

ROUNDUP³⁶⁰

Children's orthopaedics

Xref For other Roundups in this issue that cross-reference with *Children's Orthopaedics* see: [Spine Roundups 5 and 6](#).

Urgent supracondylar fractures: a thing of the past? **Xref**

■ Are you still getting up in the night to pin the type 3 supracondylar fracture? Although clearly for patients with a white pulseless hand the timing of surgery is not debated, in patients with other patterns of injury, timing is more contentious. A study team in **Colorado (USA)** set out to more carefully characterise patients with a type 3 supracondylar fracture in this retrospective study of a pooled group of patients at a single centre in the US. The study focused on timing and other clinical characteristics including complications in 872 children presenting with type 3 supracondylar fractures. The researchers grouped the patients into four time cohorts based on interval from injury to surgery; less than six hours, six to 12 hours, 12 to 24 hours and greater than 24 hours. They confirmed in this large group of patients that increased time from presentation to surgery was not associated with increased morbidity from the injury or from complications in those patients without neurovascular compromise or an open fracture. In contrast, there was a trend towards a steady decrease in morbidity and complications with increased time to surgery. This is, however, likely to represent selection bias. The treating surgeon is more likely to take the

more severe injuries to the operating room early. Of particular interest, of 54 children who presented with an absent radial pulse, only five required vascular intervention. Nerve injury was found in 12 %, being AIN median in the majority, followed by radial then ulnar. Use of a medial entry pin was not associated with ulnar nerve injury.¹ This is one of the largest studies of 'off ended' supracondylar fractures and confirms the evidence base for current practice in the majority of modern centres. Only patients with neurovascular compromise should be operated on emergently; the remainder should be treated on the first available list with a suitably qualified theatre and surgical team.

Rotational osteotomy for synostosis

■ It is relatively rare to see a hypothesis-driven prospective study in the literature. However, this is precisely what surgeons in **Nagpur (India)** have achieved. These ingenious surgeons, based on the premise that the forearm with the elbow in relative extension can pronate more than supinate, postulated that "forearm excessive pronation in congenital proximal radioulnar synostosis which interfered with function could be improved by corrective osteotomy of 20°–30° of supination." They then designed an operation to test this hypothesis. Initially they evaluated 48 patients with proximal radioulnar synostosis. Each child was asked 12 questions concerning their ability to achieve activities of daily living in

addition to completing the Jebsen-Taylor hand function evaluation. Following this quite comprehensive evaluation, 11 children were treated conservatively. In the remaining 36 children (28 with reported results) who underwent corrective surgery, this was undertaken consisting of a proximal third ulna and distal third radius de-rotational osteotomy with plaster cast fixation in 20–30° of supination. They report results with a minimum follow-up of three years. Subjective and objective improvements in all of the operated children were demonstrated in this study, with extremely low morbidity of one delayed union and one angulated union.² Post-operatively, the time taken to carry out the Jebsen-Taylor hand evaluation fell significantly (47.7 seconds to 33.3) and all outcomes were assessed as excellent according to the modified Failla classification. We are impressed by the quality of this study, here at 360. The hypothesis of this study and the technique used are certainly validated by the presented results and the authors have clearly demonstrated a well thought through study to establish a new technique in a controlled and scientific manner.

Predicting slip in paediatric forearm fractures **Xref**

■ Predicting which forearm fractures are going to slip later on is an essential and intuitive skill (See 'I have a bad feeling about this...' below). While senior clinicians are often happy to rely on this intuition, in these days of evidence-based

medicine there is a continued push to provide evidence for each part of every treatment pathway. Clinicians in **Philadelphia (USA)** set about doing just this for paediatric both bone forearm fractures. They conducted a retrospective review of patients presenting to a level 1 children's hospital in the US with a both bone forearm fracture from 2004 to 2010. A sizeable cohort of 2600 patients was identified, and out of this cohort just 124 patients were managed non-operatively. This alone indicates the extremely high rate of operative intervention in this group of patients in the US as compared with other healthcare systems. Of these 124 patients, 20 patients were converted to operative management. Patients in the conversion group were significantly older than patients who were successfully treated conservatively (11.1 years versus 5.7 years). The authors report that no patients younger than four years of age needed conversion to surgery, whereas no patients older than 14 years of age were successfully treated conservatively. Other factors that differed significantly between the two groups were a lower radial and ulnar angulation in the AP (coronal) plane, a more proximal ulnar fracture location, more radial fractures that were not transverse or oblique (i.e. spiral, comminuted, or non-displaced), and more frequent translation or shortening of the radius in the conversion group. In multivariate analysis, the best model for prediction of conversion

to operative treatment included age, ulnar angulation in the AP (coronal) plane, and proximal ulnar fracture location. Older age, less AP (coronal) ulnar angulation, and proximal fracture location strongly increased the risk for conversion.³ The figures in the paper show a fractured forearm that is inadequately casted and another forearm fracture that would likely continue to be managed non-operatively in many institutions throughout the world, both of which were converted to operative treatment. Despite the significant limitations (which in themselves do illustrate the management skew seen in fee-driven systems), the study does give the treating surgeon some parameters by which he may judge the likelihood of failure of non-operative treatment, therefore shortening his follow-up intervals to deal with anticipated loss of reduction, which can also be managed by non-operative means!

Progressive lengthening of the digit is possible

■ Yes, you read it correctly and at 360 we can't believe this one either. In perhaps a triumph of technique over common sense, surgeons in **Beirut (Lebanon)** present a single case of a patient who had a debridement of the distal phalanx of her index finger for osteomyelitis and then had lengthening of the remnant which could only be for cosmetic reasons.⁴ On the follow-up pictures the finger looks anything but normal although the lengthening was a 'success'. We wanted to include this paper for sheer novelty value!

Treatment of SUFE with the Dunn osteotomy [Xref](#)

■ Sometimes it can be difficult to publish negative papers or poor results – a source of publication bias. In areas of surgery where results are not in general good this can result in a lack of evidence to inform practice. One of the few papers to break this trend in the area of slipped capital epiphysis has come from **Boston (USA)**. In an honest paper

from Boston Children's Hospital, a centre of paediatric orthopaedic excellence, they describe the short-term (2.6 years) outcomes of this controversial area of orthopaedic treatment. The paper concerns a retrospective series of 43 consecutive adolescent patients with moderate (6) to severe (37) slipped capital femoral epiphysis who were treated with a modified Dunn procedure. They use a very small modification from Dunn's actual description to reduce the trauma of hip dislocation. Twenty-six patients had stable slips (0% AVN rate) and were 17 unstable (47% AVN rate). Twenty-two complications occurred in 16 patients. Ten (23%) patients developed AVN. Four (9%) had femoral neck non-union and two patients (5%) sustained a post-operative hip dislocation. The patients were treated by four different surgeons. The surgeon who did the majority of the surgery, 30 cases (70%), had a complication rate of 17% with only two AVN and two nonunions. They have, as a consequence of these results, changed their practice. The high volume surgeon must be present for each of the modified Dunn procedures. They have also modified their protocol so that only patients with acute severe epiphyseal displacement with minimal chronic remodeling of the metaphysis presenting within 24 hours of the slip be considered. Patients who do not meet these inclusion criteria are treated with in-situ pinning *versus* anterior open reduction, depending on the chronicity and severity of the slip. The potential for future surgery is discussed with the patient and family to deal with the residual femoral neck deformity.⁵ Taking a more global view, it is interesting to us at 360 that this practice, following the devastating results of the Dunn osteotomy in the hands of anyone



but Dunn, had been adopted in much of the UK at least 20 years ago. It is disappointing that it seems, on surprisingly regular occasions, that the same lessons have to be learnt on both sides of the Atlantic.

I've got a bad feeling about this....

■ Clinical intuition is a widely recognised, but under-evidenced, thing. It is perhaps impossible to quantify the value of an experienced clinician's 'gut instinct'. Believe it or not, however, this is precisely what primary care doctors in **Flanders (Belgium)** have tried to do.

They have designed an interesting study to test the hypothesis that a clinician's intuition may be important in assessing the severity of children's infection. They conducted an observational study of 3890 children presenting to primary care physicians. Their presenting features, laboratory findings, and the doctor's 'intuitive response' at the time of first consultation were all recorded, as was the eventual diagnosis from secondary care. There were six patients (0.2%) who, despite a clinical and laboratory assessment of 'non-severe' illness, were subsequently admitted to hospital with serious infections. Quite amazingly, 'gut feeling' substantially increased the risk of serious illness (likelihood ratio 25.5) and would have been able to prevent 33% of serious illnesses in this cohort. This would, however, have been at the cost of 44 false alarms (1.3%). The clinical features recorded in the study that were most strongly associated with poor gut feeling were the children's mental state (drowsiness, no laughing), abnormal breathing, weight loss, and convulsions. The only contextual factor that was of significance was parents' concern that the illness was different (odds ratio 36.3, 95% confidence interval 12.3 to 107).⁶ This

is a fascinating study that piqued our interest here at 360. Despite the relatively small numbers, it makes a number of good clinical and research point. The most interesting of which is not that intuition works, but that a number of factors can be identified as associated with 'gut feeling'.

The best way to apply the eight-plate?

■ Guided growth has taken off as a technique to correct deformity or limb length in the lower limb. There has been much debate (some included in these pages previously) as to the best way to plan and achieve what can be complex corrections with the eight-plate. Researchers in **Baltimore (USA)** have taken to the saw bones with a biomechanical study to establish the biomechanically optimal configuration of plate and screws to control coronal plane correction.⁷ In what turned out to be an interesting biomechanical study using a saw bone and rail model, the authors designed this study to compare the effectiveness of screw length, eight-plate size and screw configuration on achieving coronal plane correction. In summary, only screw configuration appeared to have any major influence, screws parallel to the physis being the most effective configuration followed by hyper-divergent and then divergent. This simple paper has a very straightforward message – screws parallel to the physis are important in obtaining maximal correction with the eight-plate.

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