



Shohada Educational & Treatment Hospital

Surgery for cerebral palsy



Successful surgery can increase independent motor function and improve gait and range of motion. It can also correct deformities in children with cerebral palsy.

How surgery can help

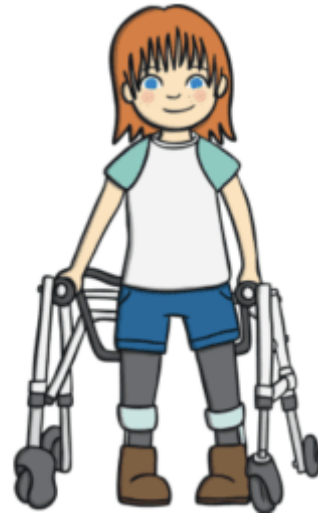
Surgery is one of the many options available to help children with cerebral palsy improve mobility, posture and ensure healthy growth. Most doctors recommend physical therapy and medication before surgery.

Surgery can correct or improve movement and alignment in the legs, ankles, feet, hips, wrists and arms. These operations are performed on the muscles, tendons, bones and nerves.

As is the goal with all treatment of cerebral palsy, surgery aims to give children the greatest chance of living as independently as possible. Movement problems caused by cerebral palsy can improve over time, but they also carry the risk of getting worse.

Surgery is used to:

- Relieve stiff muscles
- Correct spinal curvatures (scoliosis)
- Reduce tremors
- Correct foot deformities
- Improve posture
- Improve balance and coordination
- Relieve pain
- Correct fixed joints and tendons
- Prevent spinal deformities
- Free permanently tightened muscles (contractures)
- Prevent hip dislocation
- Treat co-occurring conditions



Considerations before deciding on surgery

It's impossible to offer a one-size-fits-all treatment plan for children with cerebral palsy—a surgery that is successful in one scenario may not be in another. Additionally, the potential benefits must be greater than the risks at stake.

For example, children who are able to walk with or without assistance tend to have better results from surgery than non-ambulatory children. Therefore, parents of non-ambulatory children may not want to put their child through surgery if there is a lower chance of correcting movement.

Parents considering surgery to improve their child's well-being should be aware of the risks and benefits involved.

Types of surgery

There are a variety of procedures that can correct many issues and secondary conditions of cerebral palsy. Orthopedic surgery is generally used to improve movement, posture, and gait. Other surgeries may be used to correct co-occurring conditions, such as issues with feeding or hearing impairment.

Orthopedic surgery

Orthopedic surgery (also spelled *orthopaedic*) is a type of surgery used to improve mobility. These procedures are beneficial in treating spasticity or jerky, exaggerated movements caused by muscle tightness/contractions.

This surgery is usually suggested after previous therapies and medications have proven unsuccessful. Orthopedic surgery can also prevent future complications, such as contractures (permanent tightness causing a deformity) and hip dislocations.

If your child is exhibiting rotational abnormalities, joint dislocation, pain, or problems when wearing shoes, orthopedic surgery may be able to help improve their condition and overall comfortability.

The 6 main types of orthopedic procedures are:

- **Muscle lengthening** – Surgical lengthening of the muscles used to relieve tightness in the hands and fingers. Lengthening the arm muscles can help children grasp objects more easily and improve fine motor skills.
- **Tendon lengthening** – Lengthening tendons can reduce painful contractures, which is a permanent tightening of the tendons or muscles. This surgery is often used to improve a child’s ability to walk and sit upright.
- **Tendon transfer** – Tendon transfers typically involve the cutting and replacement of a tendon. The goal of tendon transfers is to ensure that the muscles in the body are properly aligned. This surgery also helps reduce any pain or walking problems that children with CP may be experiencing, as well as improving the extension and flexibility of the wrists.
- **Tenotomy/myotomy** – Tenotomy describes the cutting of the tendon, whereas myotomy involves cutting the muscle. This procedure is used to improve muscle function, increase control of the upper limbs, and enhance the ability to grasp objects with hands.
- **Osteotomy** – This procedure is used to realign joints for better posture and mobility. It involves repositioning bones at angles more conducive to healthy alignments and is commonly used to correct hip dislocations in children with CP.
- **Arthrodesis** – In severe cases of spasticity, when splints and casts aren’t enough, arthrodesis may be used to permanently fuse bones together. Fusing the bones in the ankle and foot can make it easier for a child to walk.

The type of orthopedic surgery that would be best for your child depends mostly on whether they are considered to be ambulatory or not. An ambulatory child is able to walk around independently or with the use of mobility aids such as crutches or walkers. A nonambulatory child is unable to walk or requires the use of a wheelchair in order to move about.

Ambulatory

Ambulatory children with cerebral palsy may have a tendency to step mostly on their toes, cross their hips while walking, or bend their knees when taking strides. These issues can be caused by tight muscles, weakness, or misalignment of the joints or bones.

The purpose of surgery for ambulatory children is to improve their ability to walk, which is essential to improving self-reliance. For example, a child who "toe-walks" may have their stride corrected with a tenotomy or tendon lengthening procedure. Orthopedic surgery can also correct issues caused by poor alignment of the hips or knees.

Non-ambulatory

Non-ambulatory children are unable to walk, which is why the goal of orthopedic surgery is more centered around increasing comfort and avoiding any further mobility complications.

Orthopedic surgery is used to stop certain complications from getting worse or causing contractures, which are deformities caused by permanent tightening of the muscle the child may be unable to use.

Surgeries correcting spinal curvature, hip dislocations, and contractures alleviate pain and promote a comfortable, well-aligned sitting position. Osteotomy may be used to fuse bones in the spine to correct severe scoliosis.

The benefits of orthopedic surgery aren't immediate. Children often require **physical therapy** to ensure a successful recovery and to keep muscles strong and flexible.

Selective dorsal rhizotomy

Selective dorsal rhizotomy (SDR) is an aggressive procedure that helps reduce pain and spasticity. SDR is typically recommended in severe cases of spasticity when other treatments have failed to make an impact. Children with spasticity in the legs (spastic diplegia) tend to benefit more than children with spasticity in other locations (quadriplegia, hemiplegia).

SDR gets to the root of spasticity issues by cutting the nerves in the spinal column, which is responsible for muscle stiffness. This procedure requires navigating the complex network of nerves to pinpoint which nerves are causing movement issues. SDR can be used to relax muscles in the upper and lower limbs.

Selective dorsal rhizotomy improves:

- Walking
- Sitting
- Standing
- Balance
- Deformities in tendons, muscles, feet and hips
- Voluntary movement



Recovery from selective dorsal rhizotomy requires intensive physical therapy to relearn muscle control and movement.

Reference:

<https://www.cerebralpalsyguide.com>