

Cerebral palsy

Cerebral palsy is a problem with muscle function. It is caused by brain injury or abnormal development of the brain that occurs while a child's brain is still developing. This may be before the baby is born, during the birth or soon after birth.

What is cerebral palsy?

Cerebral palsy is a name for a group of life-long conditions that have problems with muscle function and control. It is caused by brain injury or abnormal development of the brain that occurs while a child's brain is still developing. This may be before the baby is born, during the birth or soon after birth.

Most people think of cerebral palsy as causing severe problems with movement but the symptoms and disabilities range from mild to severe. Some people with cerebral palsy also have other problems such as intellectual disability and [epilepsy](#).

Types of cerebral palsy

Spastic cerebral palsy

Spastic means that the affected muscles are more stiff than normal. How stiff an affected arm or leg is, can vary greatly from case to case. Movements of an affected arm or leg are stiff and jerky. Some muscles may become permanently shortened and stiff. This is called contracted.

Athetoid, or dyskinetic, cerebral palsy

People with this type of cerebral palsy have slow, writhing movements of the hands, arms, feet, or legs. Some people have sudden muscle spasms.

Ataxic cerebral palsy

People with ataxic cerebral palsy have difficulties with balance and fine movement. This can mean loss of balance or being unsteady when walking.

Mixed cerebral palsy

People with mixed cerebral palsy have a combination of two or three of the above types. It is most often a combination of spastic and athetoid cerebral palsy.

Cerebral palsy symptoms

Cerebral palsy can range in severity from mild to severe. For example, a person with mild spastic hemiplegia is likely to be fully mobile, active and independent but have a slightly abnormal walking movement (gait). He or she may have some difficulty in using one hand and one foot may drop or drag.

At the other extreme, someone with severe quadriplegia will be wheelchair-bound and need help with daily living tasks. Many people are in between these two extremes. Everyone is different and needs assessing by a specialised team.

Depending on the type of cerebral palsy and the area of brain affected, a child with cerebral palsy may have difficulty with moving, talking, eating or playing in the same ways as other children. The symptoms of cerebral palsy depend on the exact part of the brain that is affected.

The stiffness of the muscles in spastic cerebral palsy can gradually lead to permanent fixed contractures of joints in arms and legs. Some joints may eventually become fixed in a flexed position as a child becomes older. A main aim of treatment for spastic cerebral palsy is to keep to a minimum the effects of the muscle stiffness.

Spastic cerebral palsy symptoms

This type of cerebral palsy occurs in about 7 in 10 cases.

There are different words that are used to describe types of spastic cerebral palsy. For example:

- **Hemiplegia** - means that the leg and arm of one side of the body are affected.
- **Diplegia** - means that both legs are affected. Arms are not affected or are only mildly affected.

- **Quadriplegia** – means that both arms and legs are affected. Arms are equally or more affected than legs.

Athetoid, or dyskinetic, cerebral palsy symptoms

This type occurs in about 2 in 10 cases.

People with this type of cerebral palsy have slow, writhing movements that cannot be controlled and so are involuntary. Sometimes the tongue or facial muscles are also affected. The stiffness (tone) of the muscles can vary from too high to too low. As a result, people with athetoid cerebral palsy have difficulty in staying in one position. They may also be unable to use their arms or hands properly – for example, to hold objects.

Ataxic cerebral palsy symptoms

This type occurs in less than 1 in 10 cases. Ataxic cerebral palsy is associated with difficulties with balance and fine movement. For example, they can lose their balance or be unsteady when walking. It could also make doing fine tasks with their hands difficult, such as writing or holding cutlery. Their muscle tone is usually decreased. That is, they do not tend to be stiff.

Mixed cerebral palsy symptoms

People with mixed cerebral palsy usually have a combination of spastic and athetoid cerebral palsy, which results in stiff muscle tone and involuntary movements.

Causes of cerebral palsy

For more than half of all people with cerebral palsy, the cause occurs between 24 weeks of pregnancy and the birth. This is the period when there is a great deal of brain development. The brain is therefore particularly sensitive to any damage during this period.

For many people with cerebral palsy, the cause of the damage to the brain is not known. Genetic factors may play a part. Genetic means that the condition is passed on through families through special codes inside cells called genes.

Many other factors are known to increase the risk of developing cerebral palsy. These include:

Factors during pregnancy (antenatal)

- Preterm birth (premature babies) – in particular, babies born before 28 weeks of pregnancy.
- Babies who are part of twins, triplets, or more.
- Babies with abnormalities (congenital malformations).
- Infections of the pregnant mother, such as rubella, [chickenpox](#) and [toxoplasmosis](#), may be a cause in some cases.
- There is an increased risk of having a child with cerebral palsy in mothers who smoke, [drink a lot of alcohol](#), or [take street drugs such as cocaine](#).

Factors around the time of birth (perinatal)

- Severe infection in the baby or the mother.
- Damage to the baby's brain around the time of the birth.

Factors after birth (postnatal)

- Severe infection – for example, [sepsis](#) or [meningitis](#).
- Severe [jaundice](#) in a newborn baby.
- Bleeding into the brain (intracranial haemorrhage).
- Injury (trauma).

It was thought that problems with labour and delivery were the main cause of cerebral palsy. However, this is now known to be incorrect. It is thought that less than 1 case in 10 is due to problems around the birth of a baby. For example, severe prolonged lack of oxygen during birth may be a cause in a small number of cases.

How common is cerebral palsy?

- About 1 in 1,000 babies in the UK who are of normal birth weight have cerebral palsy.
- For low birth-weight babies (less than 2500 g) the figure is about 1 in 60.

The overall number of cases per year (the incidence) has not changed much over the period of 50 years or so.

Problems associated with cerebral palsy

Sometimes the damage to the brain affects other aspects of brain function, as well as problems with muscles.

Learning difficulties

About half of children with cerebral palsy have some degree of learning difficulty. The severity can vary. The other half will have normal intelligence or higher.

Speech problems

About half of children will have some degree of speech problems. Sometimes a child with difficulty in speaking may be thought of as having low intelligence, whereas in fact they have normal or high intelligence.

Epilepsy

About 1 in 3 people with cerebral palsy will also have [epilepsy](#).

Some children also have problems with hearing, vision, eating and drinking.

How is cerebral palsy diagnosed?

Cerebral palsy is not usually diagnosed at birth. Babies with severe cerebral palsy may have signs at birth that are obvious, such as very abnormal muscle stiffness (tone). However, most children are diagnosed between the ages of 6 months and 2 years.

Possible early signs that a baby may have cerebral palsy include:

- Unusual fidgety movements.
- Other abnormal movements, including not moving very much, or mainly moving one side of the body.
- Abnormal muscle tone - for example, reduced tone or appearing floppy (hypotonia), increased tone or stiffness (spasticity) or changing tone between being floppy and stiffness (dystonia).

- Abnormal development - for example, late with head control, late when they roll over, sit, crawl or walk. They may walk on their toes persistently.
- Feeding difficulties.

The most common delayed motor milestones for children with cerebral palsy are:

- Not sitting by 8 months. For premature babies, this time should be corrected for the child's age at birth (gestational age) - for example, it would be 10 months for a baby born two months early.
- Not walking by 18 months (corrected for gestational age).
- Preferring to use one hand rather than the other hand (hand preference) before the age of 1 year (corrected for gestational age).

There are variations and some babies are normal but late developers. However, a child who is late in these developmental milestones should usually be assessed for cerebral palsy. The diagnosis can usually be made by a child specialist, from the symptoms, signs and delay in development.

The diagnosis is mainly by careful examination and assessment of development. However, additional tests such as blood tests or a brain scan may be done if the cause of cerebral palsy is not clear. Other tests may also be needed if it is thought that there may be a different diagnosis other than cerebral palsy.

Cerebral palsy treatment

Every person with cerebral palsy is an individual with specific symptoms, disabilities and needs. Treatment is based on a thorough and ongoing assessment of all symptoms and difficulties caused by cerebral palsy.

Children with cerebral palsy should be under the care of a specialised team which includes various healthcare professionals such as doctors, nurses, physiotherapists, occupational therapists and speech therapists. The role of the local GP is to coordinate care between the healthcare professionals, monitor for associated problems (such as chest, gut or bladder disorders), support the individual and their carers and refer for additional support when necessary.

There is no cure for cerebral palsy but much can be done to limit the degree of disability that may have occurred if treatment had not been given.

Physiotherapy and occupational therapy

These are the mainstays of treatment. One main aim of physiotherapy is to (as far as possible) prevent or limit the contractures and limb deformities that can occur with spastic cerebral palsy. Physiotherapists also focus on range of movement, power and mobility.

Various techniques may be used, such as exercises, mobility training, braces, splints, etc (orthotics), and other equipment. A physiotherapist can show parents and carers the correct positioning of joints and which stretching exercises to do. If advised, these must be done regularly for the best chance of minimising problems.

An occupational therapist can enhance children's independence skills, such as moving on the floor, dressing and feeding independently. Occupational therapists can help with wheelchair recommendation and housing options to enable the person to live life to their maximum potential.

Surgery

Depending on the type and degree of muscle contracture, an operation may help - for example, an operation to loosen tight muscles or to correct a joint deformity. The aim is to give more flexibility and control to the affected limbs and joints. Most operations are performed on the muscles around the hips, knees and ankles.

What about medication?

Medicines usually have a limited role. For example, [botulinum toxin injections](#) (in conjunction with physiotherapy) are used in some cases to relax spastic muscles. The most commonly injected muscles are the hamstrings, calf muscles and muscles that pull the hips together (hip adductors). The effect of a botulinum injection lasts 3–6 months.

Other muscle-relaxing medicines such as [baclofen](#) are sometimes used. Children with associated epilepsy need medicines to prevent fits (seizures).

Other treatments and therapies

Other treatments and therapies may include:

- Speech therapy.
- Vision aids.
- Dentistry.
- Communications aids.
- Nutritional advice.
- Promoting sport.
- Assistive technology. There is a range of devices and gadgets that can help with communication, mobility and daily tasks.

What is the outlook for people with cerebral palsy?

Because the severity of cerebral palsy can range from mild to severe, it is difficult to predict the future for each individual. The initial brain injury does not worsen in cerebral palsy, but the individual's condition does change over time - for example lack of movement will make stiffness worse and contractions may develop. If the disability is relatively mild, the outlook and quality of life of the individual may be similar to someone who is unaffected by cerebral palsy. Your team of specialists will be able to give advice. Treatments such as physiotherapy and speech therapy can make a big difference to the eventual outcome.

Further reading

- [Spasticity in children and young people](#); NICE Clinical Guideline (July 2012, updated Nov 2016)
- [Cerebral palsy in under 25s: assessment and management](#); NICE Guidance (January 2017)
- [Cerebral palsy](#); NICE CKS, June 2019 (UK access only).
- [Cerebral palsy in adults](#); NICE Guideline (January 2019)
- [Vitrikas K, Dalton H, Breish D; Cerebral Palsy: An Overview. Am Fam Physician. 2020 Feb 15;101\(4\):213-220.](#)

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