The influence of intensive upper-extremity training on endurance and cardiac autonomic regulation system of children with unilateral cerebral palsy: a self-control clinical trial

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Background: An intensive hybrid program improves upper extremity function as well as walking endurance of children with unilateral cerebral palsy (UCP). Endurance improvement may be associated with the cardiac autonomic regulation system (CARS) adaptation, known to be impaired among these children. Objective*:* To examine the influence of an intensive hybrid program on CARS, walking endurance and the correlation with upper extremity function of children with UCP. Methods: 24 children aged 6-10 years with UCP participated in a hybrid program, 10 days, 6 hours per day. Data were collected pre-, post- and 3-months post-intervention. Main outcome measures included the Polar RS800CX for heart rate (HR) and heart rate variability (HRV) data, the 6-Minute Walk Test (6MWT) for endurance, and the Assisting Hand Assessment (AHA) and Jebsen-Taylor Test of Hand Function (JTTHF) for bimanual and unimanual function. Results*:* A significant reduction in HR and an increase in HRV at post- and 3-month post-intervention was noted ($chi^2_{2=}8.3$, p=0.016) along with a significant increase in 6MWT with a median increase of 81 meters ($chi^2_{2=}$ 11.0, p=0.004) at the same interval. A significant improvement was noted in unimanual and bimanual performance following the intervention. Conclusions*:* An intensive hybrid program effectively improved CARS function as well as walking endurance and upper extremity function in children with UCP.