Cerebral Palsy

Dr.Suresh Kumar Murugesan PhD

Disclaimer

- This presentation is prepared for learning purpose only and all the images and pictures used in this presentation are taken from google image search.
- Due recognition was given to all the material collected from the various sources.
- Any name or reference is missed kindly bring it to the notice of the presenter for inclusion.
- Email - sureshkumar800@yahoo.com

Thank you

Yellow Pond

RED POND

Concept of Cerebral Palsy

Cerebral Palsy (CP)

- Cerebral palsy (CP) is a group of disorders that affect a person's ability to move and maintain balance and posture.
- CP is the most common motor disability in childhood.
- *Cerebral* means having to do with the **brain**. *Palsy* means weakness or problems with using the **muscles**.

What is cerebral palsy?

- Cerebral palsy affects a person's ability to move and maintain balance and posture.

- Cerebral palsy is caused by brain damage or abnormal brain development that happens before birth or early in life.

- Cerebral palsy is permanent. However, it's not progressive.

Cerebral Palsy

"Cerebral"

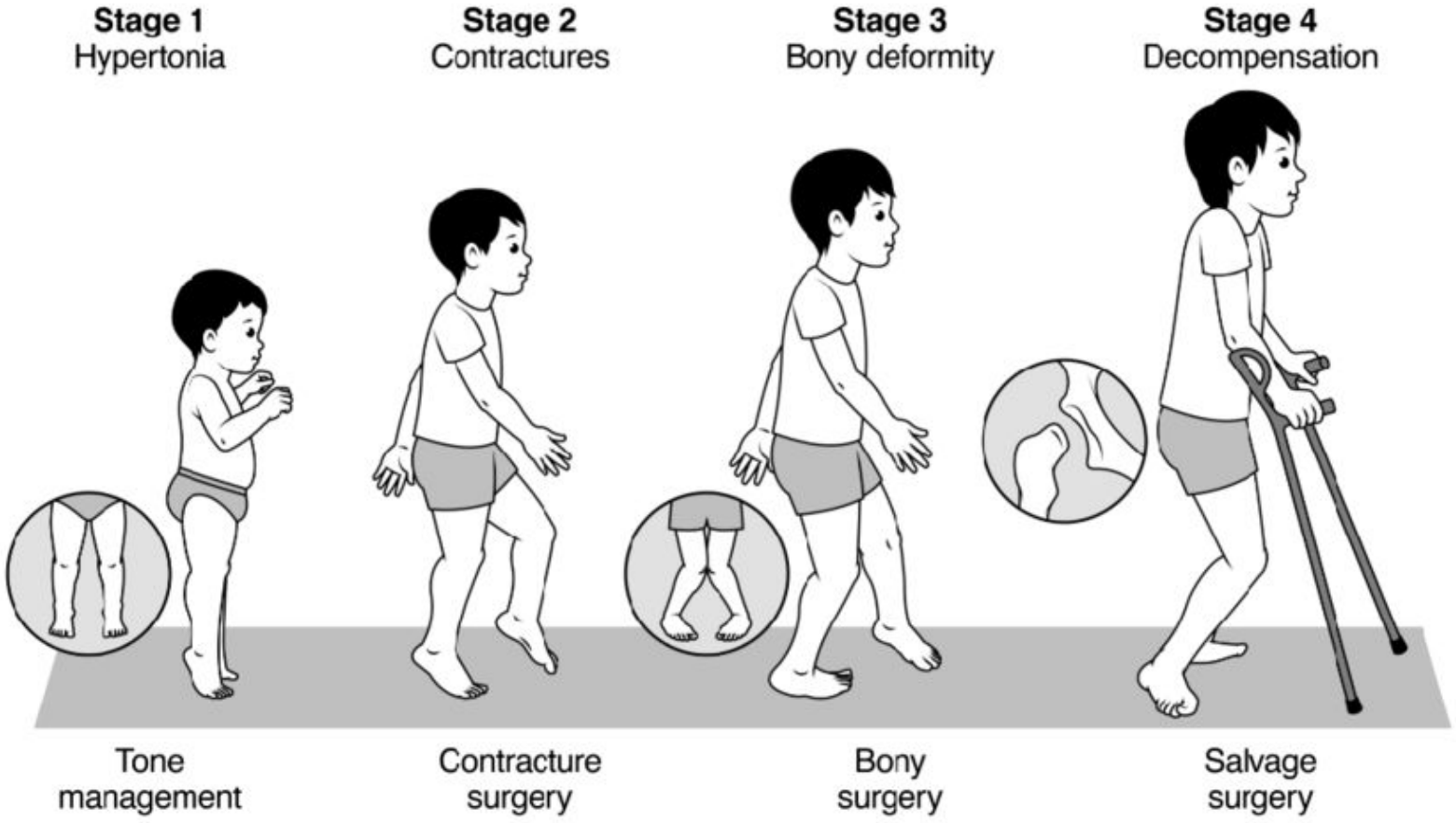
refers to the cerebrum, which is the affected area of the brain

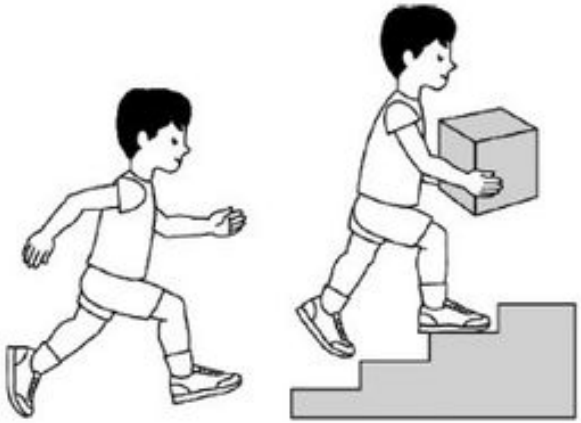
"Palsy"

refers to the brain injury's resultant disorder of movement

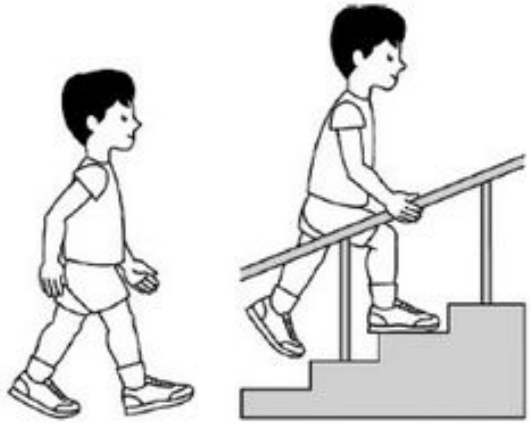
Levels of Cerebral Palsy

Musculoskeletal pathology in cerebral palsy

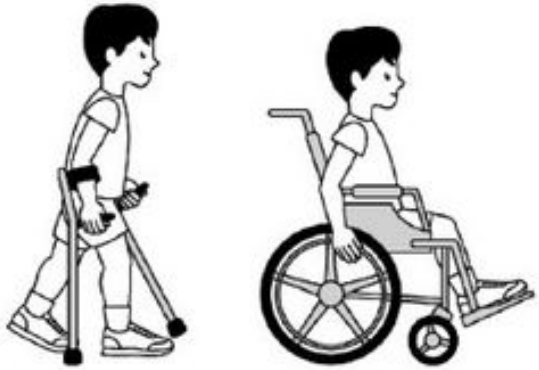




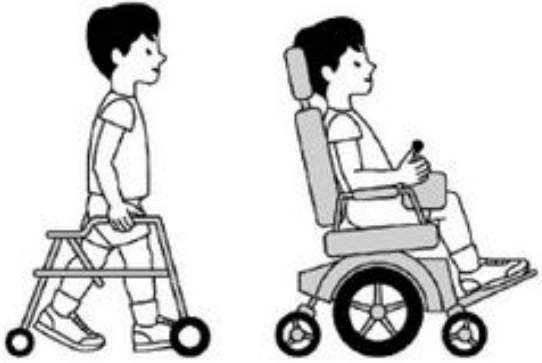
GMFCS Level I



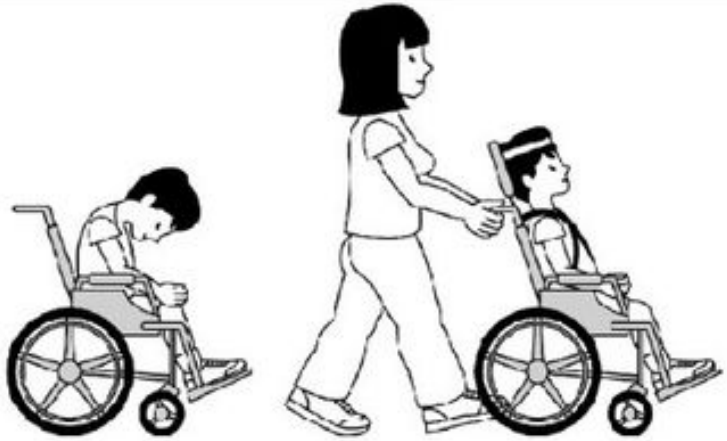
GMFCS Level II



GMFCS Level III



GMFCS Level IV



GMFCS Level V

Associated impairment of CP

ASSOCIATED IMPAIRMENTS

Children with cerebral palsy may also have a range of physical and cognitive impairments.

1 in 3 is unable to walk

1 in 4 is unable to talk

3 in 4 experience pain

1 in 4 has epilepsy

1 in 4 has a behaviour disorder

1 in 2 has an intellectual impairment

1 in 10 has a severe vision impairment

1 in 4 has bladder control problems

1 in 5 has sleep disorder

1 in 5 has saliva control problems

Facts of CP

Fact

About 70% of cases of cerebral palsy results from a birth injury.

How Often Does Cerebral Palsy Occur?

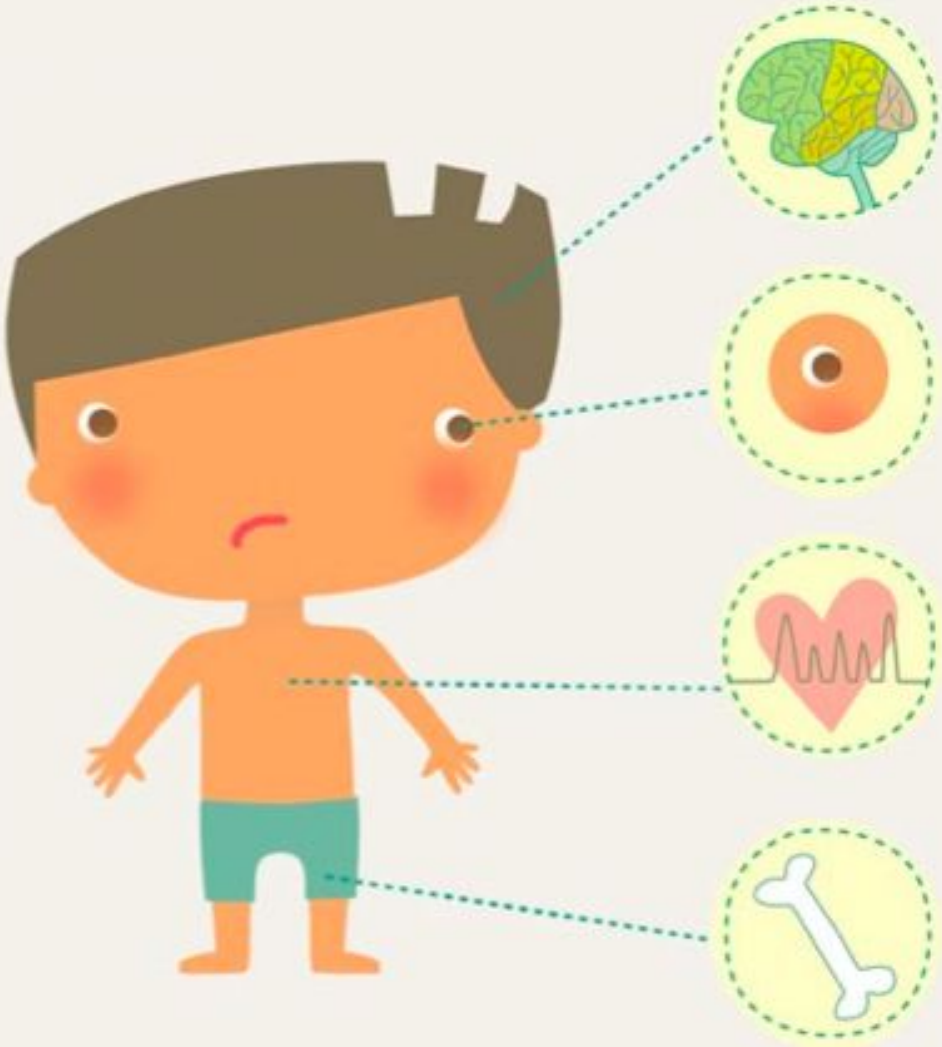
children in the U.S. have cerebral palsy,
making it the most common motor disability in childhood.

(Source: Centers for Disease Control and Prevention)

42% of children with cerebral palsy aren't receiving appropriate care.

More than **4 in 10** eligible children don't get any of these treatments.

CARING FOR SPECIAL NEEDS KIDS



40% 40% have a cognitive disability

35% 35% have epilepsy

15% 15% have vision impairment

60% 60% of children with CP have another developmental disability

41% 41% of children with CP are limited in their ability to crawl, walk, run, or play.

31% 31% of children with CP need special equipment to move.

$1 MIL The estimated lifetime cost of caring for a person with CP is almost $1 million.

CP

- 1 in 2 have some form of intellectual disability
- 1 in 3 are unable to walk
- 1 in 4 are unable to speak
- 1 in 3 have hip displacements
- 1 in 4 have epilepsy
- 1 in 4 have a behavioral disorder
- 1 in 4 have bladder control problems
- 1 in 10 are blind
- 1 in 15 have to be tube-fed
- 1 in 25 are deaf

CP

Conditions that may occur alongside cerebral palsy include:

- Attention deficit hyperactivity disorder (ADHD)
- Autism spectrum disorder (ASD)
- Chronic pain
- Epilepsy
- Intellectual disabilities
- Mental health disorders
- Speech disorders
- Vision or hearing impairments

Common medical errors of CP

Common Medical Errors That Cause Cerebral Palsy

Wrongly administed drugs

Unnoticed Changes in Foetal Statistics

Failure to carry out appropriate tests

Non-action when foetus is distressed

Starvation of oxygen

Causes of CP

Causes of Cerebral Palsy

Cerebral palsy is caused by damage to the fetal or infant brain. It can be difficult to pinpoint the exact cause of brain damage, but there are several factors that may cause a child to develop the condition.

Common causes of cerebral palsy include:

- Bacterial and viral infections such as meningitis
- Bleeding in the brain (hemorrhaging)
- Head injuries sustained during birth or within the first few years of infancy
- Lack of oxygen to the brain before, during, or after birth (asphyxia)
- Mercury poisoning from fish
- Prenatal exposure to drugs and alcohol
- Toxoplasmosis from raw/undercooked meat

Cerebral Palsy Caused by Medical Negligence

Some children develop cerebral palsy as the result of a birth injury caused by medical malpractice or negligence. These types of cerebral palsy cases stem from inadequate care from medical professionals during the childbirth process.

Some examples of medical negligence that can lead to cerebral palsy are:

- Failure to detect and/or properly treat infections
- Failure to detect changes in fetal heart rate
- Failure to schedule or perform a medically advisable cesarean section (C-section)
- Failure to detect a prolapsed umbilical cord
- Improper use of delivery tools, such as vacuum extractors and forceps

Causes

Cerebral palsy is caused by an abnormality or disruption in brain development, most often before a child is born. In many cases, the cause isn't known. Factors that can lead to problems with brain development include:

- **Gene mutations** that lead to abnormal development
- **Maternal infections** that affect the developing fetus
- **Fetal stroke,** a disruption of blood supply to the developing brain
- **Bleeding into the brain** in the womb or as a newborn
- **Infant infections** that cause inflammation in or around the brain
- **Traumatic head injury** to an infant from a motor vehicle accident or fall
- **Lack of oxygen** to the brain related to difficult labor or delivery, although birth-related asphyxia is much less commonly a cause than historically thought

Risk Factors of CP

Risk factors

A number of factors are associated with an increased risk of cerebral palsy.

Maternal health

Certain infections or toxic exposures during pregnancy can significantly increase cerebral palsy risk to the baby. Infections of particular concern include:

- **Cytomegalovirus.** This common virus causes flu-like symptoms and can lead to birth defects if a mother has her first active infection during pregnancy.
- **German measles (rubella).** This viral infection can be prevented with a vaccine.
- **Herpes.** This can be passed from mother to child during pregnancy, affecting the womb and placenta. Inflammation triggered by infection can damage the unborn baby's developing nervous system.
- **Syphilis.** This is a sexually transmitted bacterial infection.
- **Toxoplasmosis.** This infection is caused by a parasite found in contaminated food, soil and the feces of infected cats.
- **Zika virus infection.** Infants for whom maternal Zika infection causes their head size to be smaller than normal (microcephaly) can develop cerebral palsy.
- **Other conditions.** Other conditions that can increase the risk of cerebral palsy include thyroid problems, intellectual disabilities or seizures, and exposure to toxins, such as methyl mercury.

Infant illness

Illnesses in a newborn baby that can greatly increase the risk of cerebral palsy include:

- **Bacterial meningitis.** This bacterial infection causes inflammation in the membranes surrounding the brain and spinal cord.
- **Viral encephalitis.** This viral infection similarly causes inflammation in the membranes surrounding the brain and spinal cord.
- **Severe or untreated jaundice.** Jaundice appears as a yellowing of the skin. The condition occurs when certain byproducts of "used" blood cells aren't filtered from the bloodstream.
- **Bleeding into the brain.** This condition is commonly caused by the baby having a stroke in the womb.

Other factors of pregnancy and birth

While the potential contribution from each is limited, additional pregnancy or birth factors associated with increased cerebral palsy risk include:

- **Breech presentation.** Babies with cerebral palsy are more likely to be in this feet-first position at the beginning of labor rather than being headfirst.
- **Low birth weight.** Babies who weigh less than 5.5 pounds (2.5 kilograms) are at higher risk of developing cerebral palsy. This risk increases as birth weight drops.
- **Multiple babies.** Cerebral palsy risk increases with the number of babies sharing the uterus. If one or more of the babies die, the survivors' risk of cerebral palsy increases.
- **Premature birth.** Babies born fewer than 28 weeks into the pregnancy are at higher risk of cerebral palsy. The earlier a baby is born, the greater the cerebral palsy risk.

Complications

Muscle weakness, muscle spasticity and coordination problems can contribute to a number of complications either during childhood or in adulthood, including:

- **Contracture.** Contracture is muscle tissue shortening due to severe muscle tightening (spasticity). Contracture can inhibit bone growth, cause bones to bend, and result in joint deformities, dislocation or partial dislocation.
- **Premature aging.** Some type of premature aging will affect most people with cerebral palsy in their 40s because of the strain the condition puts on their bodies.
- **Malnutrition.** Swallowing or feeding problems can make it difficult for someone who has cerebral palsy, particularly an infant, to get enough nutrition. This can impair growth and weaken bones. Some children need a feeding tube to get enough nutrition.
- **Mental health conditions.** People with cerebral palsy might have mental health conditions, such as depression. Social isolation and the challenges of coping with disabilities can contribute to depression.
- **Heart and lung disease.** People with cerebral palsy may develop heart disease and lung disease and breathing disorders.
- **Osteoarthritis.** Pressure on joints or abnormal alignment of joints from muscle spasticity may lead to the early onset of this painful degenerative bone disease.
- **Osteopenia.** Fractures due to low bone density (osteopenia) can stem from several common factors such as lack of mobility, nutritional shortcomings and anti-epileptic drug use.

Symptoms of CP

Physical Symptoms

- Contractures (shortening of muscles)
- Drooling
- Exaggerated or jerky reflexes
- Floppy muscle tone
- Gastrointestinal problems
- Incontinence
- Involuntary movements or tremors
- Lack of coordination and balance
- Problems swallowing or sucking
- Problems with movement on one side of the body
- Stiff muscles (spasticity)

Neurological Symptoms

- Buildup of cranial pressure due to fluid imbalance (hydrocephalus)
- Behavioral problems
- Delayed motor skill development
- Difficulty with speech and language (dysarthria)
- Sensory impairments
- Visual/hearing impairments

Diagnosis of CP

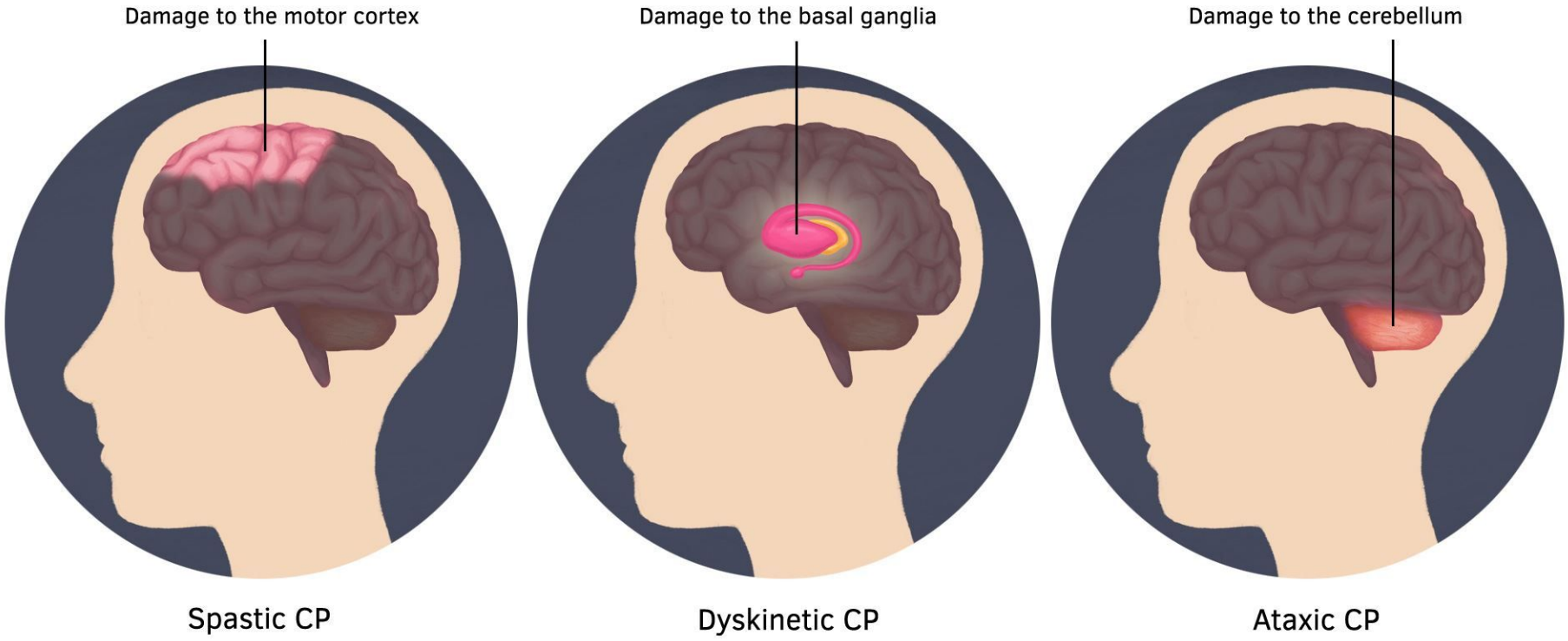
Cerebral Palsy - Diagnosis

A cerebral palsy diagnosis is made using imaging tests to observe any form of brain damage.

Imaging tests used to diagnose cerebral palsy include:

- Cranial ultrasounds
- Computed tomography scans (CT)
- Electroencephalograms (EEG)
- Magnetic resonance imaging (MRI)

Types of CP


Damage to the motor cortex
Damage to the basal ganglia
Damage to the cerebellum
Spastic CP
Dyskinetic CP
Ataxic CP

MOTOR TYPES:

SPASTIC: 70-80%
Most common form.
Muscles appear stiff and tight.
Arises from Motor Cortex damage.

ATAXIC 6%.
Characterised by shaky movements.
Affects balance and sense of positioning in space. Arises from Cerebellum damage.

DYSKINETIC: 6%.
Characterised by involuntary movements. Arises from Basal Ganglia damage.

MIXED TYPES:
Combination damage

There are different types of cerebral palsy,

depending on what part of the brain is affected.

Stiff muscles (spasticity), associated with damage to or developmental differences in the

cerebral cortex

Uncontrollable movements (dyskinesia), associated with damage to the

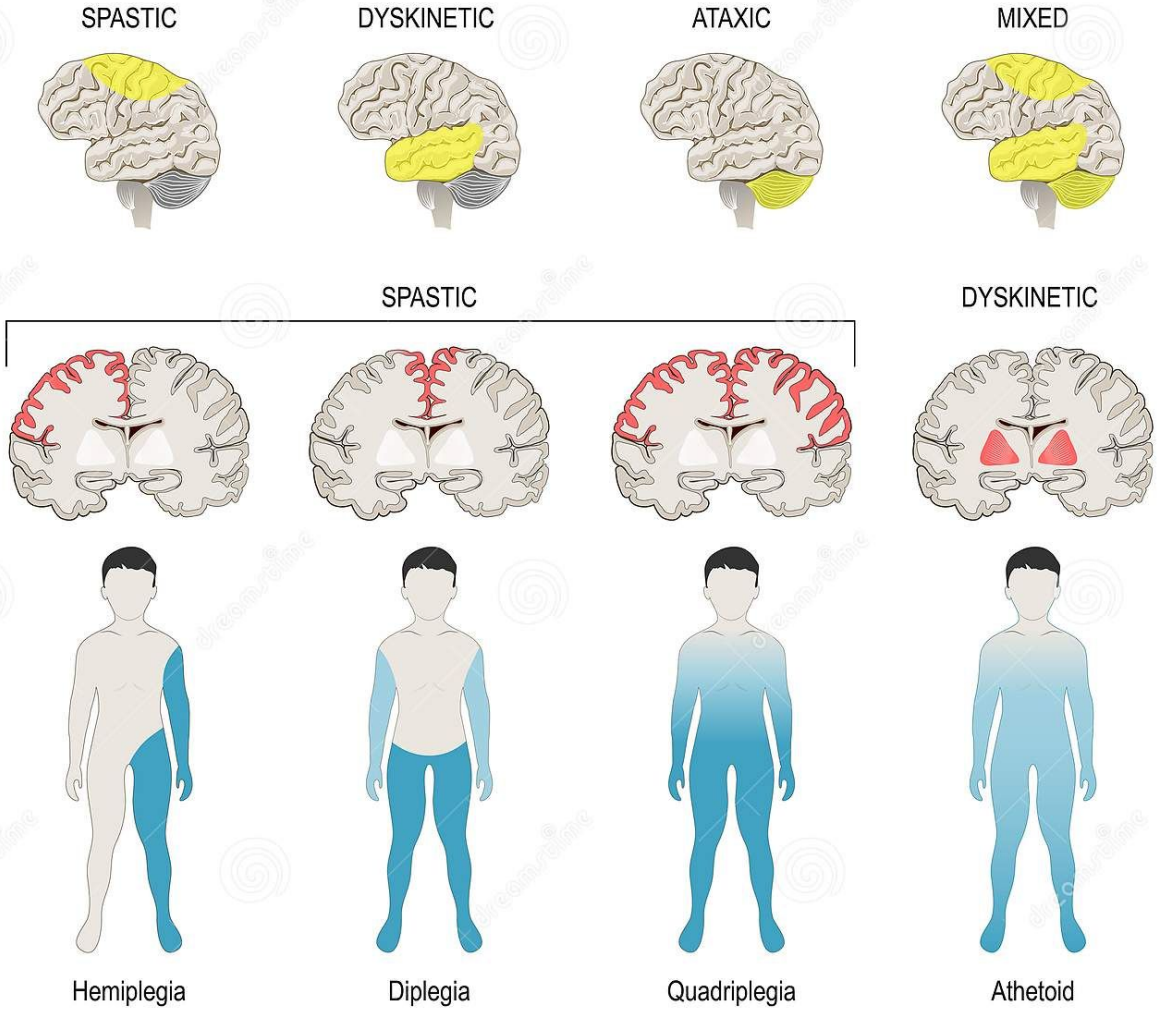
basal ganglia

Poor balance and coordination (ataxia), associated with damage to the

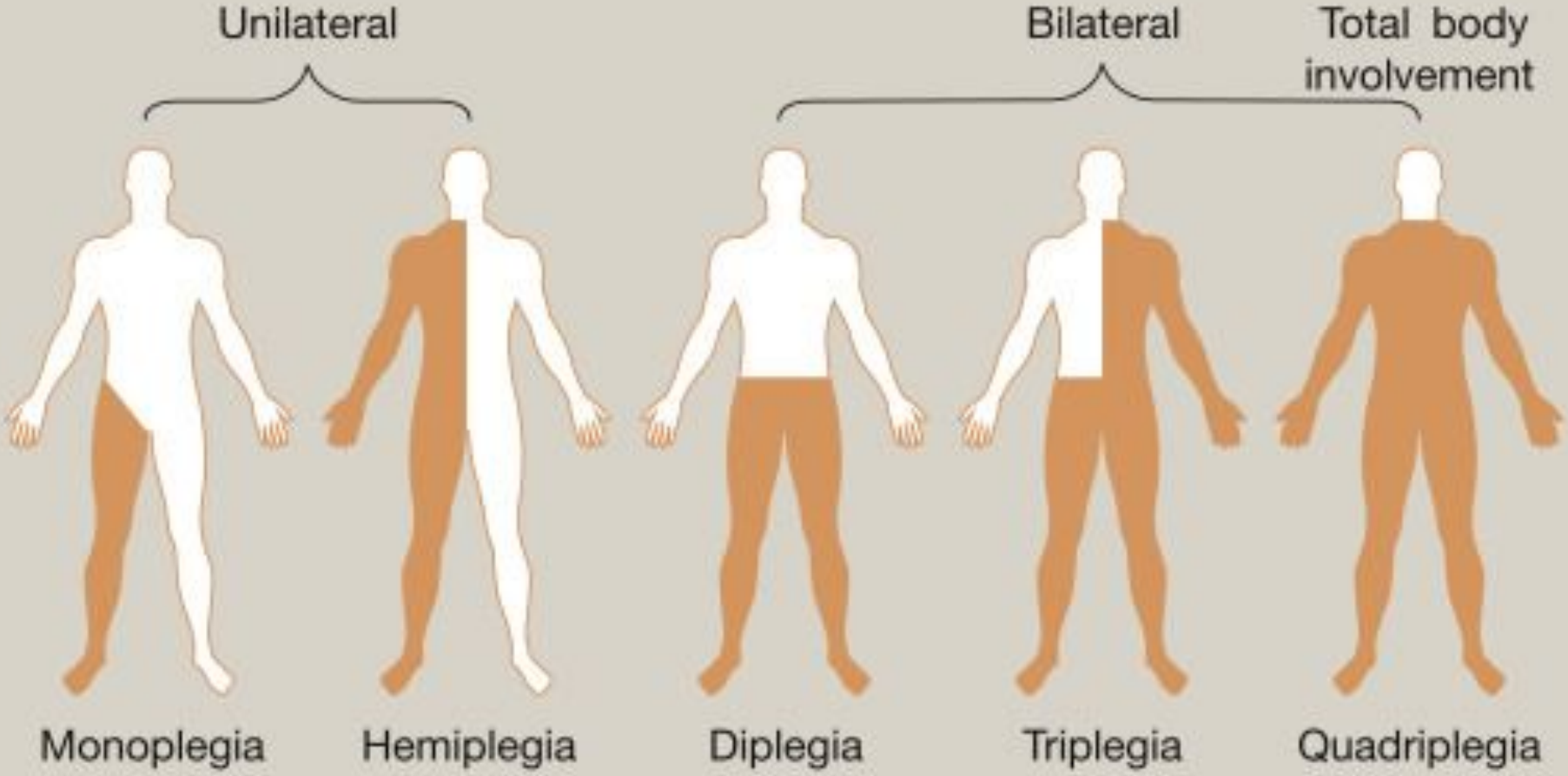
cerebellum

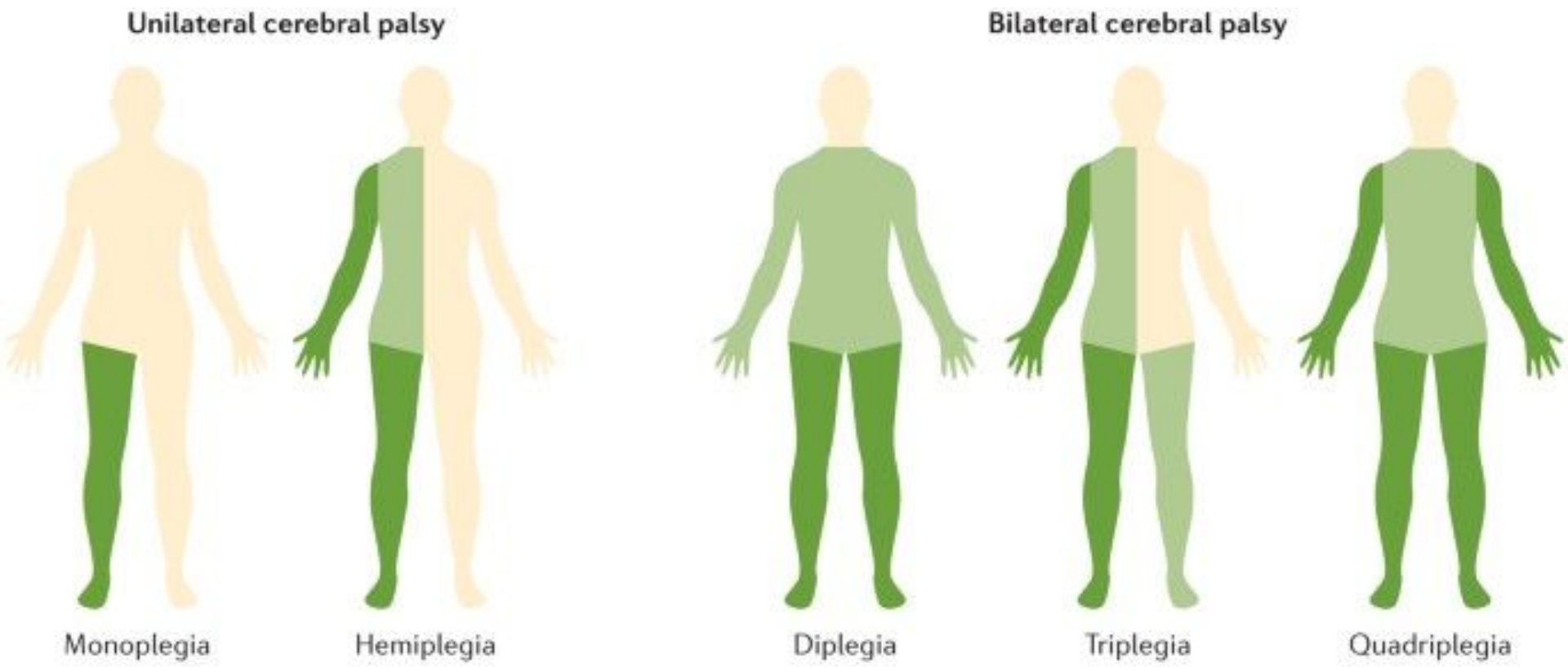
Mixed, a combination of two or more types, associated with damage to

multiple areas of the brain


SPASTIC
DYSKINETIC
ATAXIC
MIXED
SPASTIC
DYSKINETIC
Hemiplegia
Diplegia
Quadriplegia
Athetoid

Topographical classification of CP




Unilateral cerebral palsy
Bilateral cerebral palsy
Monoplegia
Hemiplegia
Diplegia
Triplegia
Quadriplegia

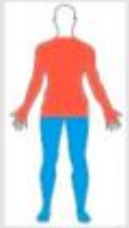
Body Regions Affected by Cerebral Palsy

Cerebral palsy can be defined by which parts of the body are affected

Hemiplegia

Affected Limbs: 2

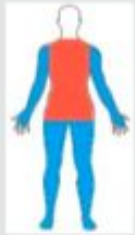
One side of the body is affected. The arm is usually more involved than the leg.



Diplegia

Affected Limbs: 4

All four limbs are affected. The legs are more involved than the arms.



Quadriplegia

Affected Limbs: 4

All four limbs are affected.

Monoplegia

Affected Limbs: 1

One limb is affected. The involved limb is usually the arm.

Triplegia

Affected Limbs: 3

Three limbs are affected (usually both arms and one leg).

Pentaplegia

Affected Limbs: 5

All four limbs, the head, and the neck are affected.

1. Spastic Cerebral Palsy

- Spastic cerebral palsy
- Spastic quadriplegia
- Spastic diplegia
- Spastic hemiplegia

1. Spastic Cerebral Palsy

Spastic cerebral palsy accounts for 75 percent of all cases. It causes increased muscle tone, known as spasticity and causes:

- Delayed developmental milestones for moving.
- Abnormal movements.
- Movement inhibition.
- Stiff and spastic muscles.
- Difficulties controlling muscle movement.
- Difficulties moving from one position to another.

Spastic Cerebral Palsy

- Spastic quadriplegia impacts a child’s upper and lower limbs and body, severely restricting mobility.
- Spastic diplegia only affects the lower half of the body. Many of these children can still walk with some impairments and may need assistive devices such as walkers.
- Spastic hemiplegia affects one side of the body only, usually the arm more than the leg. Most children with hemiplegia can walk.

2. Dyskinetic Cerebral Palsy

Dyskinetic cerebral palsy is the second most common type of CP. Symptoms include:

- Dystonia, repetitive and twisting motions.
- Athetosis, writhing movements.
- Chorea, unpredictable movements.
- Poor posture.
- Painful movements.
- Difficulty swallowing or talking.

3. Ataxic Cerebral Palsy

Ataxic cerebral palsy is the least common. It causes poor balance, limited coordination, tremors, and shaky movements that are difficult to control.

4. Mixed Cerebral Palsy

Mixed cerebral palsy causes symptoms characteristic of two or three of the other types. Spastic-dyskinetic cerebral palsy is the most common type of mixed CP.

Prevention of CP

Prevention

Most cases of cerebral palsy can't be prevented, but you can lessen risks. If you're pregnant or planning to become pregnant, you can take these steps to keep healthy and minimize pregnancy complications:

- **Make sure you're vaccinated.** Getting vaccinated against diseases such as rubella, preferably before getting pregnant, might prevent an infection that could cause fetal brain damage.
- **Take care of yourself.** The healthier you are heading into a pregnancy, the less likely you'll be to develop an infection that results in cerebral palsy.
- **Seek early and continuous prenatal care.** Regular visits to your doctor during your pregnancy are a good way to reduce health risks to you and your unborn baby. Seeing your doctor regularly can help prevent premature birth, low birth weight and infections.
- **Practice good child safety.** Prevent head injuries by providing your child with a car seat, bicycle helmet, safety rails on beds and appropriate supervision.
- **Avoid alcohol, tobacco and illegal drugs.** These have been linked to cerebral palsy risk.

Treatment for CP

Treatment aim

Cerebral palsy treatment is not focused on curing or fully correcting a child’s condition but is focused on nurturing a child’s development to encourage an independent life.

Medication

Medication may be used to treat some symptoms of cerebral palsy, including involuntary movement, seizures, and spasticity.
Common classes of medications for children with cerebral palsy include:

- Anticholinergics (neurotransmitter blockers)
- Anticonvulsants (suppress neurons that cause seizures)
- Antidepressants (relieve symptoms of depression)
- Anti-inflammatories (reduce pain and inflammation)
- Baclofen (muscle relaxer)
- Benzodiazepines (treats anxiety, seizures, and insomnia)
- Botox (treats spasticity)
- Muscle relaxants
- Nerve blocks
- Stool softeners

Medication may also be used to treat secondary disorders caused by cerebral palsy such as incontinence, acid reflux, behavioral disorders, and more.

Therapy

There are several different therapy options to help treat cerebral palsy symptoms. Therapy can be used to improve mobility and brain cognition.

- **Physical therapy** can help relieve pain and muscle stiffness, as well as improve balance, coordination, and overall mobility. Physical therapists will use specialized equipment that helps your child move more freely and live more independently.
- **Occupational therapy** helps children with cerebral palsy learn how to complete everyday tasks and activities by improving fine motor skills and cognitive ability.
- **Speech therapy** can help children to improve their communication and language skills. This type of therapy can give children the confidence to learn and socialize. Speech therapy can also help children who have difficulty eating and swallowing.
- **Alternative therapy** helps children focus on themselves as an individual and lets them overcome physical and mental obstacles. Alternative therapy includes hippotherapy, music therapy, aquatic therapy, acupuncture, and more.

Surgery

Surgery may be recommended for children with severe mobility and muscle issues. Surgery can correct or improve issues with movement in the legs, ankles, feet, hips, wrists, and arms. Muscles, tendons, bones, and nerves are operated on to improve movement in these areas of the body.
Cerebral palsy surgery may be recommended to:

- Correct fixed joints and tendons
- Correct foot deformities
- Correct muscle contractures
- Correct spinal curvatures (scoliosis)
- Improve posture
- Improve balance and coordination
- Prevent hip dislocation
- Prevent spinal deformities
- Reduce tremors
- Relieve pain
- Relieve stiff muscles
- Treat co-occurring conditions

Assistive Devices

Specialized assistive devices can help individuals with cerebral palsy that experienced issues with communication, hearing, and vision.

Types of assistive devices include:

- Cochlear implants
- Electronic communication boards
- Eye-tracking devices
- Typing aids
- Writing aids

Mobility Aids

Children with mobility limitations may benefit from assistive technology that can be adjusted to their individual needs. Mobility aids aim to help children with cerebral palsy move freely and can greatly improve their quality of life and independence.

Types of mobility aids include:

- Canes
- Crutches
- Lifts
- Power scooters
- Orthotic devices
- Standers
- Walkers
- Walking sticks
- Wheelchairs

References

1. Kristin Proctor (2021). Cerebral Palsy. https://www.cerebralpalsyguide.com/cerebral-palsy/
2. M. Wade Shrader, MD and Margaret Salzbrenner, APRN (September 2018). Cerebral Palsy. https://kidshealth.org/en/parents/cerebral-palsy.html
3. Gina Jansheski, (June 11, 2020). Cerebral Palsy. https://www.cerebralpalsyguidance.com/cerebral-palsy/
4. https://www.healthline.com/health/cerebral-palsy
5. Renee A. Alli (May 31, 2021). What Is Cerebral Palsy? What Causes It? https://www.webmd.com/children/guide/understanding-cerebral-palsy-basic-information
6. https://www.cdc.gov/ncbddd/cp/facts.html
7. https://www.mayoclinic.org/diseases-conditions/cerebral-palsy/diagnosis-treatment/drc-20354005

About the Presenter

- Dr.Suresh Kumar Murugesan is a passionate Professor, researcher and Positive Mental Health Practitioner from Madurai, Tamil Nadu, India
- At present he is heading the PG Department of Psychology, The American College, Madurai
- He is very keen in research studies and open to learn.
- His ultimate aim is to make impression in the field of Knowledge
- His area of specializations are Psychomentry, Psychotherapy, Positive Psychology, Education Psychology, Cognitive Psychology, Cyber Psychology etc
- He has published 30 journal articles, 50 Conference and seminar proceedings
- Organised more than 500 webinars and acted as a resource person for 175 + webinar session
- Received 4 Awards and delivered 25+ Radio Talks
- Qualified UGC NET in Psychology and Education, Central Teacher Eligibility Test
- Published three books

RED POND