Clinical Policy: Selective Dorsal Rhizotomy for Spasticity in Cerebral Palsy

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Coding Implications
Revision Log

Description

Selective dorsal rhizotomy (SDR) is a neurosurgical technique developed to reduce spasticity and improve mobility in children with cerebral palsy (CP) and lower extremity spasticity. It involves the selective division of lumbosacral afferent (sensory) rootlets at the conus or at the intervertebral foramina under intraoperative neurophysiological guidance. Early procedures were effective at reducing spasticity but were associated with significant morbidity; however, technical advancements have reduced the invasiveness of the procedure, typically from a five-level laminoplasty to a single level laminotomy at the conus.[4,18]

Policy/Criteria

I. It is the policy of PA Health & Wellness® that s*elective dorsal rhizotomy* is **medically necessary** for children with spastic CP when meeting all of the following:

A. Spastic diplegia, or spastic quadriplegia with no significant ataxia or dystonia;
B. Gross Motor Function Classification System (GMFCS) level II or III;
C. Age > 2 to < 10 years;
D. No significant muscle weakness;
E. Functional and intellectual ability to participate in physical rehabilitation;
F. Failure of or inability to tolerate other conservative treatment (e.g., pharmacotherapy, orthopedic management, physical therapy);
G. No botulinum toxin A injection has been given within the last six months;
H. No orthopedic surgery within the last year;
I. No significant scoliosis;
J. Periventricular leukomalacia (PVL) on MRI with no involvement of the thalamus, basal ganglia or cerebellum;
K. Reimers index < 40%, (i.e., no significant femoral head subluxation on pelvic radiograph.)

II. It is the policy of PA Health & Wellness® that *selective dorsal rhizotomy* is **not medically necessary** for children with spastic hemiplegia, or ataxic or athetoid spasticity.

Background

Cerebral palsy (CP) refers to a heterogeneous group of conditions involving permanent nonprogressive central motor dysfunction that affect muscle tone, posture, and movement. The average age at diagnosis for children with CP is 12 to 24 months, with specific sub-type typically diagnosed after 18 to 24 months of age. The motor impairment generally results in limitations in functional ability and activity, which can range in severity. Other symptoms include altered sensation or perception, intellectual disability, communication and behavioral difficulties, seizure disorders, and musculoskeletal complications. Although the underlying etiology itself is not progressive, the clinical expression may change over time as the nervous system matures.[2]

Spastic CP is characterized by muscle hypertonicity and impairment in motor skills. Spastic diplegia is one of the most frequently occurring forms of CP, with spasticity confined to the lower extremities. The gait pattern of those with spastic diplegia includes in-toeing steps, toe walking, scissoring, excessive trunk sway, and diminished walking endurance.[17,18]

Standardized measurement of an individual's functional status can help guide treatment selection and allows for monitoring of change over time. The Gross Motor Function Classification System (GMFCS) is used to categorize functional motor impairment in children with CP. Other widely used tools for evaluating function include the Manual Ability Classification System (MACS) and the Communication Function Classification System (CFCS). The goals of treatment for children with CP include improved motor function, increased mobility and independence, improvement in ease of care, reduction in pain and reduced extent of disability.[16]

The Gross Motor Function Classification System (GMFCS) for ages 6 to 12 years (modified descriptions of these categories are used for younger age groups) [1,2,16]

- Level I: Walks in all settings; climbs stairs without using a railing; runs and jumps, but speed, balance, and coordination may be limited
- Level II: Walks in most settings, though may have difficulty walking long distances and balancing on uneven terrain; walks up and down stairs holding onto a railing; minimal ability to run and jump
- Level III: Walks using a hand-held mobility device (canes, crutches, and anterior and posterior walkers that do not support the trunk); may use wheeled mobility for longer distances; when seated, may require a seatbelt for balance; may require physical assistance when transferring from sitting to standing; may walk up and down stairs holding onto a railing with supervision or assistance
- Level IV: Generally dependent on wheeled mobility; may be able to use power mobility independently; may walk short distances with support in familiar environments; at home may use floor mobility (roll, creep, or crawl); requires adaptive seating for trunk and pelvic control; requires physical assistance for most transfers
- Level V: Transported in a manual wheelchair in all settings; limited ability to maintain antigravity head and trunk postures and control arm and leg movements; transfers require complete physical assistance

Controlling spasticity is crucial in the treatment of CP as it causes discomfort, gait abnormalities, and functional limitations. It also generates muscle shortenings that influence bone growth and leads to deformities.[3] The approach to treating spasticity in children with CP is not standardized. Treatments may include pharmacotherapy (e.g., oral baclofen, benzodiazepines), nerve blocks (i.e., botulinum toxin and/or phenol injections), orthopedic management, physical therapy (PT) and occupational therapy (OT) including use of braces, orthotics and mobility devices, SDR and intrathecal administration of baclofen.[1]

An SDR may be performed in selected patients with a goal of permanently diminishing spasticity and improving motor function of the lower limbs. Younger children (age > 2 years to < 10 years) are generally optimal candidates for SDR since they are young enough to relearn appropriate motor patterns for ambulation. Patient selection should be rigorous, and active participation in therapies postoperatively is critical.[1]

A meta-analysis of three randomized controlled trials comparing SDR plus PT with PT alone in a total of 90 children with spastic diplegia who were primarily ambulatory (most were <8 years old and most had a GMFCS level of II or III), spasticity at 9 to 12 months (assessed by the Ashworth scale) was less with SDR plus PT compared with PT alone. The SDR group had a modest, but statistically significant, improvement in motor function (assessed by the GMFM score), and this correlated with the proportion of dorsal root tissue that was transected. No serious adverse events were reported.[1] Studies suggest that the beneficial effects of childhood SDR extend to adulthood quality of life and ambulatory function without late side effects of surgery. [9,10,11,12,18]

A recent review of the literature concluded that SDR plus postoperative PT improved gait, functional independence, and self-care in children with spastic diplegia. SDRs through multilevel laminectomies or laminoplasty were associated with spinal deformities (i.e., scoliosis, hyperlordosis, kyphosis, spondylolisthesis, spondylolysis, and nonhealing of laminoplasty), however, SDRs through a single level laminectomy prevented SDR-related spinal problems.

The use of SDR in the setting of severe motor impairment (GMFCS level IV or V) is controversial. Severe spasticity and contractures cause significant discomfort and may interfere with sitting and general caretaking. In addition, often other comorbidities exist (e.g., intellectual disability, seizure disorder). The goal of surgery in this setting is to ease the difficulty of daily caretaking, to improve comfort, and improve stability in the seated position. SDR in those severely affected generally requires greater extent of nerve root division, and as a result may experience troublesome weakness.[1,9]

National Institute for Healthcare and Excellence (NICE) [5]
Current evidence on selective dorsal rhizotomy for spasticity in cerebral palsy shows that there is a risk of serious but well recognized complications. The evidence on efficacy is adequate. Therefore, this procedure may be used provided that normal arrangements are in place for clinical governance and audit. Parents or caregivers should be informed that SDR for spasticity in CP is irreversible, and that patients may experience deterioration in walking ability or bladder function, and later complications including spinal deformity. They should understand that prolonged physiotherapy and aftercare will be required, and that additional surgery may be necessary. This procedure and patient selection for it are still evolving with most of the evidence relating to children aged 4 through 10 years.

Coding Implications
This clinical policy references Current Procedural Terminology (CPT®). CPT® is a registered trademark of the American Medical Association. All CPT codes and descriptions are copyrighted 2023, American Medical Association. All rights reserved. CPT codes and CPT descriptions are from the current manuals and those included herein are not intended to be all inclusive and are included for informational purposes only. Codes referenced in this clinical policy are for informational purposes only. Inclusion or exclusion of any codes does not guarantee coverage. Providers should reference the most up-to-date sources of professional coding guidance prior to the submission of claims for reimbursement of covered services.

CPT® Codes	Description
63185	Laminectomy with rhizotomy; 1 or 2 segments
63190	Laminectomy with rhizotomy; more than 2 segments

Reviews, Revisions, and Approvals	Revision Date	Approval Date
Policy developed. Specialist reviewed.	10/19	1/30/2019
Annual Review complete. References reviewed and updated. Specialist reviewed.	2/18/2021	
Annual review. Changed "review date" in the header to "date of last revision" and "date" in the revision log header to "revision date." Minor edits to background with no impact on criteria. References reviewed, updated and reformatted. Reviewed by specialist.	4/29/2022	
Annual review completed. Added "muscle" in I.D. Background updated and minor rewording with no clinical significance. ICD-10 diagnosis code table removed. References reviewed, reformatted and updated. Reviewed by specialist.	12/15/2022	
Annual review. Updated level descriptions for "Gross Motor Function Classification System" in the background with no clinical significance. References reviewed and updated. Reviewed by external specialist.	11/2023	02/2024
References reviewed and updated. Reviewed by external specialist.	12/2024	

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