

in the limited fusion groups. Whilst the composite range of motions (perhaps predictably) were within acceptable limits, there was a clear difference in the extremes of motion for flexion and radial deviation between the three fusions.

### Just how good is a wrist arthrodesis?

■ Wrist arthrodesis is one of those bailout options that exist in all sub-specialities of surgery – “if it all goes wrong we can always fuse it” is something that is perhaps more often thought than said, but is always at the back of the mind when evaluating the difficult-to-treat wrist. As the ‘salvage option’ however, it is far from clear how much is salvaged. The hand surgery team in **Canberra (Australia)** set out to establish what outcomes could be expected from wrist fusion, specifically according to indication.<sup>8</sup> Their study reported the results of 77 consecutive patients all of whom underwent a wrist arthrodesis with a pre-contoured dorsal plate. Outcomes were reported using a range of outcome scores with mean scores more than acceptable at final six year follow up (Buck-Gramcko Lohman 9, Disabilities of the Arm, Shoulder 19, Hand and Patient Rated Wrist Evaluation 13). As is always the

case, final outcomes were affected adversely by workers’ compensation claims. In general however the cohort did well, demonstrating wrist fusion to be a successful operation even in the days of heavy use at the computer keyboard. Certain subgroups did not do so well, and patients with inflammatory arthritis or of the female sex had a significantly poorer outcome.

### Social support and upper limb functions? X-ref

■ It isn’t just an interesting observation that patients with psychological illness, or comorbidities have poorer outcomes, in these days of ‘surgeon-level reporting’ it is essential that patients who are likely to have poorer outcomes are identified so that this can both be taken into account in outcomes reporting and steps can be taken to ensure their function is optimised. Researchers in **Boston (MA, USA)** have undertaken a comprehensive analysis of the measurable effect of support (emotional, instrumental and psychosocial) on the patient’s perception of upper limb function.<sup>9</sup> The research team administered the QuickDASH and the computer adaptive testing (CAT) PROMIS measurement system to establish the effects of pain interference and emotional

support measures. The study concerns the responses of 193 patients all with upper limb pathology, and the study was designed to establish the contributory effect of the pain interference, depression, emotional support, psychosocial illness impact, and instrumental support on the QuickDASH score as a primary outcome measure. The results in themselves were somewhat surprising. Whilst there was a weak correlation between the emotional and instrumental support measures and QuickDASH in a multivariable analysis the social support measures were discarded and the pain interference CAT (perhaps not surprisingly) was able to explain 66% of variability in function. So it seems that social support has little bearing on initial presentation with upper limb illness. We would be intrigued to see what the outcomes of this study were if repeated to look at the effects on postoperative recovery – do patients who are isolated and not socially supported really vary in their outcomes as much as we think they do?

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## Shoulder & Elbow

**X-ref** For other Roundups in this issue that cross-reference with

**Shoulder & Elbow** see: **Research Roundup 1, 3; Trauma Roundup 5.**

### Glenoid fracture still an issue in shoulder arthroplasty X-ref

■ The longevity of total shoulder arthroplasty is usually considered to be limited by the glenoid component. The large forces placed across a small surface area (in traditional arthroplasty) and large lever arm (in reverse arthroplasty), both resisted by the relatively slight bone seen in the glenoid, are more often than not

the cause of wear, loosening and failure. The advent of more modern materials, in particular polyethylene bearings which can form carbon-carbon cross-links between polyethylene molecules during irradiation, changes to glenoid designs and different joint kinematics have potentially improved the longevity of these components and their functional outcomes. There is, however, a wide array of component designs, and material scientists in **Berkeley (USA)** have set out to establish which of these design variations are

associated with mechanical failure and fracture.<sup>1</sup> This interesting and insightful study is based on the retrieval of 16 glenoid components, all presenting with fracture. The implants consisted of a range of materials, including gamma-sterilised Hylamer and ultra-high-molecular-weight polyethylene (UHMWPE), and gas plasma-sterilised, remelted, highly cross-linked (HXL) UHMWPE, and a range of conformities between a 0 mm and 10 mm radial mismatch. The explanted components were subjected to highly detailed analysis

including scanning electron microscopy (SEM) and oxidative analysis. There was a common pattern of failure with fracture at the rim of the component for all 16 explanted components, and significant oxidative change was seen in the components subjected to gamma sterilisation. However, this was not seen in the HXL glenoid component. Fracture at the rim of the glenoid component in traditional total shoulder arthroplasty is still clearly a problem, despite evolution in component design. Whilst this paper cannot

quantify the problem, it is interesting and important to note that the failure mechanisms remain the same, with the exception that heat annealing does appear to reduce the rates of oxidative degradation in the glenoid component.

### Glenoid retroversion and pathology

■ Little is known about posterior instability, other than the associations with fits and electrocution. The reasons why some patients suffer from unidirectional posterior instability are far from clear. Given that there is a natural range of glenoid versions, it would be reasonable to expect that if the glenoid version varies, this is likely to impact on shoulder stability. Researchers in **Boston (USA)** have investigated the impact of glenoid version relative to the scapula body and the effect that this has on stability of the shoulder.<sup>2</sup> The authors report three groups of patients: those with anterior pathology (33 patients), those with posterior instability or glenoid labral tears (34 patients) and a number of normal controls (30 patients). Version was established with plain films using a variety of methods. Despite the potential for inaccuracy in this methodology, there was a 5° greater posterior version (-9° vs -4°) in the control group. This patient group is essentially a retrospective cohort study that establishes an association between posterior version and unidirectional instability. Although there is no clear take home message from a clinical standpoint, the observation of association alone is enough to raise some extremely interesting questions.

### How long is long enough? Stemmed shoulder arthroplasties X-ref

■ The effects on bone loading of implant design have become the province of computer scientists and engineers. Gone are the days of following plain films for years to establish what the long-term effects are. Despite the significant advances

in computer modelling, this has rarely translated into generic design feature evaluations – the technology is more often used to design or prove the design benefits of one particular implant. We were delighted to see this paper from **London, Ontario (Canada)** which was devised to evaluate the benefits or otherwise of longer-stemmed humeral components.<sup>3</sup> The authors used digital imaging and communications in medicine (DICOM) standard CT images to construct finite element analysis models of five patients with short, standard and stemless humeral components, and then simulated loading in various degrees of shoulder abduction. The aim was to establish the level of stress transfer to the humerus. Results were reported as average with bone stresses at eight transverse slices as a percentage of intact values. As perhaps would be expected, the shorter stems matched the normal humeral loading better than the longer stems. This paper very capably and succinctly summarises the effects on biomechanical loading although it doesn't tell us anything about other design constraints such as fixation. However, it has brought the issue back into orthopaedic discussion. This kind of comparative generic biomechanical computer-modelled study provides an insight into specific design features that would not be investigated with industry-run studies.

### Steroids apparently not great in bursitis

■ Some of the most common conditions in orthopaedics are those with the poorest evidence for treatment and the most debated best treatment choice. We were delighted to see this randomised controlled trial from **Goyang-si (South Korea)** which asks the question, do steroid injections have any benefit over compression bandaging in the non-operative management of olecranon bursitis?<sup>4</sup> The authors recruited 90 patients from two centres, all of whom had confirmed non-infected olecranon bursitis and

were allocated to receive one or other treatment on a 1:1 basis for the three interventions tested: compression bandage and NSAIDs, aspiration alone, or aspiration with steroid injection. There was some attrition with seven patients lost to follow-up, making some of the groups rather small. Outcomes were assessed using the VAS pain scale and signs of symptom resolution. Broadly speaking, the authors didn't see any difference with either group in their study. However, three-way studies are always notoriously difficult to power adequately, and the authors here appear to have performed a retrospective power calculation, concluding that they were only adequately powered to detect a 30% difference in the primary outcome measure, suggesting that this study is hugely underpowered. Although we would commend the authors for selecting an interesting and relevant topic for their study, it is somewhat surprising that they have then sadly chosen not to adequately power the study.



### When surgery of the olecranon fails X-ref

■ The olecranon is a fracture that is not very tolerant of failure. The fracture itself can be difficult to stabilise, and with large eccentric forces crossing the joint, the metalwork failure rate is not insignificant. To top it all, the thin and mobile soft-tissue envelope is prone to irritation and infection and, as such, the re-intervention rate is also quite high. Surgeons in **Boston, Massachusetts (USA)** utilised their large in-hospital registry to identify 392 patients, all with operative treatment of an isolated olecranon fracture, with the intention of identifying factors that are

associated with both implant removal and re-operation.<sup>5</sup> The patients had a combination of plate fixation (n = 138; 35%) and tension band wiring (n = 254; 65%). Outcomes were assessed at a minimum of four months, and in that time one quarter of patients had required further intervention. The predictors of the need for further surgery were well explored by the authors, and re-operation was more common in women than men (64% vs 36%) and younger patients, and the same was true for patients requesting metalwork removal.

### Designing the best total elbow arthroplasty

■ Total elbow arthroplasty (TEA) can sometimes be a poisoned chalice. Done well, it can provide reliable and satisfactory performance for a range of diagnoses including degenerate and traumatic indications. However, the excellent pain control and range of motion achievable in modern devices belies the short lifespan and restrictions in upper limb weight-bearing imposed by most surgeons to improve outcomes. The survival of TEAs is inextricably linked to the inherent design of most modern arthroplasties, with large torsional and tension forces dissipated across a small bearing surface. In what is an excellent review article from the Hospital for Special Surgery, **New York (USA)**, the authors walk through current implant designs and review the limitations, expanding indications and challenges faced by surgeons, patients and device manufacturers in the coming years.<sup>6</sup> This is an excellent read from a world-leading centre and we would thoroughly commend the article to the 360 readership.

### Can septic arthritis of the shoulder be treated with closed suction drainage?

■ Septic arthritis of the shoulder can be a challenging diagnosis, particularly when the infection includes the other spaces around the shoulder such as the subacromial space. Effective debridement and lavage can

be difficult to achieve, leaving the patient at risk of recurrence. These surgeons in **Seoul (South Korea)** report their experience of treating septic arthritis using a predominantly closed suction drainage method.<sup>7</sup> The surgical team performed a fairly aggressive debridement on 68 patients, combined with arthrotomy and irrigation. A suction drain was placed in the glenohumeral joint and left in place for an average of 24 days at a constant negative pressure of 15 cm H<sub>2</sub>O. This strategy appeared to be rather successful with a reported cure rate (in combination with around five weeks of antibiotics) of 98%. The authors conclude that their approach provides reliable eradication of the infected joint with little in the way of recurrence. Nonetheless, we would inject a note of caution; nearly four weeks of closed suction drainage isn't without its morbidity, and the presence of a drain in the joint for that period may well accelerate any future arthritic change. Slightly less enthusiastically than the

authors, we would perhaps recommend this as a reasonable option for patients in whom traditional methods have failed as it certainly does appear to have an excellent outcome here in terms of clearance of the primary septic arthritis.

### Depression hinders outcomes in total shoulder arthroplasty

■ There doesn't seem to be much in the way of positive news for the depressed with regard to their health outcomes. Surgeons at NYU Hospital for Joint Diseases, **New York (USA)** conducted a study to explore the link between depression and outcomes in total shoulder arthroplasty (TSA).<sup>8</sup> The study team used the US National Inpatient Sample to identify 224 060 patients undergoing elective TSA. There was a pre-existing incidence of depression of 12.4% in those patients, which was associated with significant independent risks for post-operative complications, including delirium (OR 2.29), anaemia (OR 1.65), infection (OR 2.09) and discharge to an alternate location (OR 1.65). Due to

the large sample size, all of these observations were of course highly significant. It is interesting that this incidence of pre-operative depression is associated with poorer post-operative results in the selected outcome measures that were used in this study. Whilst the study of course only establishes an associative link, rather than a causation, there is a clear message here: patients with depression are at higher risk of complications, and perhaps this should be taken into consideration when making treatment decisions.

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## Spine

**X-ref** For other Roundups in this issue that cross-reference with Spine see: [Trauma Roundup 2](#).

### High expectations improve lumbar disc herniation treatment

■ Any orthopaedic surgeon will be more than familiar with the difficulties of managing overly high expectations for treatment, and will know that investing time in doing so will likely yield a more satisfied patient. Nowhere does this apply more than for patients with spinal pathology, where expectations are all and functional overlay common. In this work from **Dartmouth, New Hampshire (USA)**, of the 1244 patients enrolled in both arms of SPORT, 1168 patients provided expectation data and had lumbar intervertebral disc herniation. These patients' outcomes were analysed

to see what influence the patients' expectations had on back pain, function and disability score following surgical or non-operative treatment.<sup>1</sup> The outcome of interest (expectations) was assessed on 5 point scales (equating to a percentage) of expected symptomatic and functional improvements. The outcomes of this study themselves are slightly unexpected. Patients with low expectations of surgical outcomes did poorly, regardless of the treatment modality offered. Those patients with high expectations of an improvement with surgical treatment yielded not only better outcomes overall following surgery, but better outcomes in non-operative treatment as well. Those with a higher expectation of non-operative treatments fared better with non-operative care, but no better than those with low

expectations with regards to surgical outcomes. It seems unlikely that surgeons would be comfortable counseling our patients that they would do well with surgery then offering non-operative treatments, but this work does show that managing expectations are as much a part of spinal treatment as surgery or physical therapy.

### Should we remove spinal hardware after trauma? X-ref

■ Some procedures in trauma involve the routine removal of hardware (think Lisfranc plates or in some cases, diastasis screws) but the role of hardware removal in maximising recovery following trauma in the spine has been poorly investigated. In a retrospective cohort study of 137 consecutive adult patients in **Zurich (Switzerland)**, posterior instrumentation was electively removed

from patients who had previous post-traumatic spinal fixation.<sup>2</sup> Only instrumentation (clearly not cages) was routinely removed once spinal fusion had been confirmed by CT scan. Outcomes were assessed using pain scales and the fingertip-to-floor distance (FFD). Both pain and FFD was significantly improved after hardware removal by 0.5 on a numerical pain score and 7 cm respectively. No significant change in reduction or Cobb angles was seen on radiographs. Rather worryingly however, 9% of patients that had posterior fixation alone showed a wound dehiscence following removal, and 8% patients showed delayed wound healing, with 3% needing revision as a result. Whilst there are some clear indications for hardware removal and a range of practices exist, the indications for elective hardware removal