

the cases. In attempting to identify the causes of these never-events, some of the surgeons were generally described as rushed, inexperienced, cavalier, or overconfident, and these are certainly characteristics and situations that we should all try to mitigate in our own practices. One surgeon was described as extremely careful and meticulous; that particular surgeon recognized the error at the time of surgery, reminding us that we can all make mistakes. The authors' conclusion is unsurprising:

knowledge of the relevant anatomy is crucial to avoiding inadvertent harvest of the median nerve instead of the palmaris longus tendon.

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Shoulder & Elbow

X-ref For other Roundups in this issue that cross-reference with *Shoulder & Elbow* see: *Research Roundup 5; Trauma Roundup 2.*

Better outcomes with SAD, but below clinical importance

■ Unsurprisingly, Can Shoulder Arthroplasty Work? (CSAW), a randomized controlled trial from the Oxford group published in the *Lancet*, takes centre stage in the shoulder and elbow roundup for this issue. This study has generated numerous headlines in the mainstream media, which are often sensationalistic oversimplifications along the lines of 'shoulder surgery doesn't work'! This crude media folly underlines the importance of a careful academic assessment of any scientific paper and of appropriate clinical interpretation with respect to our individual patients. These authors from **Oxford (UK)** undertook a large three-armed randomized controlled trial reporting the outcomes of over 300 patients, all with subacromial impingement-type pain, randomly allocated to decompression surgery (n=106), arthroscopy only (n=103), or no treatment (n=104).¹ Outcomes were assessed at both six months and one year, and were reported using the Oxford Shoulder Score. Conducting a trial of

this nature is a significant challenge and the group are to be commended. Although cloaked in caution, their conclusion that the results of subacromial decompression (SAD) are no different to those of arthroscopy alone is an uncomfortable one for many surgeons, and much criticism has therefore been levelled, both justified and unjustified. Observers have highlighted the 42% of patients in the sham arthroscopy group and 23% of patients in the surgical arthroscopy group who were non-compliant with their treatment allocation. Furthermore, 12% of the 'no treatment' group did not continue in their study allocation; some patients chose to undergo surgical decompression. The treatment effect in the surgical group may be due to the surgery or the postoperative physiotherapy. Finally, subacromial pain has a variety of potential aetiologies, and pathologies such as partial cuff tears were included in the study. Randomization should eliminate the effects but, with 100 patients in each arm and significant crossover, the results are therefore rather difficult to interpret. There may be remaining questions over the underlying diagnoses at the time of inclusion in the study, but a pragmatic study is often the best way to examine real-life situations.

It is indeed likely that subacromial decompression is performed too frequently in many countries, as many patients would do just as well with conservative management, but it may well be the case that there is a subset of patients who would still benefit from the procedure. The British Elbow & Shoulder Society/ British Orthopaedic Association (BESS/BOA) response to this paper highlights exactly this point, urging careful patient selection and informed shared decision-making; their general guidance for the management of subacromial pain is due to be updated in the near future.

Elbows and the Norwegian Arthroplasty Register

■ Registry data are extremely powerful with the weight of numbers behind them; however, they are just observational cohort data and, despite the numbers, drawing inferences can be tricky. In the United Kingdom, while lower limb arthroplasty data are well established, the shoulder and elbow arthroplasty data in the National Joint Registry are in their relative infancy. We therefore applaud the foresight of the Norwegian register to set up early and allow the production of this long-term follow-up study. This study

from **Bergen (Norway)** sets out to present 20 years' worth of follow-up data from a national perspective.² Over 800 elbows were recorded on the register between 1994 and 2017. The authors extracted data from the register to study for survival and reason for revision. Comparisons were also made between different types of replacement. The longest follow-up in this series is now at 24 years, and although the survivorship is inevitably inferior to that of lower limb arthroplasty, the rates at 20 years are quite respectable: five-, ten-, 15-, and 20-year overall survival rates for all elbow arthroplasties were reported as 92%, 81%, 71%, and 61%, respectively. Unsurprisingly, aseptic loosening dominated the reasons for revision, followed by defective polyethylene, infection, and dislocation. As the authors point out, the reasons for these failures are often somewhat design-specific, and newer and more refined designs may overcome this issue. Considering that this data spans the last 20 years, in which time we have learned much about implant design, these figures should improve with future evolutions. Certainly, our knowledge of the mechanisms of failure have improved. We now have a greater appreciation of the importance of

the type of implant coating, and of the distal humeral metaphyseal fit and anterior flange in preventing torsional loosening, as well as the impact of the type of linkage and constraint on dislocation, polyethylene wear, and forces transmitted to the fixation interfaces.

BIO-RSA effective in glenoid bone loss?

■ The management of extensive glenoid bone loss in shoulder arthroplasty is extremely demanding. In other clinical scenarios, a bone graft is an obvious solution, but here the subsequent fixation of the implant must also be considered. The poor bone stock often seen at revision, combined with a narrow window for screws and a large lever arm, makes achieving good fixation a challenge. Surgeons' experience with the bony increased offset reverse shoulder arthroplasty (BIO-RSA) is improving and the system is designed in such a way that it permits the lateralization of the centre of rotation of the prosthesis. This provides mechanical advantage to the deltoid, as well as extending the effective glenoid neck length, theoretically reducing medial impingement and notching. The authors of this study from **Nice (France)** are recognized as clinical leaders in this technique and this study demonstrates its efficacy.³ Their report is based on the outcomes of 54 patients, all of whom underwent a BIO-RSA arthroplasty. The surgical team utilized a trapezoidal bone graft, harvested from the humeral head and fixed with a long-post baseplate and screws, to compensate for residual glenoid bone loss. The authors managed a mean follow-up of 36 months and report both radiological measures and Constant Scores as outcome measures. As they point out, using a humeral head autograft allows the correction of multiplanar glenoid bone loss and so the technique is versatile. Superior inclination of the glenosphere is well recognized as predictive of failure in reverse shoulder arthroplasty. The

authors' 94% incorporation rate of the bone graft is remarkable, and failure of incorporation is probably the greatest hazard in the early to mid-term, so, while the mean study follow-up is only 36 months, in this context the results reported here are promising. We must, however, bear in mind the experience and expertise of this group in performing these surgeries; we look forward to studies from lower-volume groups to verify these results. There is no doubt that techniques to manage glenoid bone loss are going to become more and more important. The development and widespread popularization of the reverse shoulder arthroplasty and the particular failure modes associated with this have resulted in a singular problem to solve. Although this may not be the eventual answer, BIO-RSA offers a unique potential solution.

Rate of improvement as a measure of outcome?

■ Shared decision-making and the management of patient expectation is a huge part of any surgery. The patient should know as far as possible what to expect both at the time of the operation and in their recovery and rehabilitation. The advice we give is often predicated on our own practice, which in turn is developed based on our experience and that of our immediate colleagues. With many upper limb arthroplasty surgeons acting as relatively low-volume providers compared with lower limb colleagues, distinguishing the differences in clinical outcomes between the various options can be rather tricky, with often limited personal and unit experience on which to make a judgement. We therefore welcome this paper from Florida, which helps inform this process for both anatomic and reverse shoulder arthroplasty, and which contains information relevant to everyone's practice. These authors from **Palm Beach Gardens, Florida (USA)** report a prospective series of 1183 patients who received either a

standard anatomic total shoulder arthroplasty (n=505) or a reverse total shoulder arthroplasty (n=678).⁴ The series reports a complete range of outcomes including the Simple Shoulder Test (SST), University of California at Los Angeles (UCLA) Shoulder, American Shoulder and Elbow Surgeons (ASES), Constant, and Shoulder Pain and Disability Index (SPADI) scores. The meat of this study is the reporting of these 3587 visits by 1183 patients, which were analyzed and several differences between prosthesis types were noted. The biomechanical differences between the prostheses led to some expected results: patients undergoing anatomic shoulder arthroplasty experienced better improvements in external rotation when compared with reverse prostheses and, conversely, reverse arthroplasty achieved better elevation. Most improvement occurred in the first six months but, perhaps surprisingly, improvements did continue up to 24 months. The rate of improvement was similar between the two types of prostheses and both reliably improved patient outcomes. This paper should allow surgeons to better inform their patients of their expected recovery trajectory.

Coracoclavicular loop for the treatment of distal clavicle fractures?

■ The management of distal clavicle fractures can be challenging and, where surgery is indicated, no single best solution has been identified. When the conoid and trapezoid ligaments are incompetent, fixation into the small lateral residual clavicle is not likely to yield a successful stabilization. Surgeons then usually turn either to a hook plate or to stabilization involving the coracoid. As is predictable in this scenario, there is therefore a variety of accepted techniques. This study from **Taipei (Taiwan)** compares two of the most accepted.⁵ The clavicular hook plate is still widely used and achieves stability through the hook placed



under the acromion. However, this approach does have some known complications, with the recognized sequelae of acromial erosion, impingement, and cuff complications, which are common enough that surgeons routinely offer subsequent removal. Direct reconstruction of the coracoclavicular (CC) ligaments is also not a new technique. In this paper, the authors utilized a cow hitch knot of Mersilene tape over the clavicle itself, running under the coracoid and sutured back on itself. Most other synthetic reconstructive techniques rely on screw fixation to the clavicle or transosseous tunnels through it. The authors report a series of 72 patients, all with at least one year of clinical follow-up. The groups were somewhat mismatched in size, with 49 hook plates and 23 CC reconstructions. Outcomes were assessed using the Constant Score, which was significantly better in the CC loop group (95 vs 87) at the final reported follow-up. The authors also, unsurprisingly, report a lower complication rate in the CC loop group (0% vs 25%). A comparison with the humble hook plate may not be of significant value to the general orthopaedist, but the technique described is certainly of interest. We look forward to larger follow-up studies examining the authors' theory that complications on the clavicular side of the coracoclavicular reconstruction would be reduced.

Fixing the elderly distal humerus X-ref

■ Decision-making in complex distal humeral fractures in elderly patients is complicated, and outcomes are often poor regardless of treatment method. Significant stiffness is common, and the complexity

of reconstruction of these multifragmentary articular fractures has led many surgeons to lower their threshold for arthroplasty in these patients (either total elbow arthroplasty or distal humeral hemiarthroplasty). Indeed, there is a notable debate in the literature about whether or not osteosynthesis should be attempted in this group, with many suggesting that arthroplasty may well be a better option. This impressive series of 21 patients reported from the Mayo Clinic in **Rochester, Minnesota (USA)** reminds us that internal fixation remains a strong option.⁶ At their mean follow-up of four years, the complication rate was low, and the mean flexion arc achieved was almost 100°, with mean flexion of 110°. It is important to remember that these surgeries were performed by two experienced elbow surgeons in a specialist centre, but these injuries can often wait to be transferred to a unit with such expertise. Furthermore, the patients underwent early and aggressive mobilization regimes; possibly our reluctance to appreciate the importance of this in elbow surgery has compromised results in the past. In the present study, patients are mobilized early (active assisted), with no range of motion restrictions at 48 hours post-surgery. These patients are often a heterogeneous group in terms of their underlying physical health and comorbidities; some are frail with established osteoporosis and some are active with high expectations for function and weight-bearing. In some patients, especially those with pre-existing osteoarthritis, there will be a role for primary arthroplasty; shared decision-making, as always, is key. Undoubtedly, united fractures will permit greater weight-bearing in future due to the load restrictions we place on our elbow arthroplasty patients. Finally, we would point out that, as with other periarticular

fractures, anatomically precontoured locking plates have revolutionized our ability to repair these injuries and historical results for open reduction internal fixation (ORIF) should be reviewed in this light.

Massage or injection for tennis elbow?

■ Does physiotherapy work for tennis elbow? Here at 360, we are aware that the evidence base for hand and elbow surgery is hardly spectacular. We also note that the evidence base for physiotherapy is not always comprehensive. Sadly, tennis elbow is common and presents regularly to upper limb clinics, leaving the treating surgeon in a quandary as to what exactly to do. We were therefore especially pleased to come across a randomized study from **Newark, New Jersey (USA)** investigating both rehabilitation and the management of tennis elbow.⁷ The patients were randomized to receive one of three treatments: splinting and stretching, a cortisone injection, or a lidocaine injection with deep friction massage. While all three treatments gave significant benefit in both objective outcomes (grip strength) and patient-reported outcomes (pain and Disabilities of the Arm, Shoulder and Hand (DASH)) during the first six weeks, only the deep friction massage group maintained the improvement at six months of follow-up. In terms of the steroid injection group, this is not surprising as there is a body of literature that recognizes that the benefits are short-lived and, indeed, the overall effect may be deleterious in this condition in the longer term. It is, however, somewhat interesting that this study concluded that the effects of splinting and stretching were not maintained, as this is a mainstay of treatment in many systems, albeit a therapy that is probably sensitive to technique, frequency, and duration

of treatment, which may explain this result. High-quality studies examining physiotherapy treatments would be well received as this study really represents a large pilot, and the problem is a clinically important and relevant one.

Ulnar nerve transection in an orthopaedic surgeon sustained during surgery

■ We seldom include case reports in 360 but this report from Duke University in **Durham, North Carolina (USA)** is a sobering one for all surgeons and theatre staff, and contains important reminders and lessons for us all, not least in the areas of reflective practice and resilience. During an anterior cruciate ligament (ACL) reconstruction, a knife was placed on a Mayo table, unnoticed by all members of the surgical team. The attending consultant, leaning on the table while the junior surgeon performed part of the procedure, felt a sharp pain in his elbow and electric shock radiating to the ulnar two digits of his hand. Needless to say, the diagnosis was immediately evident and, on exploration, the surgeon in question had a fully transected ulnar nerve, which was repaired the same day. There was some minor fortune in the discovery of a Martin-Gruber anastomosis, which permitted the initial retention of approximately 40% of hand intrinsic function strength, which improved to 80% as the muscles reinnervated following nerve repair. In terms of lessons learnt, as well as reviewing education of sharps practice, relevant human factors were considered. These included the teamwork element of morning and mid-list briefings, slowing down the flustered pace of lists to ensure that everyone remains task-focused (common with pressures for efficiency), and developing an open culture where junior staff can raise concerns when they observe potential risks.

They also emphasize the importance of caring for all members of the surgical team in adverse situations and the concept of the 'second injury'; it is not only the injured party who suffers but also those around them, including members who feel they may have contributed in some way. As orthopaedic surgeons, we have an important role in providing leadership to create and maintain a good theatre environment for the care of our patients, our colleagues, and ourselves.

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