

Intralesional resection for central grade 1 chondrosarcoma

■ The confusion surrounding the diagnosis and management of chondrosarcoma is not restricted to the value of imaging modalities in reaching the diagnosis. There is again much debate on the best treatment methods - proponents of intralesional methods argue that this can be safely undertaken without the risk of morbidity associated with more extensive reconstructions and without exposing the patient to unnecessary risk of recurrence. These authors from **Beijing (China)** have published an updated review and meta-analysis with the aim of establishing whether there is an excess mortality associated with intralesional resection versus wide local margin resection

in patients with central grade 1 chondrosarcoma.⁷ The authors were able to identify ten studies reporting the outcomes of 394 patients in the literature. This included 214 patients treated with intralesional resection and 180 patients treated with wide local excision. There were some surprisingly marked differences in the results. Patients treated with intralesional resection had a significantly lower complication rate and better functional outcomes. Reassuringly, there were no significant differences in terms of overall local recurrence. This paper essentially shows that, on the face of it, curetting out a grade 1 chondrosarcoma is safe. However, this does not take account of potential issues with patient selection, so patients with more 'worrying' features may well have undergone

resection. The main concern is that if a low-grade chondrosarcoma recurs, it will do so at a higher grade and may then metastasise. This can take many years. A pinch of salt should therefore perhaps be taken when interpreting these results.

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Children's orthopaedics

X-ref For other Roundups in this issue that cross-reference with *Children's orthopaedics* see: *Hand Roundup 7; Spine Roundup 4.*

Acetabular anatomy in slipped capital femoral epiphysis

■ It is still not entirely clear what the mechanical and other factors are that result in slipped capital femoral epiphysis (SCFE). Although there are some clearly defined and widely accepted risk factors (such as hormonal imbalance, age and obesity), it is likely that some biomechanical factors are also a risk. Currently, the established view is that over-coverage of a femoral head (particularly by a deep and retroverted acetabulum) might be one significant biomechanical risk factor for the development of a SCFE. However, there is little evidence to support this view one way or the other. This study from **Düsseldorf (Germany)** reports on acetabular anatomy in 36 patients with SCFE.¹ The authors matched the patients

to 36 controls by gender and age, and compared various anatomical characteristics as determined by CT in both age groups. The meat of the paper was the determination of acetabular depth-width ratio (ADR), the lateral centre-edge angle (LCEA), anterior and posterior acetabular sector angle (ASA), and version. There was a significantly lower coronal ADR in the SCFE cohort compared with the contralateral hips but this did not differ from the controls. However, the mean LCEA was lower in the SCFE hips than in the contralateral hips. In essence, these authors report acetabular retroversion as the primary abnormality seen, and there was no real evidence of an increase in acetabular depth. This anatomical information may have implications for reconstruction surgery. However, it is unknown whether the decreased acetabular version is a primary or secondary deformity.

Assessing symbrachydactyly

■ This is a very good article on the functional assessment of children

and adolescents with unilateral symbrachydactyly, a rare and challenging condition to assess. We were interested to read this article from **Sacramento, California (USA)** where the authors had grouped their patient cohort by the presence or absence of opposable digits.² The patients underwent assessment of pinch grip, bimanual activity performance, activities of daily living (ADL) performance and psychosocial status. The authors also report subjective rating of the appearance and function of the hands from both participants and parents. The groups did not differ in terms of numbers of outliers with pinch grip strength; however, there was a significantly higher average pinch grip strength (2.4 kg vs 4.1 kg) in the opposable digit group. In addition to this, patients without opposable digits were less likely to use their affected hand in bimanual activities, although there were no differences in patient- and carer-related satisfaction with hand function. Nor were there any

apparent differences in numbers of ADL that were not achievable in either group. The authors insightfully report that "stable, opposable border digits enable complex hand function, incorporation into bimanual activities and the ability for increased in-hand manipulation." This article provides information not only for clinicians, but also for parents to understand what level of function is achievable and what the potential benefits of surgery might be.

Flexible nailing of paediatric femoral fractures X-ref

■ Flexible intramedullary nailing has become a mainstream technique for treating long bone shaft fractures in children. The nails can be inserted using different entry points and directions, and previous work has identified the need to achieve a stable fixation by tensioning the nails against each other. Different entry points have their relative pros and cons and, although there are a wide variety of techniques, there are precious few comparative studies from

which to draw conclusions about the possible benefits or otherwise of one technique over another. This paper from **Dallas, Texas (USA)** sets out to identify the potential advantages or disadvantages of different entry points in flexible nailing of the femur.³ The authors of this study present a comparative retrospective review and they seek to compare the outcomes when using a combined medial-lateral entry *versus* an all-lateral entry retrograde nailing of the femur. This retrospective report of the outcomes of 244 children with femoral shaft fractures treated with retrograde flexible nailing included 156 in the medial-lateral entry group and 88 in the all-lateral entry group. Outcomes assessed were radiography-based alignment measures and operative parameters. In the all-lateral group, the surgical team achieved osteosynthesis in a 30 minutes' shorter anaesthesia time. However, the malunion rate was identical (5.7% vs 5.8%). There were no differences noted in the techniques with regard to outcomes of shortening, coronal angulation or sagittal angulation at union. The all-lateral technique was found to be quicker and to achieve the same final fracture alignment, without additional complications.

Guided growth: a novel treatment for anterolateral bowing of the tibia

■ It is rare that we feature case reports in 360; however, we think this technique article from **Dublin (Ireland)** is worthy of a mention.⁴ The authors report a very interesting case where a technique of tibial pseudarthrosis prevention has been used in a patient with neurofibromatosis (NF). It is well known that anterolateral bowing of the tibia in NF patients is a precursor to pseudarthrosis that is usually very difficult to treat and can, if left untreated, lead to amputation. The 'go-to' conservative treatment for tibial bowing is a clamshell brace, which often fails to prevent development of pseudarthrosis, while present operative techniques

are usually just modifications of the original McFarland procedure. The authors of this study demonstrate brilliant use of the Hueter-Volkman law, as they used two tension-band plates across the tibial physes in a staggered construct (proximal-medial, distal-lateral) as an adjunct to the brace treatment. At the four-year follow-up, both varus and procurvatum angulations had reduced significantly and the patient had suffered none of the fractures that usually initiate the vicious cycle resulting in pseudarthrosis. The authors make the assertion that, in this case, guided growth had reduced the tensile loads at the apex by reducing the displacement of the convex deformity from the mechanical axis. Guided growth is easy to perform, has low associated morbidity and preserves the option of more extensile surgical alternatives in the future. Could this be the silver bullet we were looking for when it comes to pseudarthrosis prevention in NF? Larger studies should answer that question.

Low back pain in adolescents: a one-year analysis of eventual diagnoses X-ref

■ Low back pain (LBP) in adolescents is a common diagnosis in a paediatric orthopaedic practice, with prevalence rates of chronic LBP occurring at least weekly being reported as anywhere between 18% and 26%. The authors of this study from the USA sought to identify the most common causes of that pain. The authors of this report from **Charlottesville, Virginia (USA)** used the PearlDiver patient dataset (PearlDiver, Colorado Springs, Colorado) to examine the outcomes of 215 592 children presenting with symptoms of LBP over a three-year period.⁵ The authors report the patients' eventual diagnostic codes at a year following presentation to establish whether the initial diagnosis of the underlying condition had been given, and whether it matched the diagnosis at the one-year follow-up. The most common associated subsequent diagnoses were lumbar

strain/spasm (8.9%), scoliosis (4.7%), lumbar degenerative disc disease (1.7%), and lumbar disc herniation (1.3%). The rates of all other recognised lumbar spine diagnoses including spondylolysis, spondylolisthesis, infection, tumour, and fracture had < 1% association with LBP. All in all, 80% of patients were not found to have an establishable diagnosis at one year post-presentation. Low rates of imaging use were found, with radiographs performed in 8.7% of patients, and MRIs in just 4.7%. In conclusion, the authors state that the majority of adolescent LBP cases do not have a clear underlying associated medical diagnosis within a year of presentation. However, a high level of suspicion for potential serious spinal pathology is warranted. The difficulty with lumbar spine pain as a symptom in children is that often (based on this and other series) there is no abnormality to be found. However, pain in the lower back is also clearly also associated with everything from lumbar spine infection through to disc herniation and tumours. The clinician is left with a difficult decision to make, however, in light of 20% of patients having an establishable diagnosis, we would err on the side of caution and investigate all those children who present with lower back pain.

Casting for scoliosis? X-ref

■ Casting has somewhat fallen out of favour for the treatment of scoliosis. The use of a cast used to be commonplace, but has in many centres been replaced by bracing, which suffers from both the advantage and disadvantage that it can be removed. In this retrospective study of 21 children from **New York, New York (USA)**, all with early-onset scoliosis treated with a cast, the authors set out to examine whether casting for this particular condition is effective.⁶ The clinical team used a protocol of serial extension, derotation and flexion casting for early-onset scoliosis, and the authors tried to determine the clinical and radiological features that help predict



the response to treatment. They divided the cohort into two groups of patients: the 'success' group that achieved > 10° improvement in Cobb angle; and group two, which showed no improvement. From a demographic perspective, those patients who went on to a successful outcome (n = 15) had a significantly lower Cobb angle (21° vs 56°) and rib vertebral angle difference (13° vs 25°) compared with the other group at latest follow-up. One of the more interesting findings of this study was the fact that only body mass index (BMI) was predictive of Cobb improvement. For each unit increase in BMI, a 2.38-fold increase in the chance of improvement was noted. This corroborated Mehta's initial observation of the 'sturdy' body habitus patients having a better response to treatment than those with the 'slender' body type. It was found that the key aspects of treatment that may determine success included age of less than 1.8 years at initiation of casting and derotation of the spine to correct a rib vertebral angle difference of < 20°. It seems that casting can have a role to play in treatment of mild scoliosis when started early. However, although casting for scoliosis clearly has some efficacy, it also has significant clinical and social drawbacks and should be conserved perhaps for those in whom it is most likely to be effective.

The adolescent clavicle X-ref

■ There is confusion about the best option for clavicle fractures in

the adult literature, let alone in the paediatric and adolescent literature. Given the usually higher tolerances in terms of union rates and the capacity for remodelling, paediatric orthopaedic surgeons have traditionally been much more cautious in their approach with fractures – and the clavicle is no exception to this. This retrospective small-sample comparative study from **Rochester, Minnesota (USA)** investigated functional outcomes in patients aged between ten and 16 years with mid-shaft clavicle fractures and ≥ 15 mm shortening. The authors were able to achieve a minimum of nine months of follow-up.⁷ Of 41 fractures, 20 met the inclusion criteria and were treated operatively with plate fixation. A total of 16 patients, equally divided between operative and non-operative plate fixation, were included in the eventual study and completed a Quick Disabilities of the Arm, Shoulder and Hand Score (QuickDASH) and Constant Shoulder Score, in addition to questions about satisfaction with treatment. Quantitative isometric strength, range of movement and abduction fatigue testing were performed on the involved and uninvolved arm. There

was no difference in demographics, and QuickDASH and Constant Shoulder Scores were perfect in all but one patient in the operative group. This was due to persistent symptomatic metalware and required removal. In total, one quarter of patients required the removal of metalware. There was, however, no difference in range of movement, isometric strength or abduction fatigue between groups. Although the study has many weaknesses, it demonstrates that shortened mid-shaft clavicle fractures in adolescent patients have excellent outcomes after non-operative treatment. There does not appear to be any functional advantage associated with surgical stabilisation, and plate removal was necessary in 25%. It appears that, for the time being, the cautious approach adopted by the majority of paediatric orthopaedic surgeons is appropriate.

The eight-plate: generally successful

■ This interesting paper looks at the effectiveness of deformity correction using guided growth with eight-plates. These tension band constructs place a screw above and below the epiphysis and are able to address

angular deformities specifically as the remainder of the epiphysis continues to grow. The real advantage of the eight-plate is in the relatively minor nature of the surgical intervention. The authors of this multinational multicentre study co-ordinated by the **AO Foundation in Davos (Switzerland)** set out to establish what the results of eight-plate surgery could be expected to be using a cohort of 126 patients. This large case series demonstrates the eight-plate to be a safe technique which can correct deformity effectively in 66% of patients and leg length difference in 59% (although previous studies have shown that drill or percutaneous epiphysodesis is more reliable in the correction of leg length inequality). Maintenance of correction in the longer term is high at 85%, and of the adverse events, which are relatively common (occurring in 18% of patients), the majority were minor screw issues. This series confirms the eight-plate as an effective and, most importantly, safe technique that we should continue to use.

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Research

X-ref For other Roundups in this issue that cross-reference with Research see: **Hip Roundup 8; Knee Roundups 8 & 9; Trauma Roundups 3 & 4.**

Bone-preserving stem designs

X-ref

■ In the modern age of total hip arthroplasty (THA), there has been considerable interest in developing an implant that is bone-preserving, and is associated with small resections and physiological loading to maintain bone stock. Hip resurfacing is one such implant with mixed results, and is not without controversy, particularly with the

recent Medicines and Healthcare products Regulatory Agency (MHRA) guidelines in mind. Another development is that of the short femoral stem. In this design, load transfer is more physiological compared with more traditionally designed stems, potentially reducing stress shielding around the proximal part of the stem. The authors of this paper from **Seoul (South Korea)** highlight the problems of assessing short femoral stems as their size and shape is so variable, making direct comparisons very difficult.¹ However, they wished to highlight a feature they had identified in a

femoral stem which they had been using that was a shortened tapered version of a conventional stem, the TRI-LOCK (Depuy International Ltd, Leeds, UK). This study came about as the authors had noticed lateral cortical atrophy in Gruen zone I and blunting of the cut surface in zone VII. This was a retrospective study of 72 consecutive patients with a mean age of 48.2 years who underwent 80 THAs. Follow-up was 37.3 months with a detailed radiological analysis. The authors demonstrated that a total of 61 cases (76.3%) had either an intra-cortical osteolytic lesion (IOL) or thinning of the lateral cortex

of greater than 10%. In 37 cases (46.3%), the lateral cortical thickness was less than 20%. With univariate analysis, the authors identified that cortical thickness appeared to correlate with a low body mass index (BMI). With a cortical thinning of more than 20%, there appeared to be a correlation with low BMI, gender and operation time. While the clinical significance of this is perhaps uncertain, there was one case of a periprosthetic fracture in a patient with lateral cortical reduction of 33.2%. This study will be of interest to hip surgeons as there has been increasing popularity in these