Intensive Pediatric Powered Mobility Training for Very Young Children with Disabilities: A Pilot Study

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Case Study

Statement of the Problem

- The benefits of independent mobility for development of young children are vast and well documented. Despite this, there is limited research describing powered mobility (PM) training protocols for very young children with disabilities.

Purpose

- The aims of this study were:
  1. To describe an intensive powered mobility training protocol.
  2. To document the immediate effects of intensive training on a child's ability to operate a power wheelchair.
  3. To determine how feasible and beneficial this protocol was to the parent and child.

Design

- N-of-1, repeat measures, AB design

Participant

- 29 Months & 24 Days Old
- Female
- Primary Diagnosis: Cytomegalovirus (CMV)
- Secondary Diagnosis: Cerebral Palsy (CP)
- Classified as a Level IV on the Gross Motor Function Classification System (GMFCS)
- Receives OT, PT and Speech

Methods

- Training Sessions
  - Baseline phase (A), training once a week for three weeks
  - Intervention phase (B), training three times per week for three weeks
  - Each training session was video-recorded for later quantitative analyses

- Subjective Data Collection
  - An unstructured interview with the caregiver was conducted on the last day of training and transcribed.
  - Field Notes from therapy team (OT, PT, SLP) were collected on an ongoing basis throughout the project.

- Data Analysis
  - Utilizing a qualitative analytic strategy, emerging themes from the caregiver’s responses and field notes were coded.
  - Quantitative data was entered into SPSS and/or Excel to produce descriptive statistics and graphical displays of the data at a future date.

Outcome Measures

- Outcome, adopted from the literature, to measure independent, assisted, and caregiver driving times.
- Half-time measure
- Field Notes
- Semi-structured interview with the caregiver to capture their perceptions of aid motivations to participate in PM training.

Literature Review

- Who is Appropriate For Training?
  - Readiness cannot be solely determined by age, visual ability, cognition or behavior.
  - However, research has shown that:
    - Children as young as 11 months have shown some degree of powered wheelchair driving competence
    - Readiness for PM device develops during mobility experience

- Developmental age, not chronological age, should be used to guide clinical decision-making

- How Long Does Training Take?

  1.89 hours per day for 238 days
  14 consecutive weekdays, 35-45 minutes
  60 minutes sessions twice a week over 12 weeks

- Is There a Best Practice for Training?
  - No, But Research Suggests:
    - Instructional strategies for very young children with disabilities.
    - A number of strategies to employ.

- Mobile Training Protocol

  - Worked in conjunction with the literature, to measure independence, assisted, and caregiver driving times.

  - Independent Mobility
    - The child independently holds the joystick and manually pushes the joystick.

  - Assisted Mobility
    - The child independently engages the joystick to control the chair. The caregiver provides support.

  - Dependent Mobility
    - The caregiver manually pushes the joystick, and the child is passively engaged in PM training.

- Theoretical work used framework design of training protocol:

  - Trainings occurred in a structured and safe environment
  - Clinicians engaged the participants in purposeful, and engaging activities, rather than directly “teaching” power mobility skills
  - Allow the client to practice driving in a safe and motivating environment in trial and error form, with minimal verbal feedback
  - Continual reassessment and utilize clinical judgment to provide the just right challenge to develop skills

The Figure describes the possible amount of assistance that the therapist might provide during the session, from dependent to independent.

Subjective Results

- Participation and Self-Efficacy

  - Caregiver described a decrease in learned-helplessness behaviors and an increase in engagement, both with her mother and the environment.

  - I think that now that (has) the confidence of knowing what she wants, and knowing that I know that’s what she wants when she tells me.

  - Typically after school she would go straight in the car and be like out. Now it was like ok, I have to take her to the park, I have to engage, I have to do something with her.

- Body Functions and Structure

  - Caregiver's report illustrated improvements in cognition (cause-and-effect decision-making), vision, and gross motor skills.

  - I don’t know if the really knows really what a power chair (does).

  - (She) demonstrated increased precision, independence, and control of her

- Caregiver Satisfaction & Attitude

  - Caregiver was satisfied with PM training evident in caregiver’s motivation of participate in intensive training program despite limited resources/support.

  - Demonstrate decreased scissor/grip pattern following session

- Improved Gross Motor Function

  - Demonstrated decreased scissor/grip pattern following session

  - Required less assistance to prevent extension thrusting during gait training following PM training

- Caregiver Descriptions

  - I think that she now (has) the confidence of knowing what she wants, and knowing that I know that’s what she wants when she tells me.

  - (But) she has her processes and (drives) then she can possibly get (toys/bubbles) I think she knows now that she can move herself like that’s huge with her.

Strategies for Training

- A number of strategies to employ during power mobility training were identified in the literature. Many found conducive to teaching power mobility skills during this pilot study. These strategies are listed below.

  - One additional strategy, responsive to child’s reaction, in terms of adjusting both hardware and software, to promote success emerged during the research.

  - Set up an1 Engaging Environment

  - Involve Caregivers in Training

  - Treat Participants with Independence

  - Avoid Loud Environments

  - Encourage Exploration and Experimentation

  - Prompt with Single Words or Very Short Sentences

  - Respond to Child’s Reactions

Conclusion

The benefits of independent mobility are well known. Unfortunately in the absence of practice guidelines, power mobility options are being underutilized as an option for very young children to experience independent mobility. This case-study aimed to look at one element of PM provision, training. Results offer some valuable clinical implication for power mobility training including:

- Secondary benefits, such as those reported in this case-study, should be considered during decision making.
- Independent PM control is not the only goal for PM training.

- Most secondary benefits were identified after four weeks of training and during the intervention phase (training 3x/wk).

- Clinician-confidence and confidence to adjust both setting and positioning as well as programming the chair in response to the child’s actions is essential to promote success.

- Allowing the child adequate response time to compensate for latency can be difficult but is important.

  - Clinical judgment, as with most therapy services, is the cornerstone for assessment and reassessment.

  - Environment should be large enough to encourage exploration and have limited distractions.