



St. Louis Children's Hospital
 Center for Cerebral Palsy Spasticity
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SELECTIVE DORSAL RHIZOTOMY

Department of Neurosurgery



MOST EXPERIENCED IN THE WORLD



St. Louis Children's Hospital

- 250 beds
- 2,500 employees
- 700 medical staff members
- 1,300 auxiliary members and volunteers
- More than 30 pediatric subspecialty departments and divisions
- Level I Pediatric Trauma Center, the highest level of emergency care available
- Has served patients from 50 states and 60 countries
- Has been recognized as one of the best children's hospitals in the nation by *U.S. News & World Report* and *Child* magazine
- Has received the nation's highest honor for nursing excellence, the Magnet designation, from the American Nurses Credentialing Center.



Founded in 1879, St. Louis Children's Hospital is one of the premier children's hospitals in the nation. It serves not just the children of St. Louis, but children across the world. The hospital provides a full range of pediatric services to the St. Louis metropolitan area and a primary service region covering six states. As the pediatric teaching hospital for Washington University School of Medicine, St. Louis Children's Hospital offers nationally recognized programs for physician training and research.

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Our Mission:

We strive to provide the best possible care for children and young adults with spastic cerebral palsy.

Selective Dorsal Rhizotomy

A Surgical Program to Provide Better Mobility to Children with Cerebral Palsy Spasticity

A Life-Changing Procedure:

Many children with cerebral palsy have spasticity, which is stiffness in the muscles of their arms, legs and trunk. Spasticity in children can interfere with their range and speed of movement and their development of walking. In growing children, spasticity is particularly harmful because it inhibits some muscle growth, and it causes muscle contractures and permanent orthopedic deformities. That's why it's important to reduce or eliminate spasticity at an early age.



Children with cerebral palsy spasticity who come to St. Louis Children's Hospital benefit from the latest technology and some of the world's leading neurosurgery specialists.

Hope for the Future

Spasticity in children with cerebral palsy is treated with physical therapy, bracing and orthopedic surgery. Selective dorsal rhizotomy, a neurosurgical procedure, is an additional treatment option. The rhizotomy can reduce spasticity permanently and improve motor activities. When performed at an early age, the rhizotomy can reduce the number of orthopedic operations patients might otherwise require. Over the past 20 years, we have proven the selective dorsal rhizotomy to be a very safe and effective surgery.



About Dr. Park

The procedure is performed by T.S. Park, MD, neurosurgeon-in-chief at St. Louis Children's Hospital, Shi H. Huang, Professor of Neurosurgery at Washington University School of Medicine, and one of the nation's leading pediatric neurosurgeons. Learn more about Dr. Park at StLouisChildrens.org.

A Winning Team

You'll see the difference the selective dorsal rhizotomy program at St. Louis Children's Hospital offers, from your first experience with our clinic to the follow-through care your child receives from our expert, dedicated staff to the smiles and renewed confidence you

child brings home. We pride ourselves on the close relationship that develops between parents, our patients and our staff.

The depth of our program is unmatched. The selective dorsal rhizotomy team includes the coordinator of the Center for Cerebral Palsy Spasticity, physical therapists and physical therapist assistants experienced in treating children with cerebral palsy, a physician assistant and Dr. Park. We also provide coordinated screenings before and after surgery that involve staff members from neurosurgery, physical therapy as well as the patient's own referring physician, orthopedist, neurologist, rehabilitation physician and physical therapist.

Dr. Park collaborates with Dr. Matthew Dobbs, a pediatric orthopaedic surgeon specializing in minimally invasive surgery, to perform a surgical procedure for tendon lengthening to relieve joint contractures (the limitation of joint motion that is present after the spasticity is addressed with the dorsal rhizotomy). Dr. Dobbs uses a minimally invasive procedure to lengthen the tendon, allowing the muscle to return to its normal length and allowing the joint to straighten. Patients are indicated for this procedure only after an evaluation by both Dr. Park and Dr. Dobbs. The most common tendons that need to be lengthened are the hamstring and/or heel cords.

The lengthening is done in the operating room through small incisions where a controlled lengthening is performed. No casting is required and patients may spend one night in the hospital. Most patients begin therapy the day after surgery. Post-operative bracing is used for standing and advancing with walking. The size of the brace decreases over time as the patient gets stronger.

St. Louis Children's Hospital follows a multi-disciplinary approach to patient care that involves the expertise of physicians and nurses, as well as other health professionals such as dietitians, social workers, child life specialists and physical and occupational therapists who work as a team to ensure the best treatment for your child. The family

is considered an important member of the team. We work to provide treatment programs that promote understanding, interaction and independence for both your child and your family members.

Understanding Muscle Stiffness in Children with Cerebral Palsy

The stiffness of a muscle is called muscle tone. Normally muscles must have enough tone to maintain posture or movement against the force of gravity, while at the same time provide flexibility and speed of movement. The command to be stiff, or increase muscle tone, goes to the spinal cord via nerves from the muscle itself. Since these nerves tell the spinal cord just how much tone the muscle has, they are called "sensory nerve fibers." The command to be flexible or reduce muscle tone comes to the spinal cord from nerves in the brain. These two commands must be well coordinated in the spinal cord for muscles to work smoothly and easily while maintaining strength.

In the child with cerebral palsy, damage to the brain usually has occurred. For reasons that are still unclear, the brain damage that occurs in these newborns tends to be in the area of the brain that controls muscle tone and movement of the arms and legs. The brain of the child with cerebral palsy is therefore unable to influence the amount of flexibility a muscle should have. The command from the muscle itself dominates the spinal cord and, as a result, the muscle is too stiff, or "spastic."

Currently, it is not possible to operate on nerves in the brain and correct the brain damage, but it is possible to operate on the sensory nerve fibers that come from the muscle. During rhizotomy each nerve root is divided into 3 to 5 nerve rootlets. By cutting some – but not all – of these rootlets, it is possible to reduce the message from the muscle to better balance the messages of flexibility (from the brain) with messages of stiffness (from the muscle). (See Figures 1 and 2 on next page). Once the muscle tone becomes more normal, it is easier

for the child to move and gain motor skills like sitting, crawling, standing and walking.

Remember that increased muscle tone or spasticity is only one problem of movement in children with cerebral palsy. Reducing spasticity will make it easier for the child to move but does not eliminate weakness, abnormal movements or balance problems.

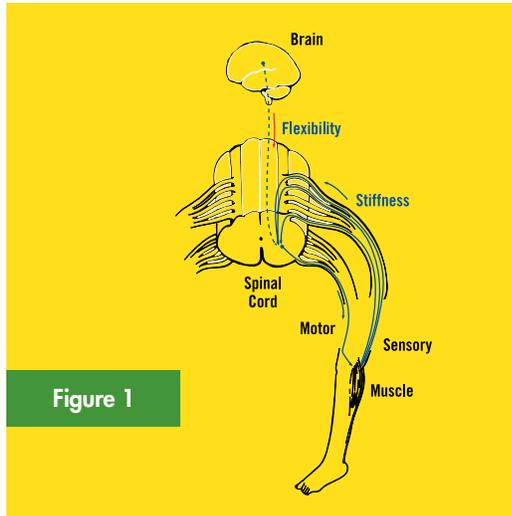


Figure 1

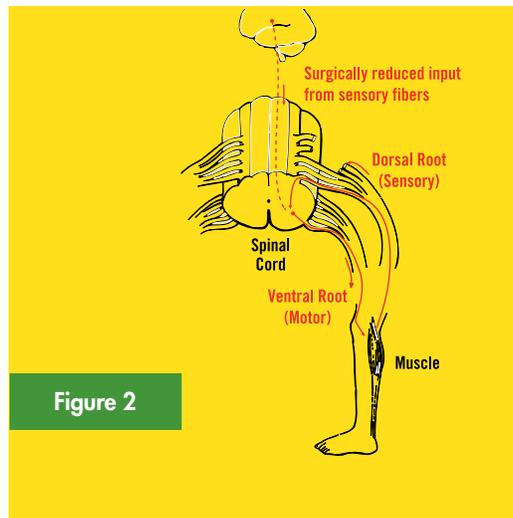


Figure 2

Benefits of Dorsal Rhizotomy

Dorsal rhizotomy reduces spasticity. The child will no longer feel so stiff; muscle tone will be more normal and movement will be easier. How much the child's mobility improves after surgery depends on several factors:

The developmental level of the child before surgery.

If the child was walking with a walker or crutches before surgery, these functions will likely be regained soon after surgery. Some children – but not all – will then progress to walk independently. If the child was sitting alone and pulling up to stand (but not walking) prior to surgery, the child will most likely begin to walk with a walker within about three months after surgery.

The amount of therapy that can be provided after surgery.

Children change very rapidly after surgery. We recommend physical therapy four to five times a week for the first six months; three to four times per week for the next six months; and two to four times per week for the subsequent year or longer. We have found that this physical therapy schedule increases the possibility of your child reaching his or her maximum potential. Therapy is provided by your child's primary therapist, who is given the post-op physical therapy protocol to follow after surgery to best help your child. Physical therapists are invited to call us any time with questions.

The extent of your child's movement problems due to causes other than spasticity.

Rhizotomy surgery reduces spasticity but does not have a direct effect on weakness, balance or abnormal movement patterns. These problems often improve because the child can move more easily after surgery, and strengthening is easier with reduced spasticity. These changes take time and persistence with physical therapy.

The child's motivation, cooperation and intelligence.

These all play an important role in changing mobility. It is also important for the family to share the child's enthusiasm as new skills are gained and to stay involved in the physical therapy program. The child needs opportunities to practice new skills at home, school and in the community.

Could Your Child Benefit From Dorsal Rhizotomy?

Dr. Park believes children with cerebral palsy spasticity should have an evaluation for potential dorsal rhizotomy before other orthopedic procedures are performed. All children with spastic diplegia, triplegia and quadriplegia following premature birth should be evaluated by neurosurgeons for the procedure.

Essential Criteria

- Diagnosis of spastic diplegia or spastic quadriplegia or spastic triplegia or spastic hemiplegia
- Premature birth or full-term birth with typical signs of spastic diplegia.
- Two years of age or more.
- Based on MRI (magnetic resonance imaging) examination, no significant damage to the key area of brain involved in posture and coordination.
- At least 3 months since last Botox injection.



Factors to Be Considered

- Adequate muscle strength in the legs and trunk. This is demonstrated by the ability to:
 - support full weight on the feet
 - hold a posture against gravity
 - make appropriate movements to crawl or walk
 - move quickly from one posture to another
- History of delayed motor development. The child is able to crawl, sit and pull to stand by age 2, but spasticity hampers the development of skills and/or causes gait deviations.
- Motivation and ability to cooperate in therapy.
- Commitment to rehabilitation and follow-up.
 - receives physical therapy currently
 - able to receive physical therapy four to five times per week for six months after the operation and with decreasing frequency for an additional one to two years
 - ability to be followed by the St. Louis Children's Hospital rhizotomy team at regular intervals for at least 16 months after surgery
- If there is doubt that the child has adequate strength to change motor function, a three-month trial of physical therapy focused on strengthening may be recommended. Progress during this trial period will provide information about the child's potential to improve motor function after spasticity is reduced.
- History of orthopedic surgery. Previous orthopedic surgery does not mean your child is not a candidate for dorsal rhizotomy. However, waiting at least one year following an orthopedic procedure allows muscle strength to recover.

Assessing Your Child's Candidacy

If you are uncertain whether your child is a suitable candidate for the initial evaluation and a physical therapy evaluation, please feel free to call our office and speak to a physical therapist, or go to our website stlouischildrens.org/SDR and click on *Patient Information Form* to complete a screening. Dr. Park will determine if more studies are needed, or if we should see a video evaluation of your child. Our rhizotomy team will review the videotape produced by the child's home physical therapist, physical therapy evaluation and hip and spine x-rays to assess the appropriateness of an initial evaluation. After the videotape and physical therapy report are reviewed, a St. Louis Children's Hospital physical therapist will contact you to discuss the rhizotomy team's recommendations. There is no charge for this assessment.

Children with cerebral palsy who possess certain conditions would not be candidates for the dorsal rhizotomy surgery. They include children who:

- have suffered meningitis, congenital infection, congenital hydrocephalus unrelated to premature birth, head trauma or familial disease
- have mixed cerebral palsy with rigidity or poor muscle tone
- have severe scoliosis
- will not make functional gains after surgery

The Initial Evaluation

The initial evaluation consists of an appointment with Dr. Park, a physician assistant and a physical therapist. Before your child's appointment, our staff will send an extensive evaluation form for you and your primary physical therapist to complete. This form must be completed and returned to our office with hip and spine x-rays before an appointment is scheduled.



At the first appointment a physical therapist will see your child to assess range of motion, wheelchair needs and discuss pre-operative and post-operative physical therapy. Dr. Park will examine your child and review his or her medical history along with the physical therapy evaluation. A physician assistant will be present during Dr. Park's evaluation. Occasionally an MRI is requested after the initial appointment with Dr. Park to better determine if your child is an appropriate candidate for the surgery.

Please bring all assistive devices such as braces, a walker, or crutches to your appointment.

Selective Dorsal Rhizotomy for Adults

Adults Can Benefit, Too

Dorsal rhizotomy is also offered for adult patients on the basis of our accumulated experience with the procedure on pediatric patients. To date, we have seen satisfactory functional gains in adult patients similar to those gains in children.

Adult patients who are identified as candidates for dorsal rhizotomy will have their surgery at Barnes-Jewish Hospital, which is adjacent to St. Louis Children's Hospital on the Washington University Medical Center campus. Most of the information in this brochure applies to both adults and children except for the following differences:

Adult patients, ages 17 through 39, are selected for the surgery on the following criteria and considerations:

- diagnosis of spastic diplegia
- history of premature birth
- currently walks independently without an assistance device
- relatively mild fixed orthopedic deformities
- patients exhibit potential for functional gains after dorsal rhizotomy
- patients exhibit motivation to attend physical therapy and perform a home exercise program
- BMI in the "healthy" range

(Adult patient criteria, continued)

In adults, the surgical technique requires only a single level laminectomy, which is the surgical chipping away of the thin bony arches of the vertebrae.

Adults may have a catheter in after surgery for a longer period than children.

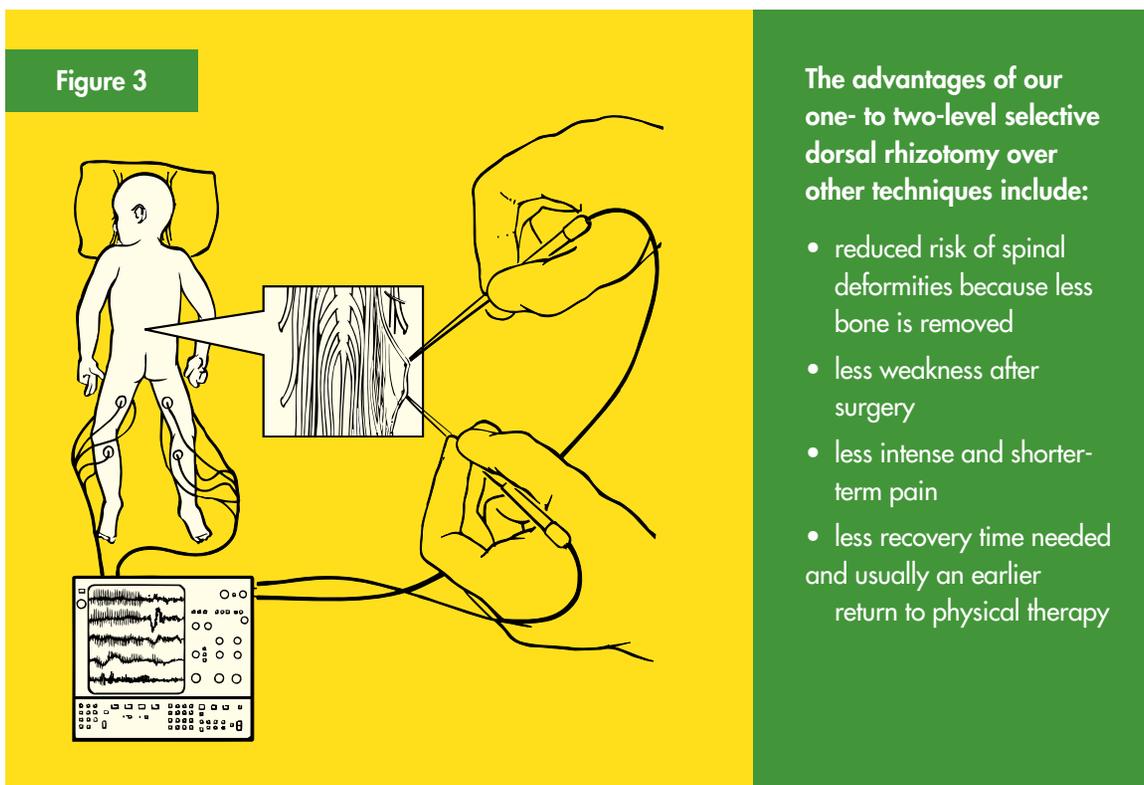
Therapy will be the same as for children immediately following surgery but the frequency may be reduced more quickly in the longer term.

About Selective Dorsal Rhizotomy

Figure 3 shows two groups of nerve roots that leave the spinal cord and lie in the spinal canal. The anterior nerve roots send information to the muscle; the dorsal nerve roots transmit sensation from the muscle to the spinal cord. At the time of your child's operation, the St. Louis Children's Hospital surgical team divides each of the dorsal roots into 3 to 5 rootlets and stimulates each rootlet electrically to identify the dorsal nerve rootlets that cause spasticity. The abnormal nerve rootlets are selectively cut, leaving the normal rootlets intact.

As Figure 3 illustrates, the surgery requires a two- to three-inch incision along the center of the lower back just above the waist. Dr. Park's procedure uses a smaller surgical site that often provides less pain and a faster recovery. In 1991, we modified our surgical procedure to remove

bone from one or two vertebrae instead of five or six. Once the surgery is complete, the skin is closed with glue; no stitches are required. Surgery takes three to four hours, depending on the age of the patient. Your child will go to the recovery room for a few hours before being transferred to the pediatric intensive care unit for an overnight stay.

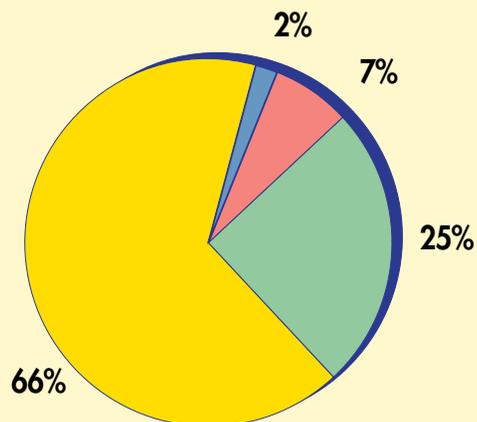


Clinical Characteristics of Our Patients Who Underwent Selective Dorsal Rhizotomy since 1987

Total: Over 2,000 patients

Age Distribution

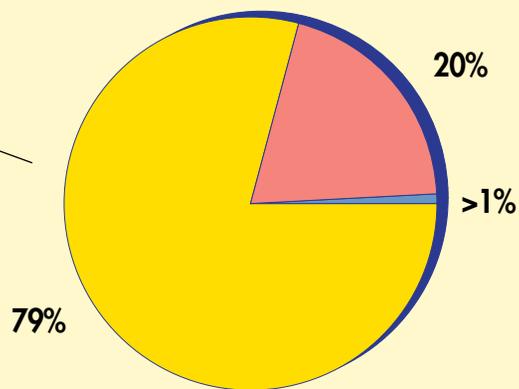
- Age: 2-5 years
- Age: 6-10 years
- Age: 11-18 years
- Age: 19-39 years



We recommend early surgery between the ages of 2 to 5 years, before children have developed leg deformities. The great majority of patients underwent surgery between 2 and 5 years of age; however, adolescents and young adults with spastic diplegia also benefited from relief of spasticity.

Subtypes of Cerebral Palsy

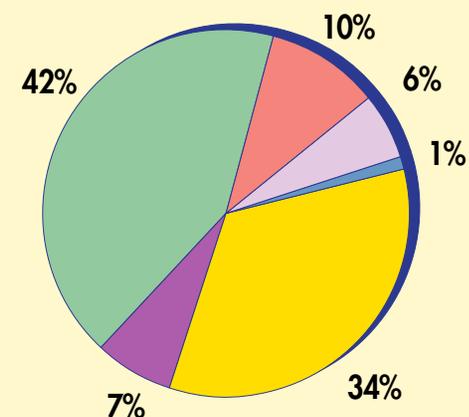
- Diplegia
- Quadriplegia
- Hemiplegia



Approximately 79 percent of our patients had spastic diplegia and 20 percent had spastic quadriplegia. Less than 1% had hemiplegia.

Mobility Level Prior to SDR

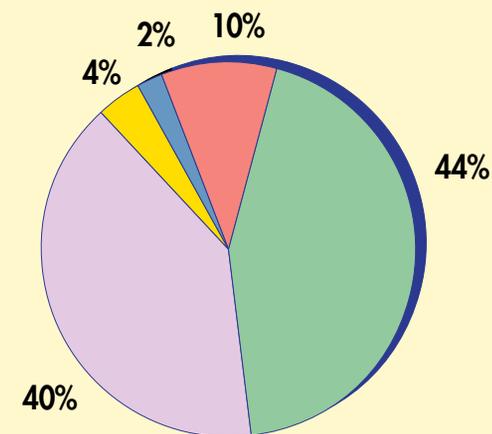
- Independent walking
- Crutch
- Walking with walker
- Some motion
- Crawling
- No independent mobility



Please note that many of our patients were walking independently. These patients walked better after surgery.

Gestation Age

- <24 Weeks
- 25-29 Weeks
- 30-38 Weeks
- >39 Weeks
- Unknown



About 90 percent of our patients were born prematurely. Patients born at full term and having spastic CP must not have progressive neurological disorders such as familial spastic paraplegia.

Preparing for Surgery

Physical therapy before surgery should focus specifically on the following areas:

- strengthening the trunk muscles and muscles of the hips and knees and calves
- improving range of motion in the hip abductor, hamstring and gastrocnemius muscles
- instructing the family in the pre-operative and post-operative home exercise program
- arranging for adaptive equipment to be used after surgery



The physical therapy program before surgery prepares you and your child for the program after surgery. Your child will learn what to expect immediately upon returning to therapy after surgery.

If your child develops a fever, chicken pox or other medical problems a few days before the scheduled surgery, contact us at **314.454.2813** or toll-free at **800.416.9956**. If your child is taking oral Baclofen, he or she will need to be weaned off the medication at least two weeks before surgery. During the two weeks before surgery, your child should not take any pain or fever medication other than plain Tylenol.

Framing the Future

On the day before surgery, our staff will videotape your child as he or she goes through a standardized test called Gross Motor Function Measure to determine the level of gait and functional skills. We will also assess range of motion and muscle tone. This videotape then can be compared with progress after surgery videotaped at four-month and 16-month follow-up visits. Your child will also see a physician assistant on the day before surgery for a history and physical examination.

Possible Surgical Issues

The dorsal rhizotomy is a long and extensive neurosurgical procedure for a child at any age. There are some risks associated with both the general anesthesia and the surgery, although overall the risks are minimal. Dr. Park will discuss the risks with you before surgery and answer any of your questions.

Parents should also be aware that depending on existing conditions, some children may require additional orthopedic surgery following dorsal rhizotomy. Dr. Park will also address these issues before surgery.

Insurance Coverage

Commercial insurance is a complex issue with any hospitalization and surgery. Generally, most insurance companies provide benefits for the selective dorsal rhizotomy. It is extremely important for you to contact your insurance company to notify them of the planned surgery. Be sure to obtain their written commitment to provide benefits. If you call your insurance company, you will need two code numbers. The diagnosis code (I-CD9) is 343.9. The procedure code (CPT) is 63190.

If your insurance company requires additional information, contact the rhizotomy program secretary, **314.454.2813** or toll-free at **800.416.9956**. Another helpful resource is the St. Louis Children's Hospital financial counseling staff members who work closely with parents and are experienced in working with numerous forms of reimbursement. For financial counseling, call **314.454.6081**.

After Surgery

After surgery, your child will spend about 24 hours in the St. Louis Children's Hospital pediatric intensive care unit (PICU) and then be transferred to the hospital's neurology/neurosurgery unit.

When your child is transported from the recovery room to the PICU, he or she will have a catheter in the bladder and an intravenous line. The catheter will be removed before your child leaves the intensive care unit.



When 9-year-old SDR patient, Henry, was not kayaking....he was rock climbing or riding a zip line at camp.

After waking from the anesthesia, most children can move their legs but possibly not as well as before the operation. The legs will be less stiff than before surgery.

While in the PICU, your child will receive medications to relieve pain and reduce muscle spasms. Your child's face may appear swollen due to positioning during surgery but this swelling will disappear in 24 to 48 hours. By the second or third day, your child will begin feeling better and will begin taking fluids by mouth. He or she will be positioned on the back or in a side-lying posture and will be turned from side to side every four to six hours.

Your child will be on bed rest until the third day after surgery, so you may want to think of activities your child can enjoy in bed. Some suggestions include a tape recorder and tapes, magnetic boards with letters, numbers or shapes; hand puppets or small dolls for imaginary play; and magic markers for drawing and coloring. VCRs are available for your use, so you may want to bring your child's favorite videos. Many of these items are also available from the hospital's Child Life Services, located on the eighth floor.

Occasionally, children experience a headache after surgery. This can be medicated with an appropriate dose of Tylenol.

Physical Therapy in the Hospital

Your child will be limited to strict bed rest until the third day after surgery. On that day, your child will be assisted into a wheelchair for a maximum of one hour; support to keep the trunk straight is essential. A physical therapist will begin gentle therapy at this time. When your child is discharged, we will give you a copy of the pre-operative P.T. report and a post-operative physical therapy protocol to give to the primary physical therapist.

Back Care After Surgery

There are no stitches to be removed from the skin. Some activity is allowed based on what your child can tolerate. The main restrictions are related to trunk movement. Your child is allowed to sit as tolerated; however, it is best to change position frequently during long periods of sitting, such as when traveling. If you have questions or concerns about your child's back, contact a physical therapist at **314.454.4166** or toll-free at **800.416.9956**.

Heading Home: The Future in Motion

When it's finally time to go home, you and your child may be feeling both excited and a little uncertain of what's to come. The first few weeks of recovery may be tiring for everyone involved. Rest assured, however, that hope is on the horizon and many smiles await you.

Strength Development

Your child will tire easily for the first few weeks at home. The muscle weakness that was hidden by the spasticity is unmasked by the rhizotomy, and strength development will take time. In addition, because of bed rest and limited activity for several days, it will take a while for normal strength and activity to return. For these reasons, your child should not return to school for three to four weeks after surgery.

Comforting Your Child

It's normal for your child to complain of discomfort in the lower back, particularly when lifted or changing position. The inpatient physical therapist will demonstrate the proper methods to transfer and lift your child. Your child also may complain of pain if the feet dangle while sitting. We recommend using a stool to support feet and eliminate discomfort.

Activity and Play

Most children quickly resume sitting, crawling and kneeling if these skills existed prior to surgery. However, even if your child walked before surgery, it may take several weeks to walk after surgery due to weakness and poor muscle control. Encourage your child to be active on the floor – crawling, sitting and playing. Consult with your physical therapist if your child begins to stand or walk before this has been introduced as part of the physical therapy program.

Sleep

Occasionally, muscle spasms may disturb your child's sleep. These can be relieved using a muscle relaxant prescribed at the hospital. We strongly encourage parents to fill this prescription and a prescription for pain medication before even leaving the hospital to prevent any unnecessary discomfort for your child.

Toilet Use

Some children's toilet habits change temporarily. This may be due to normal swelling or healing in the area of nerves that go to the bladder. Be patient. While this can be frustrating both to the child and parents, it does resolve.

Sensory Changes

Most children will have hypersensitivity on the bottoms of their feet after surgery. The child may complain of tingling, itching or funny sensations. This can be alleviated by wearing shoes and socks. Standing is often more comfortable when ankle-foot orthotics are worn in addition to shoes.



Place your hands firmly on the child's feet when dressing or bathing. Do not touch lightly or move your hands lightly over the skin. This problem usually resolves in the first few weeks.

Home Program

At least for the first few months after surgery, your child's schedule will revolve around the physical therapy program. Home exercise programs are provided at discharge. Your therapist will give you specific activities and methods. Most of this

program is learned during the pre-operative and inpatient physical therapy. It is expected that families will perform a home exercise program in addition to the outpatient physical therapy.

Recovery and Progress

Encourage your child to be active, but respect that he or she may tire easily. It takes time and repetition to produce consistent new movements. Some days your child will be frustrated because he or she has not yet learned new ways to control muscles and movements. Your child will not yet understand how to make the "new body" work. An image of a body without spasticity must be developed, and that takes time. The work is intense, but the rewards are tremendous.

Every child progresses at an individual pace, and learning new skills is followed by a plateau while those skills are practiced. Other factors may cause setbacks or plateaus. When your child goes through a growth spurt, there may be increased difficulties. Being tired or under stress will affect the child's muscle coordination and movement patterns. Expect this; don't be overly concerned. However, if the child plateaus or regresses and it does not resolve in a week or two, discuss this with your therapist. It may require a change of program frequency or a review of other activities in the program. If you have any concerns about your child's progress after surgery, please contact a physical therapist at our office.

Outpatient Physical Therapy

The St. Louis Children's Hospital rhizotomy team works to achieve an outpatient-based physical therapy program for patients who have undergone selective dorsal rhizotomy. The program includes an intensive outpatient therapy protocol in coordination with the child's primary home therapist. The goals for the physical therapy program are to:

- increase strength in the trunk, hips and legs
- develop alignment of pelvis, trunk and head
- increase range of motion of the legs
- develop isolated movements of the legs as well as opposing movements
- improve balance
- develop the ability to move in and out of position
- develop and improve walking
- incorporate new patterns of moving in and out of position for functional skills
- increase endurance of functional activities such as walking or bicycle riding.



- If the family doesn't agree to or is unable to return for this post-op visit, the rhizotomy surgery will not be considered for the child.
- Prescriptions will be given for patients up to one year following the last appointment at the Rhizotomy Clinic.

Follow up appointment one year after post-op appointment

- At the four month post-op appointment the family will discuss with Dr. Park and the rhizotomy team whether another appointment is needed one year later.
- If the family, Dr. Park and the rhizotomy team agree that another visit in a year is not necessary, the patient and family will be counseled regarding follow-up by an orthopedist, rehabilitation physician, neurologist, or another doctor.
- If the patient and family or Dr. Park and the rhizotomy team feel that another appointment in one year would benefit the child, a return visit appointment will be made.
- During each of these appointments, the child and family will meet with Dr. Park to discuss postoperative progress. This is also an opportunity for the child and family to ask questions regarding the type and frequency of PT, integration into community sports and activities, bracing needs and changes in assistive devices.

At the post-op appointment, all patients/families will be asked to bring new hip x-rays. At both post-op and follow-up appointments the patient will see Dr. Park for examination, and will see a physical therapist for an evaluation, which will be videotaped. After each clinic appointment, Dr. Park's notes will be mailed to the child's primary care physician and physical therapist. The physical therapy report will be mailed to the child's physical therapist. The patient's physical therapist will also be called to discuss the evaluation, progress, continued treatment, and recommendations for devices, bracing and more.

Sending a videotape of the child's motor function is not considered an adequate examination of the child and will not take the place of either a post-op or follow-up appointment at the Rhizotomy Clinic.

Follow-Up Appointments

Post-op appointment at four months after surgery

- The Children's Hospital treatment team will examine the child four months after discharge. This appointment is mandatory for families residing in the United States and families are expected to return for that appointment.



Our Team Addresses Your Concerns

Could there be a reoccurrence of spasticity after surgery?

There has been no return of spasticity in children with spastic diplegia, a form of cerebral palsy. A few children with spastic quadriplegia have had return of spasticity.

How long have you been doing dorsal rhizotomy surgery?

Dr. Park began performing the surgery in 1987 and has performed the surgery on more than 2,000 patients ranging in age from 2 to 39 years.

Will the surgery enable my child to walk?

Not necessarily. Selective dorsal rhizotomy only relieves spasticity. Problems with abnormal muscle coordination, weakness and abnormal reflexes may continue to be evident. But better range of motion, better sitting postures and improvements in gait patterns can be expected.

What improvements could my child have in speech?

Some children's speech improves, but this is not predictable. Improvements in trunk position when sitting, allowing improved breath support for better sound production, may be a contributing factor.

Do contractures go away with surgery?

Contractures are the shortening of muscles, tendons and other structures so they cannot be straightened or easily flexed and extended. The underlying cause of contracture is eliminated by the surgery, and so contractures may be reduced. However, if the contracture is severe and does not respond to a stretching/positioning program, serial casting or surgical intervention may be necessary. Serial casting involves a series of casts, applied at weekly intervals, to increase muscle length using a slow gentle stretch over a long period of time – usually three to five weeks.

Are there improvements in my child's upper body function?

Some progress is evident that appears to be related to the improvement of trunk control and pelvic position.

Will my child need orthotics or splints?

Most children require an orthotic for the foot and ankle after surgery to maintain proper alignment of the foot during weight-bearing activities. Often existing orthotics can be modified after surgery. If your child is in need of new orthotics around the time of surgery, we recommend they be fitted after surgery.

For More Information

For more information and a video about selective dorsal rhizotomy surgery, you or your physical therapist may call the Center for Cerebral Palsy Spasticity at 314.454.2813 or 800.416.9956. Additional information is also available at StLouisChildrens.org/sdr or [join our group on Facebook](#).

St. Louis Children's Hospital
Center for Cerebral Palsy Spasticity
Department of Neurosurgery - Suite 4S20
One Children's Place
St. Louis, Missouri 63110-1077

Understanding Terms

Contracture: The shortening of a muscle, tendon or other structure so that the joint cannot be straightened or readily flexed and extended.

Diplegia: Involvement primarily in the hips and legs; trunk and arms may be involved to a lesser degree.

MRI: Magnetic Resonance Imaging uses the body's natural magnetism to produce a clear picture of the structure being scanned.

Neurosurgery: Surgery involving the brain, spinal cord or nerves.

Quadriplegia: Equal involvement of all four arms and legs.

Spasticity: Stiffness in the muscles of the arms, legs and trunk.