ROUNDUP360

Shoulder & Elbow

Arthroscopic acromioplasty is not a cost-effective intervention

It seems that almost every arthroscopic intervention is struggling to gain an evidence base. With patients reporting sham surgery equivalent to arthroscopic meniscectomy in degenerate meniscal tears, the future is looking bleaker for arthroscopists. Following a number of mildly conflicting previous studies, researchers in **Tampere (Finland)** sought to add clarity to the questions surrounding the cost effectiveness and efficacy of arthroscopic acromioplasty. They report the results of a randomised controlled trial investigating acromioplasty in stage II shoulder impingement syndrome. The study was powered for 140 patients with VAS pain score as the primary outcome measure. The participants were then randomly assigned to either a structured supervised exercise programme or arthroscopic acromioplasty followed by a similar exercise programme. At this five-year review the authors were able to report on the assessment of 109 patients (52 in the exercise group, 57 in the surgical group). Both interventions resulted in a decrease in the VAS scores between baseline and five years, with the surgical group improving slightly more (6.5 to 2.2 *versus* 6.4 to 1.9). The authors were unable to find any significant differences between the two groups at any time point when intention to treat analysis was performed. The authors conclude that, given the lack of differences in both primary and secondary outcome measures, their paper does not support acromioplasty on cost-effectiveness grounds.[1] This is certainly a paper likely to set the cat amongst the pigeons. It is important to remember that this study only applies to patients with stage II impingement and, while we would certainly support the conclusions of this paper, it only applies to patients fitting the inclusion criteria for the study. We would love to see a formal cost-effectiveness analysis performed as part of this study which is an essential part of evaluating two apparently similar treatments.

Shockwave therapy ineffective in cuff tear

The rate of accumulation of Level I evidence over the past two months in the world of orthopaedic surgery is nothing short of remarkable. Adding to the paper above, researchers in **Leiderdorp (the Netherlands)** have set out investigate the efficacy of extracorporeal shockwave therapy (SWT) on treatment of chronic tendinitis of the rotator cuff complex. The research team designed a randomised controlled trial with 82 participants. Inclusion criteria was a clinical diagnosis of chronic tendinitis, and patients were randomly allocated to either the SWT group (low-dose rESWT, three sessions of 2000 pulses at 0.11 mJ/mm2, 8 Hz) or to the placebo group. Follow-up was at six months with a blinded assessor and blinded patient. Outcomes were assessed using pain (VAS score) and function (Constant and Simple Shoulder Test Scores). The SWT group consisted of 44 patients and the placebo group 38 participants. While both groups experienced a significant difference in all outcome measures, there were no differences at baseline, three or six months.[2] This straightforward study has the advantages of administering the placebo treatment in such a way that both treating surgeon and patient were unaware of the group allocation at final follow-up. It clearly demonstrates no efficacy of SWT over conservative measures. The case, as they say, is now closed.

Research: Microfracture relieves short-term pain in cuff repair

Microfracture is fashionable at the moment. It is a safe, cheap, reliable (and often efficacious) method of biological augment, most commonly used in the treatment of osteochondral defects. Reasoning that microfracture at the footprint of a rotator cuff repair may provide a biological augment to the tendon healing at the bone-tendon junction when arthroscopic cuff repair is undertaken, surgeons in **Modena (Italy)** set out to establish if there was any noticeable benefit in a randomised controlled trial (Level I evidence). The study recruited 57 patients who underwent shoulder arthroscopy for repair of complete rotator cuff tears and these were randomly allocated to two groups using a block randomisation method. The surgeon undertook microfracture at the footprint of the cuff repair in the treatment group, but not in the control group. There was no apparent baseline variation between the two groups, and both groups demonstrated improvement at final two-year follow-up in all measured outcomes (VAS, range of movement (ROM) and University of California at Los Angeles (UCLA) and Constant scores). While all of these outcomes were significantly in favour of the intervention group at the three-month follow-up, there were no differences to be seen by two years where both groups had significantly improved and were indistinguishable from each other. There were no adverse events noted.[3] Conclusions in these kinds of studies can be difficult to reach. When there is a short-term benefit from an intervention, on the one hand microfracture could be said to make no difference; on the other, it could be said to improve a patient's outcomes more rapidly and potentially have a health economic benefit. It would be interesting to see a full health economic utility analysis, but until then, here at *360*, we are inclined to agree with the authors. As a sustained, albeit short-term, benefit appears to occur, and microfracture itself is inexpensive, for now it looks to be a beneficial intervention.

Research: Promising early results from L-PRF augmented cuff repairs

Sticking with the theme of biologically augmented rotator cuff repairs, researchers based in **Nice (France)** have this month published the pilot results from their randomised controlled trial aimed at

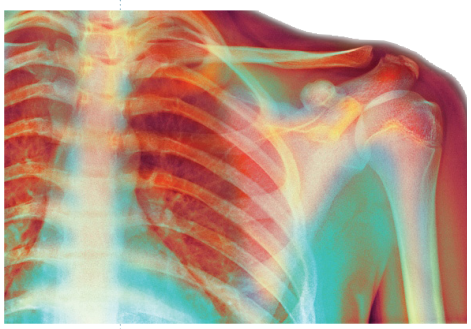
establishing the safety and potential efficacy of leukocyte- and platelet-rich fibrin (L-PRF) in arthroscopic cuff repair. The study team hypothesised that use of L-PRF was not only technically feasible and safe, but that it results in higher neovascularisation rates and the incidence of early watertight rotator cuff healing. In this pilot study 20 patients, all presenting with chronic rotator cuff tears were randomised to either L-PRF augmented rotator cuff repair or standardised treatment. The research team used a standardised surgical approach with a double-row tension band repair. Outcomes were assessed with clinical examination, outcome scores (VAS, Constant score, Simple Shoulder Test), as well as Doppler ultrasonography, to assess the vascularisation. Outcomes were assessed at six and 12 weeks. While there were no clinically significant differences in the scores between the two groups (which would not be expected), the mean vascularisation index at the tendon-to-bone insertions was higher in the L-PRF group than in the healthy shoulder group.[4] This pilot study looks promising for the potential benefit of a different type of biological augmented rotator cuff repair. Higher neo-vascularisation rates would suggest a lower eventual failure rate, although all that can be concluded from a pilot study such as this is the safety profile of the intervention and it can be used to inform a power calculation.

Rehabilitation following cuff repair revisited

Opinion is split regarding the best form of rehabilitation following rotator cuff repairs. Nearly all shoulder surgeons vehemently pursue their chosen rehabilitation regime with patients and physiotherapists. The difficulty is that not all surgeons agree, some being proponents of early range of passive movement (ROM) and others preferring a six-week immobilisation period prior to starting any ROM exercises. In our fifth shoulder randomised controlled trial, surgeons in **St Louis (USA)** decided to bite the bullet and find out what the influence of a rehabilitation regime really is on the outcomes after arthroscopic rotator cuff repair. The purpose of this study was to compare clinical results and tendon healing rates following arthroscopic rotator cuff repair using two distinct rehabilitation protocols. The study recruited 124 patients, all of whom underwent arthroscopic cuff repair over a 30-month period. Patients were randomised to their rehabilitation strategy post-operatively. The early ROM group undertook early passive ROM exercises while the immobilisation group were strictly immobilised for six weeks following surgery. The research team assessed their outcomes using a combination of clinical outcome assessments (VAS score, American Shoulder and Elbow Surgeons (ASES) score, Simple Shoulder Test (SST), Constant score, and strength measurements) at regular intervals during the rehabilitation process. At the one-year follow-up tendon integrity was assessed with ultrasonography. As would be expected, the early passive movement group had significantly better ROM scores at three months (elevation and external rotation) but at all other later time points there were no differences in any outcome measure between the two groups. Functional outcomes continued to improve for up to six months and then plateaued. At the 12 month mark 92% of cuff tears were seen on ultrasound to have healed.[5] The authors were unable to find any difference between any patient-reported, subjective or objective functional measure at final follow-up. There is no compelling evidence to use either rehabilitation regime. Given the slightly quicker return of ROM with the early passive movement group, there would seem to be a slight benefit for the patient in following this rehabilitation strategy.

Supination strength following biceps tendon rupture

Distal biceps rupture is not an uncommon injury, and although well studied, significant disagreement still exists about its treatment. The difficulty is that surgical reconstruction is relatively technically demanding and does not have an insignificant complication rate associated with it, including flexion contracture, heterotopic ossification, synostosis and intra-operative



complications. On the other hand, non-operative treatment leaves significant visible deformity and loss of supination strength. While there are plenty of studies focusing on clinical outcomes, the clinical course of conservatively treated distal biceps tendon rupture is poorly studied. Researchers in **Pittsburgh (USA)** set out to establish the longer-term clinical outcomes following conservative treatment of a distal biceps tendon rupture. They assessed outcomes using scores for pain (VAS) and function (Disability of Arm, Shoulder and Hand score), and measured isometric supination torque. Their study included 23 males, all with unilateral distal biceps tendon rupture. Evaluation was made of both the injured and uninjured arms, and patients were assessed at a mean of 44 days (4 to 455) following injury. The uninjured arm was stronger across all measurements with peak torque varying according to forearm position, although there were no differences in supination strength as a result of arm position or dominance. In this study, biceps tendon rupture led to a reduction in supination strength of around 60% and was most markedly affected in the neutral to supinated arc of the forearm. Interestingly, there was no correlation found between clinical outcome scores and supination strength, suggesting weakness is not responsible for any residual impairment in function as measured by these scores. All outcome scores improved with time from injury although it is difficult to establish to what level, given the cross-sectional nature of this study. The authors speculate that 'supination strength from pronation to neutral can improve as one strengthens the brachioradialis but strength deficits from neutral to supination are more difficult to overcome'.[6]

Longer not better in humeral components

Aseptic loosening in total elbow replacement (TER) is a significant problem and while function is excellent following TER, patients suffer from risks of early loosening and bearing wear. Given the significant forces that TER must withstand, this is hardly surprising. What remains unclear is whether these forces are better neutralised by larger components and whether the failure rate of TER might be prejudiced by using shorter humeral components. Researchers in **Zürich (Swizerland)** and the Mayo Clinic, **Rochester (USA)** set out to investigate the effect that different humeral stem lengths might have on failure rates. They reasoned that in many cases the decision of which humeral stem length to use is based on the surgeon's preference, with longer stems often finding use in revision cases or post-traumatic reconstructions. This study comes from the Mayo clinic where the Coonrad–Morrey semi-constrained elbow replacement originated. Using their dataset of 717 TERs at a mean follow-up of 88 months, the researchers were able to establish that there was no significant difference in the revision rate between the two stem lengths (1.9% for the 4-inch stems and 2.6% for the 6-inch stem) although only

16 revision procedures had been performed for aseptic loosening. Perhaps unsurprisingly, the mean time to revision was significantly shorter for the smaller stems (37 months *versus* 95 months).[7] It would seem, based on this data, that the shorter stem would be preferable for preserving bone stock, easing any eventual revision and ultimately not prejudicing the patients' outcomes.

Research: Fatty degeneration in a rodent model

Degenerative cuff arthropathy and associated cuff tears is one of the most debilitating of upper limb conditions. Patients can be left with little in the way of function. Particularly challenging to treat can be the chronic cuff tear associated with 'fatty degeneration'. While clearly visible on the MRI scan and seen arthroscopically as muscle atrophy and an infiltration of fat into the area, little is known about the pathophysiology. Researchers at **Ann Arbor (USA)** aimed to improve understanding of the changes in the contractile properties of muscle fibres and the mechanism behind fatty degeneration. The research team used a massive cuff tear model in elderly rats. Following development of the tear, fibre contractility and type distribution were assessed 30 days after the tear and interpreted along with measured expression of messenger RNA and micro-RNA transcripts specific for muscle atrophy, lipid accumulation, and matrix synthesis. A month following the tear the research team identified a reduction in contractile force coupled with induction of RNA molecules regulating atrophy, fibrosis, lipid accumulation, inflammation, and macrophage recruitment. Histologically, areas of fat accumulation were observed and associated with accretion of macrophages.[8] The extent of degenerative changes in this model was greater than that usually seen in humans, making this potentially an ideal disease model to study. This may well be due to the single insult nature of the massive cuff tear in this model, where in humans it is often a more gradual process with accumulation of small tears. Aside from confirming changes in muscle strength and contractility, the research team established that, contrary to previous belief, activation of canonical intramyocellular lipid storage and synthesis pathways are not responsible for fatty degeneration associated with chronic arthropathy, but it is more likely an inflammatory process.

The controversial acromioclavicular joint dislocation

We would finally draw the eye of the *360* reader to an excellent review penned by authors in **Toronto (Canada)** of what can be a tricky clinical problem, that of dislocations of the acromioclavicular joint. In what is a really excellent and thorough review, the authors discuss the majority of difficult and controversial topics, that of non-operative *versus* operative management, the evidence for, and selection of, the most appropriate fixation methods and the often thorny topic of both early and late coracoclavicular ligament reconstruction. We would recommend this review to both the generalist and specialist shoulder surgeon alike.[9]

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