

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 Diplegia

Definition

Diplegia is a form of cerebral palsy primarily affecting the legs.

Incidence

Spastic diplegia makes up about 25-30% of all cerebral palsy, not taking into account post-neonatally acquired cerebral palsy. It does appear, however, that the percentage of people with spastic diplegia has dropped marginally since the 1970's. It does seem there are fewer people with spastic diplegia who fall into the moderate classification and although it is much less clear it may be that there are fewer people with spastic diplegia who fall into the mild classification.

The rate of spastic diplegia in postneonatally acquired cerebral palsy is significantly lower than in non-postneonatally acquired cerebral palsy.



Yellow: Less Affected Areas
Red: More Affected Areas

Cause

Periventricular leukomalacia (PVL) is thought to be a cause of spastic diplegia. PVL is a term that means damage of the white-matter that surrounds the ventricles. This periventricular white-matter is especially vulnerable to injury in the premature infant because the blood supply system, and some of the cells that make up the white-matter are not fully developed. There is also developing evidence that infections present in the mother increases the risk of PVL.

PVL has been reported to occur in 4% -- 15% of premature infants (Perlman, Risser and Broyles, 1996).

Functional problems

The functional problems a person with spastic diplegia will have depends very much on the severity of their spasticity. The percentage of people with spastic diplegia, who fall into the "severe" classification has not changed since the 1970s.

People with spastic diplegia have more difficulties with their lower limbs than they do with the upper limbs and as a result they usually have more functional difficulties in sitting, standing and walking than they do with tasks like eating, writing and talking. This is not always the case however, because tasks like writing usually require someone to sit well so their lower limb problems can still impact on functional upper limb tasks. In addition to this any other difficulties a child may have, like hearing difficulties, visual difficulties, epilepsy and others, can make functional tasks very difficult even in the absence of spasticity.

Many people with spastic diplegia will learn to walk and will continue to do that until well into their adult life, if not all of it. Many people who can walk quite well still choose to use a wheelchair for long journeys or on difficult terrain or simply so they can be steadier and carry objects. Whatever the reasons, some people with spastic diplegia will use wheelchairs for some of their time, and some people will use wheelchairs all the time. In Queensland, the government agency called Medical Aids Subsidy Scheme (MASS) will fund basic wheelchair requirements if it is necessary for the person to function within their home. Many people need wheelchairs to be modified, but it is well worth at least seeking professional advice before purchasing a wheelchair.

For people with spastic diplegia who walk, there is the risk of early wear and tear, joints of the lower limb particularly the feet. Since people with spasticity are prone to contracture – a shortening of muscle fibres resulting in a decrease of joint mobility – they are also prone to walking with flat or high arched feet. Sometimes they have difficulty straightening or flexing their knees when walking and some people tend to lean forward from the hips. Any of these changes in people's walking will increase the wear and tear on the joints. In some cases this can lead to pain and even the loss of the ability to walk much earlier than expected.

Intellectual disability

Approximately 40 percent of people with cerebral palsy will also have an intellectual disability, but only about 30 percent of people with spastic diplegia will also have an intellectual disability.

Education, Employment and Lifestyle

Unless there is some other reason, people with spastic diplegia would normally be expected to go to school and complete the usual curriculum. Depending on how many difficulties they have, there will be a range of assistance provided to them by the education Department to help them get to school and access the curriculum.

Many people with spastic diplegia hold down competitive jobs in the open labour market. While it is probably true that fewer people with spastic diplegia

can perform hard physical jobs like labouring and building, it is also true that there are many jobs to do not require physical demands outside the capacity of people with spastic diplegia.

There are no particular reasons why people with spastic diplegia cannot choose to live in their own home or apartment. Some people, particularly those who use wheelchairs most of the time, may need to modify their house so they can live independently. There are government schemes that assist people with disabilities to modify their house if they choose to live independently, however these take time to access and not everybody is eligible so it would be wise to seek professional advice years before any decision is to be made to find orthoses if you are eligible and what it might take.

Treatment

Therapy

The functional difficulties associated with spasticity will vary at different times in a person's life so the goal of any treatment to intervention is to maximise the function and minimise any of the disadvantages or consequences. Most therapy programs are family focused and community-based and usually designed to facilitate participation in the activities usual for a person's life stage.

Orthotics

The use of orthoses is quite common in people with spastic diplegia. There are different types of orthoses ranging from small particles that slip inside a normal shoe to ankle foot orthoses (AFOs) that extend from just below a person's heel to just passed their toes around the back of their ankle. There are numerous types of orthoses and it will require professional assistance to prescribe the best ones most suitable to a person with spasticity and a certain time.

Oral medication

Baclofen
etc.

Injected medication

Botox. This is the trade name for botulinum toxin which is the same drug that causes botulism. The drug is purified in laboratories and carefully controlled amounts are injected directly into muscles to weaken them and reduce the effects of spasticity temporarily. It is believed that the drug wears off between 3 and six months after administration but the effects can last considerably longer.

Intrathecal baclofen. This is the same drug that is taken orally except very small amounts are inserted directly into the spinal cord via catheter that is surgically inserted. A pump is also surgically inserted into the abdomen just under the skin. This pump ensures small amounts of the drug is continuously administered to maintain a reducing effect on spasticity. The pump can be

refilled every three months and it will last approximately seven years before it needs to be replaced.

Phenol and alcohol. These drugs are administered by injection in a similar way to Botox. It is felt they have a similar but potentially permanent effect, as does Botox.

Surgical interventions

Orthopaedic surgery is quite common in people who have spastic diplegia. It can be used to reduce the effects of contracture, relocate dislocated joints, assist with the production of power during walking and alleviating pain.

Selective Dorsal Rhizotomy is a neurosurgical procedure that carefully removes some of the sensory nerves that are sometimes implicated in making spasticity very debilitating. It is a lengthy and relatively new procedure which requires very careful assessment and consideration before a decision is made to go ahead. While this is a big procedure there is good reason to believe that for certain people the intervention can be useful.