

## Case Study of the Month: June 2008

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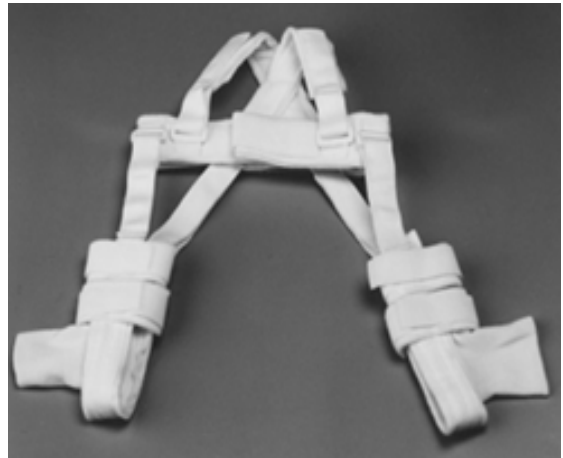
### Diagnosis: Developmental Dysplasia of the Hip (DDH)

**History of Present Illness:** The patient is a 5 day-old female who was referred to the pediatric orthopaedic clinic for evaluation of a left hip clunk. She was born full term (39 weeks) via c-section due to breech presentation. She is a first born child and her birth weight was 7 lbs 6 oz. She was noted to have a hip clunk on examination and was referred for possible hip dysplasia. There is no family history of hip dysplasia or other orthopaedic abnormalities. This is her first visit to the pediatric orthopaedic clinic.

**Physical Examination:** Height 20 inches, Weight 7lbs 2 oz, VSS, NAD, alert female infant, appears well. Heart RRR, Chest clear bilaterally, skin is normal, moves all extremities spontaneously, spine is straight with no cutaneous abnormalities, Feet are normal bilaterally, no equinovarus deformity, FROM, Normal neurologic examination with normal neonatal reflexes, excellent muscle tone throughout. Examination of her hips reveals a positive Barlow (**Figure 1**) on the left with an obvious clunk, there is also a positive Ortolani and asymmetric thigh skin folds are noted.



**Figure 1:** Barlow Examination



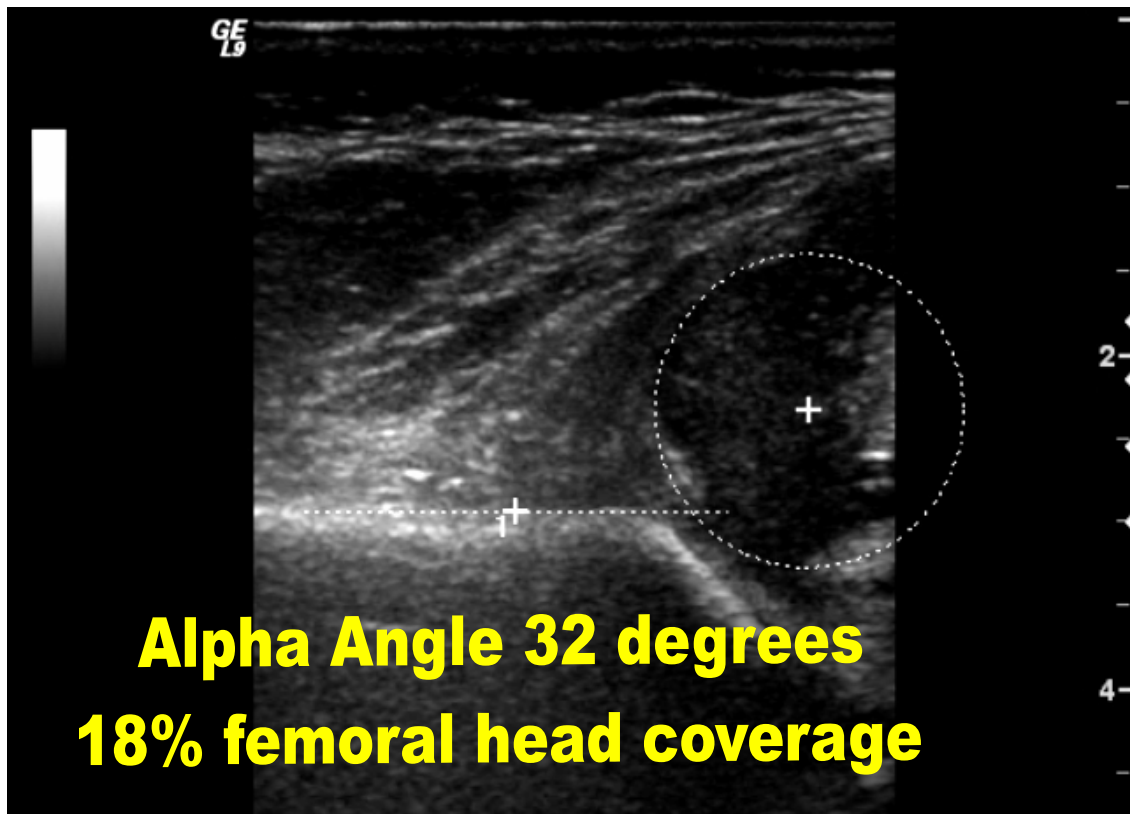
**Figure 2:** Pavlik Harness

Because there was an obvious Barlow sign confirming instability, the diagnosis of developmental hip dysplasia (DDH) was made and treatment was initiated. There are several known risk factors for developing DDH. One easy way to remember four of the common risk factors is the 4 F's—first born, female, foot first (breech position) and family history. There is also an increased incidence in premature

infants and those with conditions that are commonly associated with ligamentous laxity (ex: Trisomy 21, Larson syndrome)

Treatment of DDH in the newborn involves placement of a Pavlik Harness which places the hip in an optimum position of flexion and abduction (**Figure 2**). Generally the harness is worn full-time for 6-8 weeks or until the hip dysplasia has resolved. Ultrasound is used to confirm the diagnosis of DDH if it is suspected and is also used to confirm improvement of the dysplasia during treatment with a Pavlik harness. Generally, follow-up ultrasounds are obtained every 2-3 weeks until the values have completely normalized. Ultrasound is used in lieu of x-rays because the femoral head is not ossified until approximately 5-6 months of age.

**Case Study Radiographic Studies**—An ultrasound was obtained when the baby was approximately 2 weeks of age which confirmed continued Left DDH with a decreased alpha angle and decreased femoral head coverage (**Figure 3**). The patient was continued in her Pavlik Harness full-time (**Figure 4A & B**).



The ultrasound will give information on the angle of the acetabulum (hip socket) (alpha angle) and on the percentage of the femoral head that is covered by the socket (femoral head coverage). **In general, a normal ultrasound is an alpha angle of >60 degrees with >50% femoral head coverage.**

The Pavlik harness treatment is continued until these values have normalized. If there is no improvement after 3-4 weeks in the Pavlik or if there is interval worsening, the harness treatment is generally discontinued and the patient will be scheduled for a closed versus open reduction and spica casting. Older infants (>6 months of age) and young children presenting with DDH will generally require operative intervention consisting of closed/open reduction, femoral/acetabular osteotomy with internal fixation and spica casting.



**Figure 4A & B:** Patient at approximately 4 weeks of age wearing Pavlik harness. Note proper fit of Pavlik harness, hips in flexion and abduction, feet in external rotation.

**Case Study:** Con't--The patient had a follow up visit at approximately 7 weeks of age that revealed complete normalization of the ultrasound. The alpha angle measured 62 degrees, and there was approximately 55% femoral head coverage bilaterally. The Pavlik harness was discontinued and a follow-up appointment was scheduled for 4 months (when the patient will be 6 months) for a repeat clinical examination and to obtain an AP x-ray of the pelvis.

**Brief Discussion:** Developmental hip dysplasia (DDH) includes a very wide spectrum of abnormality from a frank dislocation (very unstable) to a stable hip with a slightly shallow acetabulum. As many of these findings may not be present at birth, the term developmental more accurately reflects the biologic features than does the term congenital. The current treatment algorithm for DDH depends on both the severity of the abnormality and the age of the infant/child at the time of diagnosis. The treatment may include observation, Pavlik harness, closed and/or open reduction, spica (body) cast as well as several other surgical procedures. Early detection and diagnosis of DDH allows for simpler and much more efficient treatment (Pavlik Harness). The management of DDH is aimed towards early detection, treatment, and prevention or early recognition of complications.

For more information on DDH—see Hart et al (2006) Developmental dysplasia of the hip: Nursing implications and anticipatory guidance for parents. *Orthopaedic Nursing*, 25(2): 100-110.