ONLINE ONLY

Supplemental material

Case-based explanation of standard work tools for selective dorsal rhizotomy for cerebral palsy
Shlobin et al.
https://thejns.org/doi/abs/10.3171/2024.3.FOCUS2468

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Online Appendix: Rehabilitation Protocol

SDR Rehab Treatment Protocol
Inpatient and Outpatient Therapy

Inpatient (Post-op Day 0 to 6 Weeks)

Restrictions: Minimal isolated trunk flexion, lateral trunk flexion, or trunk rotation for 6 weeks. Active movements are allowed.

Neurosurgery Post-op Instructions
- Admit to ward, q4 hour vital checks.
- Advance diet.
- >24 hours supine.
- Foley out after mobilization.
- If epidural in situ, rapidly weaned by pain service by POD#3.
- 24 hours ancef
- Wound covered with silver mepilex X 5 days, if it falls off then bacitracin X 5 days.
- Pain and nausea control with oral opiates and Zofran per APS protocol
- No labs or images unless clinically indicated.
- Admit to rehab for 6 weeks (pending insurance)
- Continue to follow

Initial Clinical Presentation:
- Absent or decreased spasticity in legs
- Varying degrees of tightness in hip flexors, hamstrings, adductors, and gastroc
- Weakness of hip extensors, hip abductors, external rotators, quadriceps, and ankle dorsiflexion
- May complain of sensory changes in lower extremities (dysesthesia)
- Lower back pain at laminectomy/surgical incision site
- Often fearful of movement, sitting, or lying prone
- Flexed postures are often preferential static positions

Inpatient to Rehab: physical therapy (6 weeks)
Post-op days 2 or 3
- Patient is still in PCU
- Evaluate
  - ROM: passive and active (*as able)
  - Tone
  - Strength
  - Education: what to expect in inpatient and rehab
- Patient may not voluntarily perform active ROM secondary to fear of moving
  - Important to decrease fear of pain associated with movement, normalize sensations associated with functional activity
• Will see QD until transfer to rehab unit

Post-op day 4
• Usually transferred to rehab unit
• **See bedside BID for** ROM (active and passive) and positioning
  o Initiate prone position to encourage stretching of hip flexors, start out with limited time, based on tolerance, with goal to increase daily
• May start getting into sitting position.
  o Can be fearful of the upright/seated position; progress toward fully upright position by gradual anterior lean from supported reclined position.
• Serial casting may be initiated if lack DF to neutral
• Knee immobilizers to help with hamstring stretching/knee extension
  o **Protocol: 4 hours/day when not in therapies**

Post op days 4-6
• Start treating in PT gym
• Initiate prone cart
• Transported on cart instead of wheelchair
  o Exception is transport to school
• Coordinate with nursing to administer pain meds before therapy sessions
• Focus on maximizing ROM
  o Knee extension
  o Hip extension
  o Dorsiflexion
• Prone → prone on elbows → quadruped → creeping
• Strengthening
  o Trunk stability
  o Lower extremities (quads, glutes)
• Seated tolerance
• Transitions
  o Sit ↔ supine, rolling

Post op days 7-14
• Advance mat mobility.
  o Focus is on quality of movement and retraining appropriate motor patterns and breaking patient’s abnormal movement patterns and reliance on tone for mobility
• Functional positions: quadruped, creeping, tall kneel, ring sit, side sit, and standing
• Initiate prone stander and as patient’s tolerance improves write RVVO for nursing to do in the evenings
• When ready begin standing and if ready walking with assistive device- they must have enough trunk control to build new patterns in standing and gait, do not reinforce old habits, may use knee immobilizers in standing and gait initially
• Continue casting until pt demonstrates DF of at least 0-5 degrees PROM bilaterally
• Stretching with ultrasound or hot packs as needed
• FES or biofeedback for strengthening
**Inpatient Goals**
- Need to be specific for each patient depending on involvement.

**2-3 Week Goals**
- Develop correct postural alignment in sitting with trunk strengthening/stability
- Increase ROM (hamstrings, hip flexors, and gastrocnemius)
- Increase strength throughout new ROM
- Develop reciprocal and *dissociative* lower extremity movements
- Emphasize anterior weight shift initiation and maintenance with functional activities; learning forward from posterior support, etc

**3-6 Week Goals**
- Determine orthotic needs: generally will need new braces due to changes in tone and ROM
- Wheelchair recommendations
- Initiate ambulation and continue gait training with Kaye walker to encourage step-through pattern
- Emphasize proper alignment and form in gait vs distance walked
- Increase antigravity strength and stability
- Balance reactions in sitting and standing
- Emphasis on motor control during functional activities

**Outpatient Physical Therapy (Starting at post-op week 7)**

**Frequency**
- 5x/week for 3 months
- 3x/week for 3 months
- 1-2x/week after 6 months

**2-6 Month Goals**
- Independence with gait
- Strengthening and working on motor control using new pattern of movements
- Speed and efficiency of mat mobility and transitions
- Eccentric strengthening

**6-12 Month Goals**
- Speed in gait and in all patterns of mobility
- Progressing to lesser assistive device and/or bracing
- Strengthening eccentric end ranges
- Focus strengthening on muscles for functional patterns
- Increase balance in all positions- sitting, tall kneeling, and standing
- Increase functional endurance

**12-24 Month Goals**
- Add recreational activities to continue to work on all aspects
- Maximize strength
- Fine-tune high level gait and balance
Abbreviations: Acute pain service (APS), twice daily (BID), pediatric intensive care unit (PICU), postoperative day (POD), range of motion (ROM)