The Importance of Early Mobility: what does the research say?

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WHAT WE WILL BE COVERING

- summary of research
- compilation of expert opinion

LEARNING OBJECTIVES

1. Participants will be able to describe the impact of early mobility intervention on motor development.
2. Participants will be able to describe the impact of early mobility intervention on intellectual development.
3. Participants will be able to describe the impact of early mobility intervention on visual development.

IMPORTANCE OF EARLY MOBILITY

- Power Mobility is often not recommended for very young children due to:
  - Concerns for motor development
  - Concerns that the child will not understand or be unsafe
  - Concerns about funding

POLL TIME

- The team members I work with hesitate to recommend power because of:
  - Concerns for motor development
  - Concerns that the child will not understand or be unsafe
  - Concerns about funding

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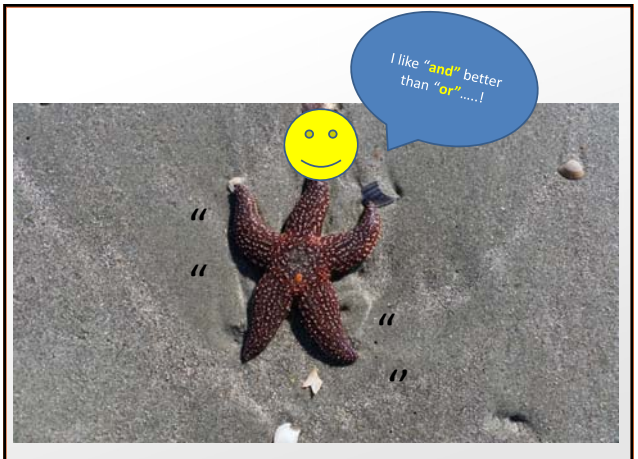
The tyranny of OR and the beauty of AND



IMPORTANCE OF EARLY MOBILITY

- Early mobility has been linked through research to key developmental milestones
- Despite this, power wheelchairs are often not explored or approved for young children
- Education is key

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IMPORTANCE OF EARLY MOBILITY

- RESNA Pediatric Power Mobility Position Paper
  - Compilation of expert opinion and summary of related research
  - Intended for education, reimbursement and to direct research
  - Available at resna.org
  - Under revision

RESNA Rehabilitation Engineering and Assistive Technology Society of North America

A GREAT NEW RESOURCE:

- Practice considerations for the introduction and use of power mobility for children by Roslyn Livingstone and Ginny Paleg in Developmental Medicine and Child Neurology, June 2013.
  - Literature Review
  - Delphi consensus
  - Clinical practice considerations
- The following information is based on this publication

INDEPENDENT MOBILITY

- This information is specific to power mobility
- However, much of the research supports developmental impact from any form of independent mobility, including:
  - Manual wheelchairs
  - Gait trainers
  - Walkers

TYPICAL DEVELOPMENT

- Crawling has a widespread and significant effect on children's overall development
  - Campos JJ, Anderson DI, Barbu-Roth MA, Hubbard EM, Hertenstein MJ, Witherington D. Travel broadens the mind. Infancy 2000; 1: 149–219.
  - Kermoian R. Locomotion experience and psychological development in infancy. In: J F, editor. Pediatric Powered Mobility: Developmental Perspectives, Technical Issues, Clinical Approaches. Arlington, VA, USA: Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) 1997: 7–22.

EMOTIONAL AND VISUAL PERCEPTUAL DEVELOPMENT

- Use of a power mobility device triggers emotional and visual perceptual development
  - Uchiyama I, Anderson DI, Campos JJ, et al. Locomotor experience affects self and emotion. Dev Psychol 2008; 44: 1225–31.

TYPICAL DEVELOPMENT

- Children typically take independent steps and explore environment by 12 – 15 months

LEARNED HELPLESSNESS

- Lack of purposeful movement and limited ability to affect environment can result in passive, dependent behavior
  - Butler C. Wheelchair toddlers. In: Furumasu J, editor. Pediatric Powered Mobility: Developmental Perspectives, Technical Issues, Clinical Approaches. Arlington, VA: RESNA, 1997: 1–6.

UNDER UTILIZATION

- Power mobility continues to be underutilized
  - Rodby-Bousquet E, H€agglund G. Use of manual and powered wheelchair in children with cerebral palsy: a cross-sectional study. BMC Pediatr 2010; 10: 59.

POLL TIME

- If you are currently recommending power wheelchairs for young children, how young do you start?
  - 12-24 months
  - 24-36 months
  - 3-5 years
  - 5 years and older

CONSENSUS STATEMENT #1

- With access to a specialized power mobility device, it is possible for infants with disabilities to have augmented mobility experiences as early as 8 months of age
  - Galloway JC, Ryu J-C, Agrawal SK. Babies driving robots: self-generated mobility in very young infants. Intel Serv Robot 2008; 1: 123–34. (level V)
  - Lynch A, Ryu J-C, Agrawal S, Galloway JC. Power mobility training for a 7-month-old infant with spina bifida. Pediatr Phys Ther 2009; 21: 362–8. (level V)

BABIES DRIVING?

- This new concept augments mobility of children as young as 8 months for the significant developmental benefits supported in the research

CONSENSUS STATEMENT #2

- Children can begin learning to maneuver a power mobility device below 14 months of age and those able to use a joystick have demonstrated competent control as young as 18 to 24 months
  - Butler C, Okamoto G, McKay T. Motorized wheelchair driving by disabled children. Arch Phys Med Rehabil 1984; 65: 95–7.
  - Butler C, Okamoto GA, McKay TM. Powered mobility for very young disabled children. Dev Med Child Neurol 1983; 25: 472–4.
  - Everard L. The wheelchair toddler. Health Visit 1984; 57: 241–2.
  - Jones MA, McEwen IR, Hansen L. Use of power mobility for a young child with spinal muscular atrophy. Phys Ther 2003; 83: 253–62.

CONSENSUS STATEMENT #2

- Children can begin learning to maneuver a power mobility device below 14 months of age and those able to use a joystick have demonstrated competent control as young as 18 to 24 months (cont.)
  - Zazula J, Foulds R. Mobility device for a child with phocomelia. Arch Phys Med Rehabil 1983; 64: 137–9. (case study)
  - Jones MA, McEwen IR, Neas BR. Effects of power wheelchairs on the development and function of young children with severe motor impairments. Ped Phys Ther 2012; 24: 131–40. (RCT)

HOW YOUNG IS TOO YOUNG?

- Very young children sometimes understand driving with 3 switches before understanding joystick control as joystick use is more abstract
- Young children can often use a power wheelchair in an age appropriate manner when their typical peers begin walking

CONSENSUS STATEMENT #3

- For children with minimal mobility experience, a power mobility device can promote overall development as well as functional mobility
  - Lobo M, Harbourne R, Dusing S, et al. Grounding early intervention: physical therapy cannot just be about motor skills any more. Phys Ther 2013; 93: 94–103.
  - Jones MA, McEwen IR, Neas BR. Effects of power wheelchairs on the development and function of young children with severe motor impairments. Ped Phys Ther 2012; 24: 131–40. (Level II)

CONSENSUS STATEMENT #3

- For children with minimal mobility experience, a power mobility device can promote overall development as well as functional mobility (cont.)
  - Butler C. Effects of powered mobility on self-initiated behaviors of very young children with locomotor disability. Dev Med Child Neurol 1986; 28: 325–32. (level III)
  - Bottos M, Bolcati C, Sciuto L, Ruggeri C, Feliciangeli A. Powered wheelchairs and independence in young children with tetraplegia. Dev Med Child Neurol 2001; 43: 769–77. (level IV)
  - Tefft D, Guerette P, Furumasu J. The impact of early powered mobility on parental stress, negative emotions, and family social interactions. Phys Occup Ther Pediatr 2011; 31: 4–15. (level IV)

CONSENSUS STATEMENT #3

- For children with minimal mobility experience, a power mobility device can promote overall development as well as functional mobility (cont.)
  - Lynch A, Ryu J-C, Agrawal S, Galloway JC. Power mobility training for a 7-month-old infant with spina bifida. Pediatr Phys Ther 2009; 21: 362–8. (level V)
  - Nilsson LM, Nyberg PJ. Driving to learn: a new concept for training children with profound cognitive disabilities in a powered wheelchair. Am J Occup Ther 2003; 57: 229–33. (qualitative)

CONSENSUS STATEMENT #3

- For children with minimal mobility experience, a power mobility device can promote overall development as well as functional mobility (cont.)
  - Odor P, Watson M. Learning through Smart Wheelchairs: a formative evaluation of the CALL centre's smart wheelchairs as part of children's emerging mobility, communication, education and personal development. Final report to the Nuffield Foundation and the Scottish Office Education Department, Edinburgh; 1994. Available from: http://callcentre.education.ed.ac.uk/Smart_Wheelch/Res.

CONSENSUS STATEMENT #3

- For children with minimal mobility experience, a power mobility device can promote overall development as well as functional mobility (cont.)
  - Guerette P, Furumasu J, Tefft D. The positive effects of early powered mobility on children's psychosocial and play skills. Assist Technol 2013; 25: 39–48. (Level IV)
  - Deitz J, Swinth Y, White O. Powered mobility and preschoolers with complex developmental delays. Am J Occup Ther 2002; 56: 86–96. (Level IV)
  - McGarry S, Moir L, Girdler S. The smart wheelchair: is it an appropriate mobility training tool for children with physical disabilities? Disabil Rehabil Assist Technol 2012; 7: 372–80.

PSYCHOSOCIAL DEVELOPMENT

- Minimal mobility experience: none to very limited movement, such as squirming on the floor
- Bottom Line:
- Kids who use power wheelchairs at a young age are more independent, participate more, engage more and view themselves as more capable.

CONSENSUS STATEMENT #4

- For children with inefficient mobility, power mobility may enhance independence and participation in family, school, and community life
  - Wiart L, Darrah J, Cook A, Hollis V, May L. Evaluation of powered mobility use in home and community environments. Phys Occup Ther Pediatr 2003; 23: 59–75. (level V)
  - Wiart L, Darrah J, Hollis V, Cook A, May L. Mothers' perceptions of their children's use of powered mobility. Phys Occup Ther Pediatr 2004; 24: 3–21.
  - Evans S, Neophytou C, De Souza L, Frank AO. Young people's experiences using electric powered indoor – outdoor wheelchairs (EPIOCs): potential for enhancing users' development? Disabil Rehabil 2007; 29: 1281–94. (qualitative)

INEFFICIENT MOBILITY

- Some children are able to ambulate or propel a manual wheelchair, but inefficiently
- Significant benefit can still be obtained through power wheelchair usage in participation and independence

CONSENSUS STATEMENT #5

- There is no evidence that using power mobility at a young age impedes development of ambulation or other motor skills
  - Jones MA, McEwen IR, Neas BR. Effects of power wheelchairs on the development and function of young children with severe motor impairments. Ped Phys Ther 2012; 24: 131–40. (RCT)
  - Bottos M, Bolcati C, Sciuto L, Ruggeri C, Feliciangeli A. Powered wheelchairs and independence in young children with tetraplegia. Dev Med Child Neurol 2001; 43: 769–77. (Level IV)

CONSENSUS STATEMENT #5

- There is no evidence that using power mobility at a young age impedes development of ambulation or other motor skills, cont.
  - Paulsson K, Christofferson M. Psychosocial aspects on technical aids – how does independent mobility affect the psychosocial and intellectual development of children with physical disabilities? In: RESNA editor. Second International Conference on Rehabilitation Engineering. Ottawa, Canada: RESNA Press, 1984: 282–6. (level V)

MOTOR DEVELOPMENT

- Bottom line:
- Kids who use power wheelchairs at a young age are not less likely to walk or become lazy

POLL TIME

- How often do you meet resistance over impact on motor development?
  - Less than 10% of the time
  - 10-25%
  - 25-50%
  - 50% or more

CONSENSUS STATEMENT #6

- Children with conditions that limit early functional mobility may benefit from power mobility to promote independence and support overall development
  - Lynch A, Ryu J-C, Agrawal S, Galloway JC. Power mobility training for a 7-month-old infant with spina bifida. Pediatr Phys Ther 2009; 21: 362–8. (level V)

CONDITIONS LIMITING EARLY MOBILITY

- Some conditions are known to offer little potential future mobility and so early intervention is particularly important
  - SMA

CONDITIONS LIMITING EARLY MOBILITY

- Even in conditions where future ambulation may develop, developmental benefits of early mobility still indicate use while working on gross motor skills

CONSENSUS STATEMENT #7

- Mobility experience in a power mobility device may support development of self-initiated behavior and learning
  - Nilsson L, Nyberg P. Single-switch control versus powered wheelchair for training cause–effect relationships: case studies. Technol Disabil 1999; 11: 35–8.
  - McGarry S, Moir L, Girdler S. The smart wheelchair: is it an appropriate mobility training tool for children with physical disabilities? Disabil Rehabil Assist Technol 2012; 7: 372–80.

CONSENSUS STATEMENT #7

- Mobility experience in a power mobility device may support development of self-initiated behavior and learning, cont.
  - Odor P, Watson M. Learning through Smart Wheelchairs: a formative evaluation of the CALL centre's smart wheelchairs as part of children's emerging mobility, communication, education and personal development. Final report to the Nuffield Foundation and the Scottish Office Education Department, Edinburgh; 1994. Available from: http://callcentre.education.ed.ac.uk/Smart_Wheelch/Res.

CONSENSUS STATEMENT #7

- Mobility experience in a power mobility device may support development of self-initiated behavior and learning, cont.
  - Nilsson L, Eklund M, Nyberg P, Thulesius H. Driving to learn in a powered wheelchair: the process of learning joystick use in people with profound cognitive disabilities. Am J Occup Ther 2011; 65: 652–60. Qualitative and case study.

Journal «Early Intervention: Theory and Practice»

St.Petersburg Early Intervention Institute

- English
- Русский

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PSYCHOSOCIAL ASPECTS ON TECHNICAL AIDS – HOW DOES INDEPENDENT MOBILITY AFFECT THE PSYCHOLOGICAL AND INTELLECTUAL DEVELOPMENT OF CHILDREN WITH PHYSICAL DISABILITIES?

April 7, 2015 от nikif 0 Комментарии

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INTELLECTUAL DEVELOPMENT

- Bottom line:
- Kids who use power wheelchairs at a young age develop foundational skills for better learning in the future

CONSENSUS STATEMENT #8

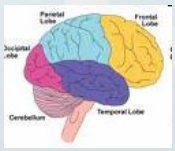
- Many children with severe intellectual and/or sensory impairments can learn to use a power mobility device competently with appropriate practice and environmental support
  - Bottos M, Bolcati C, Sciuto L, Ruggeri C, Feliciangeli A. Powered wheelchairs and independence in young children with tetraplegia. Dev Med Child Neurol 2001; 43: 769–77. (Level IV)
  - McGarry S, Moir L, Girdler S. The smart wheelchair: is it an appropriate mobility training tool for children with physical disabilities? Disabil Rehabil Assist Technol 2012; 7: 372–80. (Level V)

CONSENSUS STATEMENT #8

- Many children with severe intellectual and/or sensory impairments can learn to use a power mobility device competently with appropriate practice and environmental support, cont.
  - Odor P, Watson M. Learning through Smart Wheelchairs: a formative evaluation of the CALL centre's smart wheelchairs as part of children's emerging mobility, communication, education and personal development. Final report to the Nuffield Foundation and the Scottish Office Education Department, Edinburgh; 1994. Available from: http://callcentre.education.ed.ac.uk/Smart_Wheelch/Res

CONSENSUS STATEMENT #8

- Many children with severe intellectual and/or sensory impairments can learn to use a power mobility device competently with appropriate practice and environmental support, cont.
  - Nilsson L, Eklund M, Nyberg P, Thulesius H. Driving to learn in a powered wheelchair: the process of learning joystick use in people with profound cognitive disabilities. Am J Occup Ther 2011; 65: 652–60. (qualitative)



WHO CAN USE POWER WHEELCHAIRS?

- Many children, even those with significant and multiple impairments, can use a power wheelchair with appropriate training, support and supervision
  - Developmental benefits may outweigh functional and completely independent mobility

CONSENSUS STATEMENT #9

- Successful learning of power mobility skills may depend at least as much on practice time and quality of learning support within the child's environment as the child's motor, cognitive, or sensory abilities
  - Bottos M, Bolcati C, Sciuto L, Ruggeri C, Feliciangeli A. Powered wheelchairs and independence in young children with tetraplegia. Dev Med Child Neurol 2001; 43: 769–77. (Level IV)
  - Nilsson L, Nyberg P, Eklund M. Training characteristics important for growing consciousness of joystick-use in people with profound cognitive disabilities. Int J Ther Rehabil 2010; 17: 588–95. (Level V)

CONSENSUS STATEMENT #9

- Successful learning of power mobility skills may depend at least as much on practice time and quality of learning support within the child's environment as the child's motor, cognitive, or sensory abilities, cont.
  - Odor P, Watson M. Learning through Smart Wheelchairs: a formative evaluation of the CALL centre's smart wheelchairs as part of children's emerging mobility, communication, education and personal development. Final report to the Nuffield Foundation and the Scottish Office Education Department, Edinburgh; 1994. Available from: http://callcentre.education.ed.ac.uk/Smart_Wheelch/Res

DRIVER'S TRAINING

- Remember teaching your teen to drive?
- Typical State requirements for a teen
- Typical expectations of a PWC candidate

TRIALING POWER/ TRAINING

TAKE HOME MESSAGE:

- Our traditional view of early power mobility is changing based on more current research
- Even our very young and/or very impaired clients can benefit from augmented mobility experiences
- Identify potential drivers and try a power wheelchair out
  - Or refer to a clinic near you!

QUESTIONS?

Thank You!

CONTACT INFORMATION

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