

Mechanics of Developmental Dysplasia of the Hip (DDH): A study of the biomechanics of closed hip reduction in neonates

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Abstract

DDH is an abnormal condition where hip joint dislocation, misalignment, or instability is present in infants. Rates of incidence of DDH in newborn infants have been reported to vary between 1 and 20 per 1000 births, making it the most common congenital malformation. DDH early detection and treatment is critical to avoid the use of surgical treatment in infants and to prevent future complications in adult life. To this day treatment is based on empirical methods that often depend on physician expertise or trial-error procedures. Dr. Huayamave has quantified the effects of passive muscle forces in subtle and severe dislocations. His approach provides three main advantages and innovations: 1) the use of patient-specific geometry to elucidate the biomechanics of DDH; 2) the ability to computationally dislocate the model to represent physiological dislocation severity; and 3) the quantification of external forces needed to accomplish hip reduction.