

ROUNDUP³⁶⁰

Hip & Pelvis

For other Roundups in this issue that cross-reference with Hip & Pelvis see: [Research Roundups 5 and 6](#).

Hip arthroplasty in Down syndrome

x-ref [Children's orthopaedics](#)

■ Down syndrome is one of a number of congenital conditions that can result in early aggressive degenerative arthrosis of the hip. These patients often present with disabling dysplastic hips requiring an early total joint arthroplasty (TJA). The associated technical considerations include acetabular dysplasia, posterior acetabular deficiency, and an increased rate of instability. This complex anatomy combined with the frequency of cognitive and functional limitations in Down syndrome patients does not always lead to a positive result. Given the complexity of such cases, combined with the low frequency of presentation, it is heartening to see an excellent paper from researchers at the Mayo clinic in [Rochester \(USA\)](#). They present perhaps the most comprehensive clinical outcome series reporting on 21 THAs performed in 14 patients with Down syndrome over a 40-year period. Clinical follow-up was reported at an average of around six years, with significant improvements in the Harris hip scores (from 37.9 to 89.2). The authors report a much lower than expected rate of peri-operative complications.¹ However, aseptic loosening was common. While there is a general aversion to TJA surgery in this chal-

lenging group of patients, the results of this study suggest that these patients benefit significantly both with pain and at a functional level. Given the low complication rates it would seem that TJA can be recommended in Down syndrome patients, in spite of the challenges with surgery and patient.

Bulk femoral autograft successful in acetabular reconstruction

■ The restoration of acetabular bone stock is the holy grail of acetabular revision or reconstruction surgery in cases of dysplasia. There are a number of potential strategies available to the revision hip surgeon using either bone grafting (impaction or autograft) or augmentation with trabecular metal or other augments. While impaction grafting has been popularised by the Exeter group and is known to have good long-term results, it is a challenging technique and requires the generation of a contained defect with mesh or rings. An alternative is the bulk femoral head autograft which has the advantage of early stability. The results of acetabular reconstruction with this technique are not reported in the longer term. In orthopaedic surgery, we often complete investigations in the short- and mid-term; however, there are few longer-term studies, although long-term outcome studies are essential in the decision-making process. Investigators at the Mayo Clinic in [Rochester \(USA\)](#) have reported their 20-year outcomes following reconstruction of the acetabulum in

patients with developmental dysplasia of the hip (DDH). Their acetabular reconstructions were all achieved with a bulk femoral neck and head graft in combination with an un cemented acetabular component. At a mean of 21 years, this study reports the results of 44 consecutive hip arthroplasties treated in this manner, of which 35 had a complete follow-up. The study found a survivorship free from acetabular revision of 66% with all bone grafts healed to the pelvis. Acetabular revision was in the most part conducted for linear wear or fracture (n = 10/12) with a single case each of osteolysis and instability.² The high rates of graft union which has facilitated revision cup placement as well as primary hip arthroplasty with no need for additional structural grafts or metal augments required in the revision arthroplasties make this a successful long-term technique. It is heartening to see a long-term outcome study demonstrating effective restoration of bone stock in this challenging pathology – we would commend the authors on continuing to report the results of this valuable series.

Arthroplasty follow-up: is the internet the solution?

x-ref [Knee](#)

■ The number of primary total hip arthroplasties (THAs) is expected to continue to increase at an exponential rate; health economic projections suggest that by 2030 the demand on hip surgeons may be unsustainable, due in part to the follow-up burden. One potential solution to

this healthcare burden is the utility of novel methods for following patients up, especially those with well-fixed, well-aligned, and well-functioning THAs. The advent of internet conferencing and the wider dissemination of IT infrastructure have made the concept of an 'online' follow-up feasible in recent years. The feasibility and clinical effectiveness of a web-based assessment following THA or TKA in Canada has been previously demonstrated, although there is as yet no robust data to support the approach in a larger cohort of patients. Investigators in [Ontario \(Canada\)](#), following on from their previous feasibility studies, have shared their current study of 229 patients undergoing arthroplasty follow-up appointments. All of their patients had undergone total joint arthroplasty within the past year. The headline result of this paper is a cost analysis where the authors estimated the mean expense of web assessment to be approximately 60% of the cost of an in-person visit.³ For a subset of patients the authors argue that this may be a more efficient use of healthcare resources in orthopaedic care. However, this remains just one method of follow-up and may not be suitable for all patients, all surgeons or all diagnoses. The follow-up of arthroplasty patients represents a significant healthcare burden, and there is no national (let alone international) agreement surrounding the appropriate follow-up intervals and how best this should be achieved. Potential solutions vary

from nurse-led follow-up clinics, online follow-up, face-to-face, and radiographic-only clinics. As time goes on it is likely to be increasingly important to reduce the follow-up burden of these patients.

Total hip arthroplasty following acetabular fracture **x-ref Trauma**

■ One of perhaps the most challenging primary total hip arthroplasties (THAs) to perform is that following acetabular fracture treatment. Approaches can be complex with significant scarring and heterotrophic ossification. This, combined with the potential for a lower level of function associated with secondary THAs, makes this paper from **Cleveland (USA)** an interesting read. The authors designed a retrospective comparative cohort study in which outcomes from patients requiring a secondary THR following acetabular fracture were compared with those undergoing a primary hip arthroplasty at a minimum of two years post-operatively. The surgical team identified 17 patients aged 60 years or older from a group of 171 who sustained an acetabular fracture. The majority of the failed acetabular fractures had had a previous ORIF, with just three cases conservatively-managed, and a single primary arthroplasty patient. Patients whose treatment for acetabular fracture resulted in failure requiring total joint arthroplasty for the most part had sustained both columns or posterior column, posterior wall fractures. Although not disastrous there were (as could be intuitively expected) poorer outcomes in the group following acetabular fracture than the primary joint arthroplasty group.⁴ These short-term outcomes demonstrate the results of total hip arthroplasty following failed treatment of an acetabular fracture to be acceptable and, although poorer than a standard hip arthroplasty (important information to share with the patient during the consent process), it is reassuring to see that arthroplasty remains an excellent option for failed

acetabular fracture treatment.

Salvage arthroplasty following failed hip internal fixation

■ Along a similar theme to the previous study, investigators in **Rotterdam (The Netherlands)** turned their enquiring gaze on the outcomes of patients undergoing hip arthroplasty following failed internal fixation. The study rationale is similar to that for the previous study. Although hip fracture, internal fixation and failure of internal fixation are relatively common events, there is little contemporary data to inform patients, surgeons or researchers as to the likely outcome following salvage surgery for failed fixation. With improved methodology over the previous paper, these investigators report a secondary cohort study as a spin out to a previous randomised controlled trial in 14 centres in The Netherlands. Outcomes were assessed using health-related and disease-specific quality of life (QoL), gait pattern, and muscle strength. The main study involved fixation of 248 patients, of whom 27% resulted in failed internal fixation. These were compared with patients who did not have an arthroplasty from the same cohort of patients. Patients undergoing salvage arthroplasty have significantly poorer results than those who heal after internal fixation. This was reflected in functional outcomes (WOMAC score) although there were no differences in health-related QoL (SF-12). Further analyses of secondary outcome measures established a significant difference in gait and muscle function with impaired gait progression of centre of motion and weaker abductor moments.⁵ The loss of function following the salvage of failed internal fixation

is an understandable, but disappointing, finding. Reassuringly, this appears to impact on the patients' joint-specific outcomes but not the quality of life scores, suggesting that a protocol of selected internal fixation is a reasonable management strategy in these patients. Perhaps the most important piece of missing information is how primary hemiarthroplasty compares with fixation in these patients.

Bone banking financially and clinically sensible

■ Institutional bone banks may well be more than a convenience thing in the units that run them – providing fresh, high quality allograft in large quantities. However, locally-run tissue banks do attract certain regulatory and institutional costs, often requiring the hiring of staff, backup procedures and navigation of an often complex regulatory maze. There is little evidence one way or another to suggest whether or not such a large undertaking makes financial sense, and if so, how many times does bone have to be withdrawn to cover the overhead costs? Researchers in **Zurich (Switzerland)** set about quantifying all recordable costs associated with their bone bank over a three-year period, including those associated with screening, harvesting, storage and administration. During the study, 290 allograft femoral heads were harvested and stored in the bone bank either as whole or half femoral heads. Of these, 101 had to be withdrawn while 104 full and 75 half heads were used for allografting. Over that period of time the total cost of treatment was €1367 per full femoral head, and over €40 000 in savings was made, making this a cost-effective endeavour in the authors' institution. Performing a



cost-effectiveness analysis is always a challenge, as commercial costs vary from product to product and institution to institution. Assuming a cost range of between €1672 and €2149 for commercially purchased allograft, the break-even use point for an institutional bone bank is between 34 and 63 allografts per annum.⁶ It would appear that aside from the surgical convenience and advantages of fresh frozen allograft, there are also economic advantages as well.

Allogenic blood transfusion in arthroplasty **x-ref Knee**

■ Allogenic blood transfusion is an expensive healthcare intervention, and although investigated on a small scale in orthopaedics the national picture has not been seen in arthroplasty. Nevertheless, there is plenty of data readily available from a national perspective surrounding allogenic transfusion use. A research group in **Cleveland (USA)** utilised the National Inpatient Sample between 2000 and 2009 to establish patterns in blood transfusion. Their observational cohort sample included 2 087 423 patients undergoing primary arthroplasty over an eight-year period. The research team undertook a comprehensive analysis of the likelihood of transfusion, the changing demographics of allogenic blood transfusion and the risk factors predictive of need.⁷ Interestingly, the overall rate of allogenic blood transfusion is climbing in the USA, with an increase in incidence from 11.8% in 2000 to 19.0% by the end of the study period in 2009. The risk of transfusion was profoundly affected by hospital demographics as well as patient factors. Patients undergoing treatment in smaller non-teaching centres with a rural location were predictors of transfusion risk, as were a number of patient factors (age, black ethnicity and Medicare insurance). Although the National Inpatient Sample does not include data for all potential confounders, when the relevant adjustments were made on multivariate analysis the require-

ment for allogenic blood transfusion was associated with risks of longer hospital stay and increased costs – but not with increased mortality.

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