

X-ref For other Roundups in this issue that cross-reference with Foot & Ankle see: Research Roundups 2 and 7.

Peroneal tendon injury associated with fractures of the talus X-ref

■ Fractures of the talus are uncommon yet severe injuries. Much focus is given to the issues with the emergent management, blood supply and operative approaches. The assessment and management of talus injuries are frequently complex and the long-term consequences can be life-changing. There is, however, little written about associated injuries. While there is no doubt regarding the long-term morbidity associated with talus fractures themselves, there is little known specifically as to whether any longer-term symptoms are related to associated conditions rather than the fracture itself. A study team from **Chiba (Japan)** have investigated the relationship between peroneal tendon subluxation and talus fractures.¹ There is a well documented association between hindfoot fractures (specifically the calcaneus) and both peroneal tendon tears and subluxation. Curiously, this has not been investigated with regard to the talus and the information is limited, to say the least, concerning fractures and dislocations of the talus. These authors reviewed the CT imaging on 30 serial patients with subluxation of the peroneal tendons to provide an incidence of this injury in their population. The study was a retrospectively designed study and the CT imaging was reviewed by two orthopaedic surgeons to classify the fracture (using the Marti-Weber Classification). This was combined with demographic and injury-specific details. Although not gold standard (which these days would likely be MRI), CT imaging was used to diagnose peroneal tendon

dislocation using axial and coronal images. The major presented finding of this study was an incidence of CT-diagnosed peroneal tendon dislocation of 27% (8/30), with a further patient presenting late with clinically apparent dislocation of the peroneal tendons. An overall incidence figure of 30% is therefore quoted in this hitherto largest reported series in the literature. The incidence of peroneal tendon dislocation in association with fractures of the talus is surprisingly high. It is therefore important that this is excluded both clinically and radiologically during the overall assessment of the patient at presentation and follow-up. Ideally, diagnosis would be made at presentation, although this can be somewhat tricky given the usual soft-tissue envelope compromise. In any case, patients with ongoing symptoms should be examined and investigated with a view to a high potential for peroneal tendon injury.

Total ankles and wound complications

■ The curse of the foot and ankle surgeon is the soft tissues. The poorest outcomes from surgery are undoubtedly dictated by the soft tissues. In the foot and ankle, this effect is magnified and major wound breakdown following total ankle arthroplasty is a genuine problem. A truism is that the best treatment for soft-tissue complications is to avoid them at all costs. However, as this group from **Durham, North Carolina (USA)** point out, little is known about the potential intra-operative factors that may contribute to the development of wound breakdown.² The authors set out to establish whether the relative tissue hypoxia associated with tourniquet use is responsible for poor wound healing or if, in fact, other factors are at play. To answer this question, the authors prospectively collected data on 762 primary total ankle arthroplasties, of

which a subset of 26 patients (3.4%) required operative intervention for major wound complications. All of these ankle arthroplasties were performed at the same institution by specialist foot and ankle surgeons. An anterior incision and standardised approach was routinely used, with interrupted vertical mattress nylon sutures for skin. The authors' routine practice was to treat wound breakdown with a vacuum-assisted closure (VAC) dressing in superficial cases where there were no exposed tendon, neurovascular structures or implant material. Any patients with more significant soft-tissue defects underwent surgical reconstruction. In this cohort of 26 patients, 49 individual operative procedures were performed. With regard to plastics reconstructions, 18 patients had flaps and eight had skin grafts. In terms of picking out the aetiology when compared with the control group, patients with major wound complications had a significantly longer mean surgical time which was also matched by a statistically significant increase in tourniquet time in that group. There were eight patients who developed a significant deep space infection out of the 26 (30.8%). These cases required multiple returns to theatre for drainage and exchange of components. Two of those eventually required below-knee amputation. We are, in general, poor at reporting our own complications. In particular, many surgeons shy away from sharing their problems, when in fact this is precisely where we can learn the most. We applaud these authors for their frank and honest account of deep wound complications following ankle arthroplasty. From the data presented in this large series, it is clear that the outcomes of major wound complications after total ankle arthroplasty are poor with a significant surgical burden, and some even resulting in amputation

in a small number of those cases. Although there was no direct association found with the tourniquet time, the trend is something we should all be mindful of; longer surgery with longer tourniquet times is clearly not good for your patient's soft tissues.

Percutaneous fixation of calcaneal fractures X-ref

■ The surgical fixation of calcaneal fracture remains a controversial topic. In light of some newer randomised trials (such as the UK Heal study), the discussion about who should and who should not have fixation of their calcaneal fracture continues. Given the complication rates, and evidence that accurate joint reduction does not avoid subtalar arthrosis, some surgeons are starting to look at alternative approaches with calcaneal fractures, or indeed returning to conservative management. Many surgeons are moving away from an open approach to utilising a minimally invasive approach with percutaneous fixation. The potential benefits of this approach include smaller wounds and lower risk of infection and wound breakdown, while still managing the heel shape and avoiding subfibular impingement. This group from **Iowa City, Iowa (USA)** present their own series of 182 intra-articular calcaneal fractures, all treated minimally invasively with percutaneous screw fixation.³ The authors hypothesise that using a percutaneous technique for reduction and fixation with screws alone would yield results comparable with those published for open techniques, but with lower complication rates. The surgical tactic in all cases was for fracture reduction using instrumentation placed through multiple stab incisions under image guidance. Fixation was with 3.5 mm and 4 mm cannulated screws. Post-operatively, patients were managed in either a splint or plaster cast and were

non-weight bearing for ten to 12 weeks. Outcomes were assessed at three months post injury for the presence of early complications, and the reported clinical outcomes were to a minimum of one year (mean 2.6 years) post surgery in 106 feet (90 patients). At the three-month assessment, there were two superficial infections (1%) and two patients required screw removal (1%). At the one-year follow-up, complications included screw irritation (9.3%), subtalar arthritis requiring subtalar fusion (5.5%), malunion (1.8%) and deep infection (0.9%). The Böhler angle, calcaneal facet height and calcaneal width were significantly improved post-operatively. However, there was an average loss of Böhler angle at three-month follow-up of 4.9° from that achieved at the time of surgery. Recorded pain scores varied (in 37.8%, 1 to 3 in 16.7%, 4 to 6 in 30%, and 7 to 10 in 15.6%), with nearly two thirds of patients experiencing some residual pain. Using this technique, these authors have shown a low early complication rate. Unfortunately, there is no control group for comparison and the length of follow-up is short. Their measured outcomes are prone to bias and do not include any patient-reported scores. It is therefore not possible to draw conclusions about outcomes from this technique compared with an open technique. However, the rate of early complication among this cohort is low and this is a useful finding from this large cohort of patients.

Forefoot width and Morton's neuroma

■ The so-called 'Morton's Neuroma' is a benign neuroma of the plantar intermetatarsal nerve, usually occurring between the metatarsal heads, and most commonly seen in the second intermetatarsal space. Despite the often disabling symptoms and relatively common nature of the condition, it remains somewhat unclear as to what exactly causes Morton's neuroma. Theories abound and include microtrauma and foot dynamics.

This group from **Guro-gu, Seoul (South Korea)** undertook a simple epidemiology study to establish whether patients were more likely to suffer with Morton's neuroma if they had an abnormal forefoot width.⁴ Their comparative study of 84 consecutive patients with Morton's neuroma was matched to a control group of patients with similar foot symptoms but without the neuroma. The authors successfully matched for age, gender, laterality and affected web space. In this predominantly radiological study, a range of measurements including first to fifth intermetatarsal distance, intermetatarsal angle and intermetatarsal distance were recorded, and the authors undertook a validation exercise to establish that there were no biases with inter- or intra-observer reliability. There were no differences between the radiological measurements and the affected and unaffected feet; similarly, there were no discernible differences between the intervention and control groups.

Biomechanics, gait and ankle replacements X-ref

■ The problem with ankle replacement is not actually the replacements, which are limited somewhat by longevity, complications and failure to restore function in its entirety. Rather, we would argue, here at 360, that the problems with satisfaction, from both surgeons and patients, with ankle arthroplasty is that the alternative, an ankle fusion, is really quite comparable. There are two basic alternatives in design philosophy available within the world of ankle arthroplasty – fixed and mobile bearing. One of the factors continuing to push forwards evolution in ankle arthroplasty is the wish to restore more normal biomechanics. There are few patients who would report that their ankle feels 'normal' following an arthroplasty, and this is, to a certain extent, due to the altered biomechanics of gait. These authors from **Durham, North Carolina (USA)** have set out to determine whether these two competing

philosophies of ankle arthroplasty design have any effects on gait mechanics in a randomised controlled trial of ankle arthroplasties.⁵ Their study was designed to establish pain scores and gait mechanics at one year following surgery. The authors were able to recruit just 40 patients to their study from 144 eligible patients during the study period, and one has to be wary of the potential issues with selection bias here. All patients included in the study had isolated osteoarthritis of a single ankle, were independently mobile, and weighed less than 250 pounds with minimal pre-operative sagittal and coronal plane deformities. Twenty patients were randomly assigned to each bearing type, and surgical details, other than mobility of the bearing, were identical. Outcomes were assessed as both gait analysis including the usual gamut of outcomes, and 33 patients were included in the final analysis. Perhaps unsurprisingly, this small trial did not reveal any significant problems. The authors, however, did usefully undertake some power and effect size calculations, and determined that the observed effect sizes required a trial of between 66 for the largest observed effect (propulsive vertical ground reaction force) and 2336 for the smallest effect (walking speed).

Platelet-rich plasma in ankle osteoarthritis

■ Like a bad penny, platelet-rich plasma (PRP) just won't go away. Despite the wide range of studies demonstrating no efficacy, investigators continue to evaluate the potential effects of PRP on a whole variety of indications. Orthopaedic surgeons in **Chiba (Japan)** identified another diagnosis in which PRP hasn't been tested – treatment for osteoarthritis (OA) of the ankle.⁶ The authors report a small case series of 20 patients, all treated with injection of PRP for varus-type ankle OA. Three injections of 2 mL PRP were administered under ultrasonographic guidance. The efficacy was established using the Visual Analogue Scale (VAS), the



Japanese Society for Surgery of the Foot (JSSF) ankle/hindfoot scale, and the Self-Administered Foot Evaluation Questionnaire (SAFE-Q). The authors report a marked benefit with the injections, with significantly better outcomes at four, 12 and 24 months post injection. There were no serious adverse events, and the authors conclude that PRP treatment is "safe, effective and may be an option for ankle osteoarthritis". However, although there was an improvement and no complications, there was no comparator group. We are perhaps less enthusiastic about PRP, given this series, than the originators are. Clearly, until there is a comparative outcome series there is little or no evidence to support this treatment.

Investigating chronic lateral ankle instability X-ref

■ The diagnosis of lateral ankle instability, as with many ligamentous injuries, is still awaiting a 'gold standard' test. The range of options utilised in clinical settings include clinical examination, gravity and traditional stress views, along with dynamic and static ultrasound, and MRI scanning. Even with the range of investigations available, there are no data on the sensitivity of the various investigations; we regularly find ourselves struggling to identify in a reliable manner those patients who will benefit from stabilisation, and it is often left to clinical intuition. Researchers in **Seoul (South Korea)** set out to compare two of the common investigations – the probable gold standard of MRI scanning and the findings of stress

radiographs which essentially demonstrate the dynamic position of the ankle under stress.⁷ The authors report on the outcome of 132 patients, all of whom had undergone surgical reconstruction for injuries to either their anterior talofibular ligament (ATFL) or their calcaneofibular ligament (CFL). All patients also underwent MRI scanning and stress radiography. The individual MRI scans were reviewed for previously recognised signs of ligament injury on a MRI scan, including findings of ligament attenuation, visible discontinuity, “wavy” profile and high signal intensity on T2. In

just 4% of ankles, the ATFL appeared normal whereas the CFL was normal in around a third. The commonest abnormality seen was thickening and attenuation of the ligaments, while wavy or irregular contours were seen in just short of half of ankles. Perhaps most surprisingly, just 14% of ankles demonstrated increased signal intensity of either ligament. There are no other papers in the literature which describe the MRI findings following ankle ligament injury in such detail, and certainly none where the results are correlated to operative findings and stress radiographs. Sadly, diagnostic studies like this

are not undertaken terribly often, yet the information they yield is crucially important in clinical decision making.

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Wrist & Hand

X-ref For other Roundups in this issue that cross-reference with *Wrist & Hand* see: *Trauma Roundup 1*.

Is bone scanning helpful in the diagnosis of CRPS?

■ Complex Regional Pain Syndrome (CRPS) remains an enigma. While all agree that the condition exists and causes ongoing refractory pain combined with disabling loss of function, the cause and pathophysiology are unclear. There is a broad agreement that, although imperfect, the Budapest Criteria, reached as a consensus statement, represent the most reliable way of reaching the diagnosis of CRPS type 1. However, clinicians from around the globe also use a range of other criteria, and innately we all feel more comfortable with an investigation to ‘confirm the diagnosis’, especially in this somewhat nebulous condition. There is controversy associated with the use of bone scintigraphy, and the possibility of the ‘imperfect reference test’ effect having an impact on the overall accuracy of the diagnostic test. With this in mind, this review team from **Zurich (Switzerland)** did their utmost to establish the diagnostic accuracy of bone scintigraphy in the diagnosis of

CRPS.¹ They designed a systematic review of the literature and Bayesian meta-analysis to allow for estimation of the test accuracy of bone scintigraphy, and were able to account for the potential contamination of the results due to the imperfect nature of the Budapest Criteria, which in this case is the reference test. The results require a little untangling, however, they essentially establish that the sensitivity and specificity appear to be about 0.80 and 0.85, respectively, when the inaccuracy of the reference test is taken into account. Although this might make bone scanning seem appealing, when the authors turned the question on its head and repeated the analysis just using studies that included the reference test, they found a significantly lower sensitivity (0.55) but much higher specificity (0.94). This suggests that bone scintigraphy cannot be used to reach a diagnosis, however, it may be very useful in order to rule out a diagnosis of CRPS.

Do injections other than steroid work for tendinopathies? X-ref

■ Tennis elbow and other tendinopathies are usually self-limiting,

but in the meantime symptoms can be very troublesome (as, on occasion, can be the patients suffering with them!). Patients regularly present to the hand clinic complaining of everything from tennis elbow to de Quervain's tenosynovitis. Short of surgery, which has mixed results in the literature, there are many non-operative options available, but do they work? We are now in the good position that enough small studies are reported that reasonable conclusions about efficacy, indications and side effects can be reached through metanalysis. There are a number of systematic reviews concerning conservative management that deserve our attention. In a study from **Taipei (Taiwan)**, the review team set out to establish the comparative effectiveness of botulinum toxin and placebo in the treatment of lateral epicondylitis.² There were six randomised trials suitable for this review reporting the outcomes of 321 participants. The trials were a mixture of those comparing botulinum toxin with placebo and those comparing botulinum toxin with steroid injection. Outcomes assessed in the review included pain

relief and grip strength reduction at various timepoints. When compared with placebo, there was a significant improvement in pain at all three timepoints, however, efficacy was similar to that of corticosteroid. The authors found that botulinum toxin was superior to placebo and could last for 16 weeks. Corticosteroid and botulinum toxin injections were largely equivalent, except the corticosteroid injections yielded superior pain relief in the early stages and were associated with less weakness in grip in the first 12 weeks. A group from **Wuhan (China)** conducted their own investigation into the efficacy of platelet-rich plasma (PRP) in the same cohort of patients.³ This review was able to include the results of eight randomised controlled trials reporting the outcomes of 511 patients. The results of this study are somewhat curious. In the short term (up to six months), the authors established that the steroid injection provided superior pain relief and functional results. However, in the longer-term there was an about-turn and PRP then went on to provide a better result in terms of both function and pain relief. The authors go on