

Paediatric power mobility- increasing options for early independent mobility Handout

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International Seating Symposium 2016, Vancouver BC (beginner-intermediate)

March 1, 2016

Program Description: This workshop will present research and best practice supporting use of power mobility with infants, toddlers and preschool children. It will incorporate videos, case-studies and hands-on experience. Presenters from different countries will highlight recent research in this area as well as innovations in child-friendly technology and creative service delivery programs.

Objectives:

- compare features of at least three equipment options and describe their benefit to children and families
- describe at least four considerations for developing a loan program for assessment and provision of power mobility
- discuss at least three physical, social and environmental considerations when introducing power mobility

Reviews of paediatric power mobility literature

Canadian Agency for Drugs and Technology in Health. (2016). Rapid Response Report: Power Mobility Technologies for Children Aged Six Years and Under with Disability or Mobility Limitation: Clinical Effectiveness and Guidelines. Published Aug 25, 2015. Available from <https://www.cadth.ca/power-mobility-technologies-children-six-years-under-disability-mobility-limitation>.

Bray N, Noyes J, Edwards RT, Harris N. (2014). Wheelchair interventions, services and provision for disabled children: A mixed-method systematic review and conceptual framework. *BMC Health Services Research*, 14:309.

Livingstone R, Field D. (2015). The child and family experience of power mobility: A qualitative synthesis. *Developmental Medicine and Child Neurology*, 57(4):317-27.

Livingstone R, Field D. (2014). Systematic review of power mobility outcomes for infants, children and adolescents with mobility limitations. *Clinical Rehabilitation*, 28(10):954-64.

Livingstone R, Paleg G. (2014). Practice considerations for use and introduction of power mobility with children. *Developmental Medicine and Child Neurology*, 56(3):210-21.

Rousseau-Harrison K, Rochette A. (2013). Impacts of wheelchair acquisition on children from a person-occupation-environment interactional perspective. *Disability Rehabilitation: Assistive Technology*, 8(1):1-10.

Individual Studies referenced in our presentation (in order of presentation)

Jones MA, McEwan IR, Neas BR. (2012). Effects of power wheelchairs on the development of young children with severe motor impairments. *Pediatric Physical Therapy*, 24(2):131-140.
Randomized Controlled Trial 28 children (14 pairs) 14-30 months of age with CP + other diagnoses

Guerette P, Furumasu J, Tefft D. (2013). The positive effects of early powered mobility on children's psychosocial and play skills. *Assistive Technology*, 25(1):39-48.
Cohort study without control group 23 children 18-72 months of age with CP + other diagnoses

Butler C, Okamoto GA, McKay TM. (1983). Powered mobility for very young disabled children. *Developmental Medicine and Child Neurology*, 25:472-474.
Cohort study without control group 9 children 20-37 months of age, with SB, SMA, CP, OI, + other diagnoses

Butler C, Okamoto GA, McKay TM. (1984). Motorized wheelchair driving by disabled children. *Archives of Physical Medicine and Rehabilitation*, 65:95-97.
Cohort study without control group 13 children 20-37 months of age with SB, CP, OI, + other diagnoses

Everard L. (1984). The wheelchair toddler. *Health Visitor*, 57(8):241-242.
Case study 1 child 22 months of age with SMA

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Jones MA, McEwan IR, Hansen L. (2003). Use of power mobility for a young child with spinal muscular atrophy. *Physical Therapy*, 83(3):253-262.

Case study 1 child 20 months of age with SMA

Dunaway S, Montes J, O'Hagen J, Sproule DM, De Vivo DC, Kaufmann P. (2013). Independent mobility after early introduction of a power wheelchair in spinal muscular atrophy. *Journal of Child Neurology*, 28(5):576-582.
Cohort study without control group 6 children 24-26 months of age 5 with SMA 1 with congenital MD

Wiarth L, Darrah J, Hollis V, Cook A, May L. (2004). Mothers' perceptions of their children's use of powered mobility. *Physical and Occupational Therapy in Pediatrics*, 24(4):3-21.

Qualitative study of 5 mothers of children aged 3-7 years when they first received a power wheelchair.

Bottos M, Bolcati C, Sciuto L, Ruggeri C, Feliciangeli A. (2001). Powered wheelchairs and independence in young children with tetraplegia. *Developmental Medicine and Child Neurology*, 43:469-477.

Cohort study without control group 25 children aged 3-8 years with CP

Additional studies of young children referenced in our systematic review (Livingstone & Field 2014)

Lynch et al, 2009	1	7 months of age with spina bifida; UD1 robotic trainer
Ragonesi et al, 2012	1	11 months of age with CP; Koala power wheelchair
Galloway et al, 2008	1	14 months with Down syndrome + 1 7 months typically developing age, UD1
Butler et al, 1986	6	23-38 months of age with CP, SB, OI; power wheelchair
Ragonesi et al, 2010	1	3 year old with CP; UD2
Ragonesi et al, 2011	1	3 year old with CP; UD2
Benedict et al, 1999	13	children, one a power wheelchair user, 2-4yrs with CP or a metabolic disorder
Douglas & Ryan 1984	1	4 year old with SCI; Everard turbo power wheelchair
Deitz et al, 2002	2	5 year olds with CP; motorized toy car
McGarry et al, 2012	4	5 year olds and older with CP; Smart wheelchair
Tefft et al, 2011	23	parents of 18-72 months of age with CP + other diagnoses; power wheelchair
Pope et al, 1994	10	2.5-9 year olds with CP; specialized seating & mobility system (SAM)
Home & Ham 2003	57	parents of 2-7 year olds with CP & SMA; power wheelchair
Ostenjo et al, 2005	22	of 95 2-7.5 year olds with CP; power wheelchair
Wiarth et al, 2003	66	children under 18 years of age (some as young as 2); power wheelchair

Other Early Childhood Power Mobility Literature

Count Me In Report (Disability Services Western Australia - A summary of interviews and research into international best practice in early powered mobility compiled following a scholarship funded study tour in 2013-2014). Available by contacting scott.langmead@abilitycentre.com.au

Other power mobility devices

Jonasson M. (2014) The AKKA-board—performing mobility, disability and innovation. *Disability & Society*, 29(3):477-90.

Kenyon LK, Farris JP, Gallagher C, Hammond L, Webster LM, Aldrich NJ. (2016). Power mobility training for young children with multiple, severe impairments: A case series. *Physical & Occupational Therapy In Pediatrics*, DOI: 10.3109/01942638.2015.1108380 (Play and mobility device; Power wheelchair trainer)

Larin HM, Dennis CW, Stansfield S. (2012). Development of robotic mobility for infants: rationale and outcomes. *Physiotherapy*, 98(3):230-237.(Weebot)

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Ride-on toy vehicles

Huang HH, Galloway JC. (2012). Modified ride-on toy cars for early power mobility: A technical report. *Pediatric Physical Therapy Summer*;24(2):149-54.

Huang HH, Ragonesi CB, Stoner T, Peffley T, Galloway JC. (2014). Modified toy cars for mobility and socialization: Case report of a child with cerebral palsy. *Pediatric Physical Therapy*, 26(1):76-84. (21 months of age)

Logan SW, Feldner HA, Galloway JC, Huang HH. (2016). Modified ride-on car use by children with complex medical needs. *Pediatric Physical Therapy*, 28(1):100-107.

Logan SW, Huang HH, Stahlin K, Galloway JC. (2014). Modified ride-on car for mobility and socialization: Single-case study of an infant with down syndrome. *Pediatric Physical Therapy*, 26(4):418-26. (13 months of age)

Expert opinion supporting the early use of power mobility

Feldner HA, Logan SW, Galloway JC. (2016). Why the time is right for a radical paradigm shift in early powered mobility: The role of powered mobility technology devices, policy and stakeholders. *Disability and Rehabilitation: Assistive Technology*;11(2):89-102.

Casey J, Paleg G, Livingstone R. (2013). Facilitating child participation through power mobility. *British Journal of Occupational Therapy*, 76(3):158-60.

Wiat L. (2011). Exploring mobility options for children with physical disabilities: A focus on powered mobility. *Physical and Occupational Therapy in Pediatrics*, 31(1):16-8.

Wiat L, Darrah J. (2002). Changing philosophical perspectives on the management of children with physical disabilities -- their effect on the use of powered mobility. *Disability & Rehabilitation*, 24(9):492-8.

Butler C. (1991). Augmentative mobility- why do it? *Physical Medicine and Rehabilitation Clinics of North America*, 2(4):147-161.

Sunny Hill Health Centre for Children (SHHC) Power mobility resources

http://www.seatingandmobility.ca/PowerMobility/pm_PowerMobilityIntro.aspx

Also available through wheeled mobility pages on <http://www.childdevelopment.ca/Home.aspx>

SHHC Power mobility training ideas

http://www.seatingandmobility.ca/Libraries/Pdfs/Power_Mobility_Training_Ideas_for_Children.sflb.ashx

SHHC Evidence4Practice Power mobility for infants and preschoolers

http://www.childdevelopment.ca/Libraries/Evidence_for_Practice/Power_Mobility_for_Infants_Preschoolers_2012.sflb.ashx

SHHC Evidence4Practice Power mobility for school-aged children

http://www.childdevelopment.ca/Libraries/Evidence_for_Practice/Power_Mobility_for_School_Aged_Children_2012.sflb.ashx

SHHC Power Mobility Assessment: Choosing the Driving Method elearning module

<https://learninghub.phsa.ca/Courses/6000/power-mobility-assessment-choosing-the-driving-method>

SHHC Beginning power mobility: for young children with cerebral palsy parent handout

<http://www.cw.bc.ca/library/pdf/pamphlets/BCCH1467MobilityRead2012.pdf>

SHHC Power to participate parent handout (introducing benefits of power mobility use)

<http://www.cw.bc.ca/library/pdf/pamphlets/BCCH1568PowerRead2012.pdf>

SHHC-sponsored Environmental scan of power mobility use practices across Canada

<https://www.cadth.ca/power-mobility-for-preschool-children>

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Paediatric Power Mobility Equipment Manufacturers/Suppliers

Early childhood power mobility devices

Designability Wizzybug

<http://www.designability.org.uk/product/wizzybug/>

MERU Bugzi

<http://meru.org.uk/what-we-do/bugzi/>

University of Delaware Go Baby Go (ride-on toy car modifications)

<http://www.udel.edu/gobabygo/>

Babybot (BBot) website Christy Byers PT (plans to share fabrication plans online) <http://www.bbot.me>

Enabling Devices scooterboard <https://enablingdevices.com/catalog/mobility>

Kids Loco and Baby Loco Project (Japan) http://www.mech.usp.ac.jp/~maw/KL_HP/act01.html

Do It Yourself (DIY) instructions for Powered mobility training device for toddlers

<http://www.instructables.com/id/Powered-mobility-training-device-for-toddlers-1/>

Power wheelchairs

Invacare Tiger Cub and TDX Spree

http://www.invacare.ca/cgi-bin/imhqprd/inv_catalog/prod_cat.jsp?s=0&catOID=-536887494

Ottobock Skippi

<http://www.ottobock.com.au/wheelchairs-and-seating/kids-24-hour-concept-for-parents/mastering-everyday-life/transportation-and-trip/skippi/>

Permobil K450 (rearwheel) Koala (frontwheel) K300 PS Jr (frontwheel) M300 PS Jr (midwheel)

<http://www.permobil.ca/wheelchairs.php>

Quantum Rehab Q6 Edge 2.0 and Q610

<http://www.quantumrehab.com/products.asp>

Quantum Rehab Sparky (Australia & the UK)

<http://www.quantumrehab.co.uk/product-range/Jazzy-Power-Chair-Range/Jazzy-Sparky>

Sunrise Medical Zippie ZM-310

<http://www.sunrisemedical.ca>

Open Wheelchair Foundation (Brigham Young University open access plans for DIY power wheelchair)

<http://openwheelchair.org>

Permobil Tiro <http://www.permobil.com/en/English/Other-products/Please-choose/Tiro-the-training-tool/>

Smile Rehab Smart wheelchair <http://www.smilerehab.com/smart-wheelchair.php> (developed by CALL Centre Scotland)

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Measurement Tools & Wheelchair Training

Wheelchair driving tests

Assessment of Learning Powered mobility use (ALP)

Nilsson L, Durkin J. (2014). Assessment of learning powered mobility use—Applying grounded theory to occupational performance. *Journal of Rehabilitation Research and Development*, 51(6):963-74.

Nilsson L, Eklund M, Nyberg P. (2011a). Driving to Learn in a powered wheelchair: Inter-rater reliability of a tool for assessment of joystick use. *Australian Occupational Therapy Journal*, 58, 447-454.

Durkin J. (2009). Discovering powered mobility skills with children: ‘Responsive partners’ in learning. *International Journal of Therapy and Rehabilitation*, 16(6), 331-341.

Power Mobility Program (PMP)

Furumasa J, Guerette P, Tefft D. (1996). The development of a powered wheelchair mobility program for young children. *Technol Disabil*. 5(1): 41-48.

Ready, Set, Go: Pediatric powered wheelchair mobility program and pediatric powered wheelchair screening test.

<https://itunes.apple.com/us/book/ready-set-go-powered-mobility/id991600558?mt=13>

Butler’s 7 wheelchair skills

Butler C, Okamoto G, McKay T. (1983). Powered mobility for very young disabled children. *Developmental Medicine and Child Neurology*, 25(4): 472-474.

Butler, Okamoto & McKay. (1984). Motorized wheelchair driving by disabled children. *Archives of Physical Medicine & Rehabilitation*, 65(2): 95-97

Additional description in Jones M, McEwen IR & Neas BR (2012). Effects of power wheelchairs on the development and function of children with severe motor impairments. *Pediatric Physical Therapy*, 24(2): 131-140.

Participation & goal setting

Canadian Occupational Performance Measure (COPM)

Law M, Baptiste S, McColl M, Opzoomer A, Polatajko H, Pollock N. The canadian occupational performance measure: An outcome measure for occupational therapy. *Can J Occup Ther* 1990;57(2):82-7.

Goal Attainment Scaling (GAS)

Steenbeek D, Ketelaar M, Galama K, Gorter JW. (2007). Goal attainment scaling in paediatric rehabilitation: a critical review of the literature. *Developmental Medicine and Child Neurology*, 49(7):550-6.

Individually Prioritised Problem Assessment (IPPA)

Wessels R, de Witte L, Andrich R, Ferrario M, Persson J, Oberg B, Oortwijn W, VanBeekum T, Lorentsen O. (2000). IPPA, A user-centred approach to assess effectiveness of assistive technology provision. *Technology and Disability*, 13(1):105-115.

Wheelchair Outcome Measure for Young People (WhOM-YP)

Corra H, Goodmanson S, Field D, Miller W. Evaluating the Clinical Usefulness of the Wheelchair Outcome Measure for Young People (WhOM-YP). *Canadian Occupational Therapy Conference 2015*. Winnipeg, MB. May 25, 2015.

Not yet available, but information will be posted on Dr. Bill Miller’s website:

<http://millerresearch.osot.ubc.ca/tools/mobility-outcome-tools-2/the-wheelchair-outcome-measure-whom/>

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Other resources

Butler C. (2009). Effective mobility for children with motor disabilities What? Why? When? How? Global Help
Available from http://www.global-help.org/publications/books/help_effectivemobility.pdf

Dalhousie University Faculty of Medicine Wheelchair Skills Program (materials for adult manual & power)
<http://www.wheelchairskillsprogram.ca>

Karen Kangas Powered mobility training for children with complex needs. International Seating Symposium notes
http://www.seatingandmobility.ca/Libraries/word_documents/019_PoweredMobilityTrainingforChildren.sflb.ashx

Michelle Lange and Ablenet Inc. recorded webinars: (1) Is your client ready for a power wheelchair? (2) Pre-mobility training –developing readiness to use a power wheelchair (3) Power Mobility: Mobility training
https://www.ablenetinc.com/resources/recorded_webinars/

WhizzKidz charitable organization in the UK offers manual and power wheelchair equipment and training
<http://www.whizz-kidz.org.uk/get-our-help/young-people/wheelchair-skills-training/training-videos>

Leckey Firefly GoTo Seat <http://www.fireflyfriends.com/goto-seat>

Special Tomato positioning supports <http://www.specialtomato.com>

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