The central role of trunk control in the gross motor function of children with cerebral palsy: a retrospective cross-sectional study

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AIM Improvement of gross motor function and mobility are primary goals of physical therapy in children with cerebral palsy (CP). The purpose of this study was to investigate the relationship between segmental control of the trunk and the corresponding gross motor function in children with CP.

METHOD This retrospective cross-sectional study was based on 92 consecutive referrals of children with CP in Gross Motor Function Classification System (GMFCS) levels I to V, 39 females, 53 males (median age 4y [range 1–14y]), and 77, 12, and 3 with spastic, dyskinetic, and ataxic CP respectively. The participants were tested using the Gross Motor Function Measure (GMFM), the Pediatric Evaluation of Disability Inventory (PEDI), and the Segemental Assessment of Trunk Control (SATCo).

RESULTS Linear regression analysis showed a positive relationship between the segmental level of trunk control and age, with both gross motor function and mobility. Segmental trunk control measured using the SATCo could explain between 38% and 40% of variation in GMFM and between 32% and 37% of variation in PEDI.

INTERPRETATION This study suggests a strong association between segmental trunk postural control and gross motor function and mobility with significant clinical implications for the treatment of children with CP.

One of the more recent and cited definitions of cerebral palsy (CP) includes the phrase ‘a group of permanent disorders of the development of movement and posture’. This disorder in the development of movement and posture produces a corresponding reduction in mobility, self-care, and social function in children with CP. Training interventions aim at improving the child’s motor function in the hope that this will improve the child’s levels of activity and participation, thus enhancing the child’s quality of life. There are a great variety of training interventions used by therapists to improve motor function by identifying and modifying deficits in the child’s motor system. A number of studies have shown a significant relationship between motor function and various impairments such as spasticity, quality of movement, postural stability, distribution of involvement, strength, range of motion limitations, and reduced endurance. A review of the assessment of postural control in children with CP concluded that a link between postural control and functionality was evident but that there was a lack of studies assessing postural control by means of scales and functional tests or during daily functional activities. One recent study has addressed this link between trunk control in sitting and gait in children with spastic diplegia and concluded that trunk movements during gait were not solely compensatory, but could also reflect an underlying trunk control deficit. Another study from the same group concluded that trunk control is impaired in children with CP, and that the impairment is dependent on the topography and severity of the motor impairment.

A recent review identified four clinical tools measuring trunk control: the Sitting Assessment of Children with Neuromotor Disability, the Trunk Control Measurement Scale, the Trunk Impairment Scale, and the Segmental Assessment of Trunk Control (SATCo). The Sitting Assessment of Children with Neuromotor Disability, Trunk Control Measurement Scale, and Trunk Impairment Scale are tests based on functional sitting abilities.