Prevention of Hip Dislocation in Cerebral Palsy.

Background:
Children with cerebral palsy (CP) have an increased risk for hip dislocation which often causes pain, scoliosis and contractures. CPUP is a follow-up programme for children with CP that was initiated in 1994 in Sweden and since 2005 CPUP is a national health care quality register. The follow-up programme includes clinical and radiological examinations to prevent development of hip dislocation and severe contractures. The programme is adjusted to the child’s gross motor function according to Gross Motor Function Classification System (GMFCS) I-V where a higher level corresponds to a more reduced gross motor function. The hips are examined radiographically once a year (GMFCS III-V) until the age of eight, thereafter individually.

Article 1: is a retrospective longitudinal cohort study of all 24 children in Skåne and Blekinge who have been treated with unilateral femur osteotomy with a follow up of at least five years (1994-2005). The development of both the operated and the contralateral hip was analysed. During time of follow up two children needed contralateral hip surgery. The conclusion was that bilateral surgery by routine, that is often advocated, is not necessary. Larsson M, Hägglund G, Wagner P. Unilateral varus osteotomy of the proximal femur in children with cerebral palsy: a five-year follow-up of the development of both hips. J Child Orthop. 2012;6(2):145-51.

Article 2: is a retrospective longitudinal study with analysis of the Head-shaft angle (HSA) as a potential risk factor for hip displacement (MP >40%). 145 children from Skåne, Blekinge, Skaraborg and Gothenburg were included in the study. Inclusion criteria were children in GMFCS level III-V, MP <40% at time of first radiographic examination and a follow up of five years (n=91) or development of MP >40% of either hip (n=51). The study showed that a high Head-shaft angle increases the risk of hip displacement (P<0.001) independently of age, MP and GMFCS-level.

Article 3: describes the development of the CPUP Hip Score with the same material as in article 2. The CPUP Hip Score determines the risk for hip displacement with MP >40% during the following five years by analysis of the actual age, GMFCS-level, MP and HSA. Odds ratio for hip displacement was calculated for these four parameters and CPUP Hip Score was constructed with multiple logistic regression analysis. The predictive ability of the Hip Score was high and was calculated with area under receiving operating curve (AUC) = 0.87. Hermanson M, Hägglund G, Riad J, Rodby-Bousquet E, Wagner P. Prediction of hip displacement in children with cerebral palsy: development of the CPUP hip score. Bone Joint J. 2015;97-B(10):1441-4.

Article 4: will be a ”nested” case-control study analysing the importance of clinical parameters for hip displacement in all children with CP in GMFCS levels III-V in Sweden (n~1500) registered in CPUP. The development of hip displacement, measured with MP, will be analysed related to muscle tone, range of joint motion (ROM) and presence of scoliosis. The children will be matched with GMFCS-level, age and sex. Population attributable risk will be calculated to estimate the effect of preventing the parameters that are identified in the population.
Afterword: The aim of the present thesis is to analyze which children with CP that are in risk for hip dislocation and what parameters that contributes to the risk, to be able to optimize follow up and guidelines for treatment in the CPUP health care programme.

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