

## Spasticity

### Definition

Spasticity is an abnormal increase in muscle tone that can lead to incoordination, loss of function, pain and permanent muscle shortening or contracture.

### Incidence

People with spasticity make up approximately 75% to 80% of all people with cerebral palsy. While the overall percentage of people with spasticity seems to be dropping marginally, it is not clear whether there is any real change or not.

### Cause

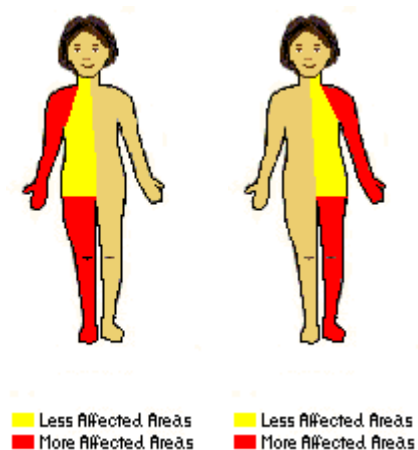
An abnormality in the movement area of the cortex can result in spastic cerebral palsy. The cortex controls thought, movement and sensation.

## Spastic Hemiplegia

### Definition

Hemiplegia is a form of cerebral palsy that affects one arm and leg on the same side of the body.

Double hemiplegia can occur but usually it affects the right and left sides in different ways and is different from spastic quadriplegia both on scans of the injury and its affect on the movement and posture of the legs.



In most cases, the arm is more affected than the leg, and the problems are often worse in the foot and hand than they are at the hip and shoulder. Problems can sometimes arise related to the spasticity and growth of the affected muscles.

### Incidence

Hemiplegia accounts for approximately 30-40% of all people who are born with cerebral palsy. (Watson, Stanley et al. 1999; Haan, Chan et al. 2004)

In children who acquire cerebral palsy after birth the rate goes up to 45 - 55%. (Watson, Stanley et al. 1999)

### Cause

Hemiplegia is usually caused by haemorrhage, often referred to as Intra-ventricular haemorrhage or IVH, deep in one side of the brain. Many parents only become aware of their child's hemiplegia gradually during infancy, but children who are at increased risk may be monitored in hospital.

As in other types of cerebral palsy there is a higher risk of hemiplegia in premature babies. The rate of hemiplegia in children born before 32 weeks gestation is 20-40 times higher than children born after 37 weeks (Watson, Stanley et al. 1999).

Birth weight is also a factor in hemiplegia, just as in other types of cerebral palsy. Over the past 20 years the rate of hemiplegia in children who weigh less than 1500g at birth has been 25 – 30 times higher (or even possibly more) than those children who weigh more than 2500g (Watson, Stanley et al. 1999).

Some children acquire cerebral palsy after birth. Although there are some other causes, most children who acquire cerebral palsy after birth do so through infection, head injury or a stroke. (Watson, Stanley et al. 1999)

Left- or right-hand preference is usually not well established until 18 to 24 months of age in an average child, so if your child is showing a preference to one hand before this time period may be a sign of hemiplegia. Other early signs to watch out for include a visibly stronger limb, a hand or thumb held in a fist, or falling to the side when they start sitting.

### **Additional disabilities**

The following information comes from the South Australian Cerebral Palsy Register (Haan, Chan et al. 2004).

Approximately 50% of children with hemiplegia are known to have intellectual disability to some degree.

Approximately 22% of children with hemiplegia have epilepsy.

Approximately 26% of children with hemiplegia have visual impairment.

Approximately 44% of children with hemiplegia have some hearing loss.

### **Functional Problems**

A child with hemiplegia may start walking late and may first start walking sideways or on tiptoe in one or both legs, however most children with hemiplegia eventually become good sitters and “walking is almost always possible” (Gage 1991).

While children with hemiplegia will sometimes walk on both toes this is not necessarily a sign that the other side is strongly affected as well. Sometimes children compensate, for the fact that one leg is longer because they are up

on their toes, by going up on both toes to get the good foot down to the ground.

Children will often hold a hand than arm in a different posture to the other side or other children. They can have difficulty using their hand for grooming, eating and the writing but many of these difficulties can be overcome with good therapy and advice.

Children with right sided hemiplegia will more often have difficulties with their communication (Caplan, Carr et al. 1999).

Children with the left sided hemiplegia will often have difficulties with spatial perception. This is the ability to understand and function well within certain spaces (Colby and Olson 1999). An example of this would be a child is constantly bumping their affected arm on furniture or even doorways because they cannot get a good grasp of how much room they need.

A further difficulty children with hemiplegia can have is the ability to coordinate and sequence complicated movements well. Tying a shoelace is a complicated series of movements all directed at the final outcome. A child with motor planning difficulties may be able to do each single activity if they are asked but may have great difficulty putting all the tasks together in the correct order to achieve the final outcome.

### **Education, Employment and Lifestyle**

Not all children and hemiplegia are able to cope easily with school. It is always best to talk with the advisory visiting teachers well before your child is due to enter school. If your child has difficulties that are likely to make school difficult it is best to talk with the education Department as early as possible to determine where he they would best go to school and what assistance may be required to ensure they have a good education.

### **Treatment**

After a child is diagnosed with hemiplegia, a full neurological evaluation should be performed to discern if other conditions are present and to make sure no other condition is causing the child's symptoms.

Spasticity management is often necessary in children with hemiplegia.

Therapy is often aimed at getting children to use both hands and both feet while they are playing, eating and generally moving around. There is sometimes the need to assist children to continue to develop generally but often children with hemiplegia will keep up with developmental milestones fairly easily.

### **Bibliography**

- Caplan, D., T. Carr, et al. (1999). Language and Communication. Fundamental Neuroscience. M. Zigmond, F. Bloom, S. Landis, J. Roberts and L. Squire. San Diego, Academic Press: 1487-1520.
- Colby, C. and C. Olson (1999). Spatial Cognition. Fundamental Neuroscience. M. Zigmond, F. Bloom, S. Landis, J. Roberts and L. Squire. San Diego, Academic Press: 1487-1520.
- Gage, J. (1991). Gait Analysis in Cerebral Palsy. Clinics in Developmental Medicine. Oxford, Mac Keith Press: 132-150.
- Haan, E., A. Chan, et al. (2004). The South Australian Cerebral Palsy Register - Annual Report 2003. Adelaide, The South Australian BirthDefects Register.
- Watson, L., F. Stanley, et al. (1999). Report of the Western Australian Cerebral Palsy Register - To birth year 1994. Perth, TVW Telethon Institute for Child Health Research.