

ROUNDUP³⁶⁰

Foot & Ankle

Replacement in osteonecrosis of the talus

■ Avascular necrosis (AVN) of the talus is a very tricky condition to treat. Although sometimes asymptomatic, those patients who experience symptoms complain bitterly of pain and stiffness. Total ankle replacement (TAR) is contra-indicated in these patients as the resurfacing components are known to perform poorly in advanced osteonecrosis. Given the high rates of talar AVN following fracture dislocation of the talus despite modern treatment, this really is a clinical problem without an answer. Many post-traumatic reconstruction patients end up with peri-talar fusions, and sometimes a pan-talar fusion for every symptomatic collapse. So why not simply replace the affected joint with a talus hemiarthroplasty? This very thought appealed to a research team in **Nara (Japan)**. They have written up the first results of 22 patients (Level III evidence) treated with a talus body prosthesis. The prosthesis designed for the study was an all-ceramic body replacement. In the first eight these included a small stem to fix the prosthesis into the neck but this was removed in design modifications for the subsequent 14. Outcomes were assessed with AOFAS hind foot scores. The patients were followed up for a mean of eight years (18 to 174 months). With the first-generation prostheses, results were relatively evenly distributed (3 excellent, 1 good, 3 fair and 1 poor) and there were significant radiological

signs of loosening surrounding the stem in all patients, prompting the subsequent design change. The clinical results of the second-generation prostheses were rather better than the initial series (3 excellent, 5 good, 4 fair and 2 poor) and the redesigned prosthesis demonstrated more favourable radiological appearances. At final follow-up four patients had failure of their implant and underwent revision surgery.¹ We found this paper to be of great interest around the office here at 360. Although it is only a small prospective case series it does dangle the tantalising carrot of a potential solution for what is a very disabling condition for many young very active patients. We were slightly surprised with the authors' conclusions, however, that having not perfected (but vastly improved on) the body prosthesis they now recommend total talus replacement, a procedure they provided no data for in this series.

Ankle instability in athletes

■ The most common cause of ankle instability following injury is a tear in the anterior talofibular ligament (ATFL). This in itself does not necessarily require surgical treatment, and randomised controlled trials have confirmed that the optimal treatment for isolated tears is early weight-bearing. The controversy arises with symptomatic instability, particularly in the athlete. Anatomic reconstruction uses suture repair of the ruptured ATFL, often in combination with augmentation using the extensor retinaculum, our preferred approach

here at 360. The efficacy of this procedure is good, but the re-injury rate (particularly in athletes) is relatively high as suture repairs can fail or stretch out with time. Non-anatomic reconstructions usually use a peroneal tendon and cross both the tibio-talar and subtalar joints which are much stronger, but associated with significant post-operative stiffness. Researchers from **New York (USA)** have tried to have their cake and eat it. They have devised a modified procedure which is both anatomic and reinforced with a peroneus longus transfer. The authors propose that their modified procedure would have the advantages of both approaches and designed a prospective cohort study (Level III evidence) to establish whether this is indeed the case. The patients included in the study underwent pre-operative baseline scoring and post-operative outcome scores with the Foot and Ankle Outcome Score (FAOS) and SF-12 scores. Fifty-seven serial unselected consecutive cases were included, and all patients were followed up to a minimum of year. Both outcome scores improved dramatically post-operatively (FAOS 58 to 89 points; SF-12 48 to 80 points) and both of these improvements were significant. Most importantly, all patients self-reported mechanically stable ankles, although 12% suffered functional instability which was a consistent barrier to a return to sports.² The authors present an encouraging early report of a new technique. We would encourage them to perform either a prospective or retrospective

analysis with one (or preferably both) techniques. Although they make the case for the new technique admirably, the results reported here are not significant improvements on other published series.

Long-term follow-up of lateral ankle ligament reconstruction

■ In a slightly different take on lateral ankle ligament reconstruction, surgeons from **Grenoble (France)** designed a long-term follow-up study to evaluate the efficacy of the modified Brostrom (anatomical repair with extensor retinaculum reinforcement). They conducted a retrospective multicentre study (Level IV evidence) including 150 patients who underwent the same surgical procedure at a number of different centres. Patients were followed up to a mean of 11 years and clinical outcomes were assessed with the Karlsson score and examination (anterior draw, inversion), and radiological outcome with the Van Dijk osteoarthritis score. The surgeons of this series were able to achieve a remarkable 93% patient satisfaction rate, and 95.2% of ankles were stable on examination. Radiographs at final follow-up demonstrated no cases of osteoarthritic degeneration and very small differences in stability (differential varus tilt of < 1°, differential anterior drawer 0.2 mm).³ This really does set the bar high for ankle instability surgery, although this is an 'all comers cohort', not exclusively high-performance ankle users. In light of these two different studies we have to say at 360 we would be

sorely tempted not to adopt the peroneal tendon reinforcement (described in the previous paper) without first attempting the standard anatomical repair. The results in this series, as they say, speak for themselves.

Half an operation for Stage II TPD?

■ Tibialis posterior insufficiency is a difficult condition to treat. Patients do appallingly badly once they have developed an irreversible deformity with complete collapse of the medial arch, and at this point salvage surgery is the only option, often with mixed results. Patients with early deformity can be treated effectively with insoles or custom footwear. However, there is a hinterland where neither widely practiced surgical option (tendon transfers nor fusions) is an ideal treatment, and insoles may not prevent progression or achieve correction. This is particularly the case with patients with Stage II tibialis posterior dysfunction. Clinical researchers in **Tours (France)** set out to prove their hypothesis that a limited surgical intervention would provide a third way, minimising the surgical insult, but maximising the potential to halt progression. The French surgeons designed a prospective follow-up study (Level III evidence) to evaluate their approach. In typically continental fashion the surgeons decided to take a different approach to the norm and performed only a calcaneal osteotomy and 'tendon balancing' (performed through peroneus brevis and triceps lengthening). The patients were clinically reviewed at a mean of four years (2 to 6.3). A total of 17 feet (in 13 patients) were included in the study; all had Stage II tibialis posterior deficiency and underwent limited surgical treatment. Patients were assessed at final follow-up by an independent observer. Outcomes were assessed as ability to perform a single heel rise, and the presence or absence of active hindfoot inversion during the single heel rise. Using a deceptively simple methodology and without recourse to the usual outcome

scores, and in spite of a single failure requiring subtalar fusion, the investigators conclude that their procedure is effective in treating mid-stage disease and may indeed be more effective than traditional options.⁴ It really does appear that in this case doing half an operation well may be better than no operation at all. The deceptively simple methodology in this small case series does support this slightly controversial procedure. Here at 360 we would normally prefer the slightly more orthodox calcaneal osteotomy and tendon transfer. This may be another French paradox, with admirable results in this series without tendon transfers. Perhaps we are overtreating this condition?

For heaven's sake don't operate on Achilles tendon ruptures

■ How can such a common injury as Achilles tendon ruptures (ATN) be so controversial? Here at 360 a straw poll round the office seems to reveal a bit of equipoise, which mirrors the views across the globe. Some surgeons advocate surgical fixation and early mobilisation, some do not. What has changed dramatically over the last few years is the early active mobilisation protocols which have revolutionised the lives of the patients and made non-operative management of ATN ruptures a much easier sell in the consulting room. Despite many randomised controlled trials there is no clear message as to how these should be managed. The lack of clarity is due to difficulties establishing whether the complication rate in operatively managed cases outweighs the slight improvement in function. Investigators in **Halifax (Canada)** have conducted a meta-analysis of randomised trials to attempt to answer this previously opaque question in light of newly published randomised controlled

trials. The authors aimed to establish the different outcomes from surgical and non-surgical outcomes in terms of re-rupture rate, complications, return to work, calf circumference and functional outcomes. The research team conducted a comprehensive literature review and assessed each identified paper for bias and data heterogeneity. Analysis was undertaken using fixed or random effects models as appropriate, and a meta-regression analysis used to identify causes of heterogeneity. The authors included ten studies in the meta-analysis. The research team identified that if functional rehabilitation protocols were used, the re-rupture rates were identical in surgical and non-surgical patients. If functional rehabilitation was not offered, the re-rupture rate was



significantly higher in the conservative group (8.8% higher) at the cost of a 15.8% increase in the risk of complications. There were no differences in this meta-analysis with regards to strength, calf circumference or functional outcomes.⁵ At 360 HQ we were delighted to see such a well constructed study answering the question so clearly. The data presented clearly answers the research question, and as such we would advise: for heaven's sake don't fix Achilles tendon ruptures. We were slightly perplexed therefore to find that the authors suggested surgical repair should take place in centres where functional rehabilitation is not available. We (both as potential patients and scientists) would have been much happier had the authors concluded that centres without functional rehabilitation protocols should get one double quick!

Weil osteotomies and Freiberg's disease

■ Freiberg's disease (osteonecrosis of the metatarsal head) can be a tricky little condition to treat. There are a range of osteotomies that are

employed to attempt to offload the metatarsal head, simultaneously improve symptoms, and allow for revascularisation of the head before irreparable damage has occurred. There is surprisingly little evidence on which to base treatment of Freiberg's disease, let alone any on which osteotomy to use and when. Researchers from **Busan (South Korea)** have taken the opportunity to share their experiences of 20 modified Weil-type osteotomy for symptomatic Freiberg's disease. It is not unreasonable to expect that this tried and tested osteotomy which shortens without plantar-flexing might effectively offload the affected ray and result in significant symptomatic relief. The authors report 20 cases in 19 patients of Freiberg's disease treated over a seven-year period. They assessed their clinical outcomes through a visual analogue scale (VAS), American Orthopaedic Foot and Ankle Society (AOFAS) scores, satisfaction ratings and range of movement measures. The authors report an improvement of nearly five points on the VAS (6.2 to 1.4) and nearly 20 points on the AOFAS (63 to 80). This was uniform across all grades of disease. No patients required further surgery and 95% of patients were satisfied with their results.⁶ The authors of this series have clearly demonstrated that Weil's osteotomy may be used effectively and safely to treat Freiberg's disease. We would (as often) inject a 360 note of caution before we order a bulk load of twist-off screws to perform our osteotomies. Freiberg's disease has a relatively predictable history with pain naturally following a relapsing and remitting course. We wonder how many patients would have improved without the surgeon's knife?

MRI is not sensitive for intra-articular lesions

■ As time goes on at 360 HQ we find ourselves more and more reliant on the wonders of modern imaging technology. While history-taking and clinical examination remain the

foundation for all diagnosis, increasingly, complex imaging techniques are relied on, particularly to identify intra-articular pathology, in a complex diagnosis like ankle ligament instability. The sensitivity and specificity of MRI for diagnosing intra-articular pathology and ligament injuries is not known. Yet again the Koreans have come to our rescue with a paper from **Goyang (South Korea)**.

The researchers report a retrospective diagnostic study (Level IV evidence) in which pre-operative MRI findings were correlated with the intra-operative findings. The authors included the results of 65 patients who underwent surgery for lateral ligament instability over a four-year period. They undertook an intra- and inter-observer reliability exercise and in order to assess the clinical significance of pathological findings the patients' outcomes were measured with the AOFAS score and a VAS. Due to the inclusion criteria all patients were found to have anterior talofibular ligament (ATFL) injuries. In 51% of cases, these were associated with talar dome lesions. Other arthroscopic findings included synovitis (60%) and anterior osteophytes (14%). The MRI scan was found to be 60% sensitive for ATFL rupture and less than 50% sensitive for all other pathologies (osteochondral lesion 46%, syndesmosis injury 21%, synovitis 21%). The investigators found that the intra-observer reliability was good, with kappa values around 0.8

for all diagnoses, but that inter-observer reliability was poor in general.⁷ The authors have not unreasonably concluded that intra-articular pathology is poorly detected on a MRI scan which has a low sensitivity and low inter-observer reliability. The difficulty we find in interpreting studies such as this is in knowing what is a clinically significant lesion. There are good data from other studies to show a high rate of osteochondral injuries following ankle fracture and other injuries, but little to show that those lesions only visible on arthroscopy require treatment. We would say the jury is most definitely out on this one.

Single-stage debridement and reconstruction in Charcot feet

■ Diabetic Charcot feet present a uniquely difficult reconstructive challenge, often complicated by osteomyelitis, poor diabetic control and micro and macro vascular disease. Traditionally, patients are managed with a staged approach, often combining vascular, orthopaedic and plastic surgical specialties. However, in the case of osteomyelitis in other areas of the musculoskeletal system, the use of circular frames allows for single-stage excision, deformity correction and fixation. This is not an approach often applied in the diabetic foot and ankle. Surgeons in **Maywood (USA)** report their experience with a single-stage approach to osteomyelitis-complicated Charcot foot. They argue that

a surgical approach with excision and correction of deformity might offer a single-stage procedure which crucially, as the burden of diabetic disease increases, may be more health economic. The research team designed a longitudinal cohort study (Level III evidence) to examine the results of their single-stage surgical approach in an unselected serial cohort of 178 patients who underwent surgical treatment for diabetic-induced Charcot arthropathy. Only 78 patients had confirmed osteomyelitis (diagnosed by the presence of an open draining wound or positive biopsy). All patients underwent a radical resection of all abnormal bone and an acute correction to produce a plantigrade foot. The correction was maintained through use of a circular frame. Patients underwent extended parenteral antibiotics that were tailored to the cultured organism in consultation with the infectious diseases service.⁸ Using this approach the surgical team were able to achieve a 95.7% limb salvage rate and all patients were able to walk with appropriate footwear. Two patients required soft-tissue flaps for wound coverage and five required a second debridement in order to achieve their end result. The authors conclude quite reasonably that this represents a potential step forward in the management of Charcot arthropathy. The achievement of a plantar-grade non-infected functional foot in over 95% of patients

with these co-morbidities does, we think, represent the current gold standard of care.

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