the authors of this paper, we would advocate that these more specialist arthroplasties are undertaken by specialist surgeons in order to improve outcomes.

### Single-step cartilage repair in the knee X-ref

The management of chondral defects in young to middle-aged patients has challenged orthopaedic surgeons for many years. Ever since Pridie wrote his paper on a method of resurfacing osteoarthritic knee joints by drilling the subchondral bone in the late 1950s, the challenge has been to recreate an articular surface repair which relieves patients' symptoms and is durable. A number of surgical techniques have been described with varying success. The two-stage autologous chondrocyte implantation technique (ACI) has provided some very encouraging results, although only a 'hyaline-like' repair has been achieved. The repair does, however, usually achieve chondrocytes enveloped within an extracellular matrix which stains with a type 2 collagen stain (Safranin O). Surgeons and scientists have struggled to recreate the zonal differentiation of normal articular cartilage; the results in some studies have been comparable with microfracture. Unpredictable results, combined with the need for two operations and high rates of chondrocyte cell death following re-implantation have limited the uptake of ACI as a technique. There are therefore a number of attractions in utilising a bone marrow aspirate concentrate (BMAC) containing mesenchymal stem cells (MSCs) loaded onto a hyaluronic acid (HA) scaffold. There have been several early encouraging studies to date but none have looked at the potential application of this technique in the slightly older patient. Knee surgeons in **Milan (Italy)** report their study treating grade IV chondral defects treated with BMAC and HYAFF®11 (Hyalofast, Anika Therapeutics Inc., Bedford, MA), a hyaluronic acid-based scaffold.[8] Their paper reports the outcomes of 20 patients aged 45 to 60 years old, treated with this technique and compared with a control group of 20 patients who were 20 to 44 years old. The authors established that at four years of follow-up, there were significant improvements in KOOS scores, activity scores and the IDKC score with little differences between patient groups. Follow-up MRI scans suggested a cartilage defect filling of around 80% in the study group. The authors report good outcomes for the treatment of grade 4 defects and, encouragingly, increasing age did not appear to affect the outcome. Interestingly, the older age group had better outcomes than the younger group at two years, however, as the authors point out, this probably reflects the fact that the older population may be less active. This is an exciting study as there has been a considerable focus on the literature to date on the management of chondral injuries in the younger patient, however, this would suggest that surgeons with an interest in cartilage regeneration techniques should not necessarily consider older patients as unworthy candidates for regenerative cartilage technique studies.

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# Foot & Ankle

**X-ref** ***For other Roundups in this issue that cross-reference with Foot & Ankle see:*** *Children's Orthopaedics Roundup 2, 7; Trauma Roundup 8.*

### Improving safety in the medial calcaneal osteotomy

The medial displacement calcaneal osteotomy is a workhorse for a range of hindfoot pathologies, including tibialis posterior insufficiency. The osteotomy is effected usually from the lateral side and as such, the medial neurovascular structures cannot be identified and protected. There isn't a universally-agreed 'safe zone' for effecting the osteotomy and surgeons potentially risk iatrogenic injury. A cadaveric study of 40 feet reported by researchers in **Baltimore (USA)** aims to improve on safety by identifying a radiographic 'safe zone' to perform the osteotomy.[1] In the first part of their study they dissected the medial neurovascular structures, marked with radiopaque wire and took a true lateral radiograph providing visualisation of these structures. The landmark of a line from the origin of the plantar fascia to the apex of the calcaneal tuberosity was used. Whilst the investigators established that a 'safe zone' as such does not really exist, with iatrogenic nerve injuries seen after osteotomy even within their 'safe zone', they were able to describe the best position for minimising risk to the neural structures. This information is useful as an intraoperative guideline to minimise neural complications. They established that an osteotomy placed 11 mm anterior to their 'landmark' line was in all likelihood the safest position to minimise neurological injury. However, they do make the valid point that iatrogenic nerve injury with this procedure may be more common than we think.

### Operative treatment of Freiberg disease X-ref

Freiberg disease (idiopathic osteonecrosis of the head of the second metatarsal) is a relatively common condition which for the most part is treated conservatively. There are however some severe or refractory cases in which operative intervention can be considered. Like many conditions in which just a small proportion are treated operatively, there is a surprising paucity of evidence to support operative treatment, and even less long-term outcome data to inform patients and clinicians of their likely outcomes. Surgeons in **Braga (Portugal)** present their long-term follow-up of 20 paediatric patients, all presenting with refractory Freiberg disease at a mean of 23 years of follow-up.[2] The surgical teams undertook a dorsal intra-articular

wedge osteotomy with the aim of offloading the metatarsal and reducing plantar pressures. Outcomes were reported at an incredible 23 years of follow-up using the AOFAS score, lesser toe metatarsophalangeal-interphalangeal scale, range of motion scores and radiographs. The headline result is that excellent outcomes were seen in 80% of patients, with the remainder achieving a 'good' result. This paper validates the use of operative intervention in selected cases of patients with Freiberg disease, however in common with many case series does not provide any comparison group and as such it is near impossible to establish if what is being observed is the natural history of the disease or the effect of the intervention.

### First metatarsophalangeal joint fusions: to lock or not?

■ First metatarsophalangeal joint (MTPJ) fusion remains the gold standard treatment for advanced degenerative disease of the first MTP joint. Despite attempts at arthroplasty and other options, fusion remains the only reliable and durable option for many patients. There are, however, a multitude of described techniques, each with their own risks and benefits. The variations in technique are aimed at improving fusion rates, and eventual functional results. In most centres the current trend is towards using dorsal plating to augment compression screw fixation across the prepared surfaces of the joint. The cost implication of this technique is obvious when compared to single screws, crossed screws or staples. Proponents would argue the advantages of achieving rigid fixation and optimal fusion position for the joint (although what the optimal position actually is remains a topic for debate!) outweigh these cost implications. There is, however, little data to support this assertion. A group of foot surgeons from **Liverpool (UK)** report their own experiences with a retrospective series of 172 first MTPJ fusions undergoing dorsal plating for end-stage hallux rigidus.[3] The series considered a mixture of non-locked and locked plates. There were no differences in failure rates between the implants, or fusion rates between locked and non-locked implants. Whilst the implant didn't appear to make a difference to the failure rates, there were some significant differences between the outcomes for males and females (17.5% *vs* 3.8% nonunion rates respectively). The authors ascribe the difference to activity levels and compliance issues; however these findings do raise the question as to whether we should be using a more conservative post-op regime for men undergoing this procedure and alter the implant used to achieve maximum rigidity after joint preparation.

### What to do for post-infection arthritis?

■ Arthroplasty in the context of a previously infected joint is controversial at the best of times – but often necessary. In the case of the ankle joint, this has long been regarded as contraindicated – the combination of relatively poor longevity and difficulty of revision has long put surgeons off arthroplasty in the face of infection. However, it is not quite clear why, other than a natural conservatism with regards to ankle replacements. Surgeons from Duke University **Durham (USA)** present their results from a series of 22 total ankle arthroplasties (TAAs),[4] which will certainly cause this question to be re-examined. These plucky surgeons implanted 22 ankle replacements in the face of previous septic arthritis and report their results. It is worth noting that these cases had an average of eight years' infection-free interval prior to surgery. As with most data relating to ankle arthroplasty, the numbers are small and the patient group relatively heterogeneous with a range of comorbidities relevant to the outcome of the surgery. At the reported two year follow-up there was no evidence of reactivation of infection in any of the 22 implanted joints; encouraging data indeed. The authors include some sage caveats to interpreting these results and point out that the decision to proceed was made in light of their clinical impression of the soft tissues and other relevant patient factors. It seems that the success of this procedure in the setting of previous infection relies heavily on clinical acumen and good decision-making.

### The large osteochondral lesion of the talar dome

■ Large osteochondral lesions of the talar dome represent a significant challenge. They are not uncommon and are associated with significant risks of degenerative change. Primary treatment options vary wildly between centres, with microfracture, autograft, allograft and even arthroplasties offered in some centres. For large lesions (> 15 mm diameter) the results of micro-fracture are poor, and hence the ongoing search for a reasonable option. With larger lesions the associated mechanical instability requires a source of tissue to 'plug the gap' and solutions have ranged from allograft or autograft. This study from **Philadelphia (USA)** compares the outcomes of these two competing techniques in patients who have had a previous and failed microfracture or attempts at conservative management.[5] This study reports the outcomes of 40 patients, all of whom presented with either a large (15 mm +) lesion, or one that had failed previous management. Patients were randomised to either autograft or allograft treatment and outcomes were assessed using both the Foot and Ankle Ability Measures and a VAS pain score. The results between the two groups were entirely comparable, with a marginally poorer outcome in terms of PROMs reported in the allograft group. With equivalent outcomes and significant donor site morbidity in the autograft group and reported incidence of persistent symptoms from the knee at final follow-up was as high as 70%, we think the talar allograft may become a more common procedure in the future.

### The midfoot fusion bolt – technique dependent?

■ Recent evidence suggesting that the midfoot bolt provides poor correction of deformity and is associated with a high failure rate is now somewhat at odds with several recently published papers. In the **London (UK)** case series, all but one foot developed at least one nonunion, 50% required revision and 80% experienced a loss of correction.[6] In larger series also describing the outcome of this implant, **Nuremberg (Germany)**[7] and Sweden present their data on a much larger multicentre cohort of 48 procedures, all again undertaken for Charcot neuropathy. In this more recent paper, a startling difference was seen with a union rate of 98% reported and maintenance of the foot correction. The difference in results can likely be explained by the modified technique employed by these authors. They readily admit that the midfoot fusion bolt in isolation is inadequate to avoid recurrence of the deformity and failure of the device. These authors describe and recommend augmenting the fixation with a further bolt passing along the lateral column of the foot from the fifth MTPJ into the calcaneus. As in the previous paper, the authors also took the opportunity to correct the subtalar joint (also internally fixed). The key take home message here is then perhaps one of technique – the addition of lateral column augmentation will prevent bending moments on a single device, and likely thereby reduce failure. This point is reinforced in a further paper from **Rostock (Germany)** which presents a

mixed case series including early single bolts followed by a lateral column augmentation and their early unaugmented case results (similar to those at King's) prior to a change in technique.[8] It seems clear that the recommended technique in this case is not quite suitable. The midfoot bolt offers a tempting and attractive option for an otherwise difficult indication. The solution it seems is to augment the lateral column in addition to the midfoot.

### Does the Ponseti method need to be exact? X-ref

The Ponseti method is now the world over the most widely-used treatment for idiopathic club foot. The method of serial casts aiming to correct one deformity at a time, with an Achilles release if required and subsequent use of the 'boots and bars' has been shown to have success in healthcare environments as diverse as the USA and the poorest of African countries. Despite its widespread use and 'gold standard' outcomes, some patients do better than others. Researchers in **Aurora (USA)** and **St Louis (USA)** set out to establish what the predictors of good outcome were (if any), in this group.[9] Their study included patients with isolated idiopathic club foot treated over a four-year period, and they were able to report the outcomes of 184 patients (149 with complete two year follow-up). The cohort was divided into one group of 58 patients with strict adherence to the Ponseti method, and a second of 91 patients where the treating physician had adapted the protocol. There was a significantly higher unplanned intervention rate in the patients undergoing the modified approach (odds ratio 51.5), however there were no differences in the unplanned 'minor' interventions (here defined as tendoachilles lengthening and tibialis tendon transfer). It certainly appears from this series that rigid adherence to Ponseti's original protocol for both patient and healthcare provider is essential if patients are to have the best possible outcomes. It is worth however bearing in mind the volume effect which is not commented upon in this paper. The single surgeon adhering to the protocol strictly treated 58 patients, with the other 16 surgeons treating a mean of just eight patients. There is certainly a bit of difference in the likely skill in management, and it does beg the question: if you are treating just two patients a year with a condition, why are you changing the protocols?

### Lisfranc under the spotlight X-ref

The Lisfranc joint has been the cause of some head scratching over the past few years. Ever since the publication of a randomised controlled trial suggesting fusion was superior to fixation, this has become an ongoing debate. In a new systematic review and meta-analysis on the topic, surgeons from **Newfoundland (Canada)** have brought us up to date with the current thinking on the topic.[10] The review team undertook a fairly comprehensive literature search and identified three studies reporting comparative outcomes of fusion *vs* fixation in closed Lisfranc fractures. The review was reported according to PRISMA guidelines and the study team were able to establish that in their population at least, there was no advantage to either approach in terms of PROMs, malunion or revision surgery. There was a higher risk of metalwork removal in the ORIF group, although this is not surprising as many surgeons routinely remove metalwork inserted for ORIF but do not for a fusion. It appears that in spite of a single study favouring fusion, there is little in the way of evidence to support the suggestion that fusion outdoes ORIF and that for the moment at least, the two methods appear to be equivocal and 'dealers choice'.


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# Wrist & Hand

***X-ref** For other Roundups in this issue that cross-reference with Wrist & Hand see: Trauma Roundup 8.*

### Salvaging collagenases

While not exactly a pandemic shift or sea change, there is a steady creep of evolution in the treatment of Dupuytren's disease with more and more surgeons and patients alike utilising less invasive approaches to early Dupuytren's such as needle fasciotomy and collagenase treatments. Collagenases such as Xiapex (CCH) is an enzymatic treatment which is becoming widely used, and although we already know that it is very effective and patient satisfaction levels are high, there remain question marks over its longer-term effectiveness. We have previously reported in *360* the high recurrence rates observed in some studies and therefore, as time passes, we will all be faced with patients with recurrent disease following Xiapex treatment. Surgeons from **Boston (USA)** have addressed the question as to what exactly happens when patients require revision surgery following Xiapex treatment.[1] Although a very small series of just 19 joints in 11 patients, this paper is important as it is the first to describe revision fasciotomy following CCH treatment. The revision surgery was undertaken on average just 12 months following the initial injection, and although the surgery is described as challenging with a loss of soft-tissue plains and extensive scarring, the clinical results were good with release of MCP joints from 42° to 0° and PIP joints from 60° to 21°. These clinical results are comparable with what should be