



# PEDIATRIC POWER MOBILITY: DETERMINING AND DEVELOPING READINESS

Independent mobility is important for children because it leads to cognitive and psychological development in addition to allowing children to move in ways they otherwise could not (Kermoian and Campos, 1998; Anderson et al, 2013). Independent movement is necessary for the development of areas such as depth perception, spatial search, and object permanence. The importance of mobility and its positive effect on cognitive development has been studied in children with disabilities (Rendeli et al., 2002; Lynch et al, 2009), confirming that cognition and language skills improve with independent mobility.

Learned helplessness is common in children with disabilities because they have to depend on others to accomplish most tasks (Butler, 1991). This leads to a negative cascade of events resulting in poor school and job performance as children get older. Learned helplessness is decreased and self-efficacy is established through independent movement that is functional and efficient. Many children with disabilities are only able to achieve this independent level of mobility with the use of a power wheelchair.

## IS MY CLIENT READY?

The precursors for independent mobility include a desire to move, a sense of cause and effect, and a consistent access point to operate the wheelchair for mobility (Rosen et al, 2009). Unfortunately, children with mobility limitations who are very young or non-verbal may not be considered for power mobility because they cannot effectively express their desire to move. Consequently, they are not evaluated for a sense of cause and effect and given the opportunity for assessment of readiness for mobility.

Most research on pediatric power mobility use and training focuses on children with motor disabilities who have mild cognitive disabilities such as children with Spina Bifida or mild Cerebral Palsy (Tefft, Guerette, & Furumasu, 1999; Ragonesi et al, 2010). Research on children with cognitive, as well as physical disabilities is more limited (Deitz, et al, 2002; Bottos et al., 2001; Nilsson et al, 2011; Jones et al, 2012). Research also frequently focuses on children capable of operating a joystick, so children with less function are frequently not included.

Jones, McEwen, and Neas (2012) studied children with severe motor impairments and found that with very little “training” from a therapist, with repeated home use, these children were successful at operating power wheelchair. As their ability to operate the wheelchair improved, cognition improved as well.

Every child who is not independently and functionally mobile should be given an opportunity to operate a power wheelchair despite perceived cognition or function. For the non-verbal child, the use of a power mobility device may be the first indication of cognition level and consequently can lead to the discovery of other skills such as language. Considering the many studies that show that independent mobility improves cognition, it is reasonable to assume that language skills may also increase.

## EVALUATION AND TRAINING

Many clinicians and suppliers are unsure of how to properly assess these individuals for mobility. Currently, no established tools or training methods have been shown to be successful for teaching children to use specialty controls on power wheelchairs. There is, however, consensus that mobility training of some type is necessary to determine whether these children can successfully operate a power mobility device.

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Nilsson et al (2011) studied children and adults with profound cognitive disabilities who could operate a joystick and found that with training many of them can develop the skills to operate power wheelchairs with differing levels of independence. Their study participants frequently had very low IQs and no sense of cause and effect at the start of the training. Training consisted of free driving sessions with facilitation from the researchers to increase interaction with the joystick and increase movement.

The individuals in Nilsson's study had the motor control to operate a joystick through training. Many children with disabilities do not have that ability and require other types of specialty controls to operate a power wheelchair. Many of these children need a head array, a switch tray or other types of switch access to be successful. Kenyon et al (2015) showed that an 18 month old with quadriplegic cerebral palsy could learn to operate a power wheelchair with a head control through training.

Jones et al (2012) included children who utilized alternative controls, as well as children who operated joysticks to maneuver their wheelchairs. They utilized in-home training with daily practice done by the families without significant guidance from a therapist or equipment supplier. Their data showed that most children successfully learned to operate a wheelchair during the training period. They did not find that the alternative control users were the most or least successful children. This is a positive sign that those children did not differ significantly from the children who could use a joystick in the study.

For children with profound cognitive and physical disabilities, it is more difficult to assess success in the initial training. They may not laugh, move their eyes or show many of the other typical reactions that are usually seen when trialing power mobility with verbal children. However, a closer look at the children as they operate the device can show small changes in affect during chair operation (Nilsson et al 2011). For a rare few of these children, the only sign of success is independent navigation with the power wheelchair without any change in affect or facial expression. Clearly, independent navigation, with or without a change in affect, demonstrates a child is operating the power wheelchair.

The training time necessary to determine whether a child is a power mobility candidate varies. For some children, a single session is enough to determine their competence. For others, longer trials and practice periods may be required. The subject evaluated by Kenyon et al (2015) was successful after clinic training for 12 weeks, two sessions a week. The children evaluated by Jones et al (2012) were studied over 12 months and were given wheelchairs to use in their homes for that time period.

In an ideal world, all clinics and suppliers would have an unlimited supply of pediatric power wheelchairs to use for evaluations and home trials. As this is not possible, each therapist and supplier must decide what they are capable of providing and what criteria must be met to be confident in their patient's ability to operate a power wheelchair. Loaner equipment may include wheelchair bases, seating systems and specialty controls. If a supplier or clinician does not have access to the equipment then referral to other professionals who do is necessary.

**TO MAXIMIZE FUNCTION AND DEVELOPMENT, ANY CHILD WHO IS UNABLE TO MOVE INDEPENDENTLY SHOULD BE GIVEN THE OPPORTUNITY FOR INDEPENDENCE THROUGH THE USE OF POWER MOBILITY.**

## **FAMILY READINESS**

One critical factor in pediatric power mobility use is parental and family acceptance. For all children, the family needs to understand the implications of living with a child who uses a power wheelchair. These children need appropriate supervision. Families with an older child may not have needed to monitor the child closely before having a power wheelchair. With children who are successful in the clinic, a home trial is still recommended to assure that the family understands and accepts the responsibilities of having a child who uses a power wheelchair. This trial should ideally be a minimum of two weeks to allow the family to truly evaluate their lives with a power wheelchair.

The inability to request movement and the inability for many children to show the "usual" responses makes selecting power wheelchair candidates difficult for many therapists and suppliers. To maximize function and development, any child who is unable to move independently should be given the opportunity for independence through the use of power mobility. The assessment and training of children with physical and cognitive limitations is complicated and requires more time, patience and attention from the therapists and suppliers who are evaluating them. Fortunately, research

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and anecdotal experience show the numerous benefits for those who are successful, making it worth the effort to improve the lives of these children.

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