The calcaneus: have we changed fracture practice? X-ref

The authors of this epidemiological study from **Cambridge (UK)** utilized the Hospital Episode Statistics system to evaluate the treatment of calcaneal fractures across England before and after the publication of the UK Heel Fracture Trial (UKHeFT).[8] The aim of the study was to establish whether the publication of that randomized controlled trial in 2014 really did change practice. The UKHeFT was a large pragmatic trial of operative *versus* nonoperative treatment for calcaneal fractures. The finding of this trial was that there was no apparent advantage for fixation in terms of subtalar arthritis or health economic outcomes in the population studied. Over the 17 years of the UKHeFT trial, 62 858 patients were admitted to English hospitals with a calcaneal fracture. The mean annual incidence reported was 10.5/100 000 population for men and 3.8/100 000 for women. The overall operative intervention rate was around 7.3% for the whole period of this study, and did not change after the publication of the UKHeFT. The authors go on to make a number of more refined analyses and comment that, although the proportions of patients being offered fixation did not change during the period of the study, the type of fixation undertaken did. The authors noted a doubling in the use of minimally invasive fixation (rising from 7.7% (292/3792) to 13.29% (71/534) after publication of the UKHeFT. The interest in subtalar approaches and percutaneous fixation methods may or may not be entirely due to the higher-than-expected complication rates reported by the UKHeFT. This approach has been very much gaining traction around the world, including in territories and countries that do not change practice based on trials based in the United Kingdom. Whatever the explanation, this seems to be a real shift in practice, and one that needs careful evaluation.

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Wrist & Hand

Immobilization and pain control following volar plating X-ref

There have been a wealth of randomized controlled trials assessing the treatments for distal radial fractures; here is one that takes a different tack. This team from **São Paulo (Brazil)** have designed their trial with the aim of examining whether postoperative splinting following volar plate fixation of distal radius fractures provides superior pain relief over early mobilization in a bandage.[1] Adults undergoing volar locking plate fixation of intra-articular distal radial fractures sustained over a 30-day period were prospectively randomized to receive either a postoperative non-elasticated bandage over a gauze dressing, or a plaster splint, which was removed at two weeks postoperatively. The outcomes assessed were: a simple visual analogue scale (VAS) pain score at 12, 18, and 24 hours postoperatively and then daily for seven days and at 2, 6, 12, and 24 weeks; inpatient and outpatient tramadol usage; the Disabilities of the Arm, Shoulder and Hand (DASH) scores; and wrist range of movement at 12, 18, and 24 weeks postoperatively. The study was apparently powered to detect a two-point difference in the VAS with 17 patients per arm. The authors were able to recruit 39 patients with 19 receiving no postoperative splint and 20 receiving a plaster splint, with 17 in the no-splint group and 19 in the splint group completing follow-up. The mean age for patients included in this trial was 49.3 years, and all had general anaesthetic and regional block. There were no statistically significant or clinically relevant differences in recorded pain scores between the two groups at any time in the first 24 weeks postoperatively. The highest VAS scores were seen at 18 hours postoperatively as the block wore off, but peaked at a mean of 4.5 points. More patients in the no-splint group required tramadol but this did not reach statistical significance. No difference in postoperative function in terms of DASH score or range of movement was observed. It is somewhat surprising that there appears to be no difference; intuitively, we would expect a freshly operated wrist to be more comfortable in a rigid splint than just in a bandage. The drive to reduce opioid use is important in all diagnoses and the authors here observe that the rate of tramadol usage was higher in the no-splint group, but not significantly so; therefore, this conclusion cannot be drawn. However, it may be that there is an effect and that the study was underpowered to detect it. While the pain scores were similar, the authors ask if this is because the no-splint group were taking more analgesia, although again the study was underpowered to detect this conclusion. The functional scores were no different between the groups, so is there little harm in applying a backslab postoperatively? Many would say so, but given the small number of patients in this trial, this may again be a type II error and, although intuitively reasonable, we would like to see a larger trial to increase our confidence in this conclusion.

Revisions for failed trapeziometacarpal joint arthritis surgery

The existence of a number of accepted surgical options for a given indication suggests both variation in practice and the absence of a 'clear winner'. Nowhere is this truer than in surgical treatment of

the degenerate trapeziometacarpal joint. There is a wealth of evidence concerning the best overall treatments, which is often conflicting and leads to a wide variation in clinical practice. Trapeziectomy with or without ligament reconstruction remains the mainstay, with other arthroplasty operations also being performed. Many patients do very well following a trapeziectomy; however, if this fails, the salvage options are often somewhat difficult and yield unpredictable results. A team from **Gainesville, Florida (USA)** have retrospectively reviewed a cohort of 90 patients over a 20-year period undergoing revision surgery following trapeziectomy, ligament reconstruction, tendon interposition alone, haematoma arthroplasty (simple trapeziumectomy with no ligament reconstruction or interposition), or implant arthroplasty.[2] Of the 90 patients reported in this series, seven were excluded due to their follow-up not exceeding the minimum two years post-revision, leaving 83 patients with 86 operated thumb bases. The primary indications for revision were pain (63%), instability (6%), and pain with instability (21%). The mean time to revision surgery was two years, and at this time 18 hands had additional surgery to the metacarpophalangeal joint (a capsulodesis in 13 and arthrodesis in five). Most commonly, an abductor pollicis longus tendon graft was used to add stability and interposition material (39%) with extensor carpi radialis longus, flexor carpi radialis, triceps, and semitendinosis also used depending on availability following the primary surgery. In terms of outcome measures, visual analogue scale (VAS) pain scores and the Disabilities of Arm, Shoulder and Hand (DASH) scores were completed by 25 patients with 27 operated hands. Follow-up in this group was 8.5 years (2 to 21); the mean VAS was 28.2 on a 100-point scale, and the mean DASH was 32.0. Unfortunately, there were no preoperative scores for comparison. Postoperative complications occurred in 20% and included mainly pin site infection/irritation and superficial radial nerve irritation, but also persistent pain, infection, sesamoiditis, and carpometacarpal joint instability. Patients with complications had significantly worse outcomes as measured by VAS for pain and DASH compared with those without complications. Overall, and not unsurprisingly, the results following revision surgery to the thumb base are worse than those following primary surgery. However, the range of movement achieved was described by the authors as comparable to primary surgery. They also reported seemingly better results with a ligament reconstruction using either abductor pollicis longus or extensor carpi radialis longus, although this could not confirmed statistically due to the small numbers, nor could potential reasons for this finding be explained. Interestingly, those patients who underwent concomitant surgery to the metacarpophalangeal joint appeared to have more favourable outcomes than those who did not. This paper provides a long follow-up of complex revision cases and demonstrates that half of patients undergoing revision thumb base surgery can expect reasonable results.

Ulnar shortening and nonunion X-ref

■ Ulnocarpal abutment is a common cause of ulnar-sided wrist pain. It is often associated with tearing of the triangular fibrocartilage complex and often occurs after distal radial fracture with subsequent radial shortening. Offloading the ulnar side of the joint is a tried and tested treatment that can improve symptoms and quality of life for affected patients. Surgically, this can be performed within the joint itself, using an arthroscopic or open wafer procedure, or by an extra-articular shortening of the ulna. Numerous techniques are described, many of which have been proven to shorten the ulna reliably, but ultimately the goal is to produce an accurate osteotomy that permits stable internal fixation and bone union. Despite the clinical successes, there are a number of complications associated with ulna shortening, such as infection metalwork failure and nonunion. This systematic review from **Iowa City, Iowa (USA)** investigates the complication of nonunion in transverse and oblique osteotomies, the latter having a theoretical advantage of a greater surface area for bone healing and the facility to place a lag screw.[3] A robust Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)-compliant review was performed, with the authors selecting papers of series including 20 or more patients. The primary outcome was union rate, with delayed union also noted where available. From an original list of 1828 unique articles, 37 were eventually included and all were level IV retrospective studies. The results of 574 transverse and 849 oblique osteotomies were extracted; all studies used compression plating and had a mean follow-up of 30.5 months. Overall, the nonunion rate was 4%; the nonunion rate was 4.16% (0% to 15.8%) for transverse osteotomies and 3.86% (0% to 17.9%) for oblique osteotomies. In the oblique osteotomy group, the use of a cutting jig demonstrated a lower, but not statistically significant, nonunion rate of 2.9% with a jig *versus* 5.06% cutting freehand. There is no standard definition of either nonunion nor delayed union, and so drawing conclusions here can be difficult. Equally, both types of osteotomy demonstrated a wide range of nonunion rates in the included studies, suggesting that other factors may be important, such as comorbidities, smoking status, and age. The authors observe that obtaining higher-level evidence for this cohort may be difficult, but more robust investigation is surely possible. In the meantime, we must conclude that neither technique offers superior nonunion rates.

Surgical anatomy of the dorsal cutaneous branch of the ulnar nerve

■ We would like to draw *360* readers' attention to a valuable anatomical paper that caught our eye this month. As the relentless wheel of evidence-based medicine continues to roll, fewer papers of this nature are grabbing the attention of the orthopaedic readership. However, for the occasional wrist surgeon, the ulnar side of the wrist can be confusing and somewhat daunting, and some succinct and appropriate anatomical help can be a godsend. We all know that the dorsal cutaneous branch of the ulnar nerve branches from the ulnar nerve proximal to the ulnar styloid, before exiting the deep forearm fascia and passing dorsally into the hand giving off multiple branches. However, injury to this nerve remains common, potentially occurring in up to 10% of surgeries around the ulnar styloid, and neuromas can be particularly troublesome for patients. A team from **Bangkok (Thailand)** have sought to improve our understanding of the anatomy in this area.[4] Using 44 arms from 22 fresh cadavers with no history of forearm fracture or deformity, the authors mapped the course of the dorsal branch of the ulnar nerve and its branches in order to accurately establish the local anatomy. Measurements of local relationships were performed with the elbow flexed and the forearm in mid-rotation. The forearm length was also measured to allow a normalized ratio to be presented. The dorsal cutaneous branch of the ulnar nerve arose from the main nerve itself at approximately the junction between the third and fourth quarters of the length of the forearm. In the majority of limbs, the nerve crossed the equator between volar and dorsal distal to the ulnar styloid at a mean distance of 10 mm. However, the nerve crossed at a mean distance of 11.2 mm proximal to the styloid in four forearms, and it passed directly over the styloid in six forearms. For those nerves crossing the volar-dorsal plane distal to the styloid, at the level of the styloid it lay, on average, 5.6 mm volar. The authors use a Cartesian coordinate system to trace the courses of the nerve and demonstrate that the danger zones are usually palmar to the styloid, both proximally and distally. Iatrogenic injury to the nerve is not infrequent, but certainly

avoidable, and this paper should aid localization and protection.

Scratch collapse test for carpal tunnel syndrome: a systematic review and meta-analysis

Despite the frequency of presentation, diagnosis, injection, and surgery for carpal tunnel syndrome, there still exists significant variation among surgeons regarding diagnosis and treatment. In the United Kingdom, the commissioning groups are starting to pay attention to treatment of carpal tunnel syndrome, both through injection and surgery. It is somewhat bemusing that, despite decades of study, we still struggle to agree on who has carpal tunnel syndrome, let alone who should receive each treatment. One of the newer contenders for diagnostic test of choice is the 'Scratch Collapse Test'. There are three camps when considering the Scratch Collapse Test: for some it may be a completely new concept; for some it has become a key component in clinical assessment of peripheral nerve problems; and others maintain scepticism concerning its accuracy. The test itself involves applying a stimulus in the form of a scratch over the area of presumed nerve injury or compression; the patient then forcibly externally rotates their shoulders against resistance. A weakness in external rotation after the 'scratch' is thought to suggest injury or compression at that site. While theories exist concerning why this effect occurs, the exact physiology behind the test remains uncertain. A team from **Ottowa (Canada)** have performed and published a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)-compliant systematic review and meta-analysis to assess the role of the Scratch Collapse Test in carpal tunnel syndrome.[5] A rigorous search yielded just 13 potentially suitable articles, from which just three were suitable for inclusion in the qualitative synthesis and meta-analysis. Data from 165 patients overall were included, and pooled results showed a sensitivity of 0.32 (95% confidence interval (CI) 0.24 to 0.41), specificity of 0.62 (95% CI 0.45 to 0.78), a positive likelihood ratio of 0.75 (95% CI 0.33 to 1.67), and a negative likelihood ratio of 1.03 (95% CI 0.61 to 1.74). A receiver operating characteristic curve constructed to establish the diagnostic accuracy of the test had an area under the curve of just 0.25, suggesting a low diagnostic accuracy. From this review, it would seem that the utility of the Scratch Collapse Test, certainly as far as the evidence is concerned, is dubious. Coupled with the poorly understood physiology that theoretically underpins the test, it is difficult to recommend it as a diagnostic measure.

Lunate subchondral cysts under the spotlight

Ulnar-sided wrist pain has a multitude of causes, only one of which is ulnocarpal impaction syndrome, described above as due to excessive loading on the ulnocarpal joint from abutment of the distal end of the ulna. There is no single benchmark diagnostic test, and a combination of physical examination and radiological findings are often employed, with subchondral cyst formation in the lunate bone purported to be of importance. Many cysts are, however, asymptomatic and so it is difficult to know exactly where we are with establishing the cause of ulnar-sided wrist pain. In this study from **Seoul (South Korea)**, the authors set out to compare lunate cysts in symptomatic and asymptomatic individuals in an attempt to establish clinical relevance.[6] Over a three-year period, 375 patients who had an MRI or CT scan for indications other than former wrist pain were analyzed and defined as an 'asymptomatic' group. The comparator group was a series of 33 patients diagnosed as suffering from ulnar impaction syndrome, and differences between the two were retrospectively analyzed and presented in this paper. Essentially, what we have here is a radiological diagnostic study with little in the way of clinical information. However, within these constraints, there are significantly more patients in the symptomatic group who had a lunate cyst visible on their imaging, with a prevalence of 57% compared with 10% in those who were asymptomatic. The symptomatic group were also found in this investigation to be significantly more likely to have cysts on the palmar side of the lunate, whereas in asymptomatic patients, dorsal lunate cysts were more frequent. Logistic regression demonstrated that both patient age and a diagnosis of ulnar impaction syndrome were a significant risk factor for the presence of a lunate cyst. Interestingly, however, neither positive ulnar variance nor duration of symptoms were predisposing factors for symptomatic individuals in this analysis. The nature of the relationship between symptomatic ulnar impaction syndrome and formation of lunate cysts is difficult to determine, and it does seem unlikely that this is a pathogenomic finding. Where present, their presence should therefore be interpreted as such.

Carpal tunnel release and new onset trigger finger

In the June 2018 issue of *360*, we reported on the results of a systematic review on trigger finger following carpal tunnel decompression surgery. This showed an incidence of trigger finger of 8.5% within six months of surgery. In this issue, we report a single study of over 1000 patients in a single tertiary centre in **Boston, Massachusetts (USA)** that aims to answer the same question, albeit in a large retrospective cohort series rather than evidence synthesis.[7] Over 1300 hands were retrospectively identified over a five-year period and, after exclusion of cases where carpal tunnel contralateral decompression surgery was performed in the first postoperative year, conditional logistic regression analysis was performed in 900 hands. The association between carpal tunnel syndrome and the development of trigger finger in the operative hand within the first 12 months was compared with that in the contralateral hand. The data from both hands was used to examine associations between carpal tunnel decompression and trigger finger in the year before surgery as compared with the year following. Multivariate regression was used to evaluate associated risk factors. A new trigger finger was seen in 10.6% of hands within one year before carpal tunnel decompression and 5.8% of hands within one year following carpal tunnel decompression. Furthermore, the incidence of trigger finger was 2.5 times higher in the operative hand when the postoperative year was compared with the preoperative year, while the contralateral hand was 0.5 times lower. With these results in mind, it therefore seems valid to say that there is an obvious predisposition for these pathologies to present in the same hand, and that there is likely to be a relationship in the presence of the pathologies. What the data from this series do not support, however, is the hypothesis that

open carpal tunnel decompression is associated with an increased incidence of trigger finger in the operative hand. This study has the great advantage of considering background incidence but, in a retrospective study with uncertain fidelity of data and unknown loss to follow-up, it is difficult to be absolutely certain of the conclusions. It is certainly of interest for hand surgeons, patients, and healthcare funders who wish to get to the bottom of this apparent relationship. While the jury is still out in terms of causation, what is clear from the currently amassed evidence is that there is a relationship between the two, which needs to be explored more closely.

TFCC in the absence of instability?

■ Continuing our focus on ulnar-sided wrist pain in this edition of *360*, we consider another pathology that is not always symptomatic, and for which the treatment choices are therefore in question. Triangular fibrocartilage complex (TFCC) tears can also cause ulnar-sided wrist pain but the natural course of the pathology is not well understood and, in common with other diseases with a potentially degenerative aetiology, such as rotator cuff tears, there is an increasing incidence of asymptomatic tears with age. It is well recognized that a TFCC repair should be considered in those with symptomatic distal radioulnar joint instability, but is this also the case in those without instability? This is a well-studied pathology in the literature and one of the difficulties is that the reported incidence of asymptomatic degenerative tears clouds the message. This group from **Anyang (South Korea)** have undertaken yet another single-centre retrospective study examining the TFCC.[8] However, unlike previous studies, their three-year cohort of 117 patients reports on individuals with TFCC tears but no distal radioulnar joint (DRUJ) instability. Diagnosis of a symptomatic tear required for the purposes of this study required ulnar-sided wrist pain, identification of a tear on MRI or CT arthrograms, and a positive ulnar grind test or ulnocarpal stress test. Overall, 25 patients were excluded as they met criteria for surgical intervention and 19 patients were lost to follow-up before six months. A total of 72 wrists were included in the final report (42 men and 30 women) with a mean age of 40 years and an age range of 18 to 70 years. This group was followed for a minimum of six months (mean 16 months) and the reported visual analogue scale (VAS) pain score and patient-rated wrist evaluation (PRWE) were recorded at the initial visit as well as at one, two, three, and six months in addition to final follow-up. A PRWE score of less than 20 points was taken to indicate complete recovery, while more than 20 points was considered to be incomplete. Survival analysis and Cox regression modelling were used to estimate the time to recovery, as well as to evaluate the effects of age over 45 years, obesity, sex, dominant hand, traumatic tears, ulnar positive variance, and chronic symptoms over six months. Overall, 30% of cases had completely recovered at six months and 50% had at one year. It was not possible from the candidate risk factors to identify any risk factors that were significant. This may be the product of an insufficient sample size, but nevertheless the paper does illustrate the potential success of treating TFCC tears non-surgically in the first instance, and the authors recommend a minimum of six months nonoperative management in their conclusion. We would agree that further study to evaluate possible predictors of failure of nonoperative management would be useful, in order to identify those who will require surgery in due course.

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Shoulder & Elbow

X-ref ***For other Roundups in this issue that cross-reference with Shoulder & Elbow Elbow see: Sports Roundup 2; Trauma Roundup 8; Children's orthopaedics Roundup 8.***

Proximal humeral fractures in the elderly: delayed reverse total shoulder arthroplasty is an option **X-ref**

■ The subject of indications for surgery for proximal humeral fractures remains controversial, as does the question of which operations one should undertake. The PROFHER (Proximal Fracture of the Humerus: Evaluation by Randomisation) study reported no benefit for open reduction and internal fixation (ORIF) over conservative management in a particular subset of patients, with hemiarthroplasty and ORIF chosen as the comparator to nonoperative treatment for these complex fractures. Recent data have suggested a three-fold increase in the use of primary reverse shoulder arthroplasty for these injuries, while a study we have previously discussed here at *360* found no apparent differences in outcome between nonoperative management and reverse shoulder arthroplasty. The jury is still very much out; until the results of PROFHER-2 are reported, we may not know with any certainty if reverse shoulder arthroplasty should become the 'go to' option for proximal humeral fractures. However, good results have been previously reported with the use of delayed reverse total shoulder arthroplasty for cases of malunion or nonunion. One question that will not be answered by the current crop of randomized controlled trials is how the outcomes compare between acute or delayed intervention with a reverse prosthesis. After all, if the complication profile is the same and