

WHAT IS CEREBRAL PALSY?

Cerebral Palsy is a dysfunction in movement resulting from injury to or poor development of the brain prior to birth or in early childhood. Generally speaking, any injury or disease that causes a decrease in oxygen flow to brain cells may result in Cerebral Palsy.

Cerebral Palsy may be accompanied by difficulties in vision, hearing, speaking, or cognitive ability, depending upon the extent of the trauma to the brain. The longer the period of time that the brain is without oxygen, the more global the deficits may be. It is important to discriminate between the accompanying disorders that can occur and Cerebral Palsy itself.

- **Cerebral Palsy is purely the inability to coordinate movement.**

Many children with Cerebral Palsy have normal or above normal intellectual ability but due to the inability to control movement, often have difficulty competing with their peers in all areas. Deficits that the student with C.P. may exhibit are directly related to the area of the brain that has been affected by oxygen deprivation or maldevelopment. The resulting brain damage ranges on a continuum from mild to severe. This explains the wide range of symptoms one might see in looking at a variety of students with Cerebral Palsy.

BRAIN DEVELOPMENT

- **In order to understand this motor dysfunction it is important to have some knowledge of brain development.**

The brain develops in a hierarchical fashion building upon previously laid foundations. Nerve pathways are like highways connecting lower brain centers with higher ones, as well as connecting muscle movement to the brain. As infants grow and mature, these nerve pathways create connections with higher brain centers.

If brain damage has occurred, then nerve pathways cannot connect to various brain centers and function can be impaired. The following are examples of possible areas where one might see deficits:

- Visual motor
- Visual perception
- Gross motor control
- Fine motor control
- Auditory memory
- Sensory integration
- Speech and language (receptive, expressive or both)
- Cognitive delay
- Learning disability

The brain encompasses a relay system by which speech, hearing, vision, learning and movement are controlled and modulated by messages traveling along nerve pathways.

- **This fine interplay between brain, nerve connections and muscles is what becomes disrupted in a child with Cerebral Palsy.**

NORMAL MOVEMENT

Movement begins in the newborn through the influence of automatic reflexes that are controlled in the lower brain centers. It is gross movement that is immature in nature and not refined.

As the nerve pathways we spoke of earlier begin to grow and connect to the higher brain centers, then movement becomes more controlled. The automatic reflexes disappear because the more sophisticated brain inhibits them and primitive movement then diminishes. This all occurs because the brain is developing normally. If there is damage to the motor areas of the brain, then development is impeded, to a greater or lesser degree, and normal functioning movement will be limited.

The movement of an infant is random in nature. He gains control over that movement as a result of normal brain maturation and the growth of solid nerve pathways that provide for communication between the brain and the muscles.

MUSCLE TONE

Muscle tone is the amount of tension the muscle carries when at rest. This is the main factor that is affected in Cerebral Palsy. Because of brain damage, the muscles do not receive correct messages concerning the amount of tension and relaxation a muscle has.

- **Hypotonia**-muscles are under stimulated producing floppy responses
- **Hypertonia**-muscles are over stimulated producing stiff and rigid responses.

It is important to note we are not looking at muscle weakness as in muscle pathology, but rather muscle in-coordination resulting from injury to the brain.

CLASSIFICATIONS OF CEREBRAL PALSY

Generally speaking, there are two types of C.P.

- **Spastic**-characterized by tense, rigid movement with limited range of motion in the joints.
- **Athetoid**-characterized by random, flailing movement that fluctuates between rigid and floppy.

There is further classification regarding how the dysfunction is distributed in the body.

- **Hemiplegia**-only the right or left side of the body is affected.
- **Quadriplegia**-both arms and legs are affected as well as trunk stability. All athetoid C.P. is in this category.
- **Diplegia**-only the legs are affected and trunk stability can be affected.

When trunk stability is affected, the student may have difficulty with secure posture in sitting. This has many implications in the educational setting.

In summary, depending on the extent of the brain damage and area of the brain affected, the result can be mild to severe and can involve anywhere from one to all four extremities. The motor dysfunction can affect any muscle in the body including ocular and oral musculature resulting in difficulties in visual tracking, swallowing, and speaking.

THE ROLE OF PHYSICAL THERAPY IN SCHOOLS

- ❑ To educate students, families, and educators about the limitations and possibilities involved when a person lives with a physical disability.
- ❑ To lend support to educators by providing necessary equipment, tools and training to enhance the child's access to her education.
- ❑ To assist the student with a disability, in mobility throughout the school setting and when needed transfers.
- ❑ To recommend adaptations insuring accessibility to playground equipment, classrooms, bathrooms and gyms.

- To provide direct therapy as it relates to school and when needed to enable the student with a disability to further achieve her educational goals.
- To instruct all staff in safe ways to assist a student with a physical disability including proper evacuation techniques in case of emergencies.

THE ROLE OF OCCUPATIONAL THERAPY IN SCHOOLS

- To facilitate sensory processing development so the student benefits from receiving and interpreting information from his/her school environment.
- To assist in developing activities to refine arm and hand movements when appropriate.
- To provide adaptive equipment and training to student and staff to promote functional task performance.
- To provide access and training for assistive technology as indicated to meet established special education goals and objectives.

- To collaborate with staff as needed to promote growth in the areas of fine motor performance and sensory-motor integration for students in special education.

Reference: *Cerebral Palsy* William M. Cruickshank

Further Resources:

1. <http://www.kidshealth.org>
2. <http://www.ldinfo.org>