X-ref ***For other Roundups in this issue that cross-reference with Shoulder & Elbow see:*** *Trauma Roundup 4; Research Roundups 1 & 5.*

Anxiety and depression once again proven to influence outcome following upper limb surgery X-ref

There is a growing body of evidence in the orthopaedic literature to support an association between inferior patient-reported outcomes (PROs) and psychosocial diagnoses such as depression, anxiety and inadequate coping mechanisms.[1] We have covered a number of articles in recent issues of *360* relating to poorer PROs and general quality-of-life scores in areas as disparate as spinal surgery, knee surgery and shoulder dislocations. In this study from **Mansfield (UK)** the authors sought to establish whether anxiety or depression had a bearing on post-operative outcomes. Their retrospective review of prospectively collected data reports the outcomes of just 55 patients who underwent arthroscopic subacromial decompression for shoulder impingement without evidence of a rotator cuff tear. The study team utilised the hospital anxiety and depression scale (HADS) prior to surgery, and patients completed the Oxford shoulder score (OSS) at six weeks and six months following surgery. As would be expected, the authors reported a clinical improvement in the OSS at six months following surgery across the group in general. However, those defined as not being depressed (n = 25) improved more rapidly and attained superior OSS scores at both six weeks and six months. As has been reported in other studies, there was a strong correlation between an increasing HADS score (more depressed) and a poorer outcome and reduced satisfaction at six months following surgery.[2] The authors conclude that patients with a HADS score of ≥ 11 have a worse outcome following subacromial decompression and that this should be considered in pre-operative counselling. This small but interesting study adds to existing data in this area, which leads to two interesting questions: 1) Do we need to modify current patient-reported outcome measures (PROMs) to take into account the obvious influence of psychosocial status?; and 2) should large prospective randomised controlled trials rely solely on PROMs that can be so strongly influenced by the mental well-being of the patient?

Reverse shoulder arthroplasty on the rise for operatively managed proximal humeral fractures X-ref

The reverse shoulder arthroplasty (RSA) is a procedure which seems to be increasing in application. There is no doubt from the small studies in existence that an excellent result can be achieved in the short term for a range of pathologies. However there is still some way to go as far as proving the longer-term advantages, or indeed the longevity of these replacements, when compared with traditional arthroplasties. There is an increasing amount of literature reporting on the use of RSA for fractures of the proximal humerus, but the national trends are still to be established. This large study from **Fort Lauderdale, Florida (USA)** includes the coded outcomes for 32 150 operatively managed proximal humeral fractures in the Medicare patient population database. The authors evaluated the trends and changes in treatment choice over the four-year period (2009 to 2012). There were no apparent significant changes in the number of fractures managed each year, however, the rate of surgical intervention declined significantly by 14%. Although open reduction and internal fixation was employed consistently, there was an almost threefold rise (11% to 28%) in the use of primary RSA with a corresponding significant decrease in the use of hemiarthroplasty (52% to 39%). Interestingly, the rise in the use of RSAs was seen both in patients older than 65 years of age (11% to 29%, almost threefold) and in those younger than 65 years (doubling, from 6% to 12%). With the recent results of the Proximal Fracture of the Humerus Evaluation by Randomisation (PROFHER) study[3] reporting no difference in outcome at two years for displaced proximal humeral fractures managed operatively or non-operatively, it will be interesting to see if the operative decline reported in this study continues when subsequent years are analysed. Although the proportionate use of RSA is on the rise for proximal humeral fractures, the indications and long-term outcome are still to be fully defined.

Why repeat the radiograph? Radial head management revisited

This study from **Boston, Massachusetts (USA)** and **Austin, Texas (USA)** comes at an interesting time, given the current literature on isolated radial head and neck fractures. There is a growing body of short- and long-term outcome data supporting the non-operative management of isolated radial head and neck fractures.[4] In conjunction with this, there are those who suggest that 'virtual' fracture clinical review is sufficient following a fracture of the radial head or neck with patient satisfaction reported at over 90%,[5] although these studies are not large enough to establish the 'miss' rate of rarer injuries such as the Essex-Lopresti without a senior review. In this current analysis of 415 non-operatively managed, isolated Broberg and Morrey Mason type 1 or type 2 fractures, the authors set out to establish the value of secondary radiographs as a decision-making aid.[6] The bottom line is 'not a lot', with 255 patients (suffering 262 fractures) receiving subsequent secondary radiographs following their initial injury radiographs, and only a single patient (0.4%) subsequently being offered surgery in light of a secondary radiograph. Amusingly, this was declined. This straightforward study demonstrates clearly that subsequent radiographs do not change the management plan of stable isolated radial head fractures, and it could be hypothesised that secondary displacement or symptomatic malunion or nonunion are likely to be exceedingly rare following such injuries.

Iatrogenic radial nerve palsy more common than previously thought in humeral nonunion X-ref

The management of humeral shaft fractures remains controversial, with much of the data supporting non-operative management coming from the older literature championed by Sarmiento and his group for a number of decades. The summary is that essentially, with or without a radial nerve palsy the results have been comparable in other series but far from consistently reproducible.[7] While long-term radial nerve outcomes are equivalent with initial presentation between operative treatment and bracing, there is little evidence in nonunions. This retrospective study from **Cincinnati, Ohio (USA)** reported the outcomes of 54 patients with humeral nonunions following conservative treatment to establish the outcomes with open reduction and internal fixation, with or without autogenous bone grafting. The headline result from this series is that in these authors' hands, the rate of post-operative iatrogenic radial nerve palsy was found to be 18.5% (n = 10). However, of these, the vast majority (80%)

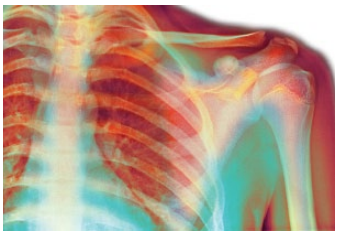
were found to have complete resolution at just two and a half months following surgery. The study team was unable to identify any real risk factors for palsy. The authors note in their conclusion that this rate of iatrogenic radial nerve palsy is much higher when compared with existing literature for those undergoing acute stabilisation, as would be somewhat expected. Like many similar studies,[8] it all depends on how complications are defined. Reading their results the other way around, only 3.7% of patients suffer a longer-term neuropraxia, which could be presented as a low incidence of palsy. When considering this study in context with existing literature, it is clear that more data are needed on the acute management of humeral diaphyseal fractures. The results of multicentre trials, such as the ongoing study in Canada comparing acute primary fixation with non-operative management for humeral shaft fractures, are eagerly awaited. Not only will the rate of recovery and the final patient-reported outcome measures be of interest, but also the incidence of radial nerve palsy when compared with that of nonunion surgery.

Why do rotator cuff repairs fail? X-ref

The humble rotator cuff tear has been the recipient of possibly one of the fastest-evolving and most commercially aggressive 'arms races' between medical device companies of the last two decades. Once arthroscopic repair had made its debut and become the definitive surgical option in the majority of centres, the race was on for faster, stronger and more convenient and biocompatible anchors. We have moved through knotless, suture only, double row and countless other innovations, each proffering greater pull-out strength and superior usability at an incidentally higher cost. However, cuff repairs rarely fail due to suture fatigue or anchor pull-out. By far the more common mechanism of deficiency is failure of the tendon to heal, or for it to heal and this not to be associated with a restoration of function. We were delighted to come across this animal model study from **La Jolla, California (USA)** which appears to potentially shed some important light on the possible reasons why this might be.[9] The authors used a rat model of a massive rotator cuff tear to investigate the changes in muscle biochemistry and architecturein rotator cuff muscles, in addition to morphology of the humerus and scapula. Outcomes were assessed at up to 16 weeks following injury, with and without chemical paralysis. The results themselves are interesting and accessible to the 'everyday' scientist. Essentially, the control animals continued to increase their muscle mass over time, while the intervention animals remained static (i.e. those with just a tenotomy). The addition of botulinum toxin not only altered the muscle architecture by increasing collagen content, but also resulted in a decreased cross-sectional area. Both intervention groups had characteristic bony changes suggestive of a decrease in loading across the shoulder. This study nicely illustrates that the repair and healing of a rotator cuff tear is not necessarily associated with restoration of function. Concomitant neurological insufficiency may contribute to the poor outcome after apparently successful surgery.

Platelet-rich plasma finding a mechanism? X-ref

The application of platelet-rich plasma (PRP) to almost any indication in orthopaedics (and the complete lack of evidence for its efficacy) is remarkable in its ability to induce loyalty in its proponents. We have thus far at *360* failed to be completely convinced by the wild claims and steadfast support of a large group of orthopaedic surgeons. However, we were interested to read this randomised controlled trial from **Manipal (India)** designed to assess the potential for benefit in rotator cuff tears.[10] A total of 102 patients were recruited into the study and



randomised to either PRP application or control. Outcomes were assessed with a gamut of clinical scores at regular intervals, in addition to the use of ultrasound to assess cuff repair integrity. The results were almost universally in favour of PRP, with Constant-Murley scores and UCLA scores both superior after one year, with a lower re-tear rate in the PRP group. The ultrasound findings would suggest better vascularity in the PRP group. This article is somewhat at odds with other studies which do not show PRP benefits. However, it does demonstrate a potential mechanism of action. The increase in vascularity (potentially due to the promotion of a local pro-cytokine environment) is associated with an improvement in the likelihood of a successful outcome after rotator cuff repair. Questions remain as to how the local PRP environment is maintained in the clinical situation beyond the initial surgery. Given the differences between this and other studies in terms of assessment of efficacy, a meta-analysis would be helpful here.

Assessing the rotator cuff effectively

One of the current challenges facing clinicians is how to demonstrate the value of interventions, particularly those perceived to be of limited value. Repair of degenerative rotator cuff tears is one such intervention where healthcare funders have taken an interest in its potential benefits or lack thereof. Sadly, in many low-quality studies, the evaluation of the outcome of repair is often compromised by poor data or poor outcome measures. This paper from **Nieuwegein (The Netherlands)** demonstrates that patients maintain a true perception of their pre-operative status up to a year following rotator cuff repair.[11] The investigators evaluated the outcomes and response shift of 36 patients undergoing rotator cuff repair. There is a common belief that a positive recalibration effect occurs over time, where previous symptoms appear worse and patients overestimate pre-operative disability. The authors applied the Western Ontario Rotator Cuff index at baseline and at regular intervals retrospectively, along with the EQ5D-3L, to establish what, if any, the response shift was over a year following surgery. There was really no response shift observed, although patients did have a negative recalibrated response shift for emotional disability at three months following the intervention. The major finding of this study is that patients remain cognisant of changes in their well-being for a useful period after intervention, and that scores can be applied retrospectively in an effective manner.

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Spine

Should we operate after we inject steroids?

Spinal surgeons everywhere consider using steroid injections for patients presenting with degenerative lumbar spine disease. They are almost the bread and butter of spinal treatment and diagnosis. When used in hips or knees before arthroplasty there is some evidence suggesting a positive association between steroid injections and post-operative infection. However, the arthroplasty, surgeons have established that the time interval is crucial; as one might expect, a longer interval between injection and arthroplasty makes the whole process somewhat safer. What we don't know is whether there is a similar association between epidural steroid injection (ESI) and surgical site infection after surgery for lumbar degenerative spine disease. Given the relatively low event rate for infection, a large study would be required to state definitively one way or the other. A group in **Boston, Massachusetts (USA)** have sought to resolve this question by carrying out a multivariate logistic regression of 5311 adult patients who have undergone surgery and either have or have not subsequently developed surgical site infections.[1] The results show that 18% of patients had an ESI in the 90 days prior to surgery. Overall, 134 (2.5%) patients had a post-operative surgical site infection. Accounting for a range of confounders through multivariate regression including the Charlson comorbidity index, tobacco use, obesity and age, no association between ESI and surgical site infection was found within 90 days or 30 days, and what's more, no dose—response relationship was found. What the study team did, however, establish was that length of stay, a posterior approach, increased intra-operative blood loss and using a drain all increased the risk of infection, so perhaps future research should be targeted at modifying these. The study notes that patients may well have received treatment elsewhere, and that imputation is used for missing data. It seems that this work is good evidence that the appropriate use of ESI probably doesn't have the same effect as steroids do for our lower limb arthroplasty colleagues, even when used in the immediate pre-operative period.

Levels in spinal surgery

We regularly tell our trainees that the three most common errors in spinal surgery are 'level, level and level'. Gone are the days when clinical diagnosis was used to identify spinal pathology and it was acceptable to have a peep at the level above and below if there didn't appear to be much pathology at the intended level. MRI scanning has revolutionised localisation of pathology in spinal surgery. We were told this too as trainees, and clearly it is appropriate for spinal surgeons to be wary about levels in spinal surgery. Surgery at the wrong level is as big a mistake as operating on the wrong side, but much easier a mistake to make. Salvation may come from a team in **Baltimore, Maryland (USA)** who have investigated the practical use of the LevelCheck software algorithm (Jeffrey H. Siewerdsen, I-STAR Lab, Johns Hopkins University, Baltimore, Maryland; Siemens Healthcare, Malvern, Pennsylvania), comparing pre-operative CT scans with intra-operative radiographs and X-rays to ensure that the correct level is targeted during surgery.[2] The software algorithm cleverly interprets intra-operative fluoroscopy using pre-operative imaging to intra-operatively establish the level of interest. The reported study used 398 intra-operative radiographs and 178 pre-operative CTs of the cervical, thoracic and lumbar spine inserted into the LevelCheck software, and asked three spinal surgeons about its performance, utility and suitability for use in real clinical settings. They found that the surgeons thought it helpful in 42% of cases and confidence-improving in 31%, and that there did not appear to be any negative effect on the flow of an operation. It was found by surgeons to be particularly useful in the more challenging situations — difficult anatomy, poor intra-operative radiology and anatomical variations — although no clinical outcomes are reported. Clearly, the orthopaedic spinal community has found this to be a useful tool when dealing with the age-old 'where am I?' problem. The authors are able to report 100% accuracy of the algorithm by the authors, although here at *360* we suspect that the fear of wrong level surgery will not be so easily assuaged. The use of surgical technology is always difficult to begin with, and has a learning curve during which there can be no substitute for the experienced eye.

Interpreting MRIs

With back pain being endemic in modern society, more and more primary care and allied health professionals are requesting and interpreting — or attempting to interpret — MRI scans, and in some cases patients are reaching surgery based on these findings. Sadly, there is no current evidence to say one way or the other if this is a sensible approach. Usually, given the high false-positive rate in MRI scanning, accurate interpretation requires an experienced clinician. In **Amsterdam (The Netherlands)** this has become widespread enough to warrant its own study. The research team set out to examine the concordance between the MRI interpretation of chiropractors, chiropractic radiologists and medical radiologists with an expert panel to see how accurate their interpretations are.[3] The study team selected 300 scans and each person was asked to review 100 in one sitting, followed by 50 scans from the same selection at a later date. Scans were divided into 'specific finding' or 'no specific findings', depending on the interpretation from an expert panel. Chiropractors showed a specificity of 0.77 for severe spinal disease but a sensitivity of just 0.70 in their analyses. This fell to 0.61 with minor pathology, suggesting that they are increasingly inaccurate with milder pathologies. Medical radiologists showed the