INTRODUCTION
Effects of Intrathecal Baclofen Therapy on Upper Extremity Function in Children with Cerebral Palsy
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Background
- Cerebral palsy (CP) affects 1.5 to 3.3 in 1000 live births, and almost 80% of children with CP have spasticity.
- Motor function greatly affects the ability of some children with CP to participate in basic daily tasks, such as eating, dressing, and playing.

Research on Function
- One pharmaceutical intervention, baclofen, is effective in reducing spasticity in children with CP.
- Baclofen, when administered orally in large doses, can cause undesired side effects such as fatigue and lethargy.

Intrathecal Baclofen (ITB) Therapy
- This method of administering a small dose of baclofen directly into the cerebrospinal fluid through an implanted pump and catheter, which effectively reduces spasticity without systemic side effects.

Studies have demonstrated the effectiveness of ITB in managing pain, reducing contractures, and improving caregiver function as a result of the reduced spasticity.

However, there is inconsistent evidence as to whether spasticity reduction due to ITB therapy leads to improvements in function, particularly upper extremity (UE) function, which is crucial for many basic daily activities.

Standardized assessments indicated some improvements in UE function as a result of ITB therapy, but the findings are inconsistent and weak.

Subjective caregiver reports consistently showed improvements in UE function as a result of reduced spasticity due to ITB therapy.

However, there is more evidence to support the use of ITB therapy in improving digital function, and it is difficult to determine whether reduced UE spasticity due to ITB therapy is related to increased UE function among children with CP.

Hypothesis
- Among children with moderate to severe CP who receive ITB therapy, improvement in UE function can be demonstrated through standardized measures of endurance, success rate, and hand position during an UE reaching task and by a standardized measurement of caregiver reported ease of participation in personal care activities.

RESEARCH DESIGN & METHODS
Participants
- Children and young adults 4 to 21 years old with spastic CP and/or generalized dystonia recommended for ITB pump (n = 14).
- The primary caregiver of each child or young adult

Measures
- Manual Ability Classification System (MACS) – Five level classification of functional hand use ranging from Level 1: Standard objects easily and successfully used to Level 5: Does not handle objects and has severely limited ability to perform even simple actions.
- Endurance, success rate, and hand position during an UE reaching task to hit a switch or achieve a toy or task.
- Hold Time (Seconds)

Design
- Single subject repeated measures design
- T1: Pre-ITB pump implantation
- T2: 6 months post-ITB pump implantation
- T3: 12 months post-ITB pump implantation

METHODS
- The MACS classification level for participants 3 and 10 decreased from pre-ITB to 12 months post-ITB intervention, indicating improvement in functional hand use.
- The Hold Time (Seconds) for participants 3 and 10 increased from pre-ITB to 12 months post-ITB intervention, indicating an improve in endurance in functional hand use.

RESULTS
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BACKGROUND
This study aims to test objective and subjective measures of UE function in children with CP, and further research must be conducted among children with CP to determine if a reduction in spasticity due to ITB therapy translates to improved upper extremity function, leading to increased participation in valued activities and ultimately, an improved quality of life.

Inconsistency of procedures between protocol visits and between participants on the UE reaching task.

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IMPLICATIONS FOR PRACTICE
Research on Function
- The fact that current measures show few significant changes in UE function as a result of ITB therapy has implications for how we conceptualize and assess function.

- Although a child who is receiving ITB therapy may demonstrate increased endurance during reach or reach and touch tasks independently, other important functional changes may be occurring such as reaching an object or shifting position while the UE is in motion.

- Familiar research should focus on identifying or developing measures of small, but meaningful functional changes and the impact of these changes on participation in meaningful activities.

Family Expectations
- Spasticity affects each child differently and, based on the findings of this study, the UE functional outcomes of ITB may not be predictable for each child.

- This variability in functional UE outcomes after ITB therapy should be conveyed to families who are considering an ITB pump.

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