

Permobil Academy



Leading the way toward independence in pediatric mobility

Continuing Education Completion Requirements for 0.10 CEU (1- hour)

Attendees must: Attend the entire course • Sign In/Out • Complete the assessment within 2 weeks [Assessment\(permobil.com\)](https://www.permobil.com/assessment)

[Permobil Representative Locator](https://hub.permobil.com/sales-locator) <https://hub.permobil.com/sales-locator>

1) **Motor Milestones**¹ (birth- 2 years old)

*CDC's 2022 guidelines do not include a crawling milestone.



2 months

Holds head up when on tummy, moves both arms and both legs, opens hands briefly

4 months

Holds head steady without support when you are holding her, holds a toy when you put it in his hand, uses her arm to swing at toys, brings hands to mouth, pushes up onto elbows/forearms when on tummy

6 months

Rolls from tummy to back, pushes up with straight arms when on tummy, leans on hands to support himself when sitting

9 months

Gets to a sitting position by herself, moves things from one hand to her other hand

¹Centers for disease control and prevention



- 12 months** Pulls up to stand, walks, holding on to furniture
- 15 months** Takes a few steps on his own
- 18 months** Walks without holding on to anyone or anything, climbs on and off a couch or chair without help,
- 2 years** Kicks a ball, runs, walks (not climbs) up a few stairs with or without help

2) **Mobility is a human right²**

Delayed access to a mobility device enabling self-directed mobility restricts a child's right to mobility. Advocacy within the medical setting, with families & caregivers, and with funding sources is part of the process to obtain an appropriate mobility device for each child.

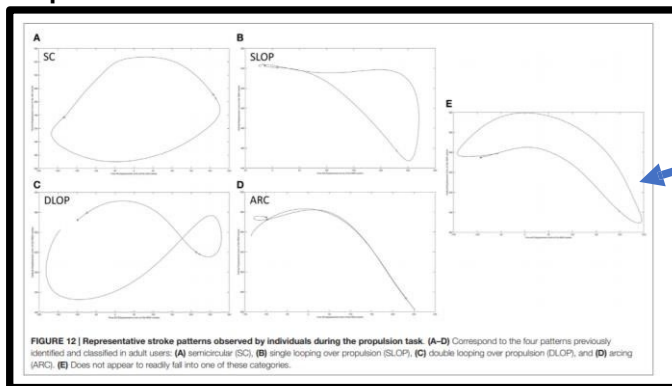
3) **Four types of children can benefit from powered mobility³**

- 1 Children who will never ambulate
- 2 Children with inefficient manual mobility
- 3 Children who will lose or have lost the ability to walk or walk efficiently
- 4 Children who need mobility assistance in early childhood and will likely progress to independent mobility

Diagnostic examples

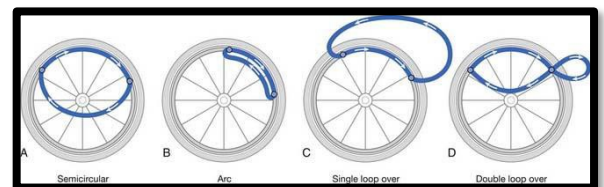
- Spinal muscular atrophy types 1&2, congenital muscular dystrophy; multiple limb deficiencies; high level SCIs
- Cerebral palsy, osteogenesis imperfecta, juvenile arthritis, myelomeningocele
- Spina bifida, Duchennes muscular dystrophy, spinal muscular atrophy type 3, progressive neuromuscular
- Cerebral palsy, Down Syndrome, orthopaedic issues earlier in life, ambulation delays

4) **Propulsion Patterns & Best Practices⁴**



Propulsion patterns

- A. SC- Semicircular
- B. SLOP- Single Loop Over
- C. DLOP- Double Loop Over
- D. ARC- Arc
- E. Resembles SLOP but hands raise above pushrim during recovery period.



²UN General Assembly, ³Livingstone, R., & Paleg, G., ⁴Slavens BA, Schnorenberg AJ, Aurit CM, Tarima S,

Propulsion pointers

- Pediatric propulsion differs from adults
- Children switch between stroke patterns during mobility and activities
- Consider all functional tasks when planning treatment and longer- term mobility strategies
- Wheelchair skill training has been shown to reduce fatigue and pain in children ages 8-18 using a modified Wheelchair skills Test⁵

5) Manual wheelchair configuration tips^{4,5,6}

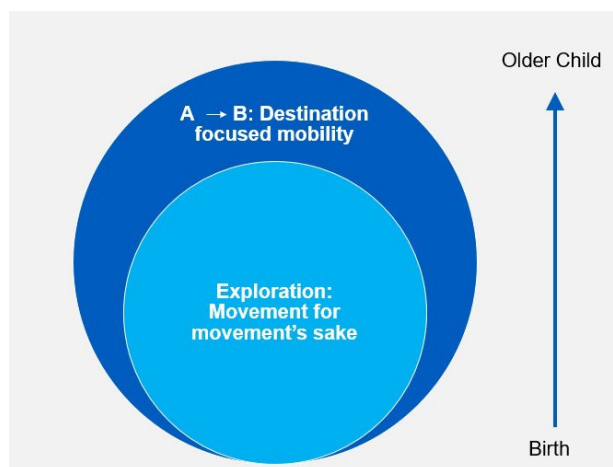
- 1) Developmental differences between pediatrics & adults
 - a. Anatomy/neurological/growth
 - b. Physical endurance and fatigue
- 2) Seat child *IN* the wheelchair, not *ON* it
 - c. Age-appropriate seat-to-floor height
 - d. Center of Gravity (COG)
- 3) Ensure proper access to the wheels
 - e. Frame width (positioning, fit)
 - f. Rear seat-to-floor height (rear wheel access)
 - g. Camber (stability, rear wheel access)
- 4) Set realistic expectations
 - a. Age, development
 - b. Diagnosis
- 5) Avoid overuse of accessories
 - a. Consider weight of accessories
 - b. Consider necessity of accessories

6) Driving to Learn⁷: 8 Phases in 3 Stages (below)

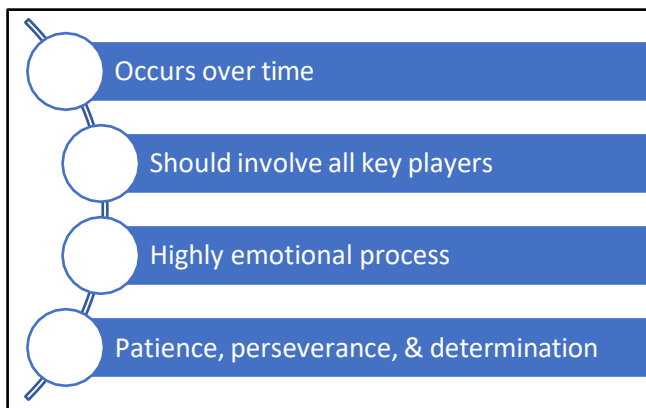
1. Explore **FUNCTIONS** body & tool/s
2. Explore **SEQUENCING** body, tool/s & environment
3. Explore **PERFORMANCE** body tool/s, environment, & occupation

7) Pediatric Power Wheelchair Training Best Practices^{8,9}

- Keep an open mind
- Age & IQ are not always good indicators to operate a power chair
- Avoid only focusing on readiness skills and pass-fail tests.



4 Common Themes of Learning Process



Do¹⁰

- Encourage child to come to you/ towards something
- Provide positive & safe feedback
- Allow child time to figure out a solution rather than immediately providing solutions

Don't¹⁰

- Instruct using directional commands
- Provide negative feedback
- Expect immediate mastery using powered mobility device

⁴Slavens BA, Schnorenberg AJ, Aurit CM, Tarima S, Vogel LC, Harris GF, ⁵Rammer, Jacob R, ⁶Boninger M., Souza A., Cooper R., Fitzgerald S., Koontz A., Fay B., ⁷Nilsson, L., & Durkin, J., ⁸Bray, N., Kolehmainen, N., McAnuff, J., Tanner, L., Tuersley, L., Beyer, F., Craig, D., ⁹Kenyon, L. K., Mortenson, W. B., & Miller, W. C., ¹⁰Jones, M. A., McEwen, I. R., & Neas, B.R.

8) Justification

Letters of Medical Necessity (LMNs)

Proactively address:

- a. Child's age
- b. Child's capability of independence
- c. Why dependent mobility is not appropriate
- d. *Age-appropriate supervision*
(child is a minor and need 24 hour supervision while engaging in mobility as do their peers).

Appealing LMN denials:

- a. Request denial in writing & clarify specific reason(s) for denial
- b. Address only denied items
- c. Include research to support your justification
- d. Be mindful of deadlines
- e. Fair hearings in-person and/or

Key Take Aways

1. Mobility is a human right
2. Benefits of "on-time" self-directed mobility
3. Strategies for enhancing mobility success in pediatrics
4. Funding & advocacy are part of the process

Suggested Next Steps

CEUs & workshops

[Clinical Implications for Wheelchair Provision: Manual and Power Mobility](#)
[Wheelchair Configuration: The Importance of an Optimized Ride](#)
[TiLite Pilot, Twist, Aero X & SmartDrive](#)
[Explorer Mini](#)
[Permobil power wheelchairs- Koala, K450 MX, M300 PSJr, K300 PSJr](#)
[Comfort Inception cushion](#)
[Permobil Power Standing Training](#)



Resources

[Centers for Disease Control Developmental Milestones 2022](#)
[A Parent's Guide to the Explorer Mini](#)
[Clinician's Guide to Explorer Mini](#)
[The Wheelchair Handbook: A consumer's guide to seating & mobility equipment](#)
[A Guideline for Introducing Powered Mobility to Infants and Toddlers](#)
[RESNA Position on the Application of Power Mobility Devices for Pediatric Users- Update 2017](#)
[Alternate Funding Resources](#)
[Permobil LMN Generator](#)
[Permobil Clinical Resources and Clinical Research](#)

References

- Boninger M., Souza A., Cooper R., Fitzgerald S., Koontz A., Fay B. (2002). Propulsion patterns and pushrim biomechanics in manual wheelchair propulsion. *Arch. Phys. Med. Rehabil.* 83, 718–723. 10.1053/apmr.2002.32455
- Bray, N., Kolehmainen, N., McAnuff, J., Tanner, L., Tuersley, L., Beyer, F., Craig, D. (2020). Powered mobility interventions for very young children with mobility limitations to aid participation and positive development: the EMPoWER evidence synthesis. *Health Technology Assessment (Winchester, England)*, 24(50), 1.
- Centers for disease control and prevention. (n.d.). CDC's developmental milestone checklist. <https://www.cdc.gov/ncbddd/actearly/milestones/index.html>
- Jones, M. A., McEwen, I. R., & Neas, B.R. (2012). Effects of power wheelchairs on the development and function of young children with severe motor impairments. *Pediatr Phys Ther*, 24(2),131-140. doi: 10.1097/PEP.0b013e31824c5fdc.
- Kenyon, L. K., Mortenson, W. B., & Miller, W. C. (2018). 'Power in mobility': parent and therapist perspectives of the experiences of children learning to use powered mobility. *Developmental Medicine & Child Neurology*, 60(10), 1012-1017
- Livingstone, R., & Paleg, G. (2014). Practice considerations for the introduction and use of power mobility for children. *Developmental Medicine & Child Neurology*, 56(3), 210-221.
- 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), 963-974.
- Rammer, Jacob R. PhD; Krzak, Joseph J. PT, PCS, PhD; Slavens, Brooke A. PhD; Winters, Jack M. PhD; Riedel, Susan A. SM, PE; Harris, Gerald F. PhD, PE. Considering Propulsion Pattern in Therapeutic Outcomes for Children Who Use Manual Wheelchairs. *Pediatric Physical Therapy: October 2019 - Volume 31 - Issue 4 - p 360-368* doi: 10.1097/PEP.0000000000000649
- Slavens BA, Schnorenberg AJ, Aurit CM, Tarima S, Vogel LC, Harris GF. Biomechanics of Pediatric Manual Wheelchair Mobility. *Front Bioeng Biotechnol.* 2015 Sep 10;3:137. doi: 10.3389/fbioe.2015.00137. PMID: 26442251; PMCID: PMC4564732.
- UN General Assembly, *Convention on the Rights of Persons with Disabilities : resolution / adopted by the General Assembly, 24 January 2007, A/RES/61/106*, available at: <https://www.refworld.org/docid/45f973632.html> [accessed 20 December 2022]