SURGICAL PROCEDURES IN CHILDREN WITH CEREBRAL PALSY

Information for Patients

WHEN DO CHILDREN WITH CEREBRAL PALSY REQUIRE SURGERY ON THEIR MUSCLES AND BONES?

Cerebral palsy is a persistent disorder of posture and movement caused by non-progressive damage to or abnormal development of the immature brain. Changes may occur before or during birth, or the disorder may arise in the first months or years of life as a result of injury or inflammation.

Increased muscle tone, balance disorders, muscle weakness and possibly pain are the primary factors that make it difficult or impossible for the child to stand or walk, and interfere with care in a non-ambulatory child. This results in static muscle contractures and secondary deformities of the bones and joints.

Through surgery, we try to improve the range of movement in joints, prevent or treat dislocations, mainly of the hip, and reduce joint contractures. Surgery is considered when changes interfere with the child’s gait or posture, when neurophysiotherapy is hampered or prevented, when joints become painful or care-giving becomes impossible and all possibilities of conservative treatment have been exhausted.

WHAT BENEFITS CAN BE EXPECTED FROM SURGERY?

Our aim is to make every child as mobile as possible, thus enabling them to function according to their capabilities. For some children, this may mean only standing in a standing frame, somewhat easier care and somewhat better and more stable walking.

Through surgical procedures, we try to increase the range of motion in joints and improve the child’s mobility, enable greater independence in their daily activities and their easier transfer to a wheelchair or bed, and facilitate neurophysiotherapy treatments in less affected children or daily care procedures in severely affected children. We wish to prevent dislocations of the joints or the development of severe contractures that are later difficult to treat successfully.
WHAT ARE THE RISKS OF ORTHOPAEDIC SURGERY IN CHILDREN WITH CEREBRAL PALSY?

In addition to the underlying impairment of movement and muscle tone and secondary changes in their extremities, children with cerebral palsy may have other associated conditions, such as difficulties swallowing and coughing, recurrent respiratory tract infections, feeding problems or epilepsy, which are all related to the degree of involvement of the central nervous system. Such associated conditions may increase the risk of complications during or after surgery.

The most frequent postoperative complication in children with cerebral palsy is a chest infection, which develops as a result of pre-existing changes in the respiratory tract, coupled with their inability to cough effectively due to inactivity and sedation, and, rarely, due to vomiting after surgery.

On admission and during preoperative preparation, it is very important to be familiar with the child’s condition. The operation must be carried out at a time when the child is in optimal health. There should be no signs of chest infection, the child’s nutritional status must be optimal, and all blood findings must be within normal limits.

Surgery and anaesthesia alone do not increase the risk of epileptic seizures, since anaesthetics generally act in a similar way to antiepileptics. This risk is somewhat increased, however, when the anaesthetic wears off.

If the child is being treated for epilepsy, it is important that at the time of surgery there are no changes either in the treatment regimen or the type and frequency of seizures.

HOW SHOULD WE PREPARE FOR HOSPITAL ADMISSION?

Children with cerebral palsy are admitted to hospital at least one day before the operation. If other associated conditions are present, such as severe epilepsy with frequent seizures, or chronic changes in the respiratory or gastrointestinal tract, the child may be admitted several days before the procedure, so that the necessary additional tests can be carried out, and other specialists can be consulted regarding the safety and possible risks of the procedure.

In addition to the results of all the required blood tests, parents must bring findings from other specialists treating the child (cardiologist, neurologist, pulmonologist etc.) to the hospital. This will reduce the need to repeat tests that can be unpleasant for the child, but are essential to ensure that the operation is safe.
If the parents or the child’s doctor feel that the child may not be well enough to undergo surgery, it is advisable to call the hospital and check with a paediatrician or orthopaedic surgeon before bringing the child to the hospital.
Parents are also requested to bring all medications the child is currently taking on a regular basis to the hospital.

**ADMISSION AND PREPARATION FOR SURGERY**

Upon admission, your child will be examined by a paediatrician and, if necessary, also by an anaesthesiologist.
If the child is unable to talk, either because of age, a speech disorder or for any other reasons, information about the child’s reactions and method of communication must be obtained from the parents. An interview with the parents is an important part of the admission procedure. The possibility of a parent staying in hospital with the child should also be discussed. The nursing staff must be familiar with your child’s special needs, diet, feeding techniques and medication schedule. Therefore, good co-operation between the parents and nurses is very important.
On the day of surgery, your child will not be allowed to eat. This means that no breakfast will be offered, but unsweetened tea or water will be allowed until two to four hours before the operation, depending on the child’s age. All prescribed medication must also be administered about four hours before the operation, unless other instructions are given by the treating doctor.

**HOW IS THE OPERATION PERFORMED?**

Different surgical methods are used in children with cerebral palsy. The procedures include lengthening, shortening or transfer of tendons (e.g. hip adductor, hamstring, heel cord or posterior tibial tendon lengthening, peroneal tendon shortening, rectus femoris tendon transfer) and osteotomy, which involves dividing a bone and fixing it in a new, corrected position. The current approach recommends single-stage multi-level surgery to correct contractures in the lower limbs. This method allows children to develop appropriate motor skills at a suitable time and prevents the occurrence of deformities that are often resistant to treatment.
Correction of paralytic hip dislocation is a major operation, which involves osteotomy of the femur and often also the pelvis, in addition to the release of muscles about the hip. The divided bone is stabilised with an angular plate and screws. After the procedure, a spica cast is applied for three to five weeks. Any major blood loss must be replaced with the patient’s own blood or donor blood. These operations are generally performed under general anaesthetic. Tendon lengthening and transfer procedures also require a bloodless field. At the end of surgery, the operated limb is placed in a cast.

THE FIRST DAYS AFTER SURGERY

In the first days after surgery, painkillers in the form of infusions, injections or suppositories are given at first on a regular basis and later only when required. Intravenous fluids are administered until the child can tolerate adequate fluid intake by mouth. Muscle cramps are a common problem in the early postoperative period due to pain, altered position and anxiety. They are prevented by additional medication, which may make the child sleepy. Many complications can be avoided by proper positioning and frequent turning of the child. This is the responsibility of the nurses and physiotherapists, who also teach the parents how to alter the child’s position in bed and how to help the child later on to sit up and get to their feet.

All casts must be observed closely in the first postoperative days. This applies in particular to a spica cast, which will remain in place for several weeks. If necessary, the cast is additionally trimmed and adjusted. Special padding is used to prevent pressure sores. While staying in hospital with the child, the parents learn how to care for the child while the cast is in place.

WHEN AND WHO TO CALL IN CASE OF PROBLEMS?

Parents should call the Paediatric Unit of the Department of Orthopaedic Surgery if any of the following problems appear:

- redness, pain or major swelling;
- damage to the cast;
- fever with no other signs of respiratory infection.