

Longitudinal development of hand function in children with unilateral cerebral palsy

Marie Holmefur^{1,2}, Lena Krumlind-Sundholm¹, Ann-Christin Eliasson¹

¹*Karolinska Institutet, Stockholm, Sweden*, ²*Örebro University, Örebro, Sweden*

Introduction: Studies of development of hand function in children with unilateral cerebral palsy (CP) are sparse. For children with unilateral CP the ability to use the affected hand as an effective assist to the dominant hand in bimanual tasks may be the most important aspect of hand function in daily life. This ability can be assessed with the Assisting Hand Assessment (AHA).

Objective: The aim of this study was to describe how the usefulness of the hemiplegic hand develops in children with unilateral CP between 18 months and 8 years of age.

Methods: Forty-three children with unilateral cerebral palsy participated (22 male, 21 female). They were recruited at local rehabilitation centres and constituted a convenience sample. Inclusion age was 18 months - 5 yrs 4 months. Manual Ability Classification System (MACS) levels: I [n=7], II [n=25], III [n=11]. The children were assessed with the AHA over a period of ≥ 3 years, with 3 to 11 assessments per child. Children entered the study at different ages allowing evaluation of development from ages 18 months to 8 years. Estimated average motor development curves were fitted with a non-linear mixed effects model.

Results: Individual differences in development were considerable. Children with a high AHA score at 18 months (over 40 raw scores) reached a significantly higher ability level and at a higher progression rate than the children with a low 18-month AHA score. The children with high 18-month AHA score reached 90% of their limit at average age 3 years whereas the children with a low 18-month AHA score reached 90% of their maximum level at a mean age of 7. Similarly, the maximum level of development differed between children in MACS level I-III. The rate of change was similar in levels I and II and significantly slower, in level III.

Conclusion: This study shows that children with different ability levels all develop their way of using their hemiplegic hand during the preschool years. The AHA can be used to follow development over time and the AHA score at 18 months can be used for approximate prediction of development of assisting hand use.