

Cerebral Palsy

Cerebral palsy encompasses a group of non-progressive and non-contagious motor conditions that cause physical disability in various facets of body movement. Cerebral palsy is one of the most common crippling conditions of childhood, dating to events and brain injury before, during or soon after birth. Cerebral palsy is a debilitating condition in which the developing brain is irreversibly damaged, resulting in loss of motor function and sometimes also cognitive function.

Despite the large increase in medical intervention during pregnancy and childbirth, the incidence of cerebral palsy has remained relatively stable for the last 60 years. In Australia, a baby is born with cerebral palsy about every 15 hours, equivalent to 1 in 400 births. Presently, there is no cure for cerebral palsy.

Classification

Cerebral palsy is divided into four major classifications to describe different movement impairments. Movements can be uncontrolled or unpredictable, muscles can be stiff or tight and in some cases people have shaky movements or tremors. These classifications also reflect the areas of the brain that are damaged. The four major classifications are: spastic, ataxic, athetoid/dyskinetic and mixed.

In most cases of cerebral palsy, the exact cause is unknown. Suggested possible causes include developmental abnormalities of the brain, brain injury to the fetus caused by low oxygen levels (asphyxia) or poor circulation, preterm birth, infection, and trauma.

Spastic cerebral palsy leads to increased muscle tone and inability for muscles to relax (hypertonic). The brain injury usually stems from upper motor neuron in the brain. Spastic cerebral palsy is classified depending on the region of the body affected; these include: spastic hemiplegia; one side being affected, spastic monoplegia; a single limb being affected, spastic triplegia; three limbs being affected, spastic quadriplegia; all four limbs more or less equally affected.

Ataxia type symptoms can be caused by damage to the cerebellum. Some of these patients have low muscle tone and tremors. Motor skills such as writing, typing, or using scissors might be affected, as well as balance, especially while walking.

Athetoid cerebral palsy or dyskinetic cerebral palsy is mixed muscle tone – both hypertonia (increased muscle tone with stiffness) and hypotonia (decreased muscle tone with floppiness) are mixed with involuntary motions. People with athetoid cerebral palsy have trouble holding themselves in an upright, steady position for sitting or walking, and often show involuntary motions. The damage occurs to the extrapyramidal motor system and/or pyramidal tract and to the basal ganglia. In newborn infants, high bilirubin levels in the blood, if left untreated, can lead to brain damage in the basal ganglia (kernicterus), which can lead to athetoid/dyskinetic cerebral palsy.

Mixed cerebral palsy refers to a pattern of cerebral palsy where there is a mixture of the above types.

Causes

In most cases of cerebral palsy, the exact cause is unknown. Some possibilities include developmental abnormalities of the brain, brain injury to the fetus caused by low oxygen levels (asphyxia) or poor circulation, infection, and trauma. Injury and asphyxia during labour and delivery were once thought to be common reasons for cerebral palsy. Kernicterus, from very high bilirubin levels in the blood can lead to athetoid cerebral palsy, though it is now relatively uncommon. Babies most at risk of cerebral palsy are those born prematurely or with low birth weight. Multiple births (e.g. twins or triplets) are also associated with higher rates of cerebral palsy.

Diagnosis

The diagnosis of cerebral palsy usually relies on the patient's history and physical examination. Early signs of cerebral palsy usually appear before three years of age. Infants with cerebral palsy are frequently slow to reach developmental milestones such as learning to roll over, sit, crawl, smile or walk. To make a diagnosis of cerebral palsy, the doctors will pay special attention to the child's movements – both their voluntary movements as well as their muscle tone. Some children may have very relaxed, floppy muscles, while others have stiff, tight muscles. Some children may have unusual postures or favour one side over the other.

Secondary conditions associated with cerebral palsy can include seizures, epilepsy, apraxia (difficult in carrying out purposeful movements), dysarthria (difficulty with speech due to disturbed muscle control) or other communication disorders, eating problems, sensory impairments, mental retardation, learning disabilities, and/or behavioural disorders. Speech and language disorders are common in patients with cerebral palsy.

Once diagnosed with cerebral palsy, further diagnostic tests may be required depending on the clinical history and findings. Neuroimaging with MRI is warranted when the etiology of a patient's cerebral palsy has not been established. When abnormal, the neuroimaging study can suggest the timing of the initial damage, or reveal some treatable conditions, such as hydrocephalus, porencephaly, arteriovenous malformation, subdural hematomas, hygromas, and a vermian tumor.

Treatment

Treatment of the child with cerebral palsy consists of ensuring the fullest physical and social development possible. Children with cerebral palsy may be supported by a team of professionals including health professionals and community-based providers who work together to help the child and family reach their goals. Early intervention with physiotherapy and occupational therapy are useful to reduce stiffness, prevent contractures and optimise motor functions. Orthopaedic appliances and surgical procedures are often required to improve mobility, often together with movement training and equipment, e.g. walking frames, wheelchairs, supportive seating, footwear and orthotics. Neurological input and

therapies such as various antispasmodic medications, botox, baclofen are also useful to reduce spasticity and maximise functional capacity.

Prognosis

Although the specific brain injury causing cerebral palsy does not worsen, the movement problems produced by the injury can vary over time. The outlook for the child with cerebral palsy also depends largely on the severity of any associated intellectual handicaps. Good adjustment can be made to fairly severe motor deficits if intellectual capacity is unaffected. The response of the family to the situation and the availability of adequate educational, therapeutic facilities and support are of great importance.