

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.

REFERENCES

- Petrie MJ, Blakey CM, Chadwick C, et al.** A new and reliable classification system for fractures of the navicular and associated injuries to the mid-foot. *Bone Joint J* 2018;100-B:176-182.
- Vulcano E, Chang AL, Solomon D, Myerson M.** Long-term follow-up of capsular interposition arthroplasty for hallux rigidus. *Foot Ankle Int* 2018;39:1-5.
- Lever CJ, Bosman HA, Robinson AHN.** The functional and dynamometer-tested results of transtendinous flexor hallucis longus transfer for neglected ruptures of the Achilles tendon at six years' follow-up. *Bone Joint J* 2018;100-B:584-589.
- Cinar E, Saxena S, Uygur F.** Combination therapy versus exercise and orthotic support in the management of pain in plantar fasciitis: a randomized controlled trial. *Foot Ankle Int* 2018;39:406-414.
- Obrador C, Losa-Iglesias M, Becerro-de-Bengoa-Vallejo R, Kabbash CA.** Comparative study of intramedullary hammer toe fixation. *Foot Ankle Int* 2018;39:415-425.
- Kim GB, Shon OJ, Park CH.** Treatment of AO/OTA type C pilon fractures through the anterolateral approach combined with the medial MIPO technique. *Foot Ankle Int* 2018;39:426-432.
- Sawa M, Nakasa T, Ikuta Y, et al.** Outcome of autologous bone grafting with preservation of articular cartilage to treat osteochondral lesions of the talus with large associated subchondral cysts. *Bone Joint J* 2018;100-B:590-595.

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



the Distal Radius Acute Fracture Fixation Trial (DRAFFT) study,¹ there has been a reignition of interest in K-wiring. The DRAFFT study deals with treatment for fractures in which a closed reduction can be achieved and, as such, excludes a large number of distal radial fractures. There has been debate about whether wires or plates are a better option for the average distal radius fracture. The instinct of many, if not most, hand surgeons is that the early stability avoids plaster immobilization, allows much earlier functional return, and avoids the potential deformity and other consequences of a collapsed fracture, even if the functional results are the same. This outlook was given some support by two recent papers. The first, a meta-analysis by researchers from **Wuhan (China)**, derived data from 22 studies comparing wires and plates, including the results of 1805 patients of all adult ages.² As would be expected with a meta-analysis of this size, the studies included a variety of outcome measures, study designs, and follow-up lengths. Patient-reported wrist evaluation (PRWE) and visual analogue scale (VAS) scores were no different between the groups. However, Disabilities of the Arm, Shoulder and Hand (DASH) scores, complication rates, supination, and grip strengths were all better in the plate groups. These findings led to the author's conclusion that plating is the preferred method of treating unstable distal radius fractures. Is

the debate settled then? Alas, no, as critics will point out that: there may be a significant interaction with age, which was not analyzed; there may be significant heterogeneity of fracture type, with intra- and extra-articular fractures all included; and the cost utility of the interventions was not examined, other than the obvious observation that plates are more expensive. In fairness to the authors, there are few large, well-conducted trials drilling down into what we believe may be prognostic features while controlling for the subtleties of each fracture type. This may be what is required, however, if we wish to advance our knowledge in this field beyond the current level of debate.

Cast or plate for wrist fractures in the over 60s X-ref

■ A second paper also advocates the superiority of plating in distal radius fractures, this time in those over 60 years old. The traditional mantra, for which there is quite some evidence, is that it is difficult to find a benefit for surgery after a distal radius fracture in older age groups. The proposed explanation for this is that, as the elderly tend to have poorer wrist performance and lower functional demands, any effect size difference is not significant enough to be detectable or relevant in this setting. However, these conclusions may rely on studies in which the exclusion criteria obscure a real benefit, for example, fitter and more active patients choosing fixation, thus leaving the lower-demand and less functionally discriminating patients in the trial. In this randomized trial, researchers from **Ali-cante (Spain)** randomly allocated 97 patients over the age of 60 years with displaced complex intra-articular fractures (AO type C) to receive either closed reduction and plaster or a volar plate fixation.³ The patients were followed up to two years, and all outcomes – including PRWE, DASH, pain, range of motion, grip, and radiological parameters – were superior in the plated group. As

the functional outcomes and quality-of-life scores were significantly better after volar plating fixation compared with conservative treatment, the authors advocate volar plate fixation in this group. Here at 360, we believe that these data should be borne in mind when advising an older patient on their options, but are obviously not a *fait accompli*. As the authors themselves acknowledge, patients in their 60s can be significantly different to patients in older age groups, and these fractures were all complex injuries; the younger patients may not tolerate the sequelae of conservative management so well. With respect to age of patient, the clinical question lies in what can be tolerated in elderly patients before unacceptable disability arises. While patients' physiological ages may be different, the effect of inclusion of patients with severe injuries below the age of retirement in this study is unclear.

Carpal tunnel release in patients receiving workers' compensation: beware poor outcomes

■ Patients who may have been injured at work present special challenges to surgeons, and we should all be wary of predicting outcome when there is litigation in the air. There is always a suspicion that a background of workers' compensation (WC) may confound the usual expectations of recovery, either consciously or unconsciously, on behalf of both the patient and the surgeon, and there is certainly evidence that our suspicions might be well-founded. A group from **El Paso, Texas (USA)** reviewed 25 studies reporting the outcomes of 1586 wrists in the WC cohort and 2781 in the non-WC cohort, and found that patients undergoing a carpal tunnel release in the context of workers' compensation took almost five weeks longer to return to work, were 16% less likely to return to pre-surgery occupation, and experienced nearly three times the reported average number of operative complications.⁴ Disturbingly, the workers'

compensation group were also less likely to have appropriate physical examination findings and electrodiagnostic tests confirming the diagnosis preoperatively. The authors make the valid observation that patients may have a potential financial interest to prove their WC claim, and therefore may end up requesting surgery for a condition that they do not strictly have according to physical examination and objective studies. On the surgical side, surgeons may feel pressured by the patient to perform what may be unnecessary surgery and, in addition, there is a potential for physicians to perform procedures outside the standard of care if financially incentivized to do so. This may seem an odd concept to some, but around the globe it can be true that worker's compensation surgery is more lucrative than standard cases. In the United Kingdom, where litigation is often required to obtain compensation, we should bear in mind the finding that ongoing litigation was an independent predictor of delayed return to work. While not always possible, patients should be encouraged to settle their claim prior to intervention. The reason for the poorer outcomes in WC patients can be difficult to unpick; it may be that failings in the preoperative assessment means that patients in the WC group without carpal tunnel syndrome are getting surgery and biasing the results, or it may be that WC patients have a social or financial motive to report poorer outcomes, either consciously or subconsciously. Here at 360, we think that these factors should all be borne in mind while treating each case on its individual merits, but it is certainly the case that we are less likely to do harm to our patients if we have a confident diagnosis before choosing to operate.

Coincidence or complication? Trigger digit after carpal tunnel release

■ From time to time, someone has a successful carpal tunnel release but then develops a trigger finger. A group from **Taichung**

City (Taiwan) have performed a systematic review that included nine studies and reported the outcomes of a total of 5654 carpal tunnel release operations, in order to address the question: Is this a coincidence?⁵ Remarkably, trigger finger occurred within six months of surgery in 8.5% of cases on average, and the incidence was as high as 32% in one study. Most patients who developed a trigger digit did so within the first six months following surgery; the thumb and ring finger were the most commonly involved digits. Various reasons for this finding are suggested by the authors, including the increased risk of both conditions in those with osteoarthritis, inflammatory arthropathies, and diabetes. The effect of these conditions is impossible to evaluate from this study, however, as the analysis comprised both papers that included and papers that excluded some of these conditions. The effect of type of surgical approach is also unclear; a number of the included studies involved high proportions of patients who underwent an endoscopic rather than open carpal tunnel release but, as no subgroup analysis was performed, it is not possible to identify the relative incidence, or to identify whether this is a risk factor. Aside from local postoperative inflammation contributing to stenosis, it has also been suggested that the release of the ligament itself may be causative, and that the slight bow-stringing of tendons post-release may increase pressure on the flexor pulleys. Regardless of aetiology, it would seem that the patient should be counselled for the risk of developing a trigger digit as part of the consent process for carpal tunnel release. Here at 360, we might even go so far as to suggest that the patient should be counselled for release of a mild trigger finger if one exists at the same time as carpal tunnel release.

Cost description of clinical examination and MRI in wrist ligament injuries

■ We must always remember in these times of austerity that no

healthcare budget is unlimited. As such, every time we spend money on any investigation, there is less money available to spend on treatment. In many areas, MRI scanning is now so readily available that there is a temptation for money to be spent on this investigation, whereas, on reflection, perhaps the diagnosis could be made without this expense. We were particularly interested to see a study from **Gothenburg (Sweden)** where the cost of MRI scanning was calculated and measured against the result of examination by an experienced hand surgeon.⁶ The authors describe the results of investigations undertaken at six radiology departments that, combined, undertook over 400 MRI investigations for suspected wrist ligament injuries. They found that the additional cost of the difference between MRI and a clinical examination by hand surgeon, plus indirect cost for patients, was over €950 000 per annum for a catchment population of 1.7 million. They also advocate early expert examination to facilitate timely acute repair of injuries, such as triangular fibrocartilage complex (TFCC) tears, the outcome of which is thought to be best when performed early. Indirect costs are notoriously difficult to estimate accurately, and extrapolation to other healthcare systems is also challenging, as the intrinsic costs of MRI scans and of surgeon time may be quite variable. If accurate, however, this saving would equate to approximately £36 million per annum in a country the size of the United Kingdom.

Safety of corticosteroid injection for carpal tunnel syndrome

■ Good medical practice mandates that we should always consider non-operative treatment before surgery, which fits with the original Hypocratic oath of 'first do no harm'. There is generally pretty good evidence, although mostly from case series, that steroid injections have some benefit, if not always durable, for patients with carpal tunnel syndrome. This treatment,

of course, also carries both major and minor hazards of its own, such as intraneural injection or tendon rupture. In this study, a team from **Canterbury (United Kingdom)** asked patients about side effects and complications at six weeks following 689 carpal tunnel injections.⁷ The injections were given in the context of a carpal tunnel treatment pathway, and all those performing the injection were specially trained to do so. The technique utilized was based on an adaption of Racasan and Dubert's technique, with the injection performed 1 cm or more proximal to the distal wrist crease, and radially rather than through the flexor carpi radialis tendon, with care taken to avoid the radial artery. Triamcinolone (40 mg) was injected without adding local anaesthetic. As usual, patients were asked to report paraesthesias, which could indicate the needle contacting the median nerve. In their series, they identified no cases of tendon rupture or intraneural injection. The group also retrospectively analyzed over 9500 injections performed in their centre over a 12-year period, which included the cases above. Overall, they identified one case of likely intraneural injection, one tendon rupture, and two cases of digital gangrene leading to partial loss of digit. They therefore advise the risk of severe side effects such as tendon rupture or intraneural injection being < 0.1%, minor persistent local effects such as subcutaneous atrophy or depigmentation being 2%, and transient effects such as pain, bruising, or facial flushing being between 15% and 20%. There has been much debate about the utility of ultrasound-guided carpal tunnel injections in avoiding intraneural injection but from this study it seems that we can be reassured that, at least if given by an experienced injector, the intervention is safe.

Radioscapholunate fusion long-term follow-up

■ Severe degenerative arthritis around the wrist can be difficult to

treat, with simple and effective solutions in short supply for a condition that carries with it some significant comorbidity. Since wrist replacement remains experimental (with a material risk of complications in the short term and little outcome data on longer-term durability, not to mention issues of bearing wear), we should consider whether a patient's own cartilage on subchondral bone is a better option than a metal or plastic bearing. Radioscapholunate fusion is an option for patients when there is established radiocarpal arthritis with preservation of the midcarpal joints. Sparing the midcarpal joints in the treatment can also preserve the 'dart-thrower's movement'. However, although in common usage, there is little hard clinical data to support its use. It is encouraging to see a series from patients in **Adelaide (Australia)** that shows good long-term outcomes in a cohort of these patients.⁸ The authors followed 17 patients with a minimum of ten years' follow-up, 15 of whom were satisfied with their outcomes, with mean outcome scores as follows: visual analogue scale for pain score, 2.1/10; Quick Disabilities of the Arm, Shoulder and Hand (DASH) score, 29; and Modified Mayo Wrist score, 60. There were two conversions to wrist fusion in the course of the follow-up of the study, both within the first two years. A cohort of these patients underwent distal pole of scaphoid and excision of the triquetrum in addition. The authors state that patients with excision of the triquetrum had a mean radial-ulnar arc of motion increase of 10°, but this in itself was not statistically significant. While we cannot conclude that a benefit exists from this evidence alone, the probability of a type II error is high with such a small group size. The mean radiographic joint space for the scaphocapitate joint was 1.7 mm and lunocapitate joint was 1.3 mm at latest follow-up, indicating long-term radiographic preservation of these joints. In this study, patients who obtained a good result at two

years were likely to achieve a good long-term outcome and, therefore, this seems a good technique in suitable patients compared with other, limited options.

Iliac bone grafting for scaphoid nonunion with avascular necrosis

■ In the previous issue of 360, we reported a paper that challenged the commonly accepted dogma that the proximal pole of the bone is ischaemic in scaphoid nonunion, that an MRI should be performed to demonstrate this, and that subsequent surgical reconstruction in the presence of avascularity requires insertion of a vascularized graft.⁹ There are certainly firm believers in the hand surgery community that this approach is necessary, but it is also true that the adoption of these assumptions leads to expensive MRI scans and complex surgery, for which only a few aficionados

might feel comfortable. In this issue, we report another paper challenging these presumptions, this time from **Seoul (South Korea)**.¹⁰ This group reports the outcomes of a series of 24 patients, all with proximal pole avascular necrosis treated operatively with a non-vascularized iliac crest autograft. The avascularity in all cases was confirmed preoperatively using MRI and intraoperatively by the clinical absence of punctuate bleeding. The operative technique of the Fisk–Fernandez wedge-shaped corticocancellous graft was used in 11 patients; cancellous bone grafting was used in 13 patients. The vast majority (n = 22/24) of the surgeries went on to heal. The two who did not have a successful outcome had both undergone previous surgeries; they subsequently underwent a further procedure using the Fisk–Fernandez technique and both then went on to union. Although relatively

small series, these two papers in consecutive 360 issues include a total of 55 patients. It seems that we can therefore conclude from these papers that the issue of avascularity may be overblown, and that routine MRI scanning and vascularized bone grafting should be avoided.

REFERENCES

1. **Costa ML, Achten J, Parsons NR, et al.** Percutaneous fixation with Kirschner wires versus volar locking plate fixation in adults with dorsally displaced fracture of distal radius: randomised controlled trial. *BMJ* 2014;349:g4807.
2. **Peng F, Liu Y-X, Wan ZY.** Percutaneous pinning versus volar locking plate internal fixation for unstable distal radius fractures: a meta-analysis. *J Hand Surg Eur Vol* 2018;43:158-167.
3. **Martinez-Mendez D, Lizaur-Utrilla A, de-Juan-Herrero J.** Intra-articular distal radius fractures in elderly patients: a randomized prospective study of casting versus volar plating. *J Hand Surg Eur Vol* 2018;43:142-147.
4. **Dunn JC, Kusnezov NA, Koehler LR, et al.** Outcomes following carpal tunnel release

in patients receiving workers' compensation: a systematic review. *Hand (N Y)* 2018;13:137-142.

5. **Lin FY, Wu CI, Cheng HT.** Coincidence or complication? A systematic review of trigger digit after carpal tunnel release. *J Plast Surg Hand Surg* 2018;52:67-73.

6. **Andersson JK, Hansson-Olofsson E, Karlsson J, Fridén J.** Cost description of clinical examination and MRI in wrist ligament injuries. *J Plast Surg Hand Surg* 2018;52:30-36.

7. **Kaile E, Bland JDP.** Safety of corticosteroid injection for carpal tunnel syndrome. *J Hand Surg Eur Vol* 2018;43:296-302.

8. **Ha NB, Phadnis J, MacLean SBM, Bain GI.** Radioscapholunate fusion with triquetrum and distal pole of scaphoid excision: long-term follow-up. *J Hand Surg Eur Vol* 2018;43:168-173.

9. **Rancy SK, Swanstrom MM, DiCarlo EF, et al.** Success of scaphoid nonunion surgery is independent of proximal pole vascularity. *J Hand Surg Eur Vol* 2018;43:32-40.

10. **Kim J, Park JW, Chung J, et al.** Non-vascularized iliac bone grafting for scaphoid nonunion with avascular necrosis. *J Hand Surg Eur Vol* 2018;43:24-31.

Shoulder & Elbow

X-ref For other Roundups in this issue that cross-reference with *Shoulder & Elbow* see: *Children's orthopaedics Roundup 4*; *Research Roundup 5*.

Lateral acromioplasty in rotator cuff repairs

■ Subacromial decompression is a hot topic in arthroscopic shoulder surgery at present, following the Can Shoulder Arthroscopy Work? (CSAW) trial,¹ which reported that surgical groups had superior outcomes for shoulder pain and function, although this difference was not clinically significant. Recently, attention has turned to the importance of the morphology of the lateral acromion and its role in mechanical subacromial impingement. It has previously been suggested that a critical shoulder angle (CSA) of more than 34°

is associated with rotator cuff tears. However, although widely quoted, the evidence for this is not yet strong. Some surgeons advocate removal of this lateral bone when performing a rotator cuff repair, but, while further research disentangles the multitude of factors that affect the outcome of a rotator cuff repair, it is important to know if this subacromial decompression is appropriate or not. This study from **Zürich (Switzerland)** reports the outcomes of 49 consecutive patients, all with a high CSA, who underwent an arthroscopic rotator cuff repair for a degenerative, full-thickness supraspinatus tear.² All of the patients underwent a lateral acromioplasty that reduced their CSA from a mean of 37.5° to 33.9° postoperatively; no patients underwent an anterior acromioplasty. At

a mean follow-up of 30 months, the mean Constant shoulder score had increased from 59 to 74 points, and seven repairs had failed. Interestingly, the postoperative CSA was significantly larger in failed than in healed repairs. Patients who had a healed cuff repair and a CSA corrected to 33° or less had 25% more abduction strength than patients with a healed cuff and a CSA of 35° or more. Importantly, the deltoid integrity was unaffected on follow-up MRI scanning, with no cases of dehiscence, atrophy, or other complications of this procedure. The authors conclude that a lateral acromioplasty is safe to perform and that large, insufficiently corrected CSAs are associated with poorer outcomes in cuff repair. While further research is certainly required with respect to

improving outcomes, it is useful to know that such procedures can be undertaken safely.

Glenosphere lateralization in reverse shoulder arthroplasty

■ Another current talking point among shoulder surgeons is the management of the subscapularis when performing a reverse total shoulder arthroplasty. Conventional wisdom was that repair was necessary to restore the force-couple with the posterior cuff, thereby balancing the prosthesis and preventing instability, while also preserving the power of internal rotation. The reverse shoulder, however, is a non-anatomical prosthesis and, as more recent designs are evolving from a traditional Grammont design towards prosthesis requiring