

ROUNDUP³⁶⁰

Children's orthopaedics

For other Roundups in this issue that cross-reference with Children's orthopaedics see: [Hip & Pelvis Roundup 1](#).

Hip dislocation in children with CTEV: two decades of experience

■ This paper is very attractive in its simplified view. Conventional wisdom (and indeed published papers) suggests that certain congenital abnormalities are associated with the development of dysplasia of the hip. Disorders of the feet including metatarsus adductus and congenital talipes equinovarus are often considered as risk factors. This series is from a single institution with a single assessor, reporting on a consecutive series of children screened for DDH. It presents a very clear investigation into the association between these two conditions. In this impressive 21-year prospective longitudinal cohort study, all hips are classified according to Graf's criteria, while all cases of idiopathic CTEV were classified according to the Harrold and Walker system.¹ Over the study period, 139 children presented with 199 cases of fixed idiopathic CTEV feet. Of this group, 259 hips were normal, 18 were Graf type II, with one Graf type III. The authors recognise that the study was a slightly small sample (the authors assert that 420 patients would be required in order to completely reach power). In the group that was studied, however, there were no cases of fixed dislocation found, and this suggests that the conclu-

sions of the paper are sound. The clear message from the paper is that fixed idiopathic CTEV should not be considered a significant risk factor for pathological hip dysplasia.

Population-based prevention of DDH in cerebral palsy: 20 years' experience

■ Preventing (and indeed treating) hip dislocation in cerebral palsy children can be a tricky task – balancing healthcare costs and the potential benefits of the screening programme possibly even trickier. There are a range of population-based programmes aimed at reducing the incidence of hip dislocation in high-risk cerebral palsy children. A study team in **Lund (Sweden)** present a comprehensive 20-year review as a follow-up to their ten-year results published in 2005 that indicated a decrease in the incidence of dislocation of the hip, from 8% in a historical control group to 0.5% in a study group in which a hip surveillance programme was in operation. At the time the authors concluded that early identification and a preventative treatment programme of hip dislocation in patients with whole-body cerebral palsy was effective and worthwhile. The programme the authors describe is a collaborative venture between paediatric orthopaedic surgeons, neuropaediatricians, and physiotherapists in southern Sweden. It is based around the institution of a clinical and radiological follow-up programme targeted at children with Gross Motor Function Clas-

sification System (GMFCS) levels 3 to 4. The majority of the children in the programme were treated initially with a customised standing brace, combined with appropriate targeted preventative surgery consisting of soft-tissue releases (adductor/psoas), combined with bony procedures as necessary (varus proximal femoral osteotomy or Dega peri-acetabular osteotomy). The rate of preventative surgery fell across the duration of the study, from 15% of children born between 1992 and 1997 to 12% of the group born between 1998 and 2007.² The study nicely demonstrates that surveillance with appropriate targeted interventions significantly reduces the risk of longstanding dislocation of the hip in patients with cerebral palsy. There is also valuable information on the cumulative probability of patients requiring preventative surgery according to GMFCS level and age; although previously described and widely known, it is very eloquently illustrated in this paper.

Shoulder derotation in congenital plexus palsy x-ref [Shoulder & Elbow](#)

■ Long-term results for surgical correction of plexus palsies in congenital plexus injury are sparse, as indeed are series with reasonable numbers of patients. We were delighted therefore to find a paper addressing both issues in *The Bone & Joint Journal (BJJ)*. Investigators from **Stockholm (Sweden)** set out to report the outcomes of shoulder derotation as a treatment for

congenital plexus deformity. Their paper describes the outcomes of a consecutive series of 274 patients and discusses the long-term results of a subset of 118 with a minimum of ten years' follow-up post-surgery. The surgical approach used was tailored to each patient but always involved an open subscapularis elongation and latissimus dorsi to infraspinatus transfer. Concomitant relocation of an incongruent joint was performed in 97 of 105 patients. Outcome assessment was based on the Mallet score, which records the range of active abduction and external rotation and the function of the shoulder with a series of reproducible tasks. The results presented here suggest that there is long-term improvement in mean external rotation following subscapularis elongation, regardless of whether this is combined with latissimus dorsi transfer.³ There are several weaknesses of this study which are recognised by the authors. In particular, there are a large number of patients lost to follow-up, and inherent to the nature of this study the cohort is an unmatched consecutive series with the associated potential for selection bias. Unusually, however, these weaknesses are recognised and discussed by the authors. This still represents one of the strongest papers on the topic and the authors are able to conclude that latissimus dorsi contributed very little to improve external rotation and this was no longer part of their surgical prescription.

Back pain in the paediatric population: could MRI be the answer?

x-ref Spine

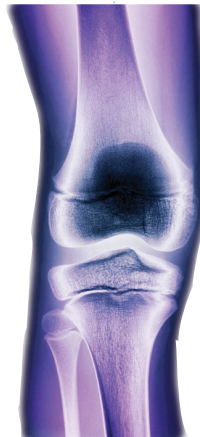
■ Back pain can be a challenge at the best of times to establish an appropriate diagnosis in the majority of patients. However, in the paediatric population it may be even more difficult to reach a diagnosis. Classical teaching suggests that thorough investigation is a necessity to rule out infection or tumour, but it may be in vain. In a prospective study of paediatric patients presenting to **San Germán (Puerto Rico)**, the investigators aimed to establish the prevalence of back pain, and the utility of MRI as part of a comprehensive diagnostic work up. The study population included 261 patients presenting with back pain over a 24-month period, a subset of 3042 presentations, giving a prevalence of 8.6%. All patients were managed according to a local algorithm including an initial history, physical examination and blood tests, with plain radiology. MRI was used as an aid to diagnosis in all patients with negative x-rays displaying any worrying symptoms (constant pain, night pain, radicular pain or abnormal neurological examination). The diagnostic importance of the MRI scan in the paediatric patient group is highlighted in this paper, in that 36% of patients requiring an MRI scan using this algorithm had an identifiable pathology. Turning the figures round, of the 89 patients with an identified pathology, 26% were diagnosed with the aid of plain radiographs, while 74% required an MRI scan for diagnosis. This paper illustrates very clearly that paediatric patients with red flag symptoms should have urgent MRI scanning with an expected yield of approximately one third. Specific diagnoses reported in this series included herniated discs, degenerative disc disease, spondylosis, cord lipoma, tethered cord, facet arthritis, bilateral ovarian cyst, sacroiliitis, juvenile osteoporosis, perineural cyst, annular tear, hydronephrosis and

ependymoma, in order of decreasing frequency.⁴ The paper supports the use of a specific algorithm for the classification of treatment options with MRI scanning as an important imaging modality, and should really be considered the standard of care for presentations of paediatric back pain.

Intercondylar fracture of the humerus in children

x-ref Trauma

■ Although fractures of the distal humerus are relatively common in the paediatric population, the majority of descriptions are of supracondylar and transphyseal fractures. Intercondylar fractures of the distal humerus are associated with very high energy injuries and, due to the rarity, there are few reports in the literature and almost no comparative series evaluating different approaches for their fixation. A surgical team in **Belgrade (Serbia)** presents one of the few comparative reports of treatment of 19 supracondylar fractures. They describe the outcomes of T type supracondylar fractures in children aged between three and 16, of whom seven underwent closed reduction and percutaneous pinning. The remaining 12 patients underwent open reduction and internal fixation. The outcomes were analysed using the OTA scoring system at a mean follow-up of around 50 months.⁵ The authors (quite correctly) present a narrative analysis, given the small sample size, but note that the majority (n=18/19) achieved a good or excellent result. They comment that a higher proportion of the closed reduction patients achieved an excellent result, although obviously the small sample size and likely selection bias is probably the major factor in explaining this observation.



The Dunn osteotomy in SUFE

■ In two interesting articles from the *Journal of Paediatric Orthopaedics*, the role of a modified Dunn osteotomy is explored for the treatment of stable and unstable slipped capital femoral epiphysis. The respective authors attempt to establish the rates of complications, especially the incidence of AVN. In the first of the two articles (1) researchers from **San Diego (USA)** review their experience over the past five years of using the modified Dunn osteotomy in comparison with pinning in situ for selected cases of slipped upper femoral epiphysis (SUFE). They were able to report on the results of 88 hips⁶ over an eight-year period, of which 17 underwent the Dunn procedure and 71 were fixed in situ. Each patient's notes and radiographs were reviewed to assess the severity of slip (using the Loder classification), acuity, complication rate and re-operation rate in both cohorts. In this large series of patients

the authors were able to make two pertinent observations. In the stable patients there were no cases of AVN when treated with pinning in situ. However, if the Dunn osteotomy was used there was a 20% AVN rate. With regard to the unstable patients the picture was slightly different, although the numbers were low. The Dunn procedure resulted in a 29% AVN rate (n=2/7) while pinning in situ had a higher complication rate of 43% AVN (n=3/7). The authors conclude that based on their results, the Dunn osteotomy has little place in stable slips, and also comment that even with a corrective osteotomy the complication rates in unstable slips are very high. In a complementary paper (2), researchers from **Boston (USA)** report the results of 43 patients,⁷ all of whom underwent a Dunn procedure at a single institution over an 11-year period.

Follow-up was for 2.6 years. The researchers were particularly interested in complications as an outcome and therefore used the modified Clavien-Dindo classification as their primary outcome measure. The cohort (as one might expect) consisted of a complex mixed group of patients, 60% presenting with an unstable slip, 40% as acute presentations, and 86% were severe, based on Southwick's slip angle. Complications occurred in 37% of patients, with many patients suffering more than one complication (22 complications in 16 patients). There were 15 revision procedures performed for a variety of indications including fixation failure, AVN and deformity progression. There were two significant failures requiring total hip arthroplasty. The authors of this concerning paper noted that there was an inverse relationship between complication rate and surgeon volume, and that complication rates, even in a tertiary referral centre, remain disturbingly high with the Dunn osteotomy. These two papers, taken together, really do raise questions about the use of the Dunn technique outside of specialist high volume centres.

Radiocapitellar line a myth!

x-ref Shoulder & Elbow

■ One of the staples of orthopaedic trauma and paediatric teaching for junior trainees is the radiocapitellar line – orthopaedic dogma holds that a line down the long axis of the radius, whatever the projection of the film, will always bisect the capitellum. This simple and, on the face of it, obvious observation is the driver behind diagnosis of radial head dislocation in children. But what if it weren't true? This observation has never been robustly tested in the literature!⁸ A busy study team from **Los Angeles (USA)** designed a radiographic study looking at normal elbows in 116 children, all evaluated by three examiners using radial shaft and radial neck lines. Their findings piqued our curiosity. Far from being a 'rule of thumb', just 50% of the 2052 radiocapitellar lines drawn passed through the central third of

the capitellum, and up to 12.7% of lines missed the capitellum completely. Perhaps the well-used rule of thumb is in fact an oversimplification?

Do 'flatfooted' children suffer?

x-ref Foot & Ankle

■ Flexible paediatric flat feet are widely considered to be a normal variant is rare that any treatment or indeed follow-up is offered for a condition regarded as a normal variant. Like many of these conditions, however, the implications for the parent and patient are not widely known. In this very interesting cross-sectional study on the flexible flat foot and impact on quality of life, researchers from **Oxford (UK)** conducted a prospective study of children with flexible flat feet and compared them with those with normal feet using a health-related

quality of life outcome measure.⁹ The two cohorts consisted of just less than 50 patients each, and outcomes were assessed using the Oxford Ankle Foot Questionnaire for Children (OxAFQ-C) and Pediatric Quality of Life Inventory (PedsQL™ 4.0), with both direct and proxy answers for children aged between eight and 15 years old. The authors carefully define the flat foot and perform a variety of studies including motion analysis, dynamic paedobarography, anthropometric measurement and simulated weight-bearing MRI. Compared with children with typically developing feet, children with flexible feet have a significantly impaired health-related quality of life in this study – comparable with children who are acutely or chronically unwell. The impairment has a broad range; and it must be considered that

parents may overestimate their child's impairment while, conversely, it seems likely physicians may underestimate it.

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