ROUNDUP360

Foot & Ankle

x-ref *For other roundups in this issue that cross-reference with Foot & Ankle see: Trauma roundups 1 and 5.*

Calcaneotibial nail in ankle fractures x-ref

Complex ankle fractures in patients with a poor soft-tissue envelope are becoming increasingly common as the population ages. Various strategies have been tried to salvage these difficult injuries, including plaster, rush pinning, fibula nails (see the trauma section in this issue p.27) and calcaneotibial nails. Whilst the hind-foot nailing technique avoids many of the soft-tissue problems associated with other techniques, there are ample reports of cases of periprosthetic fractures at the tip of the nail. A surgical team in **London (UK)** describe a potentially 'best of both worlds' approach.[1] Avoiding the soft-tissue complications associated with traditional ORIF, they have reported the outcomes of 48 frail elderly patients treated with a long calcaneotibial nail which by crossing the isthmus avoids the stress riser associated with shorter nails. As would be expected in this sort of series, none of their patient cohort were able to independently mobilise and had a mean age of 82 years (61 to 96) with an overwhelming preponderance of women (85%). The majority of these fragility fractures were low energy (94%), although around 40% were open (n = 19/48). Again as would be expected, only two thirds were still alive at six months, although 90% of these had returned to their pre-injury function. Complication rates were surprisingly low given the pre-morbid condition of the patients, with infection (6%), locking screw failure (6%) and valgus mal-union (4%). There were no cases of peri-prosthetic fracture, although a single patient with co-morbid vascular disease underwent a subsequent below knee amputation. The authors report the results of calcaneotibial nail in the frail elderly patient, concluding that this represents an excellent option in this group of patients allowing immediate mobilisation and minimises the risk of bone or wound problems. A long nail which crosses the isthmus of the tibia avoids the risk of peri-prosthetic fracture associated with shorter devices.

Reamer Irrigator Aspirator for ankle fusion

Ankle fusion is still very much a staple treatment for advanced osteoarthritis of the ankle, offering a reliable long lasting solution with similar results to ankle replacement in many patients. The difficulty with ankle fusion is when it doesn't fuse. Fusion rates have been shown to be associated with surgical technique, fixation strategy and patient factors. Many surgeons use bone graft to improve fusion rates and address deformities or limb shortening. Surgeons in **Buffalo (USA)** evaluated the use of either the femoral reamer-irrigator-aspirator (RIA) harvested bone graft or iliac crest bone graft to achieve tibiotalar fusion.[2] The study team conducted a retrospective review of patients who underwent one of the two surgical options over a four year period. Information collated for the study included demographics, complication rates and recorded clinical symptoms. Patients radiographs were also reviewed by three surgeons and the rate of radiological union established. There were no differences in the baseline characteristics between the groups although there was a significantly increased rate of nonunion in the iliac crest bone graft group (6 vs 1), although the time taken to radiological fusion was similar in the two groups (12.5 vs 12.2 weeks). Given the higher rate of nonunion in the traditional iliac crest bone graft group, an argument can certainly be made for the use of the RIA. That having been said, there is a significant cost implication for healthcare provision with the RIA system costing around £600 per use.

Periprosthetic bone infection

Periprosthetic infection of total ankle joint replacements is not as well studied or characterised as that of the hip and knee. Whilst infection is as common a problem as in other replacement joints, the relative rarity of ankle arthroplasty means that whilst well described, infections around the ankle joint are not well studied. Researchers in **Bern (Switzerland)** set out to evaluate the utility of their standardised hip and knee infection protocols for treating infections of the ankle.[3] They describe a case series of 34 infected joints drawn from a series of 511 ankle replacements and followed-up to a minimum of two years after operation. There was a mixture of acute (56%) and chronic (44%) infections, with the overwhelming majority of infections caused by Staphylococcus spp (71%). Surgical strategies included retention of components (62%), revision of both components (30%) and arthrodesis (8%). The treating team were successful in eradication of the infection in 68% of patients with this strategy, although superior cure rates were seen with revision of both components (90%). There was significant variation in the treatment strategies between patients with infected ankle replacements, and the authors noted that 80% of patients were not treated in what would be considered a standard manner for total knee or hip infection. These authors sensibly infer that treatment of ankle replacement infections should be along similar lines to those developed for other periprosthetic infections, and in particular the quality of the soft-tissues over the infected joint should be conserved. More aggressive treatment with revision of both components results in a more successful treatment strategy.

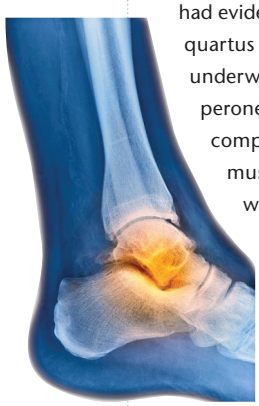
Infection in ankle fixation x-ref

Due to the poor soft-tissue envelope and subcutaneous nature of the bone, there is potentially a significant incidence of infection after ankle fixation. The majority of the published literature however, focusses on high risk groups such

as diabetics, the elderly and open fractures. Little however is known about the functional outcomes of patients following the development of infection – surgeons in **Leicester (UK)** set out to establish the long-term functional consequences of previous post-operative infection.[4] The research team undertook an age- and gender-matched cohort study to identify patient and surgical risk factors for infection, in addition to assessing the long term functional sequelae of both superficial and deep infection in a series of over 700 patients. The incidence of infection was 4% (n = 29/717) and deep infection occurred in 8 patients (1.1%). Olerud and Molander ankle performance scores were severely impeded in the infection group (60 vs 90) and multivariant regression analysis undertaken identified risk factors of diabetes (odds ratio (OR) 15), nursing home residence (OR 12) and Weber C fractures (OR 4) to be significant risk factors for infection. This paper demonstrates surprisingly poor long term results for patients who have suffered from superficial and deep infections. It seems likely to us here at *360* that this moderate impairment is partly due to the infection and also partly due to the fact that no adjustment of outcome scores has been undertaken to consider their identified risk factors (many of which would be expected to affect baseline function).

Cheap and cheerful OK in MTP fusion plates

■ One of the most common procedures in foot and ankle surgery is the first metatarsophalangeal (MTP) joint fusion. Commonly performed with either LAG screws, plate or both, the rise of interest in pre-contoured locking compression plates has resulted in a large number of specific foot and ankle plates designed to provide increased purchase and potentially more reliable toe position. Researchers in **Durham (USA)** set out to establish if the significantly increased cost of this yet to be proven technology resulted in improved outcomes.[5] They used a retrospective analysis and identified patients who had undergone 1st MTP fusion over a five year period with either technique. The study team collated a combination of radiological and clinical data (including pain scores and complication rates). There were nearly 200 patients who met their inclusion criteria, with 97 undergoing surgery with a 1/3 tubular plate and 26 the pre-contoured locking plate. Underlying diagnoses and demographic details were similar in the two groups, although clinical time to healing was a month longer in the locking plate group (3.7 vs 4.8 months). There were no differences in radiological outcomes or VAS pain scores between the two groups, suggesting that either implant can be used to effectively stabilise the fusion. The advent of newer more expensive technologies does not always confer significant advantages over traditional approaches. There was a higher union rate seen with the pre-contoured plates in a subgroup analysis of patients with inflammatory arthropathy and it may be that for this indication the higher expense is justified. However, given the overall longer healing times and no overall differences in union rates, radiological or pain outcomes, we cannot see how routine use of pre-contoured plates can be justified in the general population.



Sliding fibular graft for peroneal tendon pathology

■ Peroneal tendon pathology is probably significantly more common than the reported literature would suggest. Patients can suffer quite disabling symptoms, however the diagnosis is seldom reached if not looked for. We recently highlighted a paper in *360*, describing a high rate of undiagnosed peroneal tendon pathology in calcaneal fractures (Bone Joint *360* 3;3:21). Reaching the diagnosis is challenging enough, but then the question is what to do with that information. There are plenty of described operations, and the suitable intervention does depend to a major extent on the nature of the pathology and patient factors. However, patients with peroneal tendon subluxation or tears often fail conservative treatment at which point a decompression, repair and then either refashioning of the groove or fibular osteotomy is often required. Authors in **Qingdao (China)** describe their modified sliding fibular graft repair and support it with clinical results from 26 patients at an impressive minimum three year follow-up.[6] Their study consisted of a mixed cohort of patients, with over half of the patients (n = 15) having convex peroneal grooves with the remainder exhibiting a shallow sulcus. In addition, four patients had evidence of a peroneus quartus muscle. Patients underwent treatment of their peroneal tendon tears/decompression of their quartus muscle in combination with the sliding fibular graft repair and post-operative results suggest almost 90% of patients experienced a clinically relevant improvement in their AOFAS scores, with 23 patients regaining normal function and not describing any limitations. Despite these excellent clinical results, the study team do describe a significant rate of (albeit minor) intra-operative complications, with 30% of patients experiencing either neuropraxia, synovitis, a stress fracture or delayed union. Functional results in this case series are good, with little in the way of functional limitation. The 30% complication rate does seem rather high and we are left wondering here at *360* if there might be a better way to achieve similar results with one of any number of already described operations.

Fusion for failed ankle replacement

■ The choice of ankle replacement or fusion is a difficult one at the best of times, and is more difficult in either high demand patients or those with significant deformity. The high rate of early failure of ankle replacement in these patients will often edge clinicians (but usually not patients!) down the arthrodesis line due to concerns about early failure. A fuller understanding of the difficulties of salvage of these failed prosthesis would help to inform this difficult choice. Surgeons in **Brussels (Belgium)** report their own series of 17 patients who underwent salvage fusion following failed total ankle replacement.[7] The research team undertook a retrospective analysis of clinical and radiological records. They investigated the cause and mechanism of fixation, operative details at the time of revision (including graft types, complications and fixation method) and clinical outcomes (measured by the AOFAS score) at around 30 months after operation. Overall success rates were good, with around 75% of patients reaching radiological fusion after a first attempt. All bar a single patient went on to eventual union with a single revision operation. The vast majority of patients required bone graft, but a respectable AOFAS score of 74.5 was achieved at final follow-up. Although there were some intra-operative difficulties, this series of patients establishes that salvage fusion following ankle replacement is not a bad operation. Large cancellous allografts were used successfully to preserve length and patients achieved satisfactory post-operative clinical scores.

Subchondral bone clue to osteochondral defects of the talus x-ref

■ Secondary signs of ligamentous injury in the knee are well recognised, with subchondral bony changes known to be associated with different patterns of ligament injury on both CT scan and MRI scanning. Often secondary signs can

be more sensitive than direct visualisation of the lesion itself. Osteochondral lesions of the talus can present a tricky diagnostic difficulty. With very small osteochondral fragments and often partial thickness cartilage defects, researchers from **Hiroshima (Japan)** set out to establish if secondary signs on CT scan were related to the cartilage damage seen at arthroscopy.[8] Their study included 31 patients with osteochodral lesions of the talus, all of whom underwent CT scan, MRI scan and arthroscopic surgery. The findings on CT fit roughly into three groups for both the cystic lesion and fragment lesion. The cystic changes could be described broadly as: irregularly shaped, round with sclerotic wall, and irregular shaped with an opening to an articular cavity. The fragments were also classified into three types; those with no bone absorption, bed absorption without fragment absorption, and bed sclerosis and fragment absorption. The authors established that their CT classification gave superior diagnostic accuracy than MRI scanning and that the findings on CT directly related to the findings at surgery. Cartilagenous flaps were seen in all round and sclerotic lesions, whilst those with an opening to the articular surface all had severe cartilage damage. The bony absorption on the fragment related directly the stability of the flap, with greater absorption relating to increased instability and cartilage damage. The results presented by these authors would suggest that CT may be superior to MRI in diagnosing the type of lesion, stability and likely cartilage damage based on subtle secondary signs.

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