort study (Level IV evidence). Data were extracted using a review of case notes and radiological records, and supplemented with telephone or clinical follow-up as patients were able to manage. The research team collected data on patient demographics, AO classification

of injury, complications, time to union and the current functional status of the patient (assessed via the Olerud and Molander (O&M) score). All of the patients were available for review at the time of follow-up and their post-operative O&M was 45 with no reported post-operative wound complications. The researchers found an impressive 29 of 31 patients were able to return to their pre-operative function, although the complication rate was not insignificant. Around 10% of patients suffered a peri-prosthetic fracture and a further 7% suffered fracture of the implant (which may have been as high as 10% as only 21 patients had post-operative films available). Of the 21 patients with post-operative follow-up, up to 39% of patients failed to achieve radiological union, although the authors report this to be clinically asymptomatic. The authors conclude that this implant can be successfully used to treat these fractures. They inject a note of caution when treating patients with higher mobility levels due to the device failures seen.² We wonder if this approach offers anything additional over the 'fibula' nail reported by the Edinburgh group in an earlier issue of 360. The failure rates were much lower with this implant with better union rates.

Little treatment benefit for blood injection in tendonitis

■ Researchers in **Sydney (Australia)** have carried out an impressive participant and single assessor blinded, parallel

group, randomised controlled trial with the aim of assessing the effectiveness of two peri-tendinous autologous blood injections in addition to a standardised regime of eccentric calf strengthening in patients with mid-portion Achilles tendinopathy. Although recently popular, there is little evidence to support the practice of autologous blood injection in Achilles tendinopathy. The study population consisted of 53 patients (mean age 49) with a roughly even male:female ratio, all presenting with an established history of isolated symptoms of unilateral Achilles tendinopathy. Patients were excluded from the study if they had any previous interventional treatment (e.g. extracorporeal shockwave therapy, GTN patches, surgery or injections). All participants underwent standardised eccentric loading in addition to two injections a month apart. The treatment group had 3 mls of autologous blood injected, while the control group simply had needling. All injections were carried out blind, and treatment carried on for three months with a regular follow-up regime. Outcomes were assessed using a disease-specific tool (the Victorian Institute of Sport Assessment-Achilles (VISA-A) score) with secondary outcomes of perceived rehabilitation and ability to return to sport. Fifty patients completed the three-month study, 25 in each group, and across the whole study improvements were seen in the VISA-A score (treatment 18.7 point improvement, control 19.9 point improvement).

However, the effect of treatment was not significant in either the primary or secondary outcomes.³ While there were no adverse events noted with the treatment group, this study is, to our minds, definitive. There is no indication for autologous blood injection in patients with mid-substance Achilles tendinopathy. Although there is significant improvement in their outcome scores, the same effect can be achieved with eccentric loading alone.

Fixed bearing ankles successful in the short-term

■ The elusive nature of successful ankle replacement surgery does nothing to deter the numbers of patients and surgeons, respectively, requesting and performing the procedure. There are undoubtedly large numbers of patients who benefit greatly from TAR and similarly, there are patients who have not. The complex interplay between expectation and outcome is further hindered by the lack of large outcome series, even in the short-term, for many of the available prostheses, an information void that researchers in **Duke (USA)** have attempted to partly fill. Noting that there are a number of fixed bearing TARs available, but that the early results are still as yet mostly unknown for the fixed bearing prostheses, they designed a retrospective cohort series to examine the outcomes and survivorship of the Salto-Talaris ankle replacement, a fixed bearing prosthesis in widespread use throughout the USA. The study group were able to report on the outcome of a modest 67 patients who had undergone TAR for end-stage osteoarthritis of the ankle, with a minimum of two years' follow-up. Patients had all undergone a standardised follow-up regime, including physical examination, functional assessments and radiological evaluation. The study team were able to present an impressive 96% survival at a slightly less impressive 2.8 years of follow-up when revision was taken as an endpoint, but note that two patients were diagnosed with aseptic

loosening of the tibial component; one awaiting surgery and one being treated conservatively. Of the initial cohort of 67 patients, the majority (67%) required further surgery following their index procedure; most commonly with deltoid ligament release although impingement surgery was also undertaken. While the authors conclude that, based on the functional scores, the Salto-Talaris ankle replacement can "provide significant improvements in pain, quality of life, and standard functional methods", in light of a more than 5% early failure rate and over two thirds of patients requiring additional surgical procedures, we are not so convinced of their conclusions. There are other ankle arthroplasty systems available that provide significantly better operative outcomes with comparable functional outcomes. Longer-term follow-up is definitely needed in this case to justify the use of this prosthesis.⁴

Hindfoot motion following STAR ankle replacement

■ One of the most cited advantages of TAR over ankle fusion is that the maintenance of a mobile segment at the tibio-talar joint is thought to retard the progression of subtalar and talo-navicular arthritis, compared with an ankle fusion which offloads forces into both of these joints. That said, there is little evidence of the hypothetical advantage to support this theory, and it has been relatively difficult to quantify any biomechanical perceived advantage. Researchers in **Dallas (USA)** have used a more advanced version of gait analysis which, instead of treating the hindfoot as a single unit, is able to distinguish more subtle details. They therefore set out to quantify the function of hindfoot movement following a STAR TAR, using a multi-segment foot gait analysis model. The research team

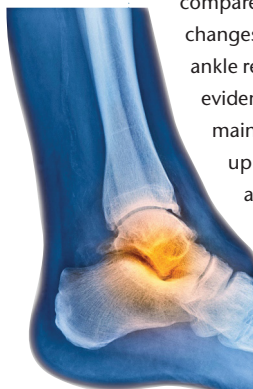
were able to recruit 46 patients into their biomechanical study, all of whom underwent 3D gait analysis following implantation of a STAR prosthesis between two and nine years previously (mean 4.9), using the contralateral limb as an internal control in each case. Analysis was undertaken on both a temporospatial basis and with kinematic analysis. Not too surprisingly, the research team identified some significant differences between the STAR and normal sides. Stance time was found to be marginally shorter and step length marginally longer (but not significantly so) in the STAR limb. There was a statistically significant difference in the kinematic results, with restricted ankle range of movement (16.8 *versus* 23.6) and similar restrictions in coronal and sagittal plane movement on the STAR side.⁵ While this study is unable to

compare the biomechanical changes between fusion and ankle replacement, there is evidence of impaired gait but maintained ankle function up to nine years following ankle replacement, and this is one of the first studies to effectively examine hindfoot movement segments following ankle replacement. We are certain there will be a range of similar articles using this approach to refine our understanding of hindfoot biomechanics over the next few years.

Minimally invasive calcaneal fracture fixation?

■ There exists a significant treatment conundrum in the management of calcaneal fractures. The dichotomy in opinion stems from trying to minimise the infection risk and attendant poor functional outcome with the effects of both mal-reduction and sub-fibular impingement when a conservative treatment option is taken. There have been a number of conflicting randomised controlled trials on

the topic and it certainly appears to us here that although improved functional results can be gained with operative fixation, some if not all, of the benefit is lost in those patients who run into complications. Surgeons in **Pittsburgh (USA)** are trying to have their cake and eat it, so to speak, and have developed a minimally invasive approach to calcaneal fracture fixation, aiming to minimise wound healing risks while maintaining the potential benefit associated with ORIF. They argue that the long-term clinical results of such an approach are not available, although early studies suggest a lower complication rate associated with the sinus tarsi approach. The surgical team undertook 112 fracture fixations over a three-year period, 33 of which were treated via a minimally invasive approach and 79 via an extensile lateral approach. In a retrospective case-matched series, chart review was performed, radiographs re-reviewed and additionally patients were asked to return for a follow-up visit where a combination of up-to-date radiographs, clinical examination, quality of life scores (SF-36) and functional outcome measures (foot function index and VAS pain scale) were recorded. Only 47 of an available 112 were able to attend for the follow-up visit. The research team were able to report that the two groups were similar demographically (with no reported statistically significant differences in any demographic category). There was a slight preponderance of Sanders II fractures (61% *versus* 53%), however, there was a significantly lower wound complication rate in the extensile group *versus* the minimally invasive group (29% *versus* 6%), which translated into a 20% re-intervention rate in the extensile group *versus* 2% in the minimally invasive group. There were no differences in union rates (100% in all cases) or radiological measures of Bohler's angle or the angle of Gissane in the two groups.⁶ The authors conclude that the minimally invasive approach is a useful new addition to



the surgeons' armamentarium when treating calcaneal fractures and we have to say we completely concur, here at 360. The results of this study, as they say, speak for themselves.

Pes planus in adolescents

■ A difficult crossover area, but one triggering many orthopaedic clinic consultations, is that of the adolescent flat foot. Not in the paediatric camp, but with some distinct crossover between paediatrics and adult foot surgery, researchers in **Tel Hashomer (Israel)** decided to tackle this often neglected patient group and have recently published their findings, examining the epidemiology of flexible flat foot in the adolescent population, paying particular attention to BMI, height and gender. Using an almost unique (and very useful) methodology, available only in those nations in which military service is mandatory, the research team performed a population study of military recruits, all aged 17, using codes from the 'Regulations of Medical Fitness Determination' relating specifically to flat foot deformities. This was then linked, using logistic regression models, to BMI, height and gender. In what probably represents one of the only inclusive cross-sectional

population studies on any medical condition, the study included 825,964 17-year-olds (467,412 males and 358,552 females). They report an incidence of around 10% (12.4% male, 9.3% female) for mild, and around 3% (3.8% male, 2.4% female) for severe, flat foot deformity. The study team noted an association between increasing BMI and short stature for flat feet, along with an increased incidence in males.⁷ While not a cutting-edge diagnostic or therapeutic study, the Israeli study team must be congratulated for the inclusiveness of their study and we hope they will be using similar methodology to study other, perhaps more clinically relevant, orthopaedic pathology.

Subluxing peroneals and groove deepening

■ Subluxation of the peroneal tendons is an uncommon but disabling condition that can occur as a result of injury to the peroneal retinaculum, either with or without an underlying dysplastic peroneal groove. The tradition of operative treatment of open fibular groove deepening is associated with some comorbidity. Due to the rarity of the condition, there are no case reports of the alternative minimally invasive (or tendonoscopic)

techniques to address this problem. Surgeons in **Schwyz (Switzerland)** report on their initial experience with seven patients, four male and three female. All cases presented with chronic subluxation of the peroneal tendons and were treated with a minimally invasive tendonoscopic procedure. All patients underwent a similar procedure with visualisation and debridement of the superficial retinaculum, if damaged, and tendonoscopic deepening of the peroneal groove without retinacular repair. Although this was a small series of just seven cases, there were no reported cases of recurrence and the AOFAS scores increased to 93 post-operatively (from just 75 pre-operatively).⁸ In the absence of complications, recurrence and markedly raised AOFAS scores, we (like the authors) would give this procedure the tentative thumbs up. We are yet to be convinced that it offers real advantages over the more traditional open approach.

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