

Empowering mobility with a joystick-controlled drive unit for young children with disabilities- a case report

Background: Independent mobility is crucial for cognitive and motor development, activity and participation. Many children with disabilities have limited access to independent mobility, and children with cognitive impairments are particularly at risk of being excluded. Although powered wheelchairs are recommended when independent ambulation or effective manual wheelchair use is not feasible, most available devices are designed for older children with limited adaptability for younger users. Manual wheelchairs, in contrast, place high demands on upper-limb and trunk function. A joystick-controlled drive unit mounted on a manual wheelchair may provide a hybrid solution, enabling powered mobility while maintaining low weight, ease of transport, and the possibility for assisted steering needed. Evidence regarding the usability and effects of this solution in young children and children with intellectual disabilities remains limited.

Objectives: To evaluate the impact of a joystick-controlled drive unit mounted on a manual wheelchair on independent mobility and participation in young children with disabilities, and to explore suitability from a physiotherapy perspective.

Methods: A clinical case report including three children aged 3–6 years with varying motor and cognitive impairments, recruited from a Habilitation Centre. A joystick-controlled drive unit (E-drive) was fitted to each child's manual wheelchair. Learning of powered mobility was assessed at baseline and after six months using the Assessment of Learning Powered Mobility (ALP). Individualized goals were set and evaluated using Goal Attainment Scaling (GAS). Following a structured initial training period, the device was used in home, preschool, and school environments with regular follow-up. Driving time was recorded using the device's built-in logging system, and parents completed questionnaires regarding usability, independent mobility, and participation.

Results: All children completed the six-month follow-up. Two children improved their ALP level and demonstrated increased independent mobility in everyday environments. One child achieved all goals, one partially achieved the goals, and one showed no change. Device use ranged from daily to occasional and was influenced by motivation, cognitive abilities, and environmental context. Parents reported increased independence, initiative, and participation in two children. The device functioned reliably throughout the study period.

Conclusion:

A joystick-controlled drive unit may be a feasible and flexible option for young children with motor and cognitive disabilities, with potential to enhance independent mobility and participation. Individualized assessment, adequate training, and practice in familiar environments appear essential. Physiotherapists play a key role in assessment, training, and follow-up of powered mobility in this population.

References (5):

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