Objectives

Variation of care exists among physical therapy assessment and intervention for individuals with cerebral palsy (CP) and other similar neuromotor conditions who undergo Single Event Multi-Level Surgeries (SEMLS).

The objectives of this demonstration poster are to (1) describe the literature search on therapy protocols regarding SEMLS, including the inclusion and exclusion criteria, keywords, databases, and results, and (2) discuss recommendations developed for an evidence-based clinical care guideline.

Description

A literature review was completed to determine common practice among physical therapists regarding management of SEMLS for individuals with CP and other similar neuromotor conditions.

Two clinical questions were identified: In children, adolescents, and young adults, aged 5 years to 25 years old, who are diagnosed with CP or other similar neuromotor conditions and undergo SEMLS, (1) What are the most common outcome measures across the International Classification Functioning, Disability, and Health (ICF) Framework? (2) Which therapeutic interventions are used to achieve optimal functional outcomes?

Inclusion Criteria included: Diagnosis of Cerebral Palsy or Encaphalopathy; Children, Adolescents, and Young Adults (less than 25 years old); Any Lower Extremity Orthopedic: multi-level surgery; Gait; Physical Therapy; Surgical Procedure(s).

Exclusion Criteria included: Surgery other than Lower Extremity Orthopedic: Non- Multi-level Lower Extremity Orthopedic surgeries; Articles related to surgical procedure or radiographic information; Articles related to Medication or Pharmacology (i.e. Botox, Bacto-Scan); Diagnoses other than Cerebral Palsy or other similar neuromotor conditions; Articles not published in English; Articles published prior to 1994; Selective Dorsal Rhizotomy; Adults greater than 25 years old; Animals.

Keywords included a combination of the following: Cerebral palsy, single event multi-level surgery, all american, single-event multilevel ortho* surgery, physio* therapy.

Databases that were searched, included Cinahl and Medline (via PubMed and Ovid). The initial search identified 1773 articles. After titles and abstracts were screened, a total of 202 full text articles were reviewed. An additional 83 articles were excluded due to not providing answers toward the clinical questions following full text review. Later, an additional 28 articles were added with an additional search. A total of 147 articles were appraised and assigned an evidence level.

Recommendations

Recommendation 1 – ICF Utilization

It is recommended that the ICF including the domains of Body Structure and Function, Activities, and Participation be used to guide care when working with individuals undergoing SEMLS.

Recommendation 2 – Gross Motor Function Classification System (GMFCS)

It is recommended that a GMFCS level is confirmed pre-operatively by a physical therapist to assist with determining post-operative plan of care and prognosis.

Recommendation 3 – Family Education

It is recommended that patients and caregivers be provided with education including: Pre-operative evaluation and goal setting, Pre-operative education for post-operative expectations, Post-operative functional prognosis based on GMFCS Level and distribution, Orthotics, and equipment, and Post-operative care.

Recommendation 4 – Goal Setting

It is recommended that patient/caregiver functional goals be identified by patients and caregivers for post-operative physical therapy intervention using the GMFCS and the Canadian Occupational Performance Measure.

Recommendation 5 – Physical Therapy Assessments

It is recommended that following SEMLS, physical therapy assessments include but are not limited to:

- Body Structure and Function: Gait analysis 2-D or 3-D. Electromyography, Walking efficiency
- Walk tests
- Muscle tone: Modified Tardieu Scale. Hypertonia Assessment Tool
- Selective Control Assessment of the Lower Extremities
- Gross Motor Function Measure
- Functional Mobility Scale
- Functional Assessment Questionnaire
- Gilat analysis 2-D or 3-D
- Walk tests

Recommendation 6 – Consults/Referrals

It is recommended that physical therapists specifically consider consults/referrals for Pain management, Tone management, Occupational Therapy, Nutrition, Gastrointestinal, Adaptive Equipment, and Orthotics.

Recommendation 7 – Post-Operative Physical Therapy Protocol

It is recommended that post-operative physical therapy intervention includes but is not limited to:

- Activities: Aquatics
- Scar Management: Neuromuscular E-Stim
- Balance Training: Treadmill Training
- Postural Training: Functional Strengthening
- Endurance Training: Functional Mobility
- Range of Motion: Equipment and Orthotic
- Strengthening: Postural Training
- Aquatics

Recommendation 8 – Long Term Monitoring

It is recommended that annual comprehensive physical therapy evaluations occur for up to 5 years following SEMLS.

Significance

An evidence-based clinical care guideline and algorithm for physical therapy management of individuals with CP undergoing SEMLS was developed to offer clinicians recommended outcome measures and interventions to optimize patient care.

Future research for individuals undergoing SEMLS include:

- Early tone management
- Wellness opportunities
- Adaptive equipment
- Optimal physical therapy intervention and dosing
- Consistent SEMLS definition
- Aquatics
- NMES
- Scar management
- Long-term follow-up
- Quality of life measures
- Efficacy of lower extremity bracing
- Importance of pre-operative physical therapy evaluation and treatment

Acknowledgements

Michelle Kiger MHS, OT/RL Catherine Quatman- Yates, PT, DPT, PhD

Cincinnati Children’s Hospital Medical Center
Division of Occupational Therapy, Physical Therapy, and Therapeutic Recreation

References available upon request.