Evaluation and Treatment of Developmental Hip Dysplasia in the Newborn and Infant

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KEYWORDS

• Developmental hip dysplasia • Acetabular dysplasia • Hip subluxation
• Hip dislocation • Ortolani maneuver • Swaddling

KEY POINTS

- Research over the past decade has reinforced most of the principles and recommendations of the 2000 American Academy of Pediatrics' *Clinical Practice Guideline*: *Early Detection of Developmental Dysplasia of the Hip*.
- A reasonable goal for the primary care physician should be to prevent hip subluxation or dislocation by 6 months of age using the periodic examination.
- The Ortolani maneuver, in which a subluxated or dislocated femoral head is *gently* reduced into the acetabulum with hip abduction by the examiner, is the most important clinical test for detecting dysplasia in the newborn.
- Safe swaddling, in which the hips are not extended and does not restrict hip motion, does not increase the risk for developmental hip dysplasia.
- Despite best practice, young adults will still present with hip dysplasia that was not detected at birth.

Video of the Ortolani maneuver accompanies this article at http://www.pediatric.theclinics.com/

INTRODUCTION

Developmental dysplasia of the hip (DDH) encompasses a spectrum of physical and imaging findings, ranging from mild temporary instability to frank dislocation. The

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child's hip will not develop normally if it remains unstable and anatomically abnormal by walking age. Therefore, careful physical examination of all infants to diagnosis and treat significant DDH is critical to provide the best possible functional outcome. Regardless of the practice setting, all health professionals who care for newborns and infants should be trained to evaluate the infant hip for instability and provide appropriate and early conservative treatment or referral. Unfortunately, musculoskeletal training in primary care residency programs and postgraduate education has received less attention than the prevalence of the condition warrants. Despite a normal newborn and infant hip examination, a late-onset hip dislocation still occurs in approximately 1 in 5000 infants as well as dysplasia in young adults.

INCIDENCE AND RISK FACTORS

The incidence of DDH varies from 1.5 to 25.0 per 1000 live births, depending on the criteria used for diagnosis, the population studied, and the method of screening. Relative risk rates are stated in the American Academy of Pediatrics' (AAP) 2000 clinical practice guidelines, and the overall DDH risk is about 1 per 1000. Traditional risk factors for DDH include breech position, female sex, being the first born, and a positive family history. Breech presentation is probably the most important single risk factor, with DDH reported in 2% to 20% of male and female infants presenting in the breech position.[1,2] Frank breech in a girl, with the hips flexed and knees extended, seems to have the highest risk. However, approximately 75% of DDH occurs in female infants without any other identified risk factors, so a careful physical examination of all infants' hips is required.[1]

The risk for DDH also depends on environmental factors. Newborn infants have hip and knee flexion contractures because of their normal intrauterine position. These contractures resolve over time with normal developmental maturation. Animal studies have shown that forced hip and knee extension in the neonatal period leads to hip dysplasia and dislocation because of increased tension in the hamstring and iliopsoas muscles that stresses the hip capsule, which may have underlying laxity or instability.[3] Comprehensive ultrasound screening during the immediate newborn period has demonstrated hip laxity in approximately 15% of infants.[4,5] The combination of capsular laxity and abnormal muscle tension is the most likely mechanism of DDH for infants who are maintained with the lower extremities extended and wrapped tightly together. In contrast, cultures that carry their children in the straddle or jockey position, common in warmer climates, have very low rates of hip dislocation compared with cultures that wrap their infants tightly with the lower limbs together and extended (**Fig. 1**).[6]

NATURAL HISTORY

The natural history of mild dysplasia and instability noted in the first few weeks of life is typically benign, with up to 88% resolving by 8 weeks of age.[7] However, the natural history of a child's hip that remains subluxated or dislocated by walking age is poor. Normal development of the hip joint depends on a femoral head that is stable and concentrically reduced in the acetabulum, a requirement for both to form spherically. Looseness or laxity within the acetabulum is termed *instability*. A nonconcentric position is termed *subluxation.* The deformity of the femoral head and acetabulum is termed *dysplasia*. With dislocation or severe subluxation, during the second half of infancy and beyond, limited hip abduction occurs, which the parent may notice during diaper change. As the child reaches walking age, a limp and lower-limb-length discrepancy may be apparent.