Exploration Made Easy: Introducing the Permobil Explorer Mini

Permobil Academy

Tuesday, April 7th, 2020

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"Every person with a disability has the right to have his or her needs compensated as far as possible by aids with the same technical standard as those we all use in our everyday lives."

Permobil Founder
Dr. Per Uddén

Introducing the Permobil Explorer Mini

Existing Solutions for Pediatric Power Mobility

Clinical Significance of On-Time Mobility

Permobil Explorer Mini: Product Overview

Reporting on Dr. Plummer's research with the Explorer Mini

Built on a solid foundation

https://sites.udel.edu/gobabygo/

- Dr. Cole Galloway and the GoBabyGo! Initiative set the stage for increasing access to mobility solutions for our youngest population

- Empowers children to seek self-initiated mobility, decreasing an existing "…exploration gap…" (Galloway, 2014)

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Existing solutions for young pediatric power mobility

GoBabyGo! Modified Ride on Toy Car

Permobil Koala

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Finally- a solution

M300 PS Jr 24”W x 36”L ~310lbs

Koala 23”W x 32”L ~225lbs

Explorer Mini 19.5” W x 25”L 52lbs

The Explorer Mini is a developmentally inspired power mobility device that facilitates self-initiated movement and early exploration for young children with mobility impairments.

Starting the mobility journey with front wheel drive

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Explorer Mini
Overview


The Explorer Mini Story
Independence through exploration

Key Principles

- Proximal stability leads to distal mobility
- Weightbearing facilitates proprioception
- Sensory input promotes motor output
- Children need environmental exploration and feedback to know their position in space

Self-produced mobility drives change

- “Exploration, in turn, provides new perspectives and it reveals new information and creates many novel experiences that can drive changes in a family of different psychological phenomena.” (Anderson, et al, 2013)
- “She can explore the environment and operate on it at will.” (Gibson, 1988)

On-time mobility

3 Months | 6 Months | 9 Months | 12 Months | 18 Months | 2 Years | 2.5 Years | 3 Years

Introduce the Explorer Mini as early as 12 months

Average age pediatric power mobility is recommended today

Benefits of On-Time childhood mobility

- Mobility
- Self-care independence
- Parent burden
- Body structure and function
- Participation
- Emotional, perceptual, intellectual development
- Curiosity, assertiveness, confidence, motivation, affect
- Cause and effect
- Language and communication

(Henderson, 2008; Jones, McEwen & Neas, 2012; Ostensio, 2005; Livingstone, 2018)

(Plummer & Halka, 2020)

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Maximize Early Learning

- Children are seeking new sights, sounds and smells
- Visual development
- Speech production can be impacted (Fagan & Iverson, 2007)
- Grasp and Reach

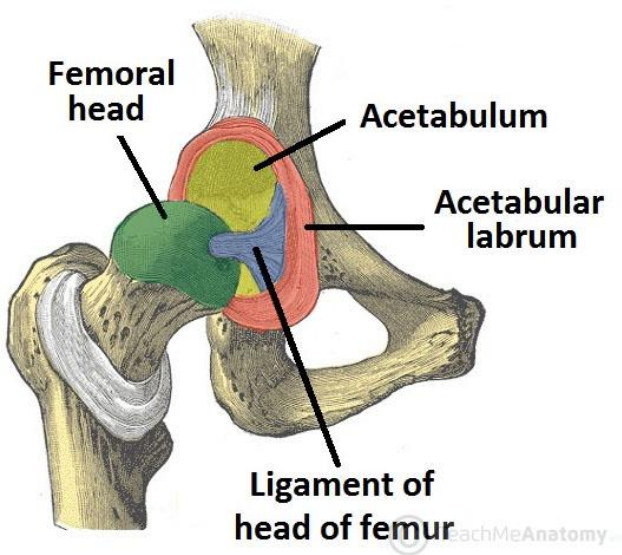
(Slide adapted from Plummer & Halka, 2020)

Distal mobility is dependent on proximal stability.

"Upper extremity function, such as reaching, grasping, and manipulating objects requires dynamic stability of the shoulder girdle on a stable trunk and an independent movement of the head and arms from the shoulders"

(Scherzer & Tscharnuter, 1990 as cited in Rosenblum & Josman, 2003)

Development of femur and acetabulum



Plummer, Morress, Logan, 2020

Postural development

- Occurs in stages
- The pelvis needs to be in an “active” position
- 1: Weight starts to shift forward and backward so that the head and trunk extend
- 2: Then as weight shifts occur from side to side- reaching can happen
- 3: Trunk rotation occurs last- once the hips and pelvis are stable

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Postural development supported in the Explorer Mini

- Stability at midline
- Saddle seat surface provides intentional sensory facilitation
- Upper extremity support tray to allow for to encourage weight bearing and GH stability to facilitate thoracic extension
- Facilitates oculomotor stability – fixation.

Slide adapted from: Plummer, Morress, Logan, 2020

Postural development is intertwined with visual exploration

(Wescott & Burtner, 2004)

Slide:
Plummer,
Morress,
Logan, 2020

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Visual Exploration

- When a child is carried, then enter a state of being “visually idle”
- When a child moves on their own, their head and eye consistently point straight ahead (Higgins as cited in Anderson, et al., 2013).
- Self-initiated mobility allows for “visual foraging”: searching for items in peri-personal and extra-personal space.

(Anderson,2013)

Facilitate upper extremity reach

A more erect or slightly tilted forward position may better facilitate reach/ grasp and allow one to practice active postural control (Westcott & Burtner, 2006. Stavness, 2006)

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Plummer, Morress, Logan, 2020

Midline joystick
Look past alternative drives

Midline Joystick

- Handedness and power mobility interface may lead to scoliosis (Grivas et al, Goldberg et al, Johnson & Yarnell, Werner et al. as cited in Liu, Chen, Lin, Kuo, Lien and Yu, 2013)

- "In conclusion, the results of this study suggest that the use of bimanual interfaces might promote greater symmetrical postural alignment in children with bilateral spastic CP than a unilateral joystick, especially for those with more severe CP" (Liu et al, 2013)

Product overview

Intended use

- Prescription only, Class II medical device
- Intended for children ages 12-36 months with mobility impairments
- Max user weight: 35 pounds
- Max user height: 39 inches

1.1 Indications for use

The Explorer Mini is a pediatric powered wheelchair with the intention to provide mobility to pediatric users weighing up to 35 pounds and maximum length of up to 39 inches tall, between 12-36 months of age, who position themselves in a sitting position in the wheelchair and has the capacity to operate a joystick hand control. Explorer Mini is intended for use indoor and outdoor on dry, firm, flat surfaces.

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Developmentally inspired seating

Incremental standing to facilitate lower extremity weight bearing

Overview of adjustments

Lifting & Transporting

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Magnetically secured tray
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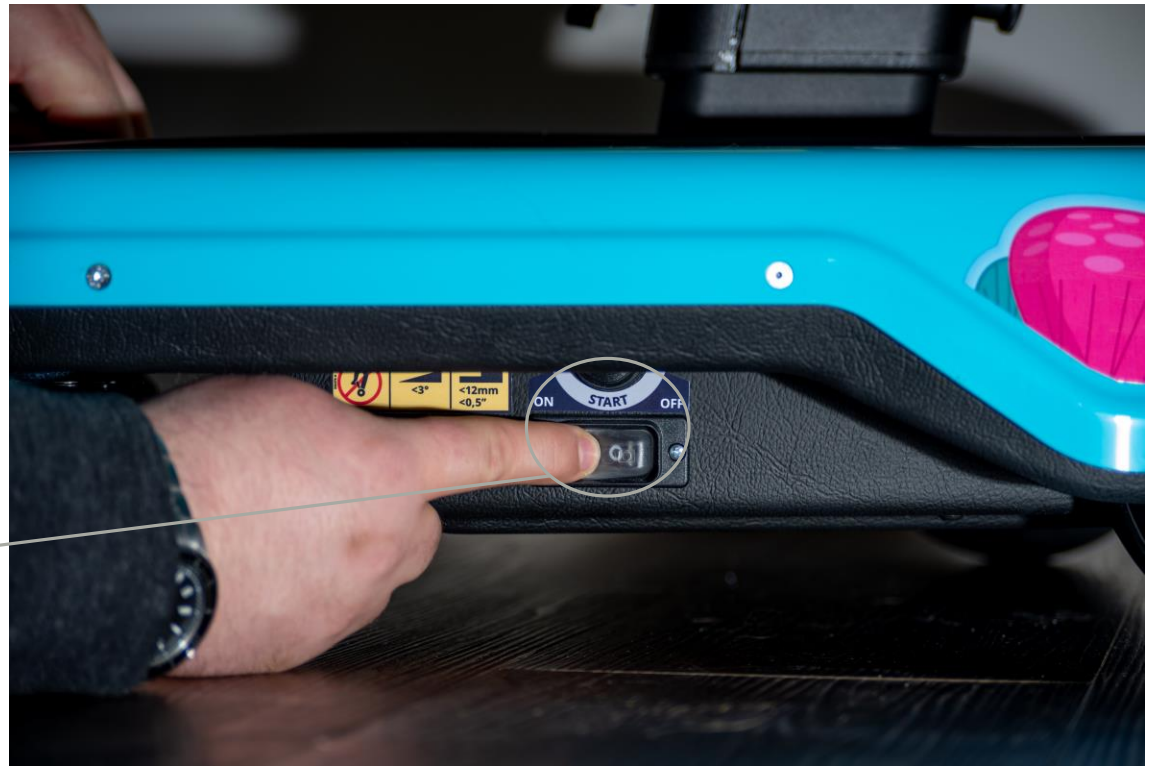
Access to charger socket on joystick underneath table

Battery saver w/ inactivity after 90 min



To turn back on:

1. Ensure circuit breaker is in “ON” position
2. Press “START” button at bottom of chassis
3. Press power button on joystick

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Everything included in one box, completely assembled

Independence through exploration

Current Research- Dr. Teresa Plummer

What are the next steps?

- Consider using the Explorer Mini as treatment tool
- Collaborate with others
- Share findings
- Be patient and explore ways to play

Explorer Mini Human Factor Validation Study

Purpose:

- Demonstrate that the Explorer Mini can be used safely by intended users, for it's intended use
- Performed in a clinical setting with the child, parent/guardian, PT/OT at 3 clinical sites after obtaining IRB approval
- Primary users: children
- Secondary users: Caregivers

Population

Inclusion Criteria (Primary):

- 6-36 month
- Unable to mobilize independently for exploratory play
- Adequate trunk/head control and hand/arm control

Sample size:

- 6 months -17 months: 15 children
- 18 months- 36 months: 15 children
- Parents and Guardians: 30 participants

Observational Data Results

- 94% explored the joystick- 88% reached w/o prompting
- Themes:
- 1. I can move
- 2. I think I like it-don’t I

Interview Data Results

- Therapist “I had no idea she even knew this existed (item on wall). I always treat her on the mat”
- “More sit to stand transitions than he could do in any session”
- Caregiver: ” I want this for the seating alone. She has never sat so well for so long”

What's Next for Research?

Protocol on how to introduce EM based on literature

Completed survey

Established protocol

Expert mentor review

Researcher review

Delphi Study for pediatric power and rsch to see if there is consensus among practitioners that can be taken to a Clinical Testing through Grant Funding

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Reference List

Anderson, D. I., Campos, J. J., Witherington, D. C., Dahl, A., Rivera, M., He, M., ... & Barbu-Roth, M. (2013). The role of locomotion in psychological development. *Frontiers in psychology*, *4*, 440.

Gibson, E. J. (1988). Exploratory behavior in the development of perceiving, acting, and the acquiring of knowledge. *Annual review of psychology*, *39*(1), 1-42.

Liu, W. Y., Chen, F. J., Lin, Y. H., & Kuo, C. H. (2014). Postural alignment in children with bilateral spastic cerebral palsy using a bimanual interface for powered wheelchair control. *Journal of rehabilitation medicine*, *46*(1), 39-44.

Rosenblum, S., & Josman, N. (2003). The relationship between postural control and fine manual dexterity. *Physical & occupational therapy in pediatrics*, *23*(4), 47-60.

Stavness, C. (2006, August 31). The effect of positioning for children with cerebral palsy on upper-extremity function: A review of the evidence. *Physical and Occupational Therapy in Pediatrics*, Vol. 26, pp. 39–53. https://doi.org/10.1300/J006v26n03_04

Upcoming Virtual Learning

Webinars:

Maintaining your Ride: Cushion and Wheelchair Care and Maintenance (Consumer Focused)

Wednesday, April 15th @ 3:00 PM EST

Beyond Exploration, What's the Next Step for Pediatric Seating & Mobility

Wednesday, May 6th @ 1:00 PM EST

CEUs:

Beginner's Guide to CRT: Power (0.1 CEU)

Tuesday, April 21st @ 3:00 PM EST

Beginner's Guide to CRT: Seating & Positioning (0.1 CEU)

Monday, April 27th @12:00 PM EST

Thank you for Attending!

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