

Selective Dorsal Rhizotomy (SDR)

What is a selective dorsal rhizotomy, or SDR?

A selective dorsal rhizotomy [rize-AH-tuh-mee], or SDR, is surgery on the nerves in the spinal cord. It is done to reduce muscle tone or spasticity [spas-TISS-it-tee]. During surgery, tiny parts of nerves that send sensory signals to the brain are cut. Sensory signals are how the brain and muscles talk to each other and control movement in the body. SDR surgery is done only once. It may keep your child from needing an implanted medical device, like a baclofen pump.

What is spasticity?

Spasticity is abnormal muscle tightness, stiffness, or increased muscle tone. It is caused by an injury to the brain or spinal cord, a stroke, or cerebral palsy. Spasticity can cause awkward movements, exaggerated reflexes, and discomfort. When your child has spasticity, their brain does not get the message to tell the muscle to relax.



What other options help with spasticity?

- Medications taken by mouth, like baclofen
- Botulinum and phenol injections
- Physical therapy
- Bracing
- Baclofen pump (an implanted medical device)

Will an SDR help my child?

An SDR does not work for every child with muscle tightness. This surgery can help some children with cerebral palsy or spasticity walk better and help their legs work better. This surgery can also help children with tight muscles who do not walk be more comfortable and easier to care for.

Your child's care team will carefully examine your child and decide if an SDR will help. Children ages 4 to 7 years old most often have an SDR, but many older children and adults have been helped by the procedure.

There are two kinds of SDR: palliative [PAL-ee-uh-tiv] and functional.

- A **palliative SDR** is for a child with tight muscles that does not walk or stand. The tight muscles make them uncomfortable, and it is hard to position them or take care of them. Your child may benefit from a palliative SDR if they:
 - Have lots of tight muscles, mostly in their legs
 - Does not stand or use their legs to transfer
- A **functional SDR** is for a child that is strong, but spasticity makes it difficult to walk or stand. Your child may benefit from a functional SDR if they:
 - Have relatively strong leg muscles, since the muscles relax after SDR
 - Works best for tight muscles in the legs.
 - Might help with tight muscles in the arms
 - Don't have fixed contractures (muscles that are permanently shortened)

Another important part of a successful functional SDR is therapy. It is important that your child has the ability to cooperate and participate in physical therapy. An SDR will change how your child walks and moves. Therapy helps your child get strong and learn to move more easily.

Can an SDR help with other kinds of tight muscles?

If your child has another form of abnormal muscle tone, such as **dystonia** [dis-TONE-ee-ah] or **athetosis** [ath-eh-TOE-sis], SDR does not usually help. There are new procedures for this. Talk to your neurosurgeon or physical medicine doctor if you would like to learn more.

How do I know if an SDR will help my child?

Here are several exams and tests that can help determine if your child will do well with an SDR. They might not need all of the tests.

- **Spasticity evaluation.** A doctor and physical therapist look at your child's muscles and do measurements to see how much spasticity they have.
- **Baclofen trial.** Puts baclofen in the fluid around the spinal cord to see how strong your child is when the spasticity is gone.
- **Gait study.** Checks how your child walks and how an SDR might affect it.
- **Neurological exam.** The neurosurgeon examines your child to see if surgery is a good option for them.
- **MRI.** Shows the neurosurgeon where your child's nerves are for the surgery. It helps them make a plan for surgery.

What are the risks of SDR?

Risks of SDR include:

- Bleeding or infection
- Problems with anesthesia
- Numb areas in the legs
- Changes in bladder control (usually goes away in a few days)
- Weakness
- Changes in how your child moves
- CSF leak/spinal headache
- Changes in the curve of the spine. (This doesn't happen very often and takes time to happen.)

How do we prepare for SDR surgery?

You will need to do the following:

- **Meet with a neurosurgeon.** They may start a medication that helps with nerve pain.
- **Help your child have a bowel movement** the day before surgery. Your child will be moving less after surgery and the medicine that helps your child sleep during surgery can make it hard to poop (bowel movement). Ask your doctor if you need help to do this.

The hospital will call you the day before surgery (or on the Friday before if surgery is on Monday). They will tell you what else you need to do to prepare and when to come to the hospital. They will call earlier if other tests are needed before surgery.

Who takes part in the surgery?

There are many experts who will work to make the surgery a success. They include:

- **Neurosurgeon:** A surgeon who separates and cuts the nerves
- **Physiatrist:** A doctor who watches the muscles to help decide which nerves to cut
- **Electrophysiologist:** A specialist who sets up and manages the equipment that monitors the nerves and muscles
- **Anesthesiologist:** A doctor who puts your child to sleep and watches them during surgery
- **Nurses:** Helps get your child ready for surgery and helps the doctors during surgery.

What happens during surgery?

- A tiny tube called an IV [eye-vee] is placed into a vein in your's child's arm. This is used to give your child fluids and medicine during surgery.
- Your child will be given medicine to health them sleep during surgery (anesthesia).
- Sensors to measure muscle response will be attached to the muscles in your child's legs.
- The surgeon makes a small opening in the lower part of your child's back to see the nerve roots in the spinal cord.
- The surgeon divides the nerves into smaller roots and separates motor nerve roots from sensory nerve rootlets (very small sections of the nerves that send messages between the brain and muscle).
- A machine is used to activate the sensory nerve rootlets to see what the muscle does. They will rank the responses from mild (not very much) to severe (very strong). If the response is severe, the surgeon may cut the sensory nerve rootlet.

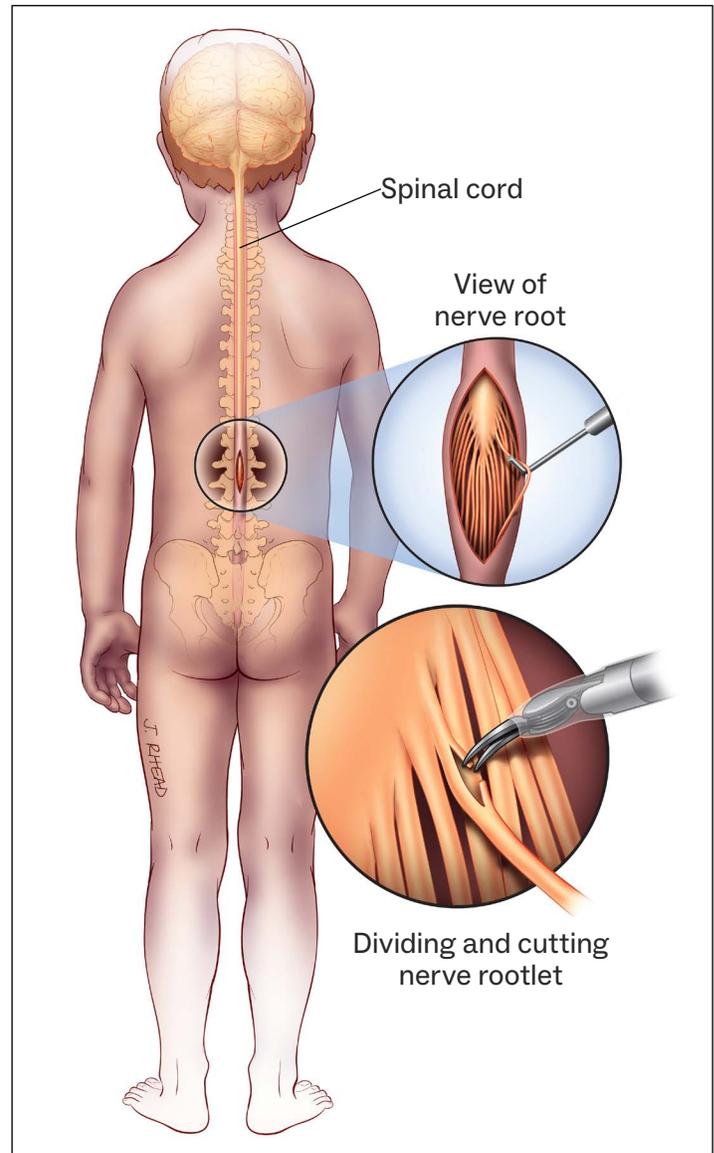
What care will my child need after surgery?

For a palliative SDR, your child will be in the hospital for 3 to 5 days. For a functional SDR, your child will be in the hospital for 10-21 days

Pain control

Pain control is an important part of care after surgery. Pain control will be guided by a pain team who will work hard to help your child be as comfortable as possible.

- During surgery, medicine is used to numb the area of the surgery. This helps with pain. This will slowly stop working.
- Pain medicine can be put into the spinal fluid (epidural catheter) or IV. These are used right after surgery and until your child can eat.
- Medicine by mouth will be started as soon as your child can eat. Acetaminophen (Tylenol) and ibuprofen (Motrin, others) are usually used to control pain by 3 to 4 days after surgery. A medicine for nerve pain might be needed.



Incision care

- The surgery site is low on your child's back. It must be kept clean and dry to prevent infection.
- Make sure no urine or poop gets in the incision. If your child wears a diaper, they may need a dressing to cover the opening to protect the wound until it heals.

Activity

- Your child will stay in bed for 2 to 3 days after surgery. They will be turned often.
- Your child will start activities slowly after surgery. This helps to prevent a spinal leak or headache. They will work with therapy to help them get moving at the right time.

Physical therapy

- **Early exercise:** The physical therapist may start exercising your child's legs the first day after surgery. By the third day, they may raise the head of your child's bed slightly.
- **Starting therapy:** Your child will start physical and occupational therapy 4 days after surgery. They will focus on stretching and strengthening their legs. Therapy will last for 2 to 3 weeks, until your child is strong enough to go home.
- **Sensitive feet:** Sometimes your child's feet may be sensitive after surgery. The therapist will help your child get used to the feeling of touch on their feet. They do this with shaving cream, touch, or other objects to create different feelings in the feet.

What can I expect after an SDR?

- The spasticity a child had before surgery does not usually come back.
- Your child might not seem as strong. This is because the tight muscles were helping them with some activities. The SDR did not make the muscles weak.
- Therapy will help your child learn how to do things they did before, like walking. It does not help them walk if they were not walking before the surgery.
- Physical therapy after surgery usually improves your child's muscle strength. Children can often walk again after a few weeks of therapy.
- Some children have better upper body function, thinking skills, and speech after SDR.
- Your child will likely be more comfortable. They may be easier to position and easier to take care of.
- You will need to follow-up with your neurosurgeon to make sure everything has healed.



- You will need to follow-up with your Physical Medicine and Rehabilitation doctor for spasticity and movement.
- You will follow-up with the neurosurgeon for problems related to the surgery.

What if I have questions?

If you have questions ask your child's healthcare provider.

Important numbers:

- Physical Medicine and Rehabilitation clinic: 801-662-5888
- Neurosurgery: 801-662-5340
- Hospital Operator: 801-662-1000

Notes
