

# ROUNDUP<sup>360</sup>

## Shoulder & Elbow

### Should we replace fractured shoulders?

■ The management of proximal humeral fractures is still very much a topic open for debate. There are no clear answers to this very common problem, which can leave patients with the potential for severely restricted function. Despite numerous randomised controlled trials and a number of systematic reviews there is little cohesive evidence to support any one individual treatment over another. This is probably due to the broad range of treatments and multiple potential confounders. So when researchers from **Helmond (The Netherlands)** designed their prospective randomised controlled trial (Level I evidence) they were hoping to shed some light onto an already murky topic. The research team carefully designed their study to only include four-part proximal humeral fractures in elderly patients (over 65) and was designed to test hemiarthroplasty against nonoperative treatment. The authors aimed to measure functional outcome scores assessed with the Constant score (primary outcome), simple shoulder test (strength) and pain scores (VAS for pain and disability). The researchers recruited 50 patients to the study and followed them for 12 months. They were unable to identify any significant differences in the Constant or Simple Shoulder Test measure at three or 12 months' follow-up. Those patients treated nonoperatively recovered their strength more quickly at a cost of higher pain scores,

although these differences normalised by 12 months.<sup>1</sup> So we still don't have an answer. There are numerous small-scale randomised controlled trials like this one peppering the scientific literature. Many of them do not reach a significant difference either due to being underpowered or due to errors in study design. Here at 360, however, we don't think they are a waste of time and resource, particularly not in intervention studies. They can be successfully combined in meta-analysis to answer questions more effectively, especially if the study methodology is sound.

### Limited evidence for shoulder fractures?

■ Researchers from the **Cochrane Collaboration (UK)** have investigated the outcomes of proximal humeral fractures, and more specifically interventions for treating them using up-to-date methodology. The researchers included 23 small randomised controlled trials similar to the previous study, and in total these small trials detail the treatment outcomes of 1238 patients. Although the studies were all designed in a slightly different way and to answer different questions, it was possible for them to undertake limited meta-analysis. The research team found that there is evidence for early mobilisation and slings rather than body bandage for patients treated conservatively, and that this could be achieved as effectively in an unsupervised manner as with regular supervised physiotherapy. For the most part, even with results pooling, there was no

difference between any interventions and nonoperative management. There was, however, (despite an excess operation to treat a complication for every nine performed) a significant benefit in favour of operative intervention when evaluating quality of life (EuroQual score), although this was not reflected in shoulder performance scores. The authors found limited support for the usefulness of medial calcar support screws, but little evidence to support fixation over replacement, nor any evidence to inform post-surgical rehabilitation regimes. The authors comment that there is not enough homogenous data to perform any meaningful analysis and given the small sample sizes it is likely that all trials suffer from type 2 error.<sup>2</sup> Like many Cochrane reviews, the authors conclude that a greater number of higher-quality trials are required. Unlike many other Cochrane reviews, with the UK's PROFER study about to report, there is a good chance this evidence may emerge.

### Cuffs and early physio: maybe sooner is better?

■ The world of shoulder surgery never stays still for long. There has been a continual evolution of treatments, particularly in arthroscopic interventions, which are all relatively new procedures. Despite this rapid pace of movement, traditionally patients have been immobilised for long periods following arthroscopic rotator cuff repair and stabilisation procedures. This allows the cuff to fully heal (which seems sensible), but

with newer implants and techniques could the rehabilitation and risk of residual stiffness be reduced? Researchers in **Venice (USA)** had just this thought, so they designed a randomised controlled trial to test their hypothesis that an early passive motion protocol would outperform the traditional early immobilisation. The study team recruited 68 patients with a mean age of 68 years who had undergone arthroscopic cuff repair. Patients were randomised to a protocol of early passive mobilisation or immobilisation following repair of a full thickness supraspinatus tear. Surgery was performed in an identical manner in all cases and combined with a subacromial decompression. Results were assessed at 12 months of follow-up with outcome measures, including cuff healing (ultrasound), clinical scores (American Shoulder and Elbow Surgeons Score) and functional testing (Simple Shoulder Test). The investigators were unable to find any meaningful differences in any of their outcome measures at final follow-up. There were no significant differences in cuff healing, patient satisfaction or range of movement in either group.<sup>3</sup> There doesn't appear to be any benefit to either strategy in outcome or patient satisfaction, leaving patients and clinicians to find a rehabilitation strategy that suits them. Here at 360 we like studies that justify our current practice, and whatever your own personal preference for post cuff repair rehabilitation you can justify it with this study.

## Matrix proteins and cuff tears

■ Our understanding of the biology of musculoskeletal diseases has come on in leaps and bounds in the past few years. Armies of white-coated scientists and clinical academics have spent years hunched over the laboratory bench with the pipette, carefully aliquoting tiny quantities of RNA, DNA and proteins to establish what exactly is going on in the extracellular matrix in a range of soft-tissue diseases. What is remarkable are the similarities between the changes seen in diseases as disparate as degenerate rotator cuff disease, Dupuytren's and carpal tunnel. The similar biology probably explains the epidemiological link. Although there are many studies investigating the matrix metalloproteinases (MMPs) which function to degrade the organic part of the extracellular matrix, there are few investigating their inhibitors such as tissue inhibitors of metalloproteinases (TIMPs). Reasoning that extracellular matrix is known to be diseased in degenerate cuff tears and that previous work has implicated MMPs in this, a research group in **Linköping (Sweden)** designed a study to establish whether known changes in MMP and TIMP levels in the cuff tissue could be measured in plasma. They designed an *ex vivo* study where blood samples were collected from 17 patients, median age 61 (39-77), with sonographically proven rotator cuff tears which were age- and gender-matched to 16 patients without cuff tears. Plasma levels of MMPs and TIMPs were measured with an ELISA technique. The authors established that plasma levels of TIMPs (TIMP-1, TIMP-3) and MMP-9 were higher in patients with full thickness tears although only TIMP-1 reached statistical significance. The authors hypothesise that the elevated levels of TIMP-1 may indicate a local pathological process in the shoulder.<sup>4</sup> It is certainly an interesting observation and although the sample numbers are respectable for a study of this size, after consulta-

tion with our team of crack boffins at 360 we would have to apply a slight note of caution. One would expect MMP levels (which are proteinases) to be more active in patients with poorer soft tissues, so why would the levels of TIMP-1 rise if this were a true finding? MMP-9 physiologically plays a role in breakdown of collagen type IV and V. These are mostly seen in basement membrane and fibrillar collagen. An alternate explanation is that the inflammation and scar tissue following a rotator cuff tear have resulted in remodelling of scar tissue (Collagen IV & V) and a proliferative activity (which TIMP-1 also has), which would perhaps better explain the observed picture.

## Long-term SLAP tear outcomes

■ The treatment of SLAP tears is controversial. Although comprehensively classified there is little universal agreement on which tears should be fixed, which require biceps debridement and which require tenodesis. To make matters worse, the younger and older patients have distinct injury patterns and the long-term outcome of surgically treated tears is not known. Researchers from **Oslo (Norway)** designed a case series to establish the long-term outcomes, and to assess the effect of age on outcomes, of treatment for SLAP tear in a whopping 107 patients followed up over a five-year period. The patient cohort consisted of 107 patients with a mean age of 44 years, just over 55% were over the age of 40. Follow-up was achieved in an impressive 95.3% and was conducted by an independent clinician. Outcomes were determined using the Rowe shoulder score, which improved significantly from 63 to 92 at final follow-up, with 88% of patients achieving a good or excellent result. There were no differences in results between younger and older patients and only 13% reported post-operative stiffness.<sup>5</sup>

Wow, we thought here at 360, an impressive paper with excellent results over long-term follow-up. The authors simply performed a primary SLAP repair and did not perform a supplementary tenodesis. We have yet to see such an extensive series for comparison, but it does seem this may be hard to beat. We are certain this paper will generate some heated debate on a topic which is already deeply controversial.



## Slippage or pull-out? Suture anchors revisited

■ The traditional measure for the effectiveness of suture anchors used widely in rotator cuff, Bankart and SLAP repairs, is their pull-out strength. The tried and tested method of selling ever increasingly expensive anchors is to conclusively demonstrate they have higher and higher pull-out strengths. Modern suture anchors are probably stronger than the original tendon insertions but, as researchers from **Zurich (Switzerland)** noted, this is only part of the story. The suture itself and, particularly in knotless sutures, the knot may have just as much effect on the load to failure. The researchers designed a study to examine the biomechanical properties of suture anchors and to try to establish the reasons for their observed higher failure rates in rotator cuff and Bankart repairs. They designed an ingenious study to compare the pull-out strength of the anchors and the static friction coefficients. They used a bovine bone model and four different models of knotless suture anchors to

establish the pull-out strength of the anchors. These were then compared with a custom suture slippage model where the suture materials were held between rods made of various anchor materials (PEEK, PLLA and metal). It was established that in all anchors (bar one) the pull-out strength was higher than the load to slippage, and that the anchors all withstood over 156N while the maximum load to slippage was only 109N. The sutures were most effectively held between metal rods than PEEK or PLLA (21N, 17N and 18N, respectively).<sup>6</sup> Here at 360 we were not planning on using knotless anchors as it always seemed a little silly not to spend the extra few moments tying a knot and then relying on a friction fitting. We certainly won't be changing our practice in light of this paper. We congratulate the authors for thoroughly investigating the causes of anchor failure, and hope this paper will help inform future innovations in anchor technology.

## Recurrent Bankart repairs?

■ There is nothing more heart sinking to a surgeon than seeing a patient following an operation which has either failed to have a significant benefit, or even worse, developed a recurrence. Arthroscopic Bankart repairs are commonly performed for anterior shoulder instability; however, there is disagreement amongst experts and studies as to the indications for, and complication rates of, this procedure. If an arthroscopic Bankart repair is really associated with a 50% recurrence rate as some papers suggest, should we really be offering this kind of stabilisation surgery to our patients? Researchers in **Milan (Italy)** constructed a systematic review (Level II evidence) to clarify the recurrence rates, and therefore help with decision making. The researchers hypothesised that if the patient populations who would most benefit from Bankart repair could be identified from the existing literature, the outcomes could be optimised by only offering anatomi-

cal repair to those likely to benefit. The authors designed a systematic review to include all studies describing the outcomes of Bankart repair. They included in their review all papers published in the last ten years that described arthroscopic instability surgery and reported data on recurrence rates along with patient demographics that could be used to identify risk factors for recurrence. The authors identified 24 papers which met the inclusion criteria. Data were collated and the risk of intervention failure was obtained through data pooling from the trials. The intervention failure at ten years ranged from 3.4% to 35%. The risk factors identified for higher recurrence rates were young age (< 22 years), male gender, incidence of pre-operative dislocation and participation in competitive sports.<sup>7</sup> We applaud the authors for a well constructed study that has enabled us here at 360 to appropriately counsel our patients. We were delighted to find that there is a clear message that at least three knotted anchors can reduce recurrence rates significantly. We will still

be offering all our patients anatomic repairs in the first instance, but are mindful that in some subsets there is a high rate of failure.

#### **Acromial morphology and calcific tendonitis?**

■ The relationship between acute calcific tendonitis and the morphology of the acromion is not well described; to us at 360 it does make intuitive sense that patients with abnormal morphology of the subacromial space might be associated with symptomatic acute calcific tendonitis. Researchers in **Cologne (Germany)** designed a study to establish any potential link between acromial morphology, subacromial impingement (SAI) and acute calcific tendonitis (ACT). The research team designed a prognostic study (Level I evidence) to establish the prognostic value of abnormal acromial morphology. They reviewed the radiographs of 150 patients; fifty patients with symptomatic ACT, 50 with SAI and 50 with previously asymptomatic shoulders. The researchers recorded the acromial morphology with a

number of standardised measures: acromial tilt (AT), acromion index (AI) and lateral acromial angle (LAA). They established that when compared with the normal controls, in both the SAI and ACT groups, the AI measure was significantly different. The two other measures were specific for the two disease subgroups ACT (LAA 79.5° versus 84.1°) and the AT was specific for SAI (32.9° versus 29.2°).<sup>8</sup> The authors appear to have confirmed that acromial morphology does have an association with subacromial disease. While we are unlikely here at 360 to make our diagnosis of acute calcific tendinitis by measuring the acromial angle, we do wonder if patients with an abnormal acromion would benefit from a subacromial decompression, particularly for refractory symptoms or recurrence. Certainly food for thought.

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