quality of life. Population screening using ultrasound has been practiced in Europe [I-3, I-10, I-19, I-20] and with an uncertain role in North America [I-1. I-2, I-8].

NATURAL HISTORY

Published works on the topic of DDH have used inconsistent terminology to describe abnormalities and have not clarified which recognized abnormalities of the hip in the newborn and early infancy are progressive and pathologic versus self-resolving and potentially within a range of normal development. As a part of the development of this clinical practice guideline, the workgroup attempted to identify as best as possible, the natural history of clinically unstable or ultrasound or radiographically abnormal hips detected in infancy with the natural duration of self-correction. The details of the review are listed in the natural history of DDH appendix within this CPG. The long-term natural history of DDH appears to be related to the type and severity of the hip abnormality. Mild dysplasia may never manifest clinically or become apparent until adult life, whereas severe dysplasia can present clinically with functional limitations during childhood. Interventions to alter the long- term natural history of DDH have included early bracing and a progressive range of manipulative and surgical options with advancing age of the child [I-31 to I-43]. In this review, included articles were examined specifically for information related to the resolution of clinical instability or ultrasound and radiographic hip dysplasia in untreated infants. All of the studies identified for this review indicate that most DDH discovered during the newborn period appear to represent hip laxity and immaturity. Approximately 60%–80% of abnormalities identified by physical examination and more than 90% identified by ultrasound (US) appear to resolve spontaneously in early infancy raising significant questions about whether or not such hips should be treated with bracing and at what age such treatment should be optimally applied.

ETIOLOGY

The etiology of DDH in typically developing children is unknown. Both genetic and environmental influences appear to play a role in the development of this condition [I-10, I-21]. Absence of a femoral head from within an acetabulum and alteration of proximal femoral anatomy has been linked to progressive changes of the acetabulum over time [I-22]. Risk factors for the development of progressive hip abnormality have been reported in observational series and are reported in the next section.

RISK FACTORS

The terminology used in defining risk factors for the presence of DDH is not precise in the published literature. Hip physical examination findings associated with DDH have semantic challenges, limited knowledge of normal ranges, and knowledge that the examination findings change over time. Case control and observational studies have suggested that "breech positioning at delivery, family history of DDH, limited hip abduction, talipes, female gender, swaddling, large birth size, and first born" have been associated with a higher probability of finding DDH [I-2, I-8, I-23].

EMOTIONAL AND PHYSICAL IMPACT

The emotional impact upon a family of detecting a non-apparent musculoskeletal problem in a newborn is unknown. There may be emotional impact upon parents who are given false positive screening information [I-24].

POTENTIAL BENEFITS, HARMS, AND CONTRAINDICATIONS

Most treatments are associated with known risks. In the case of screening and early intervention programs, potential harms may be related to either over diagnosis with increased rates of further evaluation and treatment that may be unnecessary and to under diagnosis that can lead to a late diagnosis with progression of deformity. Clinician input based upon experience decreases the probability of harms in both scenarios.

View background material and data summaries via the CPG eAppendix