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## Foot & Ankle

**X-ref** For other Roundups in this issue that cross-reference with *Foot & Ankle* see: [Research Roundup 2, 3, 4.](#)

### The midfoot fusion bolt: has it had its day?

■ It's fair to say that the prevention of deformity in Charcot neuroarthropathy of the foot is an unsolved problem, and one that carries with it some of the biggest risks and comorbidities in foot surgery, with amputation not an uncommon outcome. As a concept, intramedullary support of the entire medial column is intuitive and appealing. However, the published results from practical implementation have been less than impressive. A group from King's College Hospital, **London (UK)** present the results of their small series of patients treated with a 6 mm solid bolt.<sup>1</sup> In their small cohort of nine patients, all but two developed a nonunion in at least one joint, and six patients experienced a significant complication in the form of migration of the nail. It should be noted that all patients had active ulceration at the time of surgery and that deep infection may have contributed to failure. These results reflect those from other series, indicating to us here at 360 that in its present form, this implant is not functioning as intended. The manufacturers have recently changed the operative technique to include a recommendation to augment the device with other devices such as staples and plates. While the concept itself may well be sound, it is clear that in its application at least, even experienced surgeons

haven't yet established how to make it work.

### Ankle arthroplasty: only for the old?

■ Although the outcomes of total ankle arthroplasty are improving, the majority of surgeons and indeed device manufacturers regard ankle arthroplasty as the preserve of the elderly. Ever willing to challenge preconceived ideas and 'handed down wisdom', researchers in **New York (USA)** set out to define what the effect of age actually is on both longevity and clinical outcomes in patients with end-stage ankle arthritis treated with modern total ankle prostheses.<sup>2</sup> This study primarily concerns the results of 395 patients, all receiving total ankle arthroplasties (TAA), with their results sadly being stratified by age (rather than treating age as a continuous variable) and reported to a mean follow-up of just 3.5 years. While the authors conclude that, based on their results, there were no differences in revision or complication rates in the younger cohort, we really do have to take some exception with this conclusion. When follow-up is just to 3.5 years we would like to see this series reported to a longer outcome and perhaps with some slightly better statistical methods!

### A return to the Keller's osteotomy procedure for diabetic feet?

■ The care of the neuropathic diabetic foot is labour intensive and often tricky, requiring an acceptance of complications and a well functioning multidisciplinary team.

The surgery can be life-changing to patients, with a not insignificant risk of complications. The majority of surgical interventions are aimed at treating neuropathic ulcers and their sequelae for the soft tissue and bones of the foot and ankle. A team from **Tel Aviv (Israel)** publish their results of resection arthroplasty of the first metatarsophalangeal joint as a salvage treatment for non-healing plantar ulcers overlying a deformed joint.<sup>3</sup> This cohort study describes promising results from a small series of 28 operations for ulcers recalcitrant to all standard offloading interventions. These results were encouraging, with the primary ulcer healing in around three weeks. However, as perhaps would be expected, there were a number of complications, with an incidence of dehiscence and infection of around 20%, and a similar recurrence rate seen one year after surgery. This may seem disheartening, but in the context of treatment of the diabetic foot it represents a viable salvage option in an attempt to avoid more radical ray amputations or similar resections which inevitably unbalance the foot.

### Joint sparing surgery for ankle arthritis in the context of deformity?

■ The current standard of care for advanced arthritis of the ankle joint is arthrodesis or arthroplasty. However, both procedures have disadvantages, and plenty of page space has been devoted in 360 to discussion of the pros and cons of each. Joint preservation surgery, especially in the younger high-demand patient,

is popular in other branches of orthopaedics, and we were intrigued to see this gait analysis-based study<sup>4</sup> from a transatlantic collaboration between **Basel (Switzerland)** and **Salt Lake City (USA)**. There were, however, only a few (eight) patients included in this evaluation of the supramalleolar osteotomy compared with the contralateral (normal) limb and with a matched group of controls. While the research team observed clear evidence of stiffness in the affected limb, the other limb remained normal. The osteotomy patients had higher pain scores but their quality of life scores were identical to the control group. These results, although very small in number, were significantly better than published quality of life data for matched patients with untreated ankle arthritis. Perhaps there is some utility in joint preserving options in ankle arthritis; we were interested to read this study and, although far from persuasive, it has certainly piqued our interest.

### Beware the subtalar fusion in the ankle arthrodesis patient?

■ Progression of hind or midfoot arthritis to an adjacent joint post-fusion is a reality of reconstructive foot and ankle surgery. The group from Duke University, **Durham (USA)** have published their results of a small series of 13 patients, all of whom had a subtalar fusion following a successful ankle fusion in the ipsilateral limb.<sup>5</sup> The research team compared the results of these 13 'secondary fusions' with a further

group of 138 patients undergoing index subtalar fusion. Outcomes in terms of fusion rate were perhaps as would be expected: better in the primary subtalar fusion group (61% vs 91%). Although caution should be applied when comparing such different group sizes, the authors make some important points about the vascularity of the talus post-ankle fusion, as well as stiffness of the adjacent bony segment placing increased torque stress on the fusion site. These two factors are probably contributory to the high nonunion rate seen in this series. While this is an interesting paper in that the fusion rates are not quite as high as one would hope, clearly a proportion of patients will go on to subtalar arthritis following ankle fusion. The value in this study is in highlighting that a positive outcome is less likely and that measures to increase the chance of fusion should be considered such as supplementation with grafting and meticulous surgical technique.

#### Nonunion in the foot and ankle a predictive score X-ref

■ One of the complications associated with bony foot and ankle surgery is nonunion. Mainstays of treatment for the majority of conditions in the foot and ankle include osteotomies and fusions, and predicting nonunion will clearly help in deciding on these management strategies. Researchers in **Vancouver (Canada)** have reported on their experience on validating a score to predict nonunion in the foot and ankle.<sup>6</sup> They undertook a form of Delphi exercise with 100 experts



in the field and identified 19 recognised risk factors for foot and ankle nonunions. They then developed a weighted risk score to each factor based on the results of the survey. Validation was then attempted using two cohorts from a single-centre end-stage OA database; 22 with established nonunion and 40 age/sex linked matched subjects who had gone on to achieve bony fusion. The researchers conclude that, based on the significant differences in scores (6.6 vs 13.5) between their two relatively small cohorts, their score could be used to identify

high-risk patients for nonunion. This is certainly a start, although we would like to see a prospective study with appropriate ROC analysis to establish the thresholds for predicting nonunion in this patient group.

#### Cast versus early weight bearing following Achilles tendon repair X-ref

■ The treatment of the Achilles tendon continues to vex many trauma and foot and ankle surgeons. Not only is the decision to operate fraught with difficulty, but the choice of rehabilitation regime is far from clear. To make matters worse, although there are some short-term studies, there are no longer-term randomised controlled trials on which to base these decisions. Researchers in **Oulu (Finland)** report the ten-year outcomes of their randomised controlled trial comparing cast immobilisation with a restricted motion brace allowing neutral plantar flexion and early weight bearing.<sup>7</sup> As would be expected, although 50 patients were enrolled in the study, only 37

were available for review at a mean of 11 years following treatment. There were no differences in their primary outcome measure of the Leppilahti score at final follow-up (92.2 vs 93.6) and no differences in secondary outcomes including plantar flexion peak torques, or angular velocity measurements. Interestingly, there were differences in peak torque and isokinetic strength which were maintained between one and 11 years compared with the contralateral side, however, it is arguable whether or not these differences are clinically significant, given the impressively normal functional scores.

#### Should we plate Lisfranc injuries? X-ref

■ The Lisfranc injury is uncommon, but associated with significant morbidity and mortality. There is little in the way of consensus as to whether closed reduction and internal fixation (CRIF), usually achieved with screws, has equivalent results to open reduction and internal fixation (ORIF), usually achieved with a dorsal plate with or without fusion of the joint. A study team in **St John's (Canada)** set out to determine if there is any evidence to support one or the other treatment approach<sup>8</sup> as, despite the rarity of the injury, the results can be really quite poor. Their systematic review and meta-analysis were set up according to PRISMA guidelines and designed to establish whether outcomes differed between ORIF and primary fusion, and whether this led to improvements in hardware removal rates, outcome scores, revision surgery rates and radiographic reduction. The study team were only able to identify three studies suitable for inclusion in the meta-analysis, however, they conducted a methodologically sound review. They were able to establish with a reasonable level of certainty that hardware removal was less likely (RR 0.23), favouring fusion. Neither

method appeared to give better functional scores, a reduced risk of further surgery or an improved outcome in terms of anatomic reduction. There certainly aren't enough high-quality studies to give a definitive answer to this question at present and the humble Lisfranc injury may well be perplexing us for a number of years yet. Until we are able to establish which patients will benefit from which treatment in an evidence-based manner, it appears that, currently, a patient-by-patient approach should be favoured.

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