

Is a selective dorsal rhizotomy the right procedure for your child?

SDRs can be the right solution for many children with high muscle tone. Your health care team will guide you through the decision process.

High Chance of Meeting Surgery Goals

- Spasticity is the main cause of high muscle tone
- Good strength
- Good motor control
- Can understand and comply with instructions
- Can complete the rehabilitation program

Lower Chance of Meeting Surgery Goals

- There is no clear cause of the high muscle tone
- Dystonia is the main cause of stiffness
- Severe weakness
- Poor motor control
- Aggressive behavior
- Can't follow instructions
- Can't complete the rehabilitation program

WHO YOU WILL MEET

At Texas Children's Hospital, any child being considered for a rhizotomy will have a clinic visit with our entire multidisciplinary team. Our team includes:

- Physical medicine & rehabilitation doctors
- Neurosurgeons
- Orthopedic surgeons
- Physical therapists
- Social workers
- Custom bracing experts
- Advanced practice providers
- Registered nurses



The surgeon and nursing staff needs to be able to reach you for updates during and after the surgery.

PHONE NUMBERS AND LOCATIONS

TYPES OF RHIZOTOMY PROCEDURES

A rhizotomy (rahy-zot-uh-mee) is a **nerve surgery** performed close to the spine that permanently decreases high muscle tone or muscle stiffness in children that have nerve disorders like cerebral palsy. With a rhizotomy, a surgeon cuts the specific nerves contributing to your child's spasticity.

At Texas Children's Hospital, the most common rhizotomy procedures performed are:

- Selective Dorsal Rhizotomy (SDR)
 - Focal SDR
 - Single-level laminectomy SDR
 - Multi-level laminectomy SDR
- Palliative Rhizotomy

The different ways the surgeon performs the rhizotomy impact the patient's recovery and results. Discussions with a specialized health care team help patients and families choose the outcome that works best for them.

TYPES OF RHIZOTMY PROCEDURES

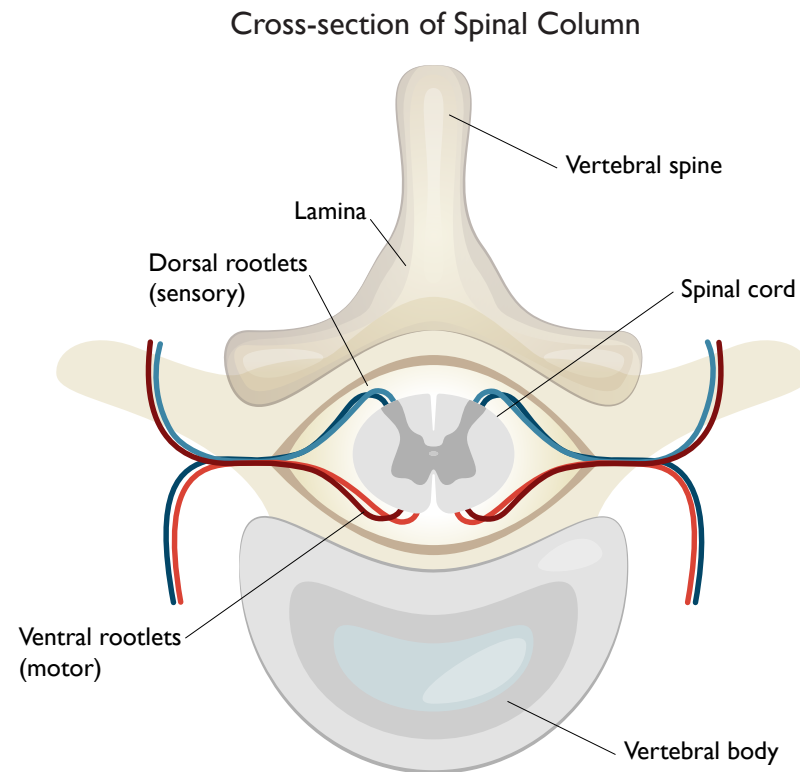
	Surgery Goals	Who Qualifies	Method	Incision Size	Recovery Expectations
Focal SDR	Reduce spasticity.	Children who have mainly spasticity in only a few muscles, typically at the ankle and foot level.	Nerve roots accessed through tube; minimal bone is removed.	2 cm	Overnight inpatient stay, with outpatient physical rehab program. Recovery in 1-2 days with minimal discomfort.
Single-level laminectomy SDR	Improve ability to gain strength.	Children who walk and have high muscle tone evenly distributed in their legs.	Nerve roots accessed by removing top bone of 1 vertebra.	5-8 cm	1-2 day inpatient stay, 2-3 week inpatient rehab program and/or outpatient physical rehab program. Recovery over months.
Multi-level laminectomy SDR	Retrain proper gait patterns.	Children with high muscle tone in their legs who need multiple nerve roots cut over several levels of the spine.	Multiple nerve roots accessed by removing the top bone over several levels of the spine.	17-21 cm	Inpatient stay, 2-3 week inpatient rehab program and/or outpatient physical rehab program. Recovery over months.
Palliative Rhizotomy	Provide comfort. Positioning. Improve ease of care.	Children who do not walk or use their legs to stand or transfer.	Tube access or single-level access with a customized percent of sensory and motor nerves cut.	5-8 cm	No therapy needed, reassessment of equipment needs. Transfer training with physical therapy.

SELECTIVE DORSAL RHIZOTOMY

The most common type of rhizotomy is a **selective dorsal rhizotomy (SDR)**. Selective means that the neurosurgeon cuts specific nerve roots at the levels of the spine causing the spasticity.

Dorsal means “on top” and refers to the location of the nerves in the spine (when a patient is lying on their stomach). The dorsal nerves have small branches called “rootlets” that send messages toward the spine and rootlets that send messages away from the spine. The dorsal rootlets are located closest to the outer surface of the back at each vertebrae or level of the spine. The dorsal rootlets are **sensory** and carry sensory information from the body to the brain.

The nerve roots are under the a protective covering of bone, called the lamina, part of each vertebra. The different names of procedures describe how the neurosurgeon accesses the nerves.



FOCAL SDR (Least invasive method)

Children who have spasticity in only a few muscles, typically at the ankle and foot level, can undergo a focal SDR.

Through a 1-inch incision, the surgeon removes a tiny piece of bone and uses a flexible tube with a microscope to access, view and cut 1 or 2 nerve levels. Children who walk on their toes but have only mildly increased or normal muscle tone above their knees, typically benefit from this type of rhizotomy. Children usually recover from this surgery in 1 to 2 days and have minimal discomfort.

SINGLE-LEVEL LAMINECTOMY SDR

(Minimally invasive method)

The single-level laminectomy SDR is for children who are able to walk and have high muscle tone evenly distributed in throughout their legs. A neurosurgeon opens a small incision over the lower spine. The top part of one vertebra, the lamina (bone around the spinal cord) is removed to expose the nerve roots. Removing the bone is part of the procedure called laminectomy. The neurosurgeon looks at the nerves under a microscope and uses special equipment to test each root. A portion of nerves are cut by the neurosurgeon to reduce spasticity in the legs.

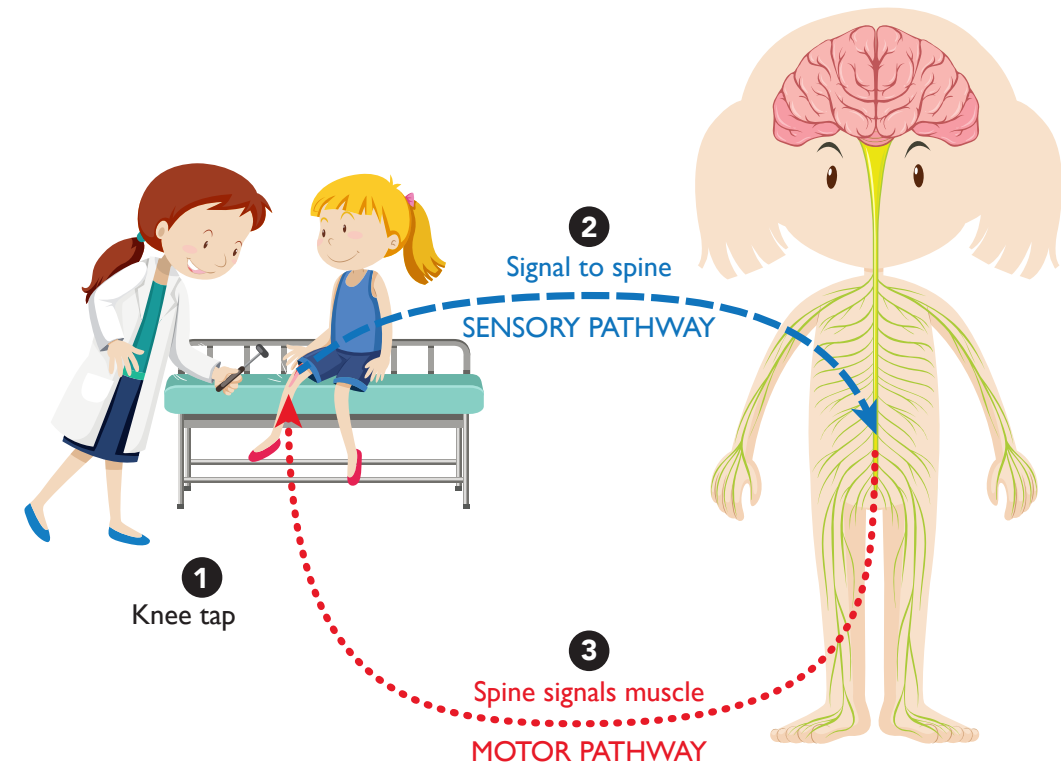
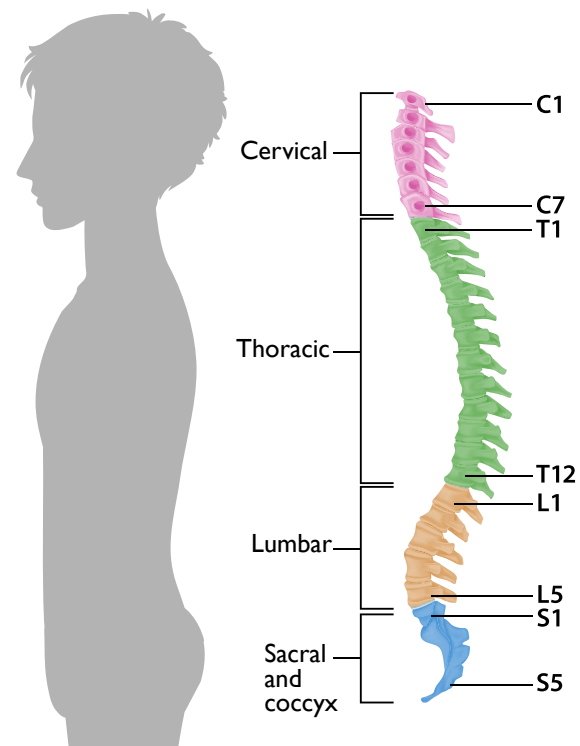
MULTI-LEVEL LAMINECTOMY SDR

(More invasive method)

An SDR with multi-level laminectomy exposes and removes bone from the top of 2 or more vertebrae in the spine. This method may be used when multiple nerve roots over several levels of the spine need to be viewed. You may hear this procedure called “traditional” because it was developed before the other methods.

A neurosurgeon makes an incision in the middle of the lower back and removes part of the vertebrae at several levels of the spine to see the nerve roots directly. After electrically testing the nerves, a percentage of nerves are cut by the neurosurgeon to reduce spasticity in your child’s lower body. The child receives an epidural for pain control after surgery.

Levels of the Spinal Column



PALLIATIVE RHIZOTOMY

A palliative rhizotomy is a surgery for children who do not walk or use their legs to stand or transfer. This type of rhizotomy reduces involuntary high muscle tone – spasticity, dystonia, or both – to make the child more comfortable. The resulting reduction in stiffness makes positioning and caregiving easier. Palliative rhizotomies can treat severe scissoring or “extensor thrusting.”

A palliative rhizotomy may also be needed to get enough tone reduction in order to move forward with orthopedic procedures. The muscle tone needs to be reduced to prevent the orthopedic problem from returning. For example, dislocated hips often happen in children who have severe spasticity and weakness. If the underlying high muscle tone remains and a surgeon realigns the hip, the hip joint may come out of position again.

SENSORY-ONLY PALLIATIVE RHIZOTOMY

Occasionally, a palliative rhizotomy can be done by cutting only the dorsal nerve roots. This surgery would help a child who does not walk or use their legs to stand or transfer and has mainly spasticity with little or no dystonia. Typically, the best candidate would be a child who uses a wheelchair for all of their mobility.

COMBINED DORSAL AND VENTRAL PALLIATIVE RHIZOTOMY

The previous rhizotomy types mentioned involve only the dorsal (sensory) nerve roots that carry messages to the brain and spine. In this procedure, both dorsal nerve roots and ventral nerve roots are cut. The ventral nerve roots carry messages out to the body to control movement and motor function. Children who have both spasticity and dystonia may benefit from a combined dorsal and ventral palliative rhizotomy.

With a combined complete dorsal and ventral palliative rhizotomy, children will have reduced movement of their legs. This includes movements that were not under their control, but also reduced purposeful movement. The child will be very relaxed below the waist and will not move their legs as they did before surgery.