

## Welcome to the: Orthopaedic Opinion Online Website

The website for the answer to all your Orthopaedic Questions

- **Orthopaedic Opinion Online** is a website designed to provide information to patients who have orthopaedic and musculoskeletal problems and are undergoing treatment.
- **Patient information** is provided in the form of downloadable information sheets.
- **Orthopaedic advice** and second opinions can be provided by our expert internationally renowned Consultant Orthopaedic Surgeons.
- **Online review** of patients' X rays or MRI scans can also be provided and any proposed treatment plans reviewed.
- **Book a clinical consultation** with one of our internationally renowned consultant orthopaedic surgeons in Bristol or London.
- **Orthopaedic reports** can be provided for Injury or Accident Claims and Medical Negligence claims.

**This Patient Information Sheet is provided by Orthopaedic Opinion Online**

## Developmental Dysplasia of the Hip

Key words: Congenital dislocation of the hip, hip pain, limp, CDH, Arthritis, physiotherapy, joint replacement, anti-inflammatory medication, Pavlick harness, hip splintage, pelvic osteotomy, hip ultrasound.

**Synonyms and related keywords:** DDH, developmental dislocation of the hip, congenital dislocation of the hip, CDH, hip dysplasia, hip subluxation, hip dislocation, teratologic hip dislocation, hip instability, displaced hip, dislocated hip

**Introduction:** The term congenital dislocation of the hip dates back to the time of Hippocrates. This condition, also known as hip dysplasia or developmental dysplasia of the hip (DDH), has been diagnosed and treated for several hundred years. This disorder is still referred to as congenital dislocation of the hip.

Ortolani and Galeazzi first described congenital dislocation of the hip. Ortolani, an Italian pediatrician in the early 1900s (Ortolani, 1976), and Galeazzi later reviewed more than 12,000 cases of DDH and reported the association between apparent shortening of the flexed femur and hip dislocation.

The definition of CDH is not universally agreed upon. Abnormal development of the hip includes the osseous structures, such as the acetabulum and the proximal femur, and the labrum, capsule, and other soft tissues. Other terms used to describe the condition; these are defined as follows:

- Subluxation is incomplete contact between the articular surfaces of the femoral head and acetabulum.
- Dislocation is complete loss of contact between the articular surface of the femoral head and acetabulum.
- Instability is the ability to subluxate or dislocate the hip with passive manipulation.

**Frequency:** The frequency is reported as 1 case per 1000 children. Many patients with DDH at birth stabilise. According to a study by Barlow the instance of hip instability during newborn examinations was as high as 1 case per 60 newborns (Barlow, 1962). According to that study,

more than 60% became stable by age 1 week and 88% became stable by age 2 months, leaving only 12% (of the 1 in 60 newborns, or 0.2%) with residual hip instability.

**Aetiology:** The etiology is multifactorial. One factor is racial background; among Native Americans and Laplanders, the prevalence of hip dysplasia is much higher (nearly 25-50 cases per 1000 persons), and the prevalence is very low among southern Chinese and African American populations (Getz, 1955; Hoaglund, 1973; Rabin, 1965; Skirving, 1979). The frequency of hip dysplasia is ten times higher than normal children whose parents had DDH (Bjerkreim, 1978).

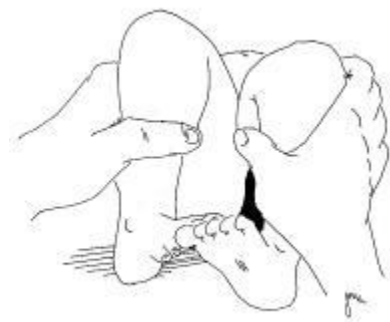
Female children, the first-born child, and breech positioning are all associated with an increased prevalence of DDH. The left hip is more commonly associated with DDH than the right, and this is believed to be due to the common intrauterine position of the left hip against the mother's sacrum, forcing it into an adducted position (Dunn, *Clin Orthop* 1976 119:11-22). Children in cultures in which the mother swaddles the baby, forcing the hips to be adducted, also have a higher rate of hip dysplasia (Kutlu, 1992).

**Clinical:** Early clinical manifestations of DDH are identified during examination of the newborn. The classic examination finding is revealed with the Ortolani manoeuvre; a palpable "clunk" is present when the hip is reduced in and out of the acetabulum and over the neolimbus. The Ortolani sign is referred to as a clunk, felt when the hip reduces into the acetabulum, with the hip in abduction.

Late clinical examination, when the child is aged 3-6 months, is quite different. At this point, the hip, if dislocated, is often dislocated in a fixed position (Bjerkreim, 1978). The Galeazzi sign is a classic identifying sign for unilateral hip dislocation (see [Image 1](#)). This is performed with the patient lying supine and the hips and knees flexed. Examination should demonstrate that one leg appears shorter than the other. Although this is usually due to hip dislocation, realizing that any limb length discrepancy results in a positive Galeazzi sign is important. Additional physical examination findings for late dislocation include asymmetry of the gluteal thigh or labral skin folds, decreased abduction on the affected side, standing or walking with external rotation, and leg length inequality.

Bilateral dislocation of the hip, especially at a later age, can be quite difficult to diagnose. This often manifests as a waddling gait with hyperlordosis. Many of the aforementioned clues for a unilateral dislocated hip are not present, such as the Galeazzi sign, asymmetrical thigh and skin folds, or asymmetrically decreased abduction. Careful examination is needed, and a high level of suspicion is important.

**Early diagnosis** is the most crucial aspect of the treatment of children with DDH. The use of ultrasonography and other diagnostic imaging modalities and the implementation of improved educational programs will most likely decrease the number of children with DDH diagnosed late. Newer, less invasive surgical techniques (eg, endoscopic techniques, image-guided surgery) are currently being developed in an effort to decrease the morbidity of surgery and to ease recovery.



The Galeazzi Sign

**The Natural History** of hip dysplasia depends, in part, on the severity of the disease, bilaterality, and whether or not a false acetabulum is formed (Wedge, 1978). Unilateral dislocations result in significant leg length inequality, with a gait disturbance and possibly associated hip and knee pain. The development of a false acetabulum is associated with a poor outcome in approximately 75% of patients. Bilateral hip dislocation in a patient without false acetabuli has a better overall prognosis. In fact, a case was reported of a 74-year-old man with no history of hip or thigh pain whose dislocated hips were only discovered shortly before his death (Milgram, 1976).

Indications for treatment depend on the patient's age and the success of the previous techniques. Children younger than 6 months with instability upon examination are treated with a form of bracing, usually a Pavlik harness. If this is not effective or if the hip instability or dislocation is noted when the child is older than 6 months, closed reduction is typically recommended, often with traction prior to the reduction. When the child is older than 2 years or with failure of the previous treatment, open reduction is considered. If the patient is older than 3 years, femoral shortening is performed instead of traction, with additional varus applied to the femur if necessary. A patient with residual acetabular dysplasia who is older than 4 years should be treated with an acetabular procedure.

Treatment for DDH that is diagnosed when the patient is a young adult can be considered for residual acetabular dysplasia. Unfortunately, radiographic characterization of DDH that is severe enough to lead to early osteoarthritis is difficult.

#### **Imaging Studies:**

- Ultrasound has been of significant benefit in the assessment and treatment of children with hip dysplasia. Ultrasound can be used for the screening of children. It is generally reserved for high-risk infants or those with positive clinical examination or when monitoring early treatment.
- Radiographs or X-rays can demonstrate the anatomy particularly in older patients.
- A CT scan can also be helpful in determining the position of the femur and covering acetabulum. Three-dimensional images are also quite popular and can be beneficial in visualizing the overall shape of the acetabulum.
- MRIs can be beneficial in identifying the underlying bony and soft tissue anatomy.

#### **Diagnostic Procedures:**

- Arthrograms are dynamic studies, performed by injecting dye into the hip joint and examining the patient with aid of fluoroscopy, usually with the patient under anesthesia. This can be useful in determining reduction or a labral fold or tear at the edge of the acetabulum.

**Non Surgical Management:** The treatment of hip dysplasia begins with a careful examination of the newborn. If evidence of instability is present, a strap called a Pavlik harness can be successfully used if fitted properly (Mubarak, 1981; Pavlik, 1992; Viere, 1990). Fitting should be checked within the first week and then weekly thereafter. Carefully monitoring the patient to ensure the harness fits and the hips are reduced is important. Ultrasonography is an excellent means of documenting the reduction of the hip in the Pavlik harness and should be performed early in the course of treatment (Suzuki, 1993). The Pavlik harness is less successful in patients older than 6 months (Weinstein, 2001). At this stage a closed reduction may be attempted with traction. A splint or cast is then used to maintain stability.

**Surgical Treatment:** Open reduction is the treatment of choice for children older than 2 years at the time of initial diagnosis or following failure of non surgical management. Surgical correction may be to the femur, labrum, acetabulum or to the pelvis to ensure a properly sited hip joint. A plaster cast is usually worn followed by a splint. Overall, the prognosis for children treated for hip dysplasia is very good, especially if the dysplasia is managed with closed treatment. If closed treatment is unsuccessful and open reduction is needed, the outcome is less favorable, although short-term outcome appears to be satisfactory. If secondary procedures are needed to obtain reduction, then the overall outcome is significantly worse.

- Barlow TG: Early diagnosis and treatment of congenital dislocation of the hip. *J Bone Joint Surg Br* 1962; 44: 292.
- Bjerkreim I, Arseth PH: Congenital dislocation of the hip in Norway. Late diagnosis CDH in the years 1970 to 1974. *Acta Paediatr Scand* 1978 May; 67(3): 329-32[[Medline](#)].
- Dunn PM: Perinatal observations on the etiology of congenital dislocation of the hip. *Clin Orthop* 1976 Sep; (119): 11-22[[Medline](#)].
- Dunn PM: The anatomy and pathology of congenital dislocation of the hip. *Clin Orthop* 1976 Sep; (119): 23-7[[Medline](#)].
- Getz B: The hip joint in Lapps and its bearing on the problem of congenital dislocation. *Acta Orthop Scand Suppl* 1955; 18: 1-81[[Medline](#)].
- Hoaglund FT, Yau AC, Wong WL: Osteoarthritis of the hip and other joints in southern Chinese in Hong Kong. *J Bone Joint Surg Am* 1973 Apr; 55(3): 545-57[[Medline](#)].
- Kutlu A, Memik R, Mutlu M, et al: Congenital dislocation of the hip and its relation to swaddling used in Turkey. *J Pediatr Orthop* 1992 Sep-Oct; 12(5): 598-602[[Medline](#)].
- Milgram JW: Morphology of untreated bilateral congenital dislocation of the hips in a seventy-four-year-old man. *Clin Orthop* 1976 Sep; (119): 112-5[[Medline](#)].
- Ortolani M: Congenital hip dysplasia in the light of early and very early diagnosis. *Clin Orthop* 1976 Sep; (119): 6-10[[Medline](#)].
- Pavlik A: The functional method of treatment using a harness with stirrups as the primary method of conservative therapy for infants with congenital dislocation of the hip. 1957. *Clin Orthop* 1992 Aug; (281): 4-10[[Medline](#)].
- Ponseti IV: Growth and development of the acetabulum in the normal child. Anatomical, histological, and roentgenographic studies. *J Bone Joint Surg Am* 1978 Jul; 60(5): 575-85[[Medline](#)].
- Ponseti IV: Morphology of the acetabulum in congenital dislocation of the hip. Gross, histological and roentgenographic studies. *J Bone Joint Surg Am* 1978 Jul; 60(5): 586-99[[Medline](#)].
- Skirving AP, Scadden WJ: The African neonatal hip and its immunity from congenital dislocation. *J Bone Joint Surg Br* 1979 Aug; 61-B(3): 339-41[[Medline](#)].
- Viere RG, Birch JG, Herring JA, et al: Use of the Pavlik harness in congenital dislocation of the hip. An analysis of failures of treatment. *J Bone Joint Surg Am* 1990 Feb; 72(2): 238-44[[Medline](#)].
- Wedge JH, Wasylenko MJ: The natural history of congenital dislocation of the hip: a critical review. *Clin Orthop* 1978 Nov-Dec; (137): 154-62[[Medline](#)].
- Weinstein SL: Developmental hip dysplasia and dislocation. In: Morrissy RT, Weinstein SL, eds. *Lovell and Winter's Pediatric Orthopaedics*. Philadelphia, Pa: Lippincott Williams & Wilkins; 2001: 905-35.

Disclaimer: The views expressed in this article are not necessarily those of Orthopaedic Opinion Online or the author. The information is provided for general background reading only and should not be relied upon for treatment. Advice should always be taken from a registered medical practitioner for individual circumstances and for treatment of any patient in any circumstances. No liability is accepted by Orthopaedic Opinion Online, or the author in respect to the information provided in respect of the content or omission or for any reason or as a result of treatment in individual circumstances. This information is not for use in the USA.

