

there was a 6.7% incidence of knee donor-site morbidity at a mean follow-up of around two years. This estimate rises to 10.8% if all patients lost to follow-up experienced donor-site morbidity. There was an overall negative association between study sample size and proportion of donor-site morbidity. In the larger studies, around 2.8% experienced donor-site morbidity, rising to 5.0% when assuming that all patients lost to follow-up experienced donor-site morbidity. This is the most accurate estimate of donor-site morbidity in this diagnosis and serves to highlight not only the rates of donor-site morbidity, but also the poor rates of overall patient follow-up

and unclear quantification of complications in this condition. More work is required here.

#### REFERENCES

1. **Tonge XN, Widnall JC, Jackson G, Platt S.** A ten-year retrospective study investigating the rate of venous thromboembolism in patients who require immobilization in a total contact lower limb cast. *Bone Joint J* 2019;101-B:691-694.
2. **Anderson SE, Lubberts B, Strong AD, et al.** Adverse events and their risk factors following intra-articular corticosteroid injections of the ankle or subtalar joint. *Foot Ankle Int* 2019;40:622-628.
3. **Sidon E, Rogero R, McDonald E, et al.** Prevalence of neuropathic pain symptoms in foot and ankle patients. *Foot Ankle Int* 2019;40:629-633.

4. **Mason LW, Kaye A, Widnall J, Redfern J, Molloy A.** Posterior malleolar ankle fractures: an effort at improving outcomes. *JBJS Open Access* 2019;4:e0058.
5. **Aujla RS, Allen PE, Ribbans WJ.** Vitamin D levels in 577 consecutive elective foot & ankle surgery patients. *Foot Ankle Surg* 2019;25:310-315.
6. **Choi WS, Cho JH, Lee DH, et al.** Prognostic factors of acute ankle sprain: need for ultrasonography to predict prognosis. *J Orthop Sci* 2019. (Epub ahead of print) PMID: 31151752.
7. **Shimozono Y, Seow D, Yasui Y, Fields K, Kennedy JG.** Knee-to-talus donor-site morbidity following autologous osteochondral transplantation: a meta-analysis with best-case and worst-case analysis. *Clin Orthop Relat Res* 2019;477:1915-1931.

## Wrist & Hand

### Bilateral scapholunate widening: is it important?

■ Both the aetiology and natural history of scapholunate (SL) interval widening are poorly understood, as is the risk of progression into carpal instability and scapholunate advanced collapse (SLAC wrist), with its classic pattern of arthritic change. When a patient with a painful wrist presents after trauma with a widened scapholunate interval, the natural assumption is that this represents an acute rupture; however, this may not be the case. It is widely recognized that the contralateral wrist can have the same abnormality. While the causes for this are unclear, other conditions such as ligamentous laxity and degenerative change are thought usually to be responsible. This study from **Ghent (Belgium)** sought to examine the prevalence of bilateral widened SL intervals in the absence of trauma, and to investigate if atraumatic SL interval widening would lead to instability and degenerative change.<sup>1</sup> The authors identified and reviewed 1000 radiographs of patients who attended clinic or were hospitalized for a hand or wrist problem over a four-year period. These patients all had bilateral radiographs, as the author's routine practice is to also image the contralateral hand simultaneously. Indication for radiographs, sex, age, and the presence of osteoarthritic change were recorded. A widened SL interval, defined as  $\geq 3$  mm, occurred in 12% of wrists and bilaterally in 6.7%. Those patients with a widened interval also had measurements taken for carpal instability, defined as a radiolunate angle of greater than  $90^\circ$  or a scapholunate angle greater than  $60^\circ$ . In this cohort, 36% of patients with radiological signs of SL dissociation had a reported trauma,

indicating that acute trauma in this study was not the main cause of dissociation. Where bilateral SL interval widening was identified, only 55% of these wrists had radiological evidence of instability, and the absence of instability was much greater in younger patients. The author, therefore, concludes that as younger patients with SL widening have instability and no arthritis, while older patients with SL widening generally have SLAC wrists, there is a firm causal progression from one to the other. Here at 360, we would note that it is not possible to draw this conclusion from the evidence presented. In an ideal world, a huge longitudinal study could look at the development of SLAC more closely, but such research is unlikely to ever be performed. This paper does remind us, however, that a widened scapholunate interval may be bilateral and/or non-traumatic in aetiology, and should be interpreted with caution.

### Immediate MRI in the management of patients with scaphoid fracture: is it worth it?

■ Scaphoid fractures are a notorious area for litigation. If the injury is not identified and the wrist is not immobilized, the patient may develop a nonunion that requires surgical intervention. The patient may then litigate for both the longer period of discomfort and the need for surgery. For most scaphoid fractures – and especially instances in which they are missed – the presentation is usually relatively subtle, and the radiological interpretation of undisplaced fractures is difficult. Indeed, it might be cheaper, once the litigation cost is accounted for, to place any wrist with a history of trauma straight into an MRI scanner. Many authors

have questioned this approach, however, as incidental pathologies may be diagnosed. This could lead to unnecessary overtreatment and, sometimes, perhaps we must accept that some fractures will be missed. In this study from **London (UK)**, the authors investigate this problem with an emphasis on cost analysis.<sup>2</sup> The authors ask which approach results in reduced costs to both the patient and the treating department. Patients with a suspected fracture who had initially normal radiographs were randomized to either immediate MRI or standard immobilization, with clinical follow-up and the potential for imaging at a later stage. The mean patient age was 37 years and the primary outcome was total cost impact at three months following enrolment. Diagnostic accuracy, patient satisfaction, and total cost impact were also assessed at six months. At three months, the difference in costs was neutral; however, they were significantly different by six months in favour of the early MRI arm, with better quality of care through earlier diagnosis. Interestingly, there was no significant difference in days off work between the two groups, as the increased number of other injuries picked up by the MRI led to immobilization for other causes. The act of studying scaphoid fractures in a department may well increase overall awareness and introduce a bias away from normal practice, in which case we will never know if any scaphoid fractures were missed by the hospital during this period. Overall, this is an excellent paper demonstrating improved satisfaction, care, and reduced cost with immediate MRI scans. This will surely be a good lever to change and a step towards the standardization of practice elsewhere.



### Satisfaction with specific and nonspecific diagnoses

■ Nonspecific pain is relatively common, especially in the upper limb, and leads to dissatisfaction for both the patient and the doctor when a diagnostic label cannot be found. Indeed, more than half of the symptoms brought to the attention of primary care doctors are not diagnostically associated with any specific pathophysiology. In the United Kingdom, when asked, 36% of the general population have reported upper limb pain in the previous seven days. For more than half of these patients, no specific pathology will be identified. Patients with no identifiable pathology will generally experience more investigations and will have higher levels of somatoform, panic, and post-traumatic stress disorder symptoms. While these symptoms may often be self-limiting, a failure to reach a named diagnosis can introduce mistrust between doctor and patient. Researchers in **Austin, Texas (USA)** sought to determine the differences in patient satisfaction between those patients given a specific *versus* a nonspecific diagnosis.<sup>3</sup> A total of 194 adult patients presenting to one of five upper limb orthopaedic surgeons were reviewed with both traumatic and nontraumatic upper limb problems. An independent research assistant recruited patients, and questionnaires were completed covering demographics, overall satisfaction with the appointment, pain intensity, and the Newest Vital Sign (NVS) health literacy test. Surgeons recorded whether there was an identifiable cause for the attendance (for example Dupuytren's

disease, fracture, rotator cuff tear) or a nonspecific cause (shoulder pain, wrist pain). Satisfaction was measured on a visual analogue scale from 0 to 10, with high scores representing optimal satisfaction. Patients were considered satisfied if they scored 9 or 10, and pain intensity was measured on a similar scale. The mean age was 50 years (18 to 86), and mean reported satisfaction across the cohort was 9.3 (SD 1.4) with a reported pain intensity of 4.1 (SD 2.7). In this cohort, one-third of patients had limited health literacy. A logistic regression model was used to model independent demographic risk factors for nonspecific diagnoses. A greater pain intensity and the first clinic attendance were associated with a nonspecific diagnosis, but neither were independently associated with nonspecific diagnoses in the multivariable model. In bivariate analysis, there was no difference in patient satisfaction between specific and nonspecific diagnosis. However, 22% of the nonspecific diagnosis patients were dissatisfied compared with 11% of those patients receiving a specific diagnosis. So, what is in a name? It does seem that a nonspecific diagnosis can be useful assuming that the "diagnosis" is presented in an appropriate way. However, it is notable that 86% of patients reported high satisfaction with their appointments, despite 37 of the 134 patients receiving a nonspecific diagnosis. While perhaps disappointing for both patient and clinician, nonspecific diagnoses are safe, appropriate, and satisfying when combined with compassionate care alongside the appropriate workup where necessary.

### Why scaphoid fractures are missed: a review of 52 medical negligence cases

■ Within the hierarchy of evidence-based medicine, we are encouraged to look to high-level studies such as randomized controlled trials. However, there is still a role for expert opinion, and much is to be gained from retrospective analysis when things go wrong. Researchers from **Nottingham (UK)** have reviewed their senior author's medicolegal practice for cases of missed diagnoses of scaphoid fractures, in order to determine the surrounding circumstances and identify any lessons that can be learnt from the missed diagnoses.<sup>4</sup> The reports concerned breach of duty and causation, or were supplied to determine condition and prognosis. They were based on a thorough and detailed review of all the medical documentation and witness statements. In total, 52 cases were retrospectively identified, with a mean age of 24 years (14 to 53). Most missed fractures were located in the waist (69%) rather than the proximal pole (25%) or the distal scaphoid (6%). The time from injury to initial

presentation to a healthcare professional ranged between 0 and 30 days, with the median being one day. Over 80% initially presented to the Emergency Department, with the remaining patients attending to see either the general practitioner or another healthcare professional, such as a therapist within a sports club. Retrospectively assessing the mechanisms of injury, as documented in the medical records and reported by the patient in their witness statement, the senior author concluded that 41 of the 52 patients had a mechanism consistent with a scaphoid injury. The remaining 11 patients all reported inconsistent histories with a likely scaphoid fracture. Universally, the site of pain and examination findings were poorly documented in the medical records, with the site not documented at all in almost one-third of cases. Indeed, the specific findings of tenderness in the anatomical snuffbox, in the scaphoid tubercle, and on thumb compression test were not documented, and therefore did not occur, in 71%, 79%, and 88% of cases, respectively. The diagnosis of scaphoid fracture was only considered at the time of presentation in 15 of the 52 patients, and only five of these had anatomical snuffbox pain. Surprisingly, 25% of patients underwent no formal x-rays at the time of presentation. Of those who did undergo an x-ray, 56% were standard anteroposterior and lateral radiographs of the wrist only. The remaining patients had additional oblique views, but only three of the 52 had a recognized scaphoid series. While a safety netting for resolution of pain or ongoing symptoms was documented in seven patients, no follow-up appointment was arranged for 71% of patients. Ultimately, the correct diagnosis was made at a median of 29 weeks (4 to 250) following the injury. However, at the time of compilation of the medical report, subsequent treatment had only successfully achieved a radiologically united scaphoid in 40% of the reviewed patients. It is well understood that scaphoid fractures are difficult to diagnose. This expert-opinion-based study nicely demonstrates that often this difficulty may be due to a lack of suspicion of scaphoid fracture, rather than because of a perceived failure to correctly interpret radiographs or clinical findings. The medical records in this series demonstrated that a scaphoid fracture was never considered nor excluded by clinical examination in 49 of the 52 cases, which demonstrates the high index of suspicion required, as well as the necessity for accurate and complete documentation of clinical findings. The authors go on to discuss the impact of these findings on the current National Institute for Health and Care Excellence (NICE) recommendation of performing a first-line MRI scan as the imaging modality of choice. While

this is no doubt a more sensitive modality for imaging possible scaphoid fractures, the diagnosis must have been considered in the first place, and these cases are a stark reminder of this.

### The Patient Reported Outcomes Measurement Information System of upper limb outcomes in base of thumb osteoarthritis X-ref

■ Here at 360, we recognize the importance of patient-reported outcome measures (PROMs) in our day-to-day practice. For a PROM to be useful, it needs to demonstrate validity, reliability, and efficiency. Measures that are frequently used in upper limb surgery include the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire and its abbreviated version (QuickDASH), the Boston Carpal Tunnel Questionnaire, and the Patient-Rated Wrist/Hand Evaluation (PRWHE). These instruments are well described in the literature and ask a series of questions focusing on specific factors and symptoms related to the function of the upper limb. Unfortunately, there is no current standard for assessment of outcome in upper limb or hand surgery. Furthermore, the existence of multiple PROMs means that individual units and surgeons will often use a different battery of outcome measures. Obviously, this lack of standardization does not aid easy comparison of clinical results. A novel tool developed by the United States National Institutes of Health seeks to overcome some of these problems. The Patient Reported Outcomes Measurement Information System (PROMIS) is an outcome measure that functions via computerized adaptive testing, allowing a question bank to be variably administered to patients dependent on the responses they provide to each item, in order to provide an overall score. For example, if an individual reported that they had no problems lifting heavy items, they would not subsequently be asked whether they could lift light items. This method permits fewer questions to be used, aiming to reduce questionnaire fatigue in patients and help to standardize outcomes achieved. The PROMIS Upper Extremity (UE) item bank consists of 46 items directed solely at upper limb conditions. Previous literature has evaluated these items in general conditions, but disease-specific validation is important. With this in mind, researchers from **Philadelphia, Pennsylvania (USA)** have tested the use of the PROMIS UE in patients with basal thumb arthritis.<sup>5</sup> They tested the PROMIS UE against the PRWHE and the Thumb Disability Examination (TDX), a specific measure for the thumb. For this paper, 100 patients were recruited in two groups of 50. Both groups completed the PROMIS UE score. The

first group also completed the PRWHE and TDX, while the second group also completed the QuickDASH. The majority of patients were female, with a mean age of 60 years. Good to excellent correlations were identified between the PROMIS UE and the QuickDASH, with good correlations identified between the PROMIS UE and both the TDX and PRWHE. Importantly, completion of the PROMIS UE required a mean of 4.9 questions (4 to 12), which was significantly lower than the QuickDASH, TDX, and PRWHE. The PROMIS UE score could be completed in less than 60 seconds, quicker than all the other measures used. There was no identified ceiling or floor effect, suggesting that the PROMIS UE effectively described all outcome statuses. It is interesting to note that while the PROMIS UE correlated well with the QuickDASH across several upper limb conditions, the correlations with more specific measures, such as the TDX and PRWHE, were not as good. Whether the PROMIS UE lacks the sensitivity to change compared with the more specific body region or disease-specific instruments is yet to be established. Overall, however, it is certainly a promising development.

### A European Pain Federation task force for complex regional pain syndrome X-ref

■ The presentation of complex regional pain syndrome (CRPS) varies considerably between patients, and symptoms and signs can also vary in the same patient over time. The aetiology is poorly understood but most patients will naturally tend to improve as the days turn into months, although early appropriate management can hasten recovery. That said, failure to fully recover is not unusual, with varying degrees of pain and functional impairment persisting in some patients permanently. While there is much variation in the presentation of CRPS, there also exists a significant variation in its investigation, diagnosis, and treatment. A **European Pain Federation** task force have reported their standards for the diagnosis and management of CRPS, which apply not just to the hand and wrist, but also to the lower limb.<sup>6</sup> The first stage of the process was to review the available evidence from recent systematic reviews and to consider the likely areas of discussion. A face-to-face meeting in June 2017 sought agreement among the members of the group on the disputed areas of practice. This collaborative approach served to develop a set of must-do statements, which were then refined to define a set of achievable standards. This must-do approach forced the members of the working group to consider exceptional cases or alternatives. When considering the diagnosis,

the working group felt that the Budapest criteria remained the benchmark for diagnosis. The Budapest criteria do require a preconceived perception that the patient may suffer from CRPS, as well as a working knowledge of the criteria. It was acknowledged by the working group that not all healthcare professionals are even aware of CRPS as a clinical entity, let alone its diagnostic criteria. Importantly, the working group highlights that Budapest criteria state that patients should have the following: continuing pain that is disproportionate to any inciting event; at least one sign in two or more of the described categories; and at least one symptom in three or more of the described categories. There must also be no other diagnosis that can better explain the signs and symptoms. This final factor is often forgotten in the day-to-day diagnosis of these patients. The differential diagnoses for CRPS are numerous, and they should be both considered thoroughly and investigated where necessary before a firm diagnosis of CRPS is made. The working group then states that patients with CRPS should be properly managed by a matched team of professionals. This may include multidisciplinary specialists in primary and secondary care, as well as pain management specialists and – where necessary – super specialists with experience in complex CRPS treatments such as neuromodulation. The importance of early appropriate care is highlighted. If symptoms do not improve within two months of commencement of treatment despite good patient engagement, further specialist opinion should be sought. A threshold of two months before considering referral to a super-specialized centre was considered reasonable, with severe psychological distress also suggested as a referral indicator. The working group were unable to make any firm recommendations about the prevention of CRPS due to the limited evidence. Treatment should encompass pain management medications where appropriate, as well as physical and vocational rehabilitation. Repeated assessments and modification of these therapies should be continued throughout the course of treatment. Alongside the physical treatments required, patients should also undergo screening for distress including depression, anxiety, post-traumatic stress, pain-related fear, and avoidance. If these factors are present, appropriate psychological treatment should be offered. Regardless of the clinician's perception of CRPS, there are certainly patients who do not respond to injury or surgery in the manner that we would usually anticipate. Ongoing symptoms in this group can be difficult to attribute to a cause, and thus difficult to treat. Those who are less familiar with CRPS would do well to update

their practice, and these standards provide a useful approach for treating these patients.

### Dorsally displaced distal radial fractures in the elderly: a randomized controlled trial **X-ref**

■ The use of locking plate fixation for distal radius fractures is commonly used but often poorly justified, given recent developments in the literature base. An often-cited original justification for using locking plate technology was in osteoporotic distal radius fractures of the elderly, with this forming the described indications for many products available. However, these patients are excluded from some trials and, as such, it was refreshing to see a trial targeting this group. This study led from **Stockholm (Sweden)** is a well-designed randomized controlled trial comparing nonoperative treatments with a volar locking plate for dorsally displaced distal radius fractures in the elderly.<sup>7</sup> A total of 140 patients were randomly allocated, with 72 in the plaster group and 68 in the volar locking plate group. The Patient-Rated Wrist Evaluation (PRWE) score, Euro-Qol five-dimension (EQ-5D) score, Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire score, grip strength, range of movement, complications, and radiological outcomes were recorded at three and 12 months after the intervention. At three months, patients treated with a volar locking plate had a significantly better median PRWE score (10.3 vs 35.5 points), a significantly better DASH score (14.4 vs 29.2 points), and a significantly better grip strength (71.0% vs 53.9% of the uninjured hand). These outcomes in the volar locking plate group remained significantly better at 12 months. Complication rates were similar, with 11% major complications in the nonoperative group compared with 14% major complications in the volar locking plate group, and 11% minor complications in the nonoperative group compared with 20% minor complications in the volar locking plate group. The investigators concluded that their results suggest a significant benefit for the elderly patient with an unstable dorsally displaced distal radial fracture

being treated with a volar locking plate, citing the significantly better grip strength, PRWE and DASH scores in the operated group at both three and 12 months. Quality-of-life scores were similar, however, and an in-depth economic analysis would be beneficial. It is also not clear how many of the group could feasibly have been treated with Kirschner wires, which would have been a cheaper and possibly equally effective way of treating some of the fractures. While contributing to the evidence base and no doubt affirming the prejudices of some, this paper is not the complete answer to this problem.

### The Distal Radius Acute Fracture Fixation Trial (DRAFFT) at five years

■ With the most appropriate and effective treatment for a wide variety of distal radius fractures not yet evident, this significant paper from **Warwick (UK)** reports the five-year follow-up of the Distal Radius Acute Fracture Fixation Trial (DRAFFT) randomized controlled trial.<sup>8</sup> This compared Kirschner wire fixation with volar locking plates for dorsally displaced fractures of the distal radius. This was a multicentre, two-arm, parallel-group randomized controlled trial including patients with a distal radius fracture within 3 cm of the radiocarpal joint requiring surgical fixation. Cases were excluded if the articular surface was sufficiently displaced to require open reduction. The mean age of patients was 58 years (19 to 89). The Patient-Rated Wrist Evaluation (PRWE) was the primary outcome measure; the EuroQol five-dimension three-level (EQ-5D-3L) score and further surgery related to the index fracture were the secondary measures. At 12 months, 90% of recruited patients provided scores, which declined to 66% at year two and 44% at year five. At all timepoints during the five-year follow-up, there was no clinically significant difference in the PRWE. At five years, the PRWE was 8.3 in the wire group and 11.3 in the plate group. Similarly, there was no difference in the health-related quality-of-life scores. In the five years following the index procedure, three of the 198 patients followed up had further surgery: one in the wire group and two in the ORIF

group. The authors therefore conclude that there was no difference in wrist pain, function, or quality of life between the groups in this cohort. This seems to obviate concerns about early development of osteoarthritis, albeit at a relatively short follow-up for this condition. There was attrition in the follow-up rate, in part because the trial sponsor required the patients to re-consent for participation in the five-year study. The authors postulate that patients who were asymptomatic would have therefore seen a higher dropout rate, which seems reasonable. Another interesting conclusion is that a patient's wrist function is likely to continue to improve in the five years following their injury.

### REFERENCES

1. **Hollevoet N.** Bilateral scapholunate widening may have a non-traumatic aetiology and progress to carpal instability and osteoarthritis with advancing age. *J Hand Surg Eur Vol* 2019;44:566-571.
2. **Rua T, Malhotra B, Vijayanathan S, et al.** Clinical and cost implications of using immediate MRI in the management of patients with a suspected scaphoid fracture and negative radiographs results from the SMaRT trial. *Bone Joint J* 2019;101-B:984-994.
3. **Ottenhoff JSE, Derksen L, Reichel LM, et al.** Satisfaction with specific and nonspecific diagnoses. *J Hand Surg Am* 2019;44:460-466. e1.
4. **Jamjoom BA, Davis TRC.** Why scaphoid fractures are missed. A review of 52 medical negligence cases. *Injury* 2019;50:1306-1308.
5. **Phillips JLH, Warrender WJ, Lutsky KF, Beredjikian PK.** Evaluation of the PROMIS Upper Extremity computer adaptive test against validated patient-reported outcomes in patients with basilar thumb arthritis. *J Hand Surg Am* 2019;44:564-569.
6. **Goebel A, Barker C, Birklein F, et al.** Standards for the diagnosis and management of complex regional pain syndrome: Results of a European Pain Federation task force. *Eur J Pain* 2019;23:641-651.
7. **Saving J, Wahlgren SS, Olsson K, et al.** Nonoperative treatment compared with volar locking plate fixation for dorsally displaced distal radial fractures in the elderly: a randomized controlled trial. *J Bone Joint Surg [Am]* 2019-A;101:961-969.
8. **Costa ML, Achten J, Rangan A, Lamb SE, Parsons NR.** Percutaneous fixation with Kirschner wires versus volar locking-plate fixation in adults with dorsally displaced fracture of distal radius: five-year follow-up of a randomized controlled trial. *Bone Joint J* 2019;101-B:978-983.

## Shoulder & Elbow

**X-ref** For other Roundups in this issue that cross-reference with *Shoulder & Elbow* see: *Sports Roundup 2; Wrist & Hand Roundup 6; Trauma Roundup 7; Children's orthopaedics Roundup 3.*

### Posterior interosseous nerve and biceps repair **X-ref**

■ The repair of a ruptured distal bicep tendon can be performed using a variety of approaches,

techniques, and implants. Having multiple ways of performing this repair suggests that no method is perfectly optimal, and each have a trade-off in terms of risks and benefits for the patient. A