Selective dorsal rhizotomy

What is selective dorsal rhizotomy (SDR)?

Selective dorsal rhizotomy (SDR) is a surgery to reduce increased muscle tone or spasticity without changing sensation (feeling) or strength.

- Increased muscle tone causes stiffness with exaggerated or normal reflexes.
- Spasticity causes tight, stiff muscles and movement problems.

Who benefits from SDR?

Cerebral palsy (CP) affects about 3 out of every 1,000 live births. Many of these children suffer from increased muscle tone or spasticity. This makes it hard for them to move and for others to move them.

Children with CP who benefit most from SDR have:

- Spastic diplegia – most stiffness and movement problems in the legs
- Spastic hemiplegia – most stiffness and movement problems on half the body (like an arm and leg on the same side)
- Gross Motor Function Classification System 1, 2 and 3 – can walk with or without an assistive device or show they may be able to walk in the future
- No dystonia or choreo-athetoid movements – other abnormal movement patterns or disorders

SDR does not cure CP. It is useful when spasticity affects movement. This is especially helpful for children with CP who:

- Can walk or show they may be able to walk in the future.
- Show improvement in lower muscle tone, gross motor movements and activities of daily living.

Can my child have SDR?

Our Spasticity Management team will discuss the possible risks and benefits of SDR for your child. They will keep in mind your child's:

- Selective muscle control.
- Age. Children who are 4 to 8 years old benefit more often from SDR. Some older children may also benefit from it.
- Muscle strength.
- Cognitive ability (able to follow commands needed for therapy).
- Potential for functional progress.
- Motivation and family motivation.

Surgery is most often not advised for children who have a history of:

- Meningitis
- Congenital infection (present at birth)
- Traumatic brain injury (TBI)
- Genetic disorders

Are there any risks?

Yes. There are risks with any surgery and anesthesia (medicine to keep your child comfortable and asleep during surgery). Talk with the doctor about these risks. Some risks may include:

- Partial paralysis of the legs
- Loss of bladder control (incontinence)
- Sensory loss
- Numbness
- Nerve pain
- Wound infection

What should I know before surgery?

- Talk with the doctor about how to wean your child off medicines they take for spasticity.
- Take your child’s orthotic devices, walking devices and wheelchair with you. Your child can use them after surgery.
- Talk with the doctor or therapists for an exercise program to help your child with rehabilitation (rehab) after surgery.

What will the surgery be like?

The surgery is scheduled for 4 hours, but the operating time most often lasts only 2 ½ to 3 hours. A nurse will update you every hour.

After surgery, your child will spend about 45 minutes in the recovery room. Then they will be moved to a room for their hospital stay.

During surgery, the doctor will:

- Make a small incision (cut) along the center of the lower back. The cut will be about 3 to 4 inches long.
- Divide the nerve roots that come out of the spine into 4 to 8 smaller roots, called "rootlets."
- Stimulate each rootlet to decide which ones are to blame for the spasticity.
- Cut the abnormal rootlets without harming the others.

Another doctor may watch the electrical responses and the effect on the muscles.

What happens after surgery?

Your child’s physical activity will be restricted for the first 3 days after surgery. Then they will begin physical therapy (PT). The amount and length of each PT session will slowly increase over time.

The therapist will teach you how to move your child safely while they heal. These are called "spine precautions." Some guidelines to follow include:

- For 3 to 4 weeks after surgery or until the doctor tells you something different, have your child avoid:
  - Bending the hips more than 90 degrees.

In case of an urgent concern or emergency, call 911 or go to the nearest emergency department right away.

  - Moving or rotating the back from side to side.
- Stay with your child at all times when they start standing. Sometimes the surgery will show areas of weakness they had before. They also need time to recover. Your child will be very weak.
- Follow the therapist's instructions closely when you help your child walk. Your child may not be allowed to walk at all for a period of time.

How long will my child need PT after surgery?

A therapist will start working with your child on day 3 after surgery. Then your child may be moved to our comprehensive inpatient rehabilitation unit (CIRU) to stay for several weeks. Most often, children are able to go home after 2 to 4 weeks in CIRU and when the doctor says it is OK.

The guidelines for PT after SDR are:
- 4 to 5 days each week for the first 3 months after surgery. Your child may spend part of this time in CIRU and will then switch to outpatient therapy.
- 3 to 4 days each week for 3 months
- 2 to 3 days each week for 6 months.

After the first 6 months, your child may be able to try other types of therapy like swimming, dancing or horseback riding, only as advised by the doctor or therapist.

What follow-up care will my child need?

Your child will follow-up with their neurosurgeon between day 10 and day 14 after surgery. They will also see a physiatrist, or pediatric rehabilitation medicine specialist, throughout their recovery.

The Spasticity Clinic is a multidisciplinary clinic where both of these specialists, as well as PTs and orthopedic surgeons, can assess your child and work with your team of specialists to improve your child’s function and outcomes.

What else do I need to know?

Occupational and speech therapy (OT and ST) are sometimes helpful for children who have SDR. The therapists may assess:
- Your child right after surgery and every 6 months for 1 year to see if they need OT or ST.
- Whether the SDR affects how your child speaks, thinks and moves their upper extremities (hands and arms).