Non-surgical or percutaneous fixation for undisplaced scaphoids?

Should we or should we not fix scaphoid fractures acutely? This issue is controversial, and all the more so when the fractures are completely undisplaced. The definitive answer will hopefully be provided by the very large randomised SWIFFT study currently being run from Leicester (UK). There are, however, already some fairly reliable indications and a review team based in **Montreal, Boston and Riyadh** have nicely summarised the available literature in their systematic review.[1] The authors included published articles over a 40-year period, all reporting scaphoid fractures treated either conservatively or through a 'minimally invasive' technique. The authors were able to find ten studies that met the inclusion criteria and were reporting sufficient demographic, treatment and outcome details to warrant inclusion in the study. The bottom line appears to be that percutaneous fixation of undisplaced scaphoid fractures indeed leads to more rapid union (44 days vs 79 days) and return to work (46 days vs 77 days) than does plaster immobilisation, with no increase in complications. Health economics are complex, but an earlier return to taxpaying status might more than pay for the extra cost of fixation. We keenly await the reporting of the SWIFFT study which should provide a robust answer to this question.

PRC or four-corner fusion?

The differing approaches of the proximal row carpectomy (PRC) and four-corner fusion (FCF) in the treatment of scaphoid nonunion advanced collapse or scapholunate advanced collapse have created much debate over the years. Proponents of PRC argue that the potential articulation of the distal row with the radius conceivably sacrifices grip strength, however, it maintains motion compared with the four-corner fusion which potentially offers a more grip strength-preserving option but may be a motion-sacrificing approach. Or at least that's how the proponents of each approach argue it. The reality may, however, be different, with many papers in fact showing apparently equivalent grip and range of movement from FCF and PRC. The latter, however, does have the advantage of requiring no insertion of metalwork, no plaster immobilisation and no bony fusion. Further information on the topic has recently been furnished by a collaboration from **Leicester (UK)** and **Rotterdam (The Netherlands)** where the authors carefully compared 24 patients treated with PRC with 24 similar patients treated with FCF using the validated Sollerman and Michigan hand scores.[2] Interestingly, this study showed that PRC results in better functional outcomes and quicker completion of motor tasks in those patients presenting with scaphoid nonunion advanced collapse or scapholunate advanced collapse and who are suitable for either operation. Taken in combination with the pre-existing literature, this really does now suggest that if a patient is suitable for either PRC or FCF (the criteria being preservation of the lunate-capitate and lunate-radius cartilage) then a PRC should probably be advised. With the relative scarcity of the diagnoses and patients who are suitable for both, it is unlikely that this comparison will ever be tested in a randomised manner.

A2 pulley release in flexor tendon repair?

It is an age-old surgical dictum that the A2 pulley must be preserved to maintain finger function, in particular to avoid bowstringing even in the presence of significant tendon injury. This doctrine can make flexor tendon repair in zone 2 a real technical challenge because the surgeon has to choose between the devil and the deep blue sea: either a stiff finger from a repair trapped within a tight pulley or the motion loss associated with bowstringing. So we were interested in a report from the team in **Niigata (Japan)** examining the outcomes of zone 2C tendon repair when associated with complete division of the A2 pulley.[3] They report the results of seven patients who underwent complete division of the pulley and compared their outcomes with those of 33 patients who underwent repair of the tendon laceration without repair of the pulley. There were few complications, and just two of the seven patients required tenolysis. All patients had outcomes assessed using Tang's criteria and there were no apparent differences between the two groups. It is reassuring to hear from an independent and comparative series that so long as all other pulleys are left intact, there is no bowstringing and finger motion is unaffected by division of the A2 and C2 pulleys when performing tendon repair.

Dupuytren's disease: trends and treatment patterns

Patients might not seek treatment for a relatively minor condition such as Dupuytren's disease if they have to submit to open surgery, but they might be tempted if the treatment was apparently safer or more straightforward. The hand surgeons at *360*, from their clinical experience, have been rather suspicious that this is the case, and that the patterns of presentation of treatment for Dupuytren's disease may have changed with the introduction of less invasive treatments. Two epidemiological papers published from evidence acquired from US-based databases would seem to support this supposition. A group from **Boston, Massachusetts (USA)** studied the impact of the use of collagenase *clostridium histolyticum* (Xiapex).[4] The authors utilised the Intercontinental Marketing Services Health Office-Based Medical Claims database to establish the changes in presentation patterns both before and after the introduction of Xiapex. They established that Dupuytren's healthcare-based encounters increased by 54% in the timeframe 2011 to 2013 compared with 2008 to 2010 (prior to the availability of Xiapex). During the same timeframe, minimally invasive treatment increased, comprising 39% of encounters in 2013 compared with only 14% in 2007. These findings should be interpreted in conjunction with another paper from **Charlottesville, Virginia (USA)** where a similar study was conducted using the PearlDiver Humana database.[5] The authors used the ICD-9 codes to examine treatment and presentation trends between 2007 and 2014. In their study, the number of patients presenting with Dupuytren's nearly trebled (from 1118 to 3280), with the proportion having surgery falling from 33% to 21%. As perhaps might be expected given that the treatment incidence remained at 41% throughout the study, this difference was made up by patients being treated with Xiapex.

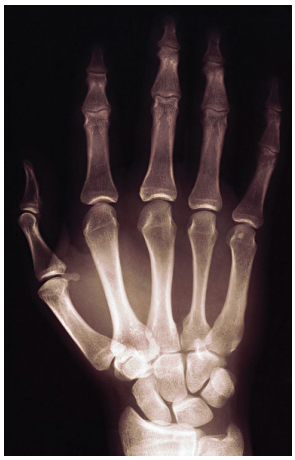
Fluoroscopic radiation in hand surgery

Hand surgeons use a lot of fluoroscopy and are often rather close to the beam. It is of perennial concern what the consequences may be, from inadvertent exposure perhaps leading to osteosarcoma of the fingers to stray beams increasing the incidence of thyroid cancer and

cataracts. Some more recent data might suggest that surgeons would do well to worry more about cataracts than the neoplastic complications. It has often been said that the mini C-arm has an almost undetectable level of radiation, although recent reports may indicate that this is not so. Investigators from **Philadelphia, Pennsylvania (USA)** have set out to investigate the potential risk that hand surgeons take when conducting fluoroscopically guided cases of increased radiation exposure to the eyes.[6] The authors of this study undertook an investigation over a 12-month period of all cases conducted by a single surgeon using both large and mini C-arm guidance. The report comprises a rather small number of 83 cases but does include both accumulated eye radiation dosage and fluoroscopic radiation output for each case. This paper does make heartening reading. The radiation dose to the eyes with either a standard image intensifier or a mini C-arm is undetectable. The data were accumulated from 83 cases over a 12-month period, with < 30 mrem per month recorded, an exposure nowhere near the recommended limit to the eye (167 mrem per month). So, although little has been known previously about this problem, it does look like there is not too much to be worried about with regard to corneal radiation. The methodology here is sound, and the findings that lower than the detectable dose of radiation is measurable at the eyes of the average hand surgeon is very much reassuring.

Comorbidities and digit replantation

■ Digital replantation is a relatively rare operation to undertake and the spectrum of results can sometimes make it rather daunting from which to 'pick winners'. While a successful replantation is clearly the best outcome, a stiff insensate venous congested finger is clearly worse than many other options such as ray resection and pollicisation. One obviously important, but relatively unstudied, prognostic factor is that of patient comorbidity. We were interested to read the outcomes of an investigation conducted by authors from **Phoenix, Arizona (USA)** who aimed to determine the effect of patient comorbidities on the success, risk, and cost of digital replantation.[7] The authors used all amputation injuries and digital replantation procedures captured by the National Inpatient Sample during 2001 to 2012. As this was a registry-based study and no real outcome measures were available, they used the rather blunt definition of secondary amputation. The extensive National Inpatient Sample dataset was queried for patient comorbidities and outcomes including failure, complications, and overall hospital costs. The authors identified 11 788 digital replants, of which 3604 patients (30.6%) failed and required further revision to amputation. Even when the patients appear to be suitable for replantation surgery, comorbidities have a strong influence on the success of surgery. Patients in this sample who present with three or more comorbidities, and those who have a history of alcohol abuse, anaemia, electrolyte imbalance, obesity, peripheral vascular disease, or psychotic disorders, are at significantly increased risk of replantation failure and all the attendant complications. This is the largest series we are aware of and, despite the limitations of the use of registry data, it has some significant strengths to its approach. There are few studies of any size to estimate the overall success of replantation, and it is eye-opening to see that in nearly 12 000 replantations, the secondary amputation rate approaches one third of patients. This study, like all registry-based studies, is rather blunt in its endpoint, with just the outcome of further surgery being used to define failure. In reality, it is likely that this study therefore overestimates the success of digital replantation as there are conceivably



many patients with suboptimally functioning fingers who have elected not to undergo revision surgery.

Trigger finger complication rates

■ Sometimes the most common of surgical procedures is associated with a surprising number of complications and adverse events. Simply because something is common does not necessarily mean it is safe. One of the most regularly performed surgical procedures is that of trigger finger release. Although there are some data to suggest that steroid injection may be just as good (particularly in the initial presentation), here at *360* we cannot foresee the number of trigger finger releases reducing at any point in the near future. Trigger finger release is incredibly common and investigators in **Charlottesville, Virginia (USA)** were able to examine the outcomes of a staggering 209 634 patients who underwent release, all recorded on an insurers' database.[8] The authors established that middle finger release was the most common and that, perhaps surprisingly, there was a complication rate of 0.8% to 1.6%. As with the previous Dupuytren's data, there was a steady increase in presentations, with the number of procedures per year growing by 16% over five years. Perhaps most encouraging, however, was the incredibly low recurrence rate, with revision surgery needing to be undertaken in just 0.3% to 0.8% of cases within three years of the index procedure. It certainly seems on the face of it that trigger finger release is in fact as common, complication-free and successful as the most reassuring hand surgeon makes it out to be.

Wrist arthroplasty in rheumatoid arthritis

■ Wrist arthroplasties are a bit of a mixed bag. Although clearly indicated in some patients, the reliable and long-term results of wrist fusion have served as the main reason why wrist arthroplasties are still very much a niche operation. There are few sufficiently large series of patients from which to calculate any reliable estimates of survival and complication rates from wrist arthroplasty. Consequently, we were delighted to see this study of 95 Universal-2 total wrist arthroplasties (TWA) reported with both survival and complications at around five years of follow-up. The authors from **Wigan (UK)** report a series of 95 Universal-2 TWAs, of whom eight either died or were lost to follow-up.[9] The authors therefore report 85 TWAs in 75 patients. Outcomes were assessed with VAS, DASH and range of motion assessments in addition to the Wrightington Wrist Score. The authors also took radiographs at regular intervals in the first year and then annually to monitor for failure or loosening. Total wrist arthroplasty had a marked effect on reported pain scores, improving from 8.1 pre-operatively to 5.4 post-operatively. During the follow-up period there was a 7% major complication rate, with failures equally split between revision arthroplasty and fusion. With revision surgery as an endpoint, the authors were able to report a survival of 91% at 7.8 years (95% CI 84 to 91). While TWA is far from the mature technology offered by almost any other joint arthroplasty, the clinical and survivorship results presented in this study do seem to suggest that, all things being equal, rheumatoid

patients will do well with a wrist replacement.

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Shoulder & Elbow

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

Is surgery needed for extra-articular scapular fractures?

x-ref

■ We suspect that the rarity of the injury and the technical difficulty of the surgery have a part to play in the decision-making process surrounding fixation, or otherwise, of scapular fractures. The indications for surgery are far from agreed, although the majority of surgeons would concur that for significantly displaced glenoid fractures, surgery should be considered. There is less consensus with extra-articular fractures, although the glenoid can be significantly displaced and this will alter the lever arm and mechanical advantages of the rotator cuff muscles. With a fresh look at what the operative indications in extra-articular fractures ought to be, surgeons from **St Paul, Minnesota (USA)** report the outcomes from their series.[1] The authors were able to report the functional outcomes of 49 of 61 patients with acute operatively managed extra-articular scapular fractures. Functional outcomes were reported to 33 months following surgery, and the authors are open about the operative indications which are well documented in the paper and are based on the limited existing literature. The authors report a 100% union rate, with DASH and SF-36 scores approaching normative values for the population at 33 months of follow-up. Excellent strength and range of motion, compared with the contralateral arm, were also found in the group. There were nine complications apparent in eight patients, with implant removal and secondary manipulation of the shoulder under anaesthesia most commonly seen. The authors concluded that operatively managed displaced glenoid neck and scapular body fractures give expected good functional outcomes. There are two significant limitations to this large series of patients which somewhat hamper the interpretation of the results. Firstly there is no non-operative control group in the study, so there is no evidence to suggest that surgery provides a superior outcome for these injuries. Second, only three patients in this series sustained low-energy trauma. This is not consistent with current epidemiological data that suggest an increasing incidence of low-energy scapular fractures in women,[2] where non-operative treatment may be more appropriate.

Propionibacterium acnes in primary shoulder arthroplasty: is it a technical surgical issue?

■ In the last edition of *360*, we discussed a paper evaluating the role of single-stage revision shoulder arthroplasty in patients with subclinical infection, where almost half of all revised cases had more than two positive cultures for *Propionibacterium acnes* (*P. acnes*).[3] *P. acnes* is known to be associated with indolent infection leading to osteolysis and loosening of shoulder prostheses, and is of great concern to shoulder surgeons. In this thought-provoking study from Australia, microbiological samples were obtained from a range of potential contaminant sites in 40 consecutive patients undergoing primary shoulder arthroplasty. These authors from **St Leonards (Australia)** [4] designed a study where cultures via swab were obtained from consecutive patients undergoing primary shoulder arthroplasty. In each patient, specimens were taken from the subdermal layer, the tip of the surgeon's glove, the deep scalpel blade, forceps and the skin incision scalpel blade. The study is based on the results of 40 patients, all undergoing shoulder arthroplasty. Of these, one third had at least a single culture positive for *P. acnes*, with 8% of females (n = 2/25) and 73% of males (n = 11/15) having more than a single positive culture. The most common site of contamination was the subdermal tissue (12 positive samples), however, there was a worrying rate of contamination of surgical gloves (seven samples) and forceps (seven samples). Allowing for the difficulties that culture of *P. acnes* poses in the laboratory, it is certainly possible that there were still more positive samples. The authors determined that males had a 66-fold increased chance of having a positive microbiological culture for subdermal colonisation and not unreasonably concluded that *P. acnes* can be found throughout the surgical field. This seemingly ever-present microbe is a persistent problem to shoulder surgeons and, as the team from Australia have suggested, given the high rate of surgeon contamination presented here new approaches are certainly needed to try to reduce the risk of colonisation at the time of primary surgery.

Primary elbow arthroplasty in distal humeral fractures

x-ref

■ The use of primary total elbow replacement (TER) for distal humeral fractures is on the rise but the reasons for this are unclear. Is this trend due to improved surgical results or a change in the pattern of presentation of these fractures? As the number of