

Orthopaedic surgery for hemiplegia

Information resources

Introduction

This information has been written to help you and your child understand why surgery is recommended, and also answer common queries about how it works and what you can expect. We hope it will leave you feeling prepared, informed and better able to support your child through the process.

Hemiplegia is caused by injury to nerve tissue in the brain. This leads to a loss of control, especially in the limbs of one side of the body. At present, it is not possible to repair the injury within the brain but this doesn't mean that motor control can't be improved. Most of current surgery is directed towards relieving the physical effects of the brain injury.

Treating children

Hemiplegia can often have an impact on the way children's affected limbs grow, particularly the way muscles develop and, to a lesser extent, bones too. This is most obvious further along the limb we look, away from the torso. For example, we often see the calf muscle in the leg becoming tighter with growth and the child increasingly walking on their toes. This is often more marked in children whose muscles work poorly at the front of the leg. These effects can be reduced with the use of physiotherapy and ankle or foot orthoses (splints).

More recently treatment with botulinum toxin has been effective in improving leg and arm function for many children. But when these treatments aren't helpful, it might be necessary to think about surgical correction for better results.

The physical effects

The arm

In the arm, issues tend to be more obvious as towards the hand. A number of things can happen, for example:

- The thumb can become tight into the hand.
- The wrist can become bent downwards.
- The elbow is flexed and the arm is turned in at the shoulder. The posture of the arm during walking and especially running often makes this appear worse.

Unlike children with other types of cerebral palsy, children with hemiplegia very rarely develop more central problems such as scoliosis or dislocation of the hip.

The leg

The difficulties that occur vary from child to child, depending on the effects of their impairment. The most frequently seen issues in the leg are:

- The turning in of the foot (although in some children the foot turns out).
- Bunions.
- Irregularities of the toes.
- Tightness in the calf muscles.
- Tightness in the hamstring muscles leading to bending of the knees.
- In the bones most children have a slight decrease in length, generally about an inch shorter than the other leg.
- Children may also develop a twisting inwards of the thigh bone and also a twist in the lower leg, either inwards or outwards.
- People with hemiplegia also tend to walk with the affected side of the pelvis a little bit behind.



Goals of surgery

The leg

Although cosmetic surgery may not sound terribly rewarding, it is the appearance of their leg which is often the most distressing to children. This is especially the case once they reach adolescence and particularly as most children with hemiplegia have very good use of their lower limb. The problems seen in the leg are very different from those in the arm. It is necessary to use both legs for walking and running, and as these are repetitive patterns of movement, it is often possible to achieve a high level of functioning even with a lot of neurological impairment.

The arm

Unlike the lower limb, each arm can act independently and do very complex and varied tasks. This requires a lot of feedback and perception of the limb. In many children with hemiplegia, the unaffected arm is preferred very strongly, with the affected arm either not used at all or relegated to very simple tasks such as clasping. And so, even if issues are corrected it is very unlikely that this will result in improved function.

This means that the potential for upper limb surgery is very limited compared to lower limb surgery. Upper limb surgery is largely used to improve the appearance of the arm and hand. However, in rare instances issues in the upper limb can give rise to problems, such as a thumb digging into the palm. In these cases surgery can relieve the irritation.

Surgical procedures

The surgical procedures used in hemiplegia are generally quite straightforward and involve:

- lengthening or moving the tendons of muscles
- stretching the muscle bodies themselves
- stabilising joints
- and sometimes the cutting and re-orientating bones (osteotomy)

The most difficult aspect of surgery is deciding what surgeries to perform and the best time to perform surgery.

“At 12 I had the op where my tendon on my right foot was stretched and straightened because it was going inwards, resulting in my toe-walking. It was very successful, (despite giving me a phobia of needles!) and I now walk with my foot flat, though I cannot do the heel-toe thing physios always go on about.”

Adult with hemiplegia

Nowadays most surgery of this type is performed by orthopaedic surgeons who specialise in the management of children. Gait analysis is often used to study walking patterns and help decide on the appropriate surgery. This involves attaching sticky markers to the skin and using cameras linked to a computer to build up a three dimensional picture of the child's movements: it's similar technology that filmmakers use for actors to 'animate' creatures in films like King Kong, Lord of the

Rings or Narnia. It also uses instruments in the ground to measure the forces involved, and electrodes can be used to measure the activity in the muscles.

“I had it done twice when I was a child, I loved it too, had loads of little silver balls stuck to my legs and hips, had to walk up and down whilst being recorded by sensors and a normal video camera. From that they could determine what action to take for my foot.”

Adult with hemiplegia



Timing of surgery

Timing of surgery is important. If done at an early age when there is a lot of growth left, the original issue can come back. If the surgery is done at maturity, problems can be quite difficult to correct and rehabilitation can be difficult. Generally the best time is when the child is between six and eleven years old. However, it may be necessary to perform surgery earlier than this if impairments are quite severe. There is a large window of opportunity, so the surgery can be timed to fit in best with other considerations such as schooling and availability of physiotherapy.

“My daughter had a tendon lengthening operation when she was in reception (she is now 8.5) and it has been successful in keeping her foot flat on the floor. I cannot remember her complaining of any pain, although the hospital was very good with pain relief and we had a supply when she came home.”

Parent of a child with hemiplegia



Orthopaedic surgery in hemiplegia generally requires an inpatient stay in hospital, the length depending on the extent of surgery. In recent years there have been considerable advances in the management of pain, with the use of regional blocks (such as epidurals) and the use of patient-controlled pumps for post operative pain. Most surgery can now be performed without any significant pain. After surgery, it is often necessary to immobilise the area in a plaster cast, generally for about six weeks. It may then be necessary to use splints to ensure that the correction that was achieved at the time of surgery is maintained.

Rehabilitation

Rehabilitation after surgery is critical. Without good physiotherapy, problems can come back. The rehabilitation period often takes quite a long time and it may be a year or longer before the full benefits are seen. This all means that before surgery your child's medical team should make a plan to identify the resources that will be needed for rehabilitation. There is not much point in doing surgery if it is then going to take four or five months to get new splints or there is no physiotherapist available.

In summary, surgery will be very helpful for many children with hemiplegia at some stage in their lives, but it needs to be part of a whole package of care to ensure that they are able to achieve their full potential.

See also **HemiHelp's** information sheets on **AFOs/DAFOs** and **Upper limb splinting**

How can HemiHelp help you?

HemiHelp:

- has a Helpline staffed by trained volunteers who all have personal experience of hemiplegia (**0845 123 2372**) - helpline@hemihelp.org.uk
- runs a UK-wide home visiting service
- has an extensive website with news and free information downloads
- has a Facebook group and Twitter feed ([@hemihelp](https://www.facebook.com/hemihelp))
- puts members in touch with others who have faced similar problems (available upon written request) and is developing a network of local groups
- has information resources on various aspects of living with hemiplegia
- produces a quarterly magazine where members can share information and experience
- runs regular conferences and workshops around the UK for parents and professionals
- organises sports and activity days for children in different regions
- has a transition support service for young adults including employment workshops, 1:1 support, and work placements
- membership is from £10 a year and benefits include HemiHelp's quarterly magazine, access to our services and schemes and priority booking at HemiHelp events

We can provide references on the source material we used to write this information sheet. Please contact us at info@hemihelp.org.uk

HemiHelp makes every effort to ensure the accuracy of information in its publications but cannot be held liable for any actions taken based on this information.

Helpline: **0845 123 2372**

(Mon-Fri 10am-1pm)

Office: **0845 120 3713**

Email: support@hemihelp.org.uk

Website: www.hemihelp.org.uk

© HemiHelp is registered as Charity No. 1085349. Registered office: 6 Market Road, London. N7 9PW. HemiHelp is a company limited by guarantee and registered in England and Wales (Registered No. 4156922). Information on this information sheet may not be reproduced without prior consent from HemiHelp. All rights reserved.

HemiHelp is happy for you to make photocopies of any part of this document.

This information product has been produced following the Information Standard requirements

www.theinformationstandard.org



Author: Aidan Cosgrove,
Consultant Orthopaedic Surgeon (2010)
Reviewer: Fergal Monsell,
Consultant Orthopaedic Surgeon (2015)
Last revision 2015 – next revision due 2018