

the benefits of our surgical interventions in ceiling effects, or scores that are not responsive enough to distinguish between treatments. As healthcare funders and patients are becoming 'outcome-score savvy', so we need to ensure these scores are fit for purpose. We were delighted to see this study from **Vancouver (Canada)** that set out to examine the Ankle Osteoarthritis Scale (AOS) from a psychometric perspective and then revise the questions to optimise the effectiveness of the score by removing redundancies.⁶ The authors used a split sample approach, with 380 patients treated with total ankle arthroplasty or arthrodesis to evaluate the AOS and propose a refined instrument. The authors established, using correlation analysis, that a number of questions on the AOS were highly correlated with other similar questions, were frequently incomplete, or showed little variation between respondents. Eight of the original AOS questions were utilised in the newly proposed Ankle Arthritis Score (AAS). These were three from the AOS pain subscale and five from the disability subscale. These authors conclude that their newly proposed AAS is both shorter than the AOS and has improved psychometric properties. The problem, of course, is that this remains a 'proposed' score and further investigation is required to determine the potential for clinical utility.

Responsiveness in patient-reported outcome measure scores

■ Sticking with the topic of outcome measures, a second

worthwhile paper caught our attention here at 360. This time, investigators in **Malmö (Sweden)** have conducted an analysis to establish the responsiveness and minimally clinically important change (MCIC).⁷ The MCIC is a crucial piece of information to establish with any patient-reported outcome measure (PROM), and all too often we don't know it. The MCIC establishes the threshold at which a change in value of a particular score, for a particular diagnosis, is perceived to be clinically relevant by patients. This particular study involves the Self-reported Foot and Ankle Score (SEFAS) which is the PROM used in the Swedish National Registries. The authors included patients with both forefoot (n = 83) and hindfoot or ankle pathology (n = 80). Scores were collected pre-operatively and at six months following surgery, along with a patient global assessment (PGA) scale (used to establish the MCIC). The authors then used a dual method to establish the MCIC, investigating the median change scores in improved patients on the PGA scale and using receiver operating characteristic (ROC) curve analysis to establish the 'best cut-off point'. Both forefoot and hindfoot cohorts had the same change in overall score (of nine points) between pre- and post-operative scores. Both methodologies for calculating the MCIC yielded a value of five points, and the measurement error calculations undertaken by the study team established that this was well above the measurement error of 2.4 points. In what is a very thorough investigation, the study team have established that an MCIC of at

least five points is required in order to consider any change significant.

Swedish total ankle arthroplasty registry outcomes

■ The Scandinavians have long led the field in total ankle arthroplasty (TAA), with the Scandinavian Total Ankle Replacement (STAR) a well-established prosthesis. However, although ankle arthroplasty continues to gain traction, albeit slowly, in the treatment of end-stage arthritis of the ankle joint, there are few large-scale studies to support its use. We were delighted to see this report from **Malmö (Sweden)** that reports the outcomes of the Swedish Ankle Registry, a registry that includes patient-centred outcomes in the form of the EuroQol-5D (EQ-5D), Short Form 36 Health Survey (SF-36), and Self-Reported Foot and Ankle Score (SEFAS).⁸ The Swedish registry recorded 241 ankle arthroplasties in an eight-year period, which is just 30 per year nationally. However, on the whole, this does represent a large series of arthroplasties. Outcomes were assessed pre-operation, post-operatively, and at two years of follow-up. Satisfaction levels were mostly high (71%) although some patients were dissatisfied (12%). Overall, SEFAS and other measures improved significantly from the pre-operative point to two years post-operatively. There were some obvious correlations between functional scores and age/satisfaction scores but no apparent differences between prosthesis design, diagnosis, or functional scores. This is one of the first large-scale reports of ankle arthroplasty.

As the other major joint registries start to report long- and mid-term outcomes of ankle arthroplasties, it is certain that we will learn more about how these prostheses perform in the medium and longer term.

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Wrist & Hand

X-ref For other Roundups in this issue that cross-reference with *Wrist & Hand* see: *Shoulder & Elbow Roundup 6*.

Radiotherapy in Dupuytren's disease: a systematic review of the evidence

■ Although much is known about Dupuytren's disease from the

interesting epidemiological aetiology (genetically propagated across Northern Europe by the Vikings), we understand a limited amount about the matrix biology that drives the

process. We also know that patients do not need treatment if they have no symptoms, yet a proportion will progress and then develop symptoms. The ideal treatment is one that

would mostly put hand surgeons out of business: one that could be administered at the first signs of the disease and would be able to switch off the process before progression occurs. Although genetic manipulation is many years away, radiotherapy has the potential, by reducing myofibroblasts turnover, to prevent disease progression. However, this may be seen by many as the ‘nuclear’ option. There are some studies on the use of radiotherapy to prevent progression and, given the contentious nature of the disease, we were delighted to see this systematic review from **London (UK)**,¹ which carefully considers the evidence. The authors were able to identify a surprising six studies that met the minimum standard set, although only one of these was a randomised trial. Their systematic review therefore relied on the reported outcomes of 770 patients with Dupuytren’s hands, with a mean radiation dose of 30 Gy. Disease regression ranged from 0% to 56%, stability from 14% to 98%, and progression from 2% to 86%. Salvage surgery was successful in all cases of disease progression post-radiotherapy. There were no reports of adverse wound-healing problems associated with such surgery or radiotherapy-associated malignancy. The take-home message from this is that, while it appeared safe, there was no conclusive evidence that radiotherapy really prevented progression. In these days of health resource scarcity, the cost of preventing progression in those with asymptomatic disease that may not actually progress should surely also be considered.

Buried versus percutaneous K-wires and infection

■ The humble Kirschner wire is still a formidable weapon in the right hands. However, despite their wide-ranging applicability, the debate surrounding the finer details still continues. The authors of this large study from Minnesota (USA),² tackle a tricky question: should the K-wire be percutaneous or buried? Essentially, the surgeon

is balancing the potentially lower risk of infection with buried wires, against the time and cost of removing those buried wires at a later date. The authors aim to set the bar for evidence that supports one technique over another. Their study design was a simple retrospective study reporting the outcomes of 16 years of phalangeal, metacarpal, or distal radius fractures that were treated with either buried or percutaneous K-wires. There were 695 patients, in whom 207 were buried K-wires and 488 were percutaneous K-wires. There were differences in the infection and complication rates based on the location of the fracture pattern. In short (and probably due to the soft-tissue excursion), patients with metacarpal fractures had the highest difference in infection rate, with around double the rate of infection in percutaneous wires (17.6% vs 8.7%). Balancing the risks of second surgery and the health economic burden is a tricky one that is clearly outside of the scope of a retrospective review such as this. However, this is one of the gems that pass through the editorial desks at 360 with a simple and easily understandable message. We will have a lower threshold for burying our K-wires in future, especially in the metacarpals.

Remote collection of patient-reported outcomes by telephone, mail, and e-mail

■ Just about everyone agrees that we should be paying attention first to what the patient thinks, then to what the doctor thinks – and that patient reported outcomes (PROMs) are therefore most likely the way forwards. The other potential benefit of PROMs is that they only require simple questions and answers; as such, no objective assessor is required to assess the outcomes. The difficulty in hanging your hat on remote collection of outcomes, of course, is that the information is only as good as the response rate. Telephone and mail methods take a lot of time and energy to collect and analyse. Digital methods, such as email, are much

more appealing in terms of efficiency, but do they provide the same quality of data and response rate? Researchers from **Salt Lake City (USA)** performed a very interesting randomised trial of 1969 serial patients undergoing carpal tunnel release.³ The surgical care was identical in all cases, but the patients were randomised to one of three follow-up methods. Their PROMs were collected by email, post, or telephone with random allocation. The outcome of interest was the response rate. A total of 68% of those contacted by telephone responded compared with email (42%) or standard mail (42%). So, if we are to capitalise on the obvious advantages of an automated digital system, we need to develop email systems yet further, perhaps by better patient engagement and computer interface, or incentivising patients in some way to complete their outcome forms.

Outcomes following isolated posterior interosseous nerve neurectomy: a systematic review

■ Sometimes we struggle to find the cause of wrist pain and sometimes, even when the cause is known, the major reconstructive procedures that may be required can cause more harm than good. For that reason, neurectomy is, on the face of it, an appealing option. By dividing the small nerves close to the wrist that supply afferent pain messages to the brain, the patient may be rendered less aware of pain without suffering or risking the drawbacks of reconstructive surgery. Before recommending this type of procedure, we do need to be sure that it causes no harm, and does indeed alleviate or remove the disabling symptoms, given that it does not address the underlying pathology. This paper by a group from **Texas (USA)** gives us reassurance.⁴ In their systematic review of the literature surrounding the use of posterior interosseous nerve neurectomies, the authors found six studies (136 cases) in which a posterior interosseous neurectomy was performed for the indication of



chronic wrist pain. Overall, the outcomes of a total of 135 patients were included in the study and follow-up was to a mean of 51 months. A large percentage of patients reported subjective symptomatic improvement and only 1% had a complication. Just 25% of patients reported recurrence of symptoms and 88.9% of patients were able to return to work. This is an intervention that appears to have a reasonable efficacy, especially given that these patients are difficult to treat. Although denervation is a somewhat blunt tool and perhaps should be considered a procedure of ‘last resort’ following thorough investigation and consideration of causative pathology, this is a relatively positive report for what would otherwise likely result in referrals to the pain clinic. We should remember this simple and safe option, distant with our duty to provide fully informed consent, before either abandoning a patient with wrist pain or recommending a potentially hazardous and function-depleting reconstructive procedure.

Prognostic factors affecting union after ulnar shortening osteotomy in ulnar impaction syndrome

■ Ulnar shortening osteotomy is a widely accepted and common procedure for a range of pathological processes. The ulnar osteotomy, however it is performed, aims to level the wrist, and thereby normalise carpal mechanics and alleviate pain from abutment. The procedure is

usually undertaken using an oblique osteotomy and lag screws. While there are a number of hardware solutions designed to improve patient outcomes, there are some persistent and clinically relevant complications. These authors from **Daejeon (South Korea)** have turned their attention to establishing which patients are likely to experience a nonunion.⁵ The study revolves around the review of 325 patients treated with an ulnar shortening osteotomy over a six-year period. The authors undertook a retrospective review and recorded patients' demographic details, function (range of movement, grip strength, Visual Analogue Scale pain score, and Mayo Wrist Score), and radiographic parameters (dorsal subluxation of the ulna and ulnar variance, distal radioulnar joint morphology, gap at the osteotomy site, and arthritic changes). Overall, 294 patients went on to develop uncomplicated bone-healing, with 31 experiencing either a delayed union or nonunion. Undertaking a series of univariate and multivariate analysis, the authors found that smoking, low bone mineral density, a decreased range of movement of the wrist, and use of a double-blade saw were significant factors for an adverse radiographic outcome. In what is a useful and now established procedure for impaction syndrome, this very large series has some clear messages to give about patient selection and surgical technique. Clearly, there is not much that can be done about reduced wrist movement or reduced bone mineral density. However, patients can give up smoking and surgeons can cease the use of a double-bladed saw. With around 10% of patients experiencing a delayed union or nonunion, optimising these factors should be considered to improve the outcomes for this potentially beneficial, but also potentially very troublesome, procedure.

How does carpal tunnel fare over ten years?

■ Carpal tunnel syndrome (CTS) is one of the most common presentations leading to surgical procedure

encountered in any orthopaedic or surgical subspecialty. It is somewhat surprising, therefore, that carpal tunnel decompression does not have long-term follow-up results correlated to electrophysiology studies. We were delighted to read this report from **Singapore (Singapore)**,⁶ where the authors have examined the long-term outcome of carpal tunnel release (CTR) undertaken for electrophysiologically severe CTS. The paper focuses on the outcomes of 40 patients (80 hands), all with bilateral and severe CTS, who were treated with a mixture of open CTR ($n = 46$ hands) and endoscopic CTR ($n = 34$ hands), with 9.3 year outcomes reported using the Boston Carpal Tunnel Questionnaire (BCTQ). In terms of neurological symptoms, the complete resolution of numbness was seen in 94% of patients, with a mean BCTQ symptom score of 1.1 and a mean function score of 1.15. By final follow-up, around three-quarters of patients reported being asymptomatic and had no functional impairment. Poorer outcomes were seen in men and patients under 55 years of age. However, interestingly, there were no differences between dominant and non-dominant hands. It is pleasing to see a long-term follow-up series that confirms what we all suspected: that carpal tunnel release has excellent results not just in the short term, but also in the longer term, even where severe electrophysiological disease is treated.

Long-term follow-up for distal pole of scaphoid fractures

■ In a month of long-term follow-ups, we were delighted to see this paper from **Malmö (Sweden)**,⁷ which reports the long term outcomes (both functional and radiological) at ten years following a distal scaphoid fracture. The cases were not a longitudinal cohort, but rather a subgroup analysis of a prospective post-traumatic radial-sided wrist pain study, which clearly introduces some selection bias. The patient cohort, however, was relatively homogenous,

consisting of 41 patients with distal pole of scaphoid fractures that had initially been treated non-operatively. There were a range of imaging modalities available (including plain films, MRI scans, and CT scans at the time of injury) and all patients were followed up with a CT scan between eight and 11 years following injury. Outcomes in this series were reported using the Disabilities of the Arm, Shoulder and Hand (DASH) and Patient-Reported Wrist Evaluation (PRWE) scores. Secondary outcomes were assessed using objective clinical measurements and radiographic measures of fracture-healing and scaphotrapezotrapezoidal (STT) joint arthritis. Perhaps surprisingly, given the selected nature of the cohort, function was good at final follow-up, with a median DASH score of 2 points and a median PRWE score of 0. There was a single patient with an asymptomatic nonunion on radiographic follow-up; in seven patients, the CT scanning revealed arthritis in the STT joint, although this was essentially clinically asymptomatic. This nicely constructed and conducted study reveals surprisingly positive long-term outcomes following a distal pole of scaphoid fracture, with those patients who do develop either a nonunion or radiographic arthritis essentially being asymptomatic.

Unpicking Kienböck's disease

■ Avascular necrosis of the lunate (Kienböck's disease) remains somewhat of an enigma. Although there are some known risk factors, treatments are well-established but not proven. One of the real challenges is identifying which patients are at risk of experiencing a pattern of lunate collapse and carpal malalignment. Distinguishing between those patients who are, or are not, likely to progress to symptomatic disease is key to guiding management and deciding when to intervene. A clinical team from **Utrecht (The Netherlands)** set out to establish if there were any clearly definable prognostic characteristics in a cohort of 195 patients, all with Kienböck's

disease.⁸ The authors recorded demographics (age, gender distribution, ulnar variance, radial height, radial inclination, palmar tilt, anteroposterior distance, and lunate type), as well as Lichtman stages of Kienböck's disease. The authors established that patients with negative ulnar variance had more advanced stages of Kienböck's disease (odds ratio 1.4), and that increasing age was also independently associated with a higher Lichtman stage of Kienböck's disease (adjusted odds ratio, 1.02). Although the authors did not reach any earth-shattering conclusions, the observation that ulnar variance is the key prognostic factor is one worth noting, as is the thought that increasing age seems likely to indicate progression.

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