Current Orthopaedics (2007) **21**, 115–121

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Current ORTHOPAEDICS

MINI-SYMPOSIUM: CHILDREN–OSTEOTOMIES AROUND THE HIP

(v) Proximal femoral osteotomy in childhood

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KEYWORDS
Osteotomy;
Femur;
Legg–Calve–Perthes disease;
Congenital dislocation of the hip;
Cerebral palsy;
Slipped capital femoral epiphysis;
Coxa vara

Summary
Abnormalities of the proximal femur in children range from teratologic hip dislocation and congenital coxa vara seen at birth to acquired disorders such as Legg–Calve–Perthes disease and slipped capital femoral epiphysis in later life. Left untreated, these conditions may lead to long-term morbidity in adulthood, ranging from early degenerative joint disease to complete inability to walk. However, treatment itself can be associated with significant complications such as avascular necrosis of the femoral head and chondrolysis, as well as the general risks of surgery. Optimal treatment requires careful consideration and planning and, importantly, involvement of parents in the decision-making process. Many of these conditions can be treated with a readjustment osteotomy of the proximal femur sometimes associated with a pelvic osteotomy. Prompt and timely intervention in the hands of an experienced surgeon can produce excellent results.

Congenital dislocation of the hip (CDH)

CDH is more correctly referred to as *developmental dysplasia of the hip* (DDH) as few hips are truly dislocated at birth. Hip dislocations in the neonate are thought to be due to teratologic factors. The incidence of late DDH is approximately 2 per 1000 live births, compared to neonatal hip instability of 5–20 per 1000. The majority of these spontaneously stabilise. For 60% of neonates with hip instability no known risk factor(s) can be identified. In 20% of cases both hips are unstable. There are, however, well-documented risk factors such as a positive family history, female sex, firstborn children, oligohydramnios, high birth weight and breech presentation. Girls are affected more than boys at a ratio of 5:1. Breech presentation, particularly with extended knees, increases the incidence by a factor of 10. Other congenital anomalies including torticollis, metatarsus adductus, congenital talipes equinovarus (CTEV), congenital vertical talus (CVT) and calcaneovalgus (CV) are associated with DDH.

As part of routine post-natal screening, the hips are clinically examined by employing the Ortolani and Barlow tests. These tests become less appropriate in the older infants because secondary signs develop (restriction of abduction, shortening, and thigh crease asymmetry). A toddler with DDH will often be noted to have asymmetric limb lengths and will walk with a limp.

Static and dynamic ultrasonography is of value in the assessment and treatment of DDH. Management is dictated by the degree of hip instability, the mainstay of treatment being the abduction harness. Failure to respond to treatment,

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doi:10.1016/j.cuor.2007.04.007

or delay in presentation, results in more invasive treatment, namely an arthrogram, adductor tenotomy, with open or closed reduction of the dislocation.[1]

Hip dislocation in the older child (Fig. 1) poses a greater challenge. Children presenting beyond the age of 2 years inevitably require an open reduction and are also likely to require a femoral shortening osteotomy to locate the hip without undue femoral head compression.

In the infantile hip, femoral neck anteversion and the neck shaft angle are increased. It is also well known that the dysplastic acetabulum is deficient anterosuperiorly. Surgical corrections of these alterations is important.[1,2]

In the planning stage of surgical correction of the dislocated hip in the older child the parents are counselled about the need not only for an open reduction of the hip but also for a varus derotation, shortening osteotomy. This type of osteotomy is aimed at redirecting the head of the femur both medially and posteriorly, maximising its containment in an otherwise deficient acetabulum.

At the time of surgery the hip joint is approached anteriorly through a Smith–Peterson approach. A capsulotomy is performed and the true floor of the acetabulum is identified. Structures blocking reduction are addressed, notably the ligamentum teres, the pulvinar (fat pad) and the limbus. A trial reduction of the hip is then undertaken with the hip in a position of abduction and internal rotation.

A second incision is made to approach the lateral femur and a Coventry lag screw is placed in the femoral neck distal to the capital epiphysis. This gives control of the proximal fragment prior to performing subperiosteal subtrochanteric shortening osteotomy sufficient to allow femoral head reduction without tension. The degree of varus is assessed by reducing the hip and the Coventry plate contoured accordingly. The femur is then derotated to bring the foot into a normal anatomical position. The osteotomy is secured with screws through the Coventry plate (Fig. 2).

Femoral head stability is improved with a capsulorrhaphy and all wounds are closed. The osteotomy is protected with a spica cast (Fig. 3) for 6 weeks, at which point it is converted to a broomstick plaster to maintain abduction for a further 6 weeks. The broomstick plaster is exchanged for night splints for 6 weeks. The implants are removed at 4–6 months post-operatively. Residual acetabular dysplasia is addressed by a later pelvic osteotomy.

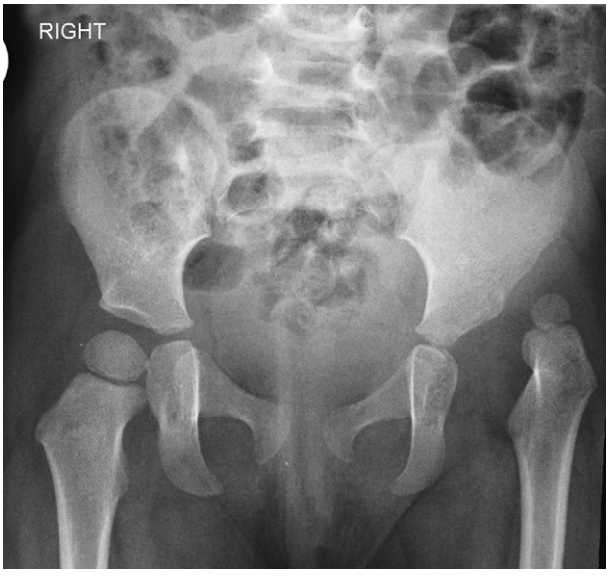

Figure 1 Late-presenting left-hip dislocation.

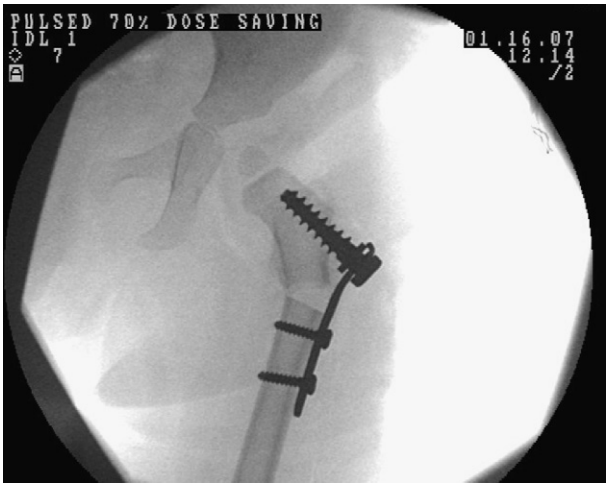

Figure 2 Intraoperative image intensifier image following varus derotation osteotomy and final placement of metalwork.

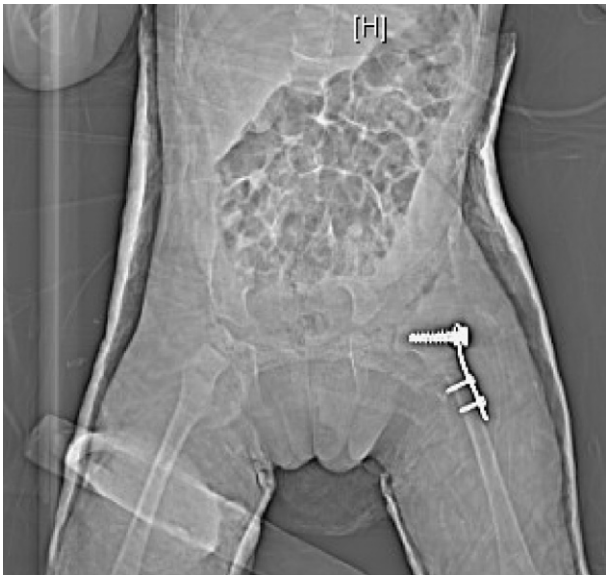

Figure 3 Post-operative CT scan scout image demonstrating hip relocation and the one and a half spica.

Cerebral palsy

Cerebral palsy is a new progressive abnormality of the central nervous system, resulting in an impairment of motor function. The neurological insult occurs before the age of 2 years but the musculoskeletal manifestations may worsen throughout later life.

The most common musculoskeletal deformity associated with cerebral palsy is equinus of the foot followed by hip displacement. Neurological subluxation or dislocation of the