

Cerebral Palsy:

Cerebral Palsy is a group of disorders of the development of movement and posture causing activity limitations that are attributed to nonprogressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, cognition, communication, perception, and/or behavior and/or a seizure disorder.

Classification:

Physiologic:

- Spastic
 - most common
 - damage to the pyramidal system, particularly the motor cortex in the brain
 - increased tone in the extremities
 - tone is dependent on velocity, which means that if a muscle is stretched rapidly, tone increases more than if the same muscle group were stretched gradually and gently
- Hypotonia
 - abnormally decreased tone
 - described as floppy or hypotonic
- Dystonia
 - increased tone, which is not dependent on velocity.
 - “lead pipe rigidity” - tone does not decrease with stretching
- Athetosis
 - abnormal writhing movements that the patient cannot control
 - movements more exaggerated as the patient tries to complete a purposeful motion

Geographic

- Hemiplegia
 - when only one side of the body is involved, with the upper extremity usually more involved than the lower extremity
- Diplegia
 - involvement of both sides of the body, with both lower extremities being involved and lesser involvement of the upper extremities
- Triplegia
 - Involvement of both lower extremities and one upper extremity
- Quadriplegia or total body involvement
 - when all four extremities are severely involved
 - poor trunk and neck control

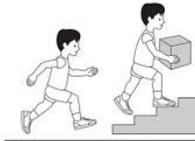
Functional

Gross Motor Functional Classification System (GMFCS)

- most commonly used to describe the patient's level of function

- GMFCS 1

- describes a patient who ambulates without aids on all surfaces and keeps up with peers

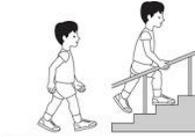


GMFCS Level I

Children walk indoors and outdoors and climb stairs without limitation. Children perform gross motor skills including running and jumping, but speed, balance and co-ordination are impaired.

- GMFCS 2

- The patient is fully ambulatory, may use lower extremity orthoses, and does not keep up fully with peers



GMFCS Level II

Children walk indoors and outdoors and climb stairs holding onto a railing but experience limitations walking on uneven surfaces and inclines and walking in crowds or confined spaces.

- GMFCS 3

- the patient uses ambulatory aids such as a walker or crutches and may use a wheelchair for longer distances



GMFCS Level III

Children walk indoors or outdoors on a level surface with an assistive mobility device. Children may climb stairs holding onto a railing. Children may propel a wheelchair manually or are transported when traveling for long distances or outdoors on uneven terrain.

- GMFCS 4

- describes non ambulatory patients who are able to propel their own wheelchair



GMFCS Level IV

Children may continue to walk for short distances on a walker or rely more on wheeled mobility at home and school and in the community.

- GMFCS 5

- inability to transfer, propel a wheelchair, or support the trunk



GMFCS Level V

Physical impairment restricts voluntary control of movement and the ability to maintain antigravity head and trunk postures. All areas of motor function are limited. Children have no means of independent mobility and are transported.

Treatment Overview

- Physical Therapy
- Mobility aids (orthoses, crutches, walker, wheelchair)
- Oral medications for spasticity, dystonia
- Botulinum toxin for temporary tone management
- Selective dorsal rhizotomy for lower extremity spasticity
- Intrathecal pump for generalized spasticity
- Orthopedic muscle lengthening and transfer
- Bony osteotomies for bony deformity
- Arthrodesis of spine or feet if collapse impairs function

References:

1. Tachdjian's Paediatric Orthopaedics 5th Ed
2. <https://emedicine.medscape.com/article/1179555-overview>