

then carried out to establish pooled sensitivity, specificity, positive and negative likelihood ratio, heterogeneity, and areas under curves. Overall, the authors were able to include ten studies (759 patients), of which seven studies (reporting 640 patients) evaluated the laboratory-based α -defensin immunoassay, and three (reporting 119 patients) investigated the Synovasure test. There was a marked difference in pooled estimates of both sensitivity (0.95 vs 0.77) and specificity (0.97 vs 0.93) between the laboratory assay and Synovasure, respectively. This is another major paper that demonstrates that the bedside test is not as accurate as the laboratory-based test. Our view here at 360 is that testing for α -defensin, in itself, is definitely useful. However, such tests need to be used with caution, and the results must be taken in context, particularly if the Synovasure version of the α -defensin assay is used.

Irrigation and debridement may not be a realistic option in infected knee arthroplasty

■ The approach of debridement, antibiotics, irrigation, and implant retention (DAIR) is gaining

popularity in joint arthroplasty circles with the concept that implant exchange, and all the attendant issues with revision joint arthroplasty surgery, may not be required in every event. Surgeons from **Pittsburgh, Pennsylvania (USA)** have investigated the success (or otherwise) of this approach with the knee.⁸ While the knee offers better exposure than a hip of the implanted prosthesis, where the effective joint space often extends down the femoral shaft in taper slip stems, it also has much poorer soft-tissue coverage. Noting wide variations in success rates, the arthroplasty group in Pittsburgh sought to establish their outcomes with a remarkably large series of 216 cases. Patients were all treated with a DAIR approach, and 206 patients are reported in this study. The authors give a realistic estimate of failure rate at four years of 57.4%, and also undertook a time-to-event analysis revealing a median survival time of 14 months. With a series of this size, multivariable modeling is a reasonable approach and revealed that time symptomatic and cultured organism were predictors of failure. The authors reported an

estimated failure rate of 39.6% in what they established were patients with a high chance of success. The failure rate of DAIR in infected TKA is higher here than has been reported before, especially in the seminal DAIR papers from the Oxford group. On the one hand, this means that there is a 60% success rate of implant retention at four years in those patients who are likely to achieve success. However, overall, just 40% of implants are successfully salvaged at four years, and those patients without a successful salvage run the risks of failed salvage, including inducing resistance in the colonizing organism, poorer soft tissues, and more extensive bone loss. Clearly, this is a balancing act, and, more so than ever, 'picking your winners' is essential if embarking on DAIR in the infected knee arthroplasty.

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Foot & Ankle

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

Classification of the navicular and associated injuries to the midfoot

■ This month, a group from **Sheffield (United Kingdom)** presents some interesting work that they have produced on a new classification system for navicular fractures.¹ Their system also incorporates the injuries often associated with these fractures in the rest of the foot. They propose a system described as logical, all-inclusive, and mutually exclusive. Their

findings come from a large consecutive series (285 fractures) from a tertiary referral foot and ankle unit and major trauma centre. Five common patterns of injury were identified and classified. These were as follows: type 1, dorsal avulsion related to the capsule of the talonavicular joint; type 2, isolated avulsion injuries to the tuberosity of the navicular; type 3, a variant of tarsometatarsal joint (TMTJ) fracture/dislocations, creating instability of the medial ray; type 4, the body of the navicular with no associated injury to the lateral column; type 5, fractures in conjunction with disruption of the midtarsal joint, with crushing of the medial,

lateral, or both columns of the foot. The reliability and reproducibility of the classification was tested using a cohort of 30 patients. Six independent assessors were asked on two separate occasions to classify the fractures in their subset. The authors demonstrate a high intra- and inter-observer reproducibility. Navicular fractures are complex fractures of the medial column, and this classification is straightforward and can be used as a simple aide memoir and guide to treatment. This allows the orthopaedic surgeon to recognize more complex patterns and associated injuries, as well as potentially acting as a guide to treatment.

Capsular interposition arthroplasty for hallux rigidus

■ There are many treatment options in the literature for arthritis of the first metatarsophalangeal joint (MTPJ). Surgically, the gold standard remains for most surgeons a fusion of the first MTPJ. However, many patients fear the consequence of permanently sacrificing range of motion at the MTPJ, leading surgeons to seek alternative motion-preserving procedures. In this large series from a unit in **New York, New York (USA)**, the long-term outcome of capsular interposition arthroplasty was presented in a series of 42 patients.² All

operations were performed by the same surgeon, with an overall mean follow-up of 11 years (4 to 16). Patient age at time of surgery was, unsurprisingly, a mean of 64 years (51 to 82), with 34 women and eight men. The authors collected a range of pre- and postoperative scores including a visual analogue scale (VAS) score for pain, 12-Item Short-Form Health Survey (SF-12), and Foot Function Index (FFI), completed by postal or email return. Along with this, patients were asked to rate their satisfaction with the procedure on a VAS. The authors neatly present their surgical technique, using the dorsal first MTPJ capsule to interpose within the joint, after dorsal cheilectomy, and secured through the metatarsal head using drill holes and sutures. Their results at final follow-up showed a statistically significant improvement in all patient outcome scores, with overall satisfaction scores a mean of 7.4. Of 42 patients, 39 would have the surgery again. Just four patients had required conversion to first MTPJ fusion at a mean of 6.1 years following the procedure due to pain. This is a long-term follow-up study showing very good results in terms of patient satisfaction, outcome, and low rates of complication. It should be noted that, from the original cohort of 64 patients, only 42 were able to be contacted for inclusion in this study, and the results should therefore be interpreted with this rate of 34% loss to follow-up in mind. The authors demonstrate admirably that this is a viable option for patients with first MTP arthritis who wish to maintain the motion in their joints. The rates of satisfaction and conversion to fusion were high; however, in the absence of a control group, this is just about all we can say.

Flexor hallucis longus to the rescue: long-term results of the neglected Achilles tendon rupture X-ref

■ Although widely managed conservatively in contemporary trauma and foot and ankle practice, there are

indications for operative fixation of the Achilles tendon (TA) rupture, and the most obvious one is neglected rupture. Patients presenting with a neglected rupture often have significant shortening scar-tissue formation, and may also require augmentation and lengthening techniques. Although the short-term results are relatively well described, there is precious little known about the longer-term results. We were delighted to read this report from **Cambridge (United Kingdom)**, which reports on the long-term results of one of the commonest tendon transfers for neglected Achilles tendon rupture, the flexor hallucis longus (FHL) transfer.³ The authors present a well-constructed and thoughtfully written retrospective review of 20 patients (they identified a cohort of 32 but 12 were lost to follow-up), all of whom had undergone transtendinous FHL transfer over an eight-year period for chronic TA rupture. This was a fairly typical cohort for neglected TA rupture, with a mean age of 53 (22 to 83), an interval from rupture to surgery of seven months, and postoperative follow-up of 73 months (29 to 120). Outcomes were reported using the Achilles tendon Total Rupture Score (ATRS) and six patients suffered at least one postoperative wound complication. At final available follow-up, the outcomes were good with an ATRS score of 83 (40 to 100) and a mean American Orthopaedic Foot and Ankle Society (AOFAS) score of 94.3. There was a mean reduction of 24% in dynamometer-measured ankle plantar flexion peak force in comparison with the non-operated side. Perhaps least surprisingly, given the donor tendon, the hallux had a mean of just 40% strength of the contralateral side. The authors conclude that this is a safe and reasonable approach for the neglected Achilles tendon rupture. Although there was no comparison group, these results compare favourably with similar series of acute Achilles tendon ruptures treated either operatively or nonoperatively, aside from the loss of plantar flexion.

Combination therapy or orthotics alone in plantar fasciitis?

■ It is rare to see randomized controlled trials (RCTs) in rehabilitation techniques and equally unusual to see randomized controlled trials in foot and ankle surgery. As such, we were delighted to read this RCT from **Nicosia (Cyprus)**, which sets out to look at the effectiveness of two commonly adjunctive therapies in combination with exercises and orthotic supports, or orthotic supports alone.⁴ Although this study purports to establish the efficacy of three groups, really this can only be considered a pilot study. The authors enrolled 66 patients in the three groups; however, there were just 17 patients in one group, and this clearly should be considered carefully when interpreting results, as it will have biased the outcomes. All study participants received 'standard care' consisting of a home exercise programme and orthotic support. The two intervention groups received additional adjunctive treatments. Patients allocated to the extracorporeal shockwave therapy (ESWT, n=25) group received 2000 shock waves with 0.02 mJ/mm² for three sessions, once a week. The low-level laser therapy (LLLT, n=24) group received a gallium-aluminium-arsenide laser with 850 nm wavelength for ten sessions, three times a week. The outcomes were assessed by some specific pain scales (Foot Function Index-pain subscale (FFI-p) and Numerical Rating Scale for pain (NRS-p)) and were evaluated regularly out to three months of follow-up. There was a significant improvement in pain over the three months in all groups, apparent on both outcome measures. In the shorter term when combined with usual care, LLLT was found to be more effective than ESWT in reducing pain at short-term follow-up. However, given the limitations of this study in terms of design and the fact that it is likely to be underpowered, one cannot really draw any firmer conclusions than that.



Is a Kirschner wire enough for a hammer toe?

■ Hammer toe surgery is one of the most common lesser toe procedures and provides relief for patients with pain and pressure areas over the lesser toes in the foot. Traditionally, temporary fixation has been achieved using an axial percutaneous K-wire following the hammer toe fixation. While this 'cheap and cheerful' option has clear advantages from a cost and simplicity perspective, it also has some drawbacks in that the K-wires are prone to infection, have to be removed in clinic, and cause some irritation and difficulty in wearing footwear. There are a variety of other options that have been designed to replace the humble K-wire over the past decade, but few have made it into mainstream practice and fewer still have any form of evidence base. A research team in **Dubai (United Arab Emirates)** set out in their retrospective review to evaluate functional outcomes in patients who had undergone proximal interphalangeal joint fusion using two types of specific intramedullary implant, the Smart Toe and the TenFUSE, and to compare them with the outcomes in patients treated over the same time period with standard K-wire fixation.⁵ The authors have based their study on the outcomes of 96 patients, all with at least 12-month follow-up. The functional and quality-of-life outcomes were assessed using the Foot Function Index (FFI), the 36-Item Short-Form Health Survey (SF-36), and the ten-point visual analogue scale (VAS). Of

the 186 toes with outcomes reported in this study, 65 (34.9%) were treated with K-wire fixation, 94 (50.5%) with Smart Toe titanium implant, and 27 (14.5%) with TenFUSE allograft implant. There were no functional differences among the three groups, but successful fusion rates and patient satisfaction were superior in the custom implant groups. The Smart Toe implant suffered an implant fracture rate of around 10%, which was higher than the other two groups. The results presented here suggest that, in the right setting, both of these implants can be used successfully with high satisfaction rates. The only question remaining is whether the added expense of these implants in return for increased satisfaction rates justifies their use over the traditional K-wire.

Medial minimally invasive plate osteosynthesis in pilon fractures [X-ref](#)

■ The treatment of pilon fractures has vexed trauma and orthopaedic surgeons since the original descriptions of operative fixation by the early AO surgeons, most notably Thomas Rüedi. When it goes well, open reduction and internal fixation (ORIF) provides the best possible outcomes for nearly all patients. However, the complications, which are not infrequent, severely compromise results and can even result in amputation. As implants have improved, in terms of the production of improved locking mechanisms, lower-profile plates, and improved soft-tissue handling, these complications are becoming rarer. One problem has always been the need biomechanically for certain

fracture types to place a medial buttress plate, but the difficulties with the soft-tissue envelope preclude the use of the large medial pilon locking plates in many patients. One potential option is the use of a large anterolateral locking plate and a small medial plate inserted using minimally invasive plate osteosynthesis (MIPO). These authors from **Seoul and Daegu (South Korea)** report on a retrospective series of 28 ankles where they have done exactly that.⁶ All patients had sustained type C pilon fractures and underwent an anterolateral approach and plating with supplemental medial MIPO. Outcomes were assessed using the visual analogue scale (VAS) and the American Orthopaedic Foot and Ankle Society (AOFAS) Ankle-Hindfoot Scale. The authors also attempted to establish whether any patients had sustained complications using a retrospective notes review. Of course, it is difficult to set the authors' results into context without any comparator. However, they report encouraging VAS and AOFAS Ankle-Hindfoot Scale clinical scores of 2 and 89, respectively, which are excellent for these types of fractures. Nonetheless, on average, the patients were a bit stiff, with a mean ankle range of motion at the last follow-up of 13° in dorsiflexion and 38° in plantar flexion. There were two complications (one skin necrosis, one deep infection). The authors conclude that their approach gives good results and should be considered a viable alternative to more widely recognized approaches, especially given the low reported rate of soft-tissue complications.

Treating osteochondral lesions of the talus with large associated subchondral cysts

■ Antegrade autologous bone grafting presents a possible 'best of both worlds' solution in talar osteochondral defects. It offers the potential to preserve the overlying articular cartilage when treating patients with large symptomatic osteochondral cysts of the talus. The gamut of osteochondral lesions of the talus are difficult to treat and probably occur with relative frequency, as the talus is almost completely covered in cartilage and has no tendinous attachments, meaning it is at risk of cartilage and subchondral bone injury. Although a small series, this clever technique from **Hiroshima (Japan)** describes the use of a medial malleolar osteotomy in the majority of the nine cases to access the defect, then use of autologous cancellous bone from the distal tibial metaphysis to treat the full-thickness articular cartilage lesions, all of which extended through subchondral bone.⁷ The authors report the outcomes of 12 patients who underwent a range of clinical and radiological assessments at a mean follow-up of just over two years. The American Orthopaedic Foot and Ankle Society (AOFAS) Ankle-Hindfoot Outcome Score improved from 65.7 (47 to 81) preoperatively to 92 (90 to 100) at final follow-up, and, rather optimistically, the authors report a 100% satisfaction rate. Radiological outcome was assessed using MRI and CT scans, and the initial quality of the clearance and grafting was such that the radiolucent area of the cysts almost disappeared on plain radiographs. Most impressively, there were no recurrences seen at the most recent follow-up

on cross-sectional imaging. In just over half of the patients, the medial malleolar screws were removed, giving the opportunity for arthroscopic examination of the ankle. In the seven ankles examined, the mean International Cartilage Repair Society (ICRS) arthroscopic score represented near-normal cartilage at this point. This paper is far from definitive but raises some interesting questions about the potential to address what is a complex and difficult problem with a technique of open retrograde autografting.

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Wrist & Hand

Pins or plates for the distal radius: a meta-analysis [X-ref](#)

■ Volar plates have been viewed with circumspection by some

authorities, as they are expensive and require open surgical intervention with the associated risks that entails. Despite this, the locking

screw technology, and low-profile plates reducing complications such as flexor tendon rupture, resulted in a dramatic increase in the use of volar

plating for distal radial fractures in the late 2000s. The pendulum, as it always does, has started to swing the other way; since the publication of