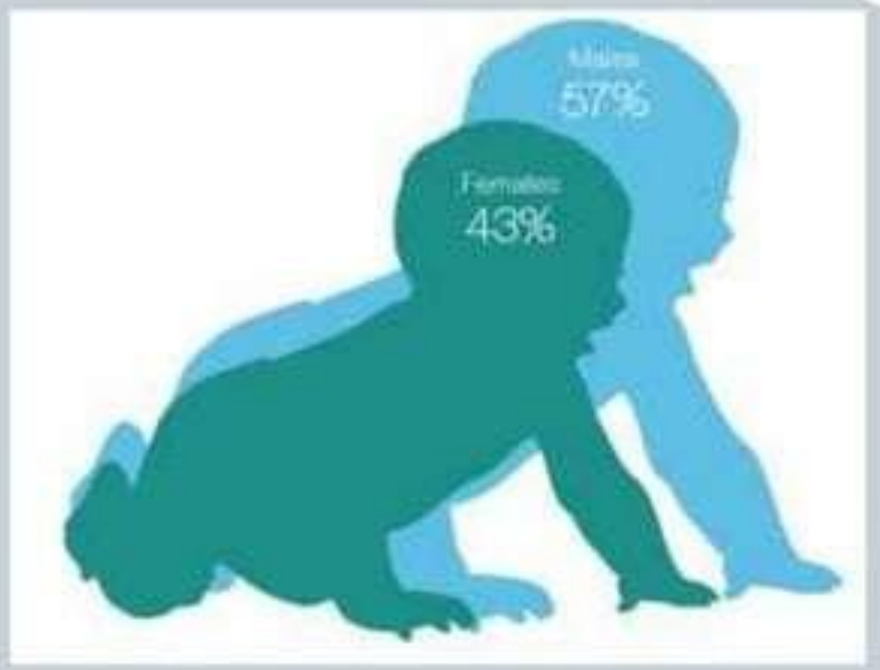
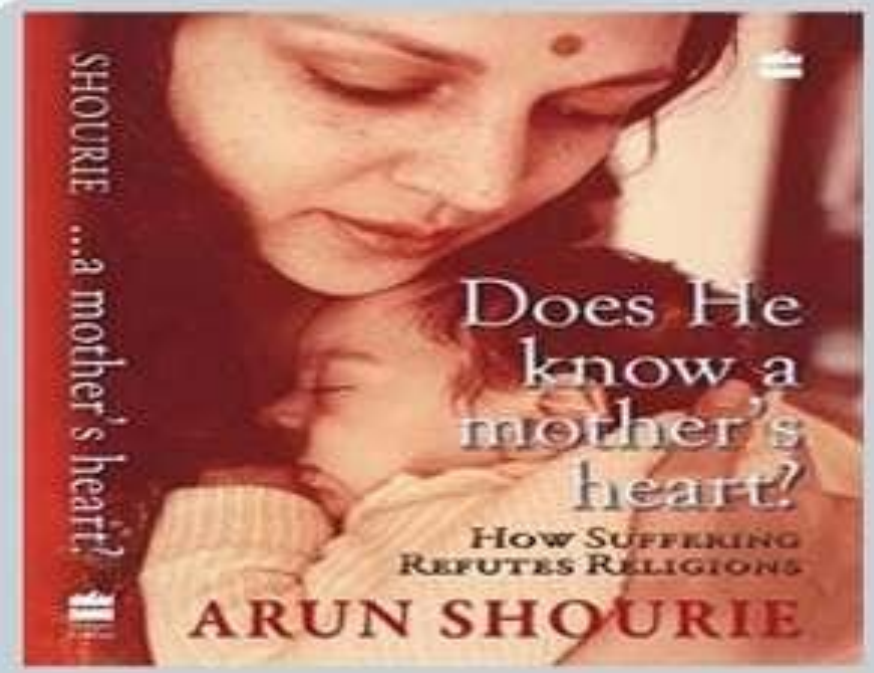
CEREBRAL PALSY





KS Charishma

History


Figure 66 William John Little (1810–1894)

In 1860s, known as

"**Cerebral Paralysis**" or

"**Little's Disease**"

After an English surgeon wrote the 1st medical descriptions

Cerebral palsy

Definition

- Cerebral Palsy (CP) is a group of permanent disorder of the development of movement and posture, causing activity limitation.

(Hockenberry & wilson)

- Cerebral palsy (CP) is a motor disorder, the condition involves disturbances of sensation, perception, communication, cognition and behavior, secondary musculoskeletal problems and epilepsy.

(Hockenberry & wilson)

- CP is term used for a group of non progressive disorder of movement and posture caused by abnormal development of damage to motor control centers of the brain.

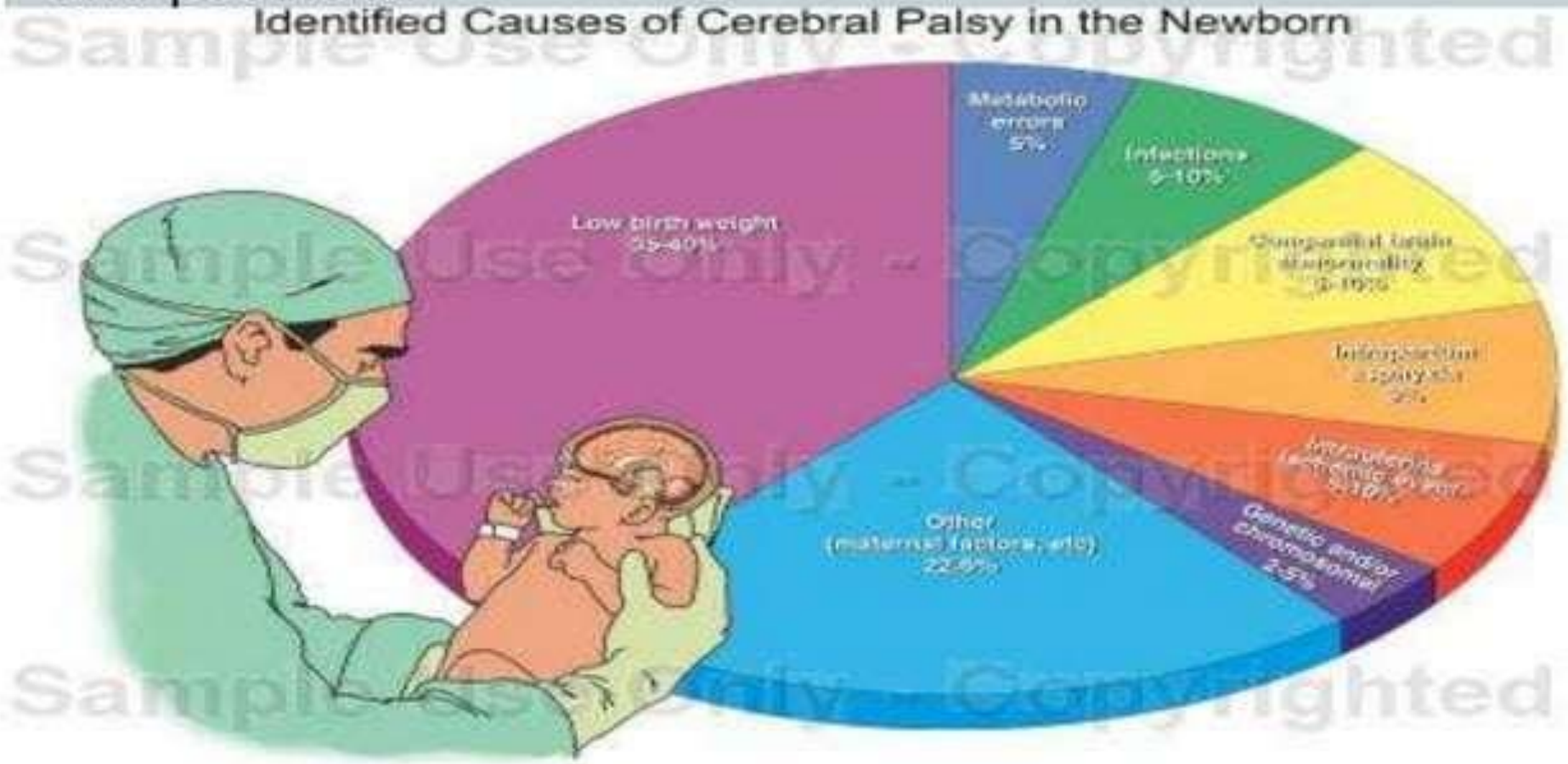
(medical dictionary.com)

- CP is a disorder of the movement, muscle tone,/ posture that is caused by an insult to the immature, developing brain, most often before birth.

(mayoclinic.com)

Etiology

Causes of cerebral palsy involve of prenatal, perinatal and postnatal



Broadly...

What causes Cerebral Palsy?

Before Birth

- Congenital abnormalities in brain development
- Infection in the mother during pregnancy

During Birth

- Brain injury due to oxygen deficiency during difficult labour
- Brain haemorrhage in premature babies

After Birth

- Infection of the brain, such as encephalitis and meningitis
- Head trauma causing concussion or brain haemorrhage

Unknown Factors

- Research indicates that cerebral palsy affects approximately two per 1 000 children

(Source: Caring for Children with Cerebral Palsy: A Team Approach)

Prenatal

Maternal

- Diabetes/hyperthyroidism
- Exposure to radiation/toxins
- Malnutrition
- Cognitive impairment/seizures
- Infections
- Incompetent cervix
- Bleeding
- Polyhydramnios
- Genetic abnormalities
- Previous child with development disabilities
- Previous premature birth
- Medication use (e.g, thyroid, estrogen, progesterone)
- Severe proteinuria

Gestational

- Chromosomes abnormalities
- Genetic syndrome
- Teratogen
- Rh incompatibility infections
- Congenital malformations
- Fetal development abnormalities
- Problems in placenta functioning
- Inflammatory response

Labour and delivery

- Premature delivery
- Prolonged rupture of membranes
- Fetal heart rate depression
- Abnormal presentation
- Long labour
- Preeclampsia
- Asphyxia

Perinatal

- Prematurity and associated problems
- Sepsis and/ or central nervous system infections
- Seizure
- Intraventricular hemorrrhage
- Periventicular hemorrhage
- Meconium aspiration
- Number of days on mechanical ventilation
- Persistent pulmonary hypertension
- Intrauterine growth restriction
- Low birth weight

Postnatal/Childhood

- Brain injury
- Meningitis or encephalitis
- Toxins
- Traumatic brain injury
- Infections
- Stroke

Common Medical Errors That Cause Cerebral Palsy

Wrongly administered drugs

Unnoticed Changes in Foetal Statistics

Failure to carry out appropriate tests

Non-action when foetus is distressed

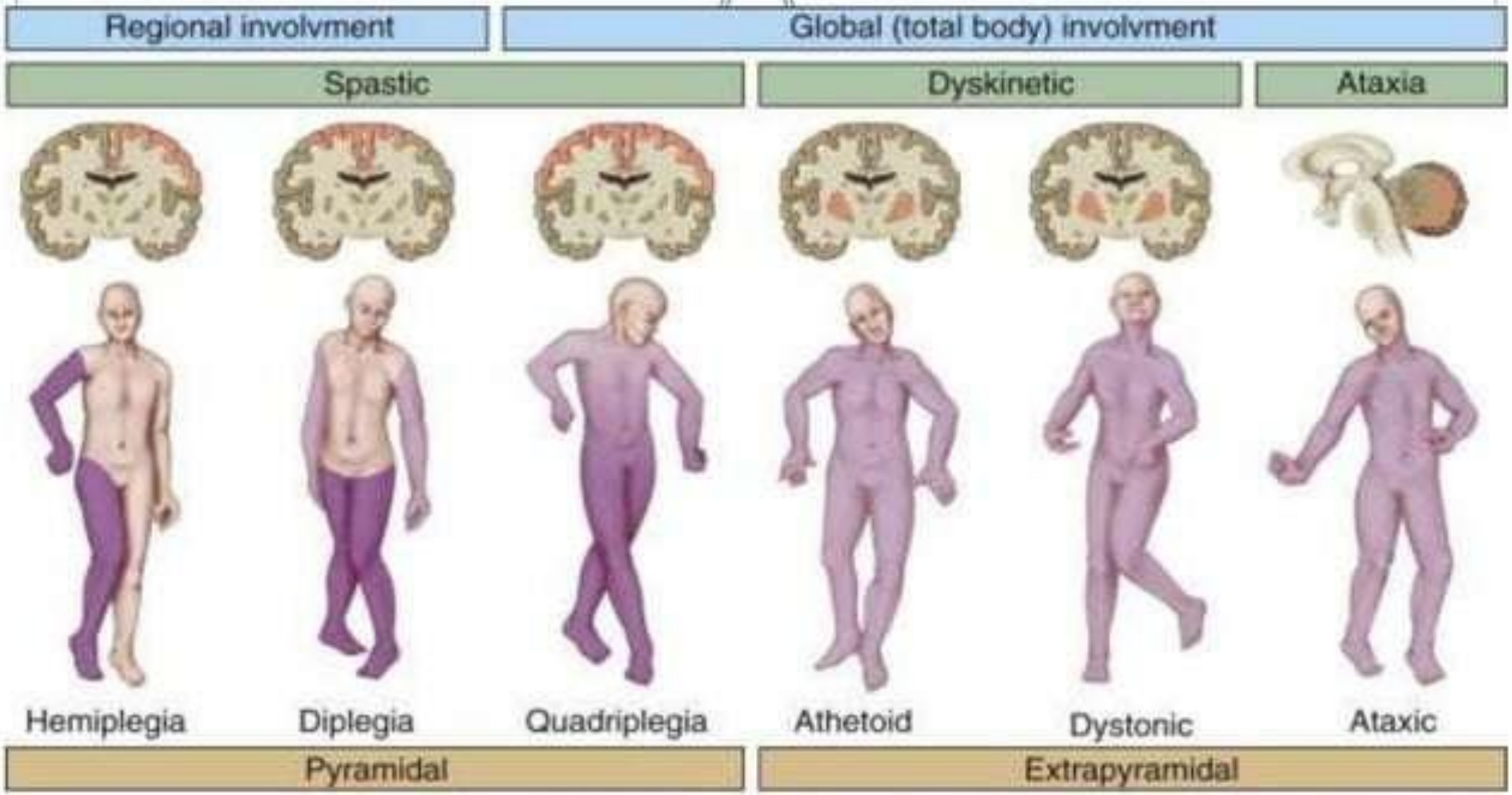
Starvation of oxygen

Protective Factors

Obstetric care:

Magnesium Sulphate
Antibiotics
Corticosteroids

Type of cerebral palsy

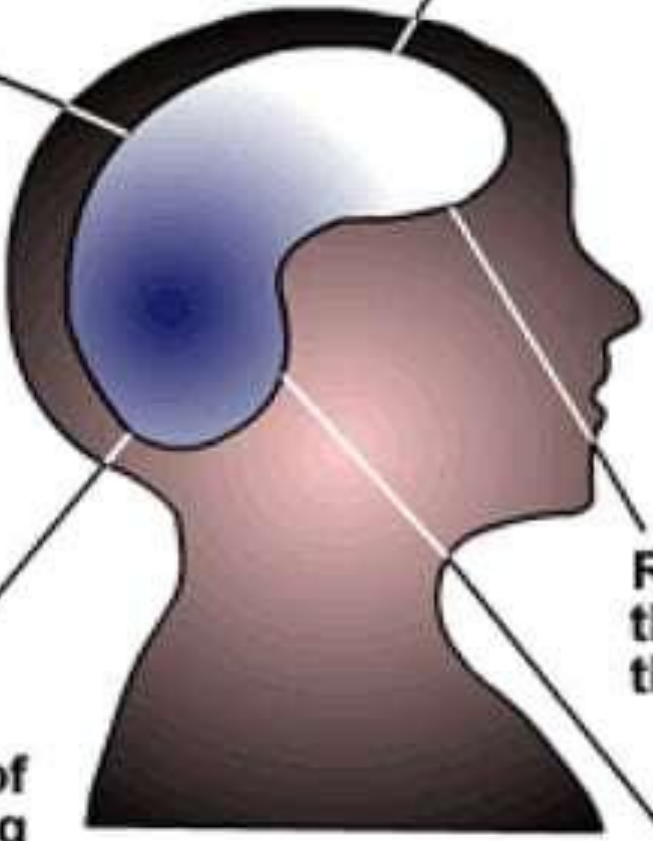


TYPES OF CEREBRAL PALSY AND AREAS OF BRAIN DAMAGE INVOLVED

TYPES OF CEREBRAL PALSY

SPASTIC- tense, contracted muscles (most common type of CP).

ATHETOID- constant, uncontrolled motion of limbs, head, and eyes.



RIGIDITY- tight muscles that resist effort to make them move.

ATAXIC- poor sense of balance, often causing falls and stumbles

TREMOR- uncontrollable shaking, interfering with coordination.

Type of cerebral palsy

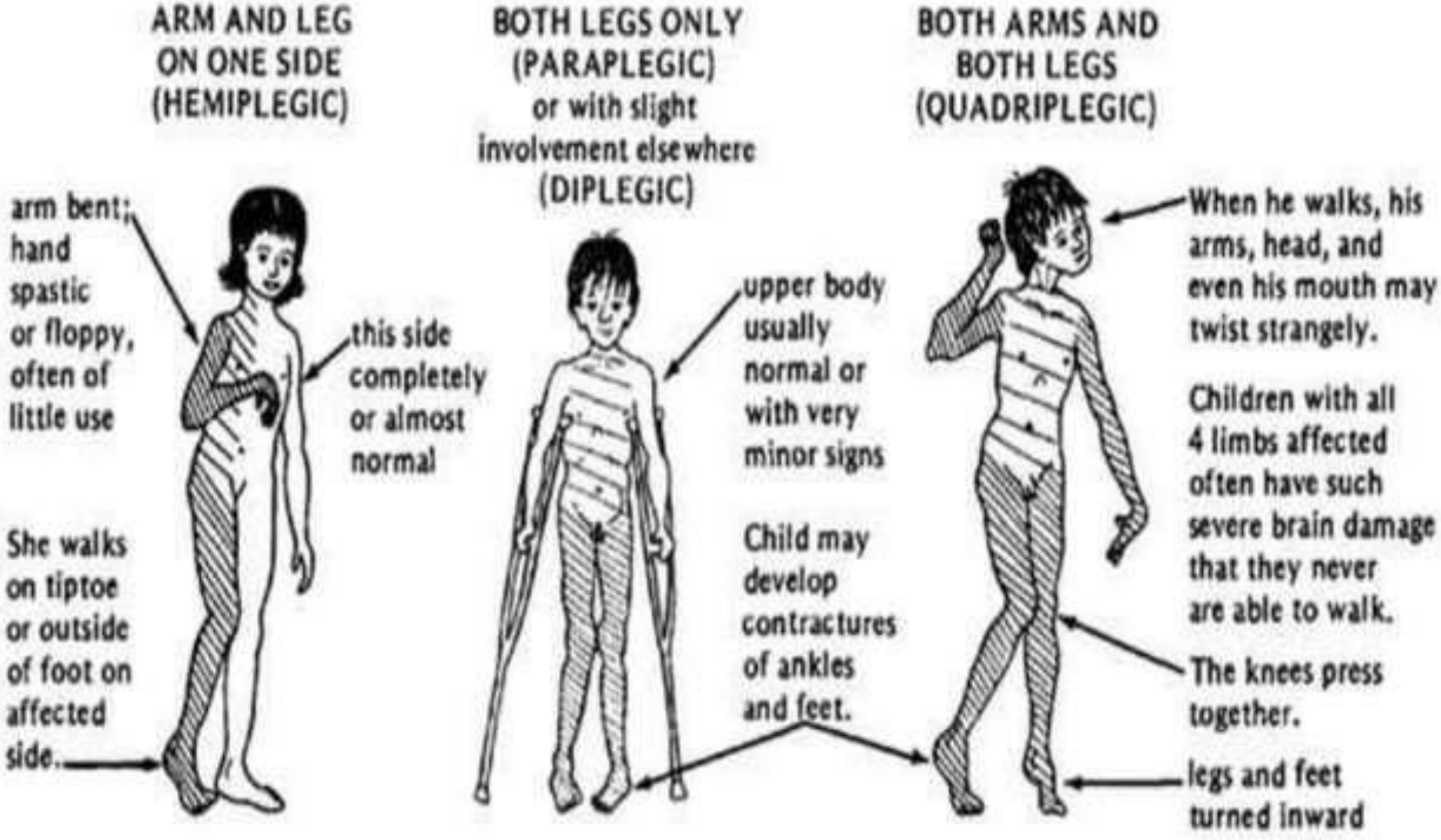
1) **Spastic (Pyramidal)**

characterized by persistent primitive reflexes, positive babinski reflex, ankle clonus, exaggerated stretch reflex, eventual development of contractures.

Type of spastic cerebral palsy:

- Hemiplegia: motor dysfunction on one side of the body, upper extremity more affected than lower.
- Diplegia: all extremities affected, but lower extremities more effected than upper.
- Tetraplegia (quadriplegia): all four extremities involved.
- Triplegia: involving three extremities.
- Monoplegia: involving only one extremities..
- Paraplegia: pure cerebral paraplegia of lower extremities.

Spastic


ARM AND LEG ON ONE SIDE (HEMIPLEGIC)
arm bent; hand spastic or floppy, often of little use
this side completely or almost normal
She walks on tiptoe or outside of foot on affected side.
BOTH LEGS ONLY (PARAPLEGIC) or with slight involvement elsewhere (DIPLEGIC)
upper body usually normal or with very minor signs
Child may develop contractures of ankles and feet.
BOTH ARMS AND BOTH LEGS (QUADRIPLEGIC)
When he walks, his arms, head, and even his mouth may twist strangely.
Children with all 4 limbs affected often have such severe brain damage that they never are able to walk.
The knees press together.
legs and feet turned inward

2] Dyskinetic (Nonspecific, extrapyramidal)

- Athetoid: chorea (involuntary, irregular, jerking movements), characterized by slow, wormlike, writhing movements that usually involve the extremities, trunk, neck, facial muscle and tongue
- Dystonic: slow, twisting movements of the trunk or extremities, abnormal posture
- Involvement of the pharyngeal and oral muscle causing drooling and dysarthria (imperfect speech articulation)

Dyskinetic

This child has severe athetosis.

3] **Ataxic (Nonspastic, extrapyramidal)**

- Wide-based gait
- Rapid, repetitive movement performed poorly
- Disintegration of movements of the upper extremities when the child reaches for objects

Ataxia

To keep her balance the child with ataxia walks bent forward with feet wide apart. She takes irregular steps, like a sailor on a rough sea or someone who is drunk.

Clinical Manifestation

1. **Physical signs**
   - poor head control after 3 months of age
   - stiff or rigid arms or legs
   - pushing away or arching back
   - floppy or limp body posture
   - cannot sit up without support by 8 months
   - uses only one side of the body, or only the arms to crawl
   - clenched hands after 3 months
   - leg scissoring
   - seizures
   - sensory impairment (hearing, vision)
   - after 6 months of age, persistent tongue thrusting

Early Signs

Infancy (0-3 Months)

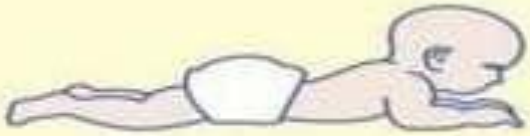
- Stiff or floppy posture

- Excessive lethargy or irritability/ High pitched cry

- Poor head control

- Weak suck/ tongue thrust/ tonic bite/ feeding difficulties

Normal motor development



- pushes up on arms
- holds head up

- sits with support
- holds head up
- rounded back

- sits without support
- arms free to reach and grasp

- pulls to stand

- independent standing or walking

Median age	Limit age
1½ months	3
3 months	6
6 months	9
9 months	13
12 months	18

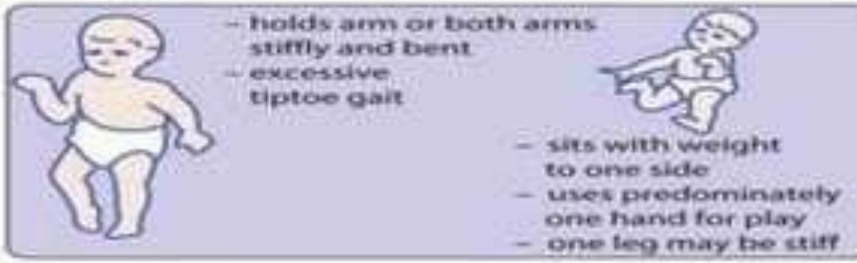
Abnormal motor development

- unable to lift head or push up on arms
- stiff extended legs
- pushing back with head
- constantly fisted hand and stiff leg on one side
- difficulty moving out of this position

- unable to lift head
- floppy trunk
- stiff arms, extended legs
- arms flexed and held back
- stiff, crossed legs

- rounded back
- poor use of arms for play
- stiff legs, pointed toes
- poor head control
- difficulty getting arms forward
- arches back – stiff legs
- poor ability to lift head and back
- will not take weight on legs

- not interested in weight bearing
- difficulty in pulling to stand
- stiff legs, pointed toes
- cannot crawl on hands and knees
- may use only one side of body to move



- holds arm or both arms stiffly and bent
- excessive tiptoe gait
- sits with weight to one side
- uses predominately one hand for play
- one leg may be stiff

2. **Behavioral signs**
   - Extreme irritability or crying
   - Feeding difficulties
   - Little interest surrounding
   - Excessive slepping

Cerebral Palsy

Historic clues

1. *Toe walking*
2. *Strong development of Lt. or Rt. Handedness before 1 yr. age*
3. *Obligatory fisting or cortical thumb posture before 3 mo. age*

The legs stiffen and the feet go into a rigid tiptoe position.

This child is *not* almost ready to walk.

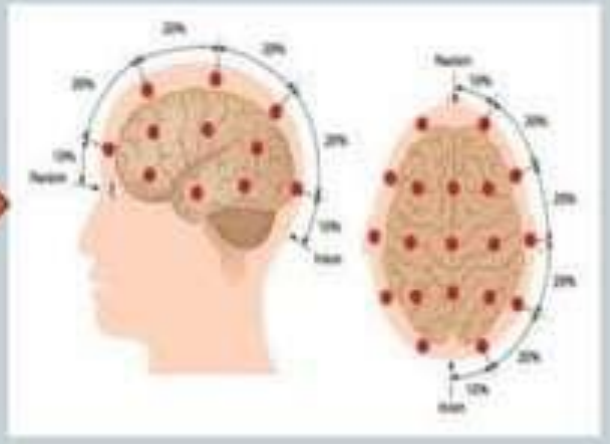
The cortical thumb posture of a child who has cerebral palsy.

Diagnostic test

- Physical examination.
- History taking.
- Neurologic assessment .
- Magnetic resonance imaging (MRI) which uses radio and magnetic waves to study the brain in more detail.
- Ultrasound: uses sound waves to detect certain type of structural and anatomic abnormalities.
- Computerised tomography (CT) scan, uses a series of X-rays that are then assembled by a computer to create a detailed 3-D model of your child's brain.

- Electroencephalogram (EEG), where small electrodes are placed on the scalp to monitor brain activity.
- Electromyogram (EMG) and nerve conduction studies (NCS) to testing the electrical activity of muscles and to measures the conducting function of nerves.
- Laboratory studies, to detect any blood clotting and screen for genetic or metabolic problems.
- Additional tests: Vision impairment, Hearing impairment, Speech delays or impairments, Intellectual disabilities, Other developmental delays, Movement disorders

Electroencephalogram



Treatment

Medical

Therapy can help a person with cerebral palsy to enhance functional abilities and therapy is chiefly symptomatic and preventive.

The broad aims of therapy are :

- To establish locomotion, communication and self help.
- To gain optimum appearance and integration of motor functions.
- To correct associated defects as early and effectively .
- To provide educational opportunities adapted to the individual child's needs and capabilities
- To promote socialization experiences with other affected unaffected children

The therapy treatment include:

1. **Physical therapy**

   physical therapy is directed toward good skeletal alignment for child with spasticity, training, face involuntary motion and gait training. Physical therapy can help the child's strength, flexibility, balance, motor development and mobility.

   physical therapy uses orthotic devices, such as braces, casting and splints to support and improved walking.

2. **Occupational therapy.**

Using alternative strategies and adaptive equipment, occupational therapists work to promote the child's independent participation in daily activities and routines in the home, the school and the community.

Adaptive equipment may include walkers, quadrupedal canes, seating systems or electric wheelchairs.

3. **Speech and language therapy**

   Speech-language pathologists can help improve the child's ability to speak clearly or to communicate using sign language.

4. **Recreation therapy**

   This therapy can help improve your child's motor skills, speech and emotional well-being.

Pharmacological

The goal of drug therapy is to reduce the effects of cerebral palsy and prevent complications:

- Analgesic drug, to reduce intense pain or muscle spasm.
- Botulinum toxin type A, used to reduce spasticity in targeted muscle of the upper and lower extremities.
- Inhaled nitrous / oral midazolam used for sedation duringbotulinum toxin A injection.
- Dantrolene sodium, baclofen, and diazepam to improving muscle coordination and to muscle relaxation.
- Anticonvulsants drug, to relieve or stop seizures

Surgical

Surgery used to correct problems with bones and joints, by lengthening any muscles and tendons that are too short and causing problems.

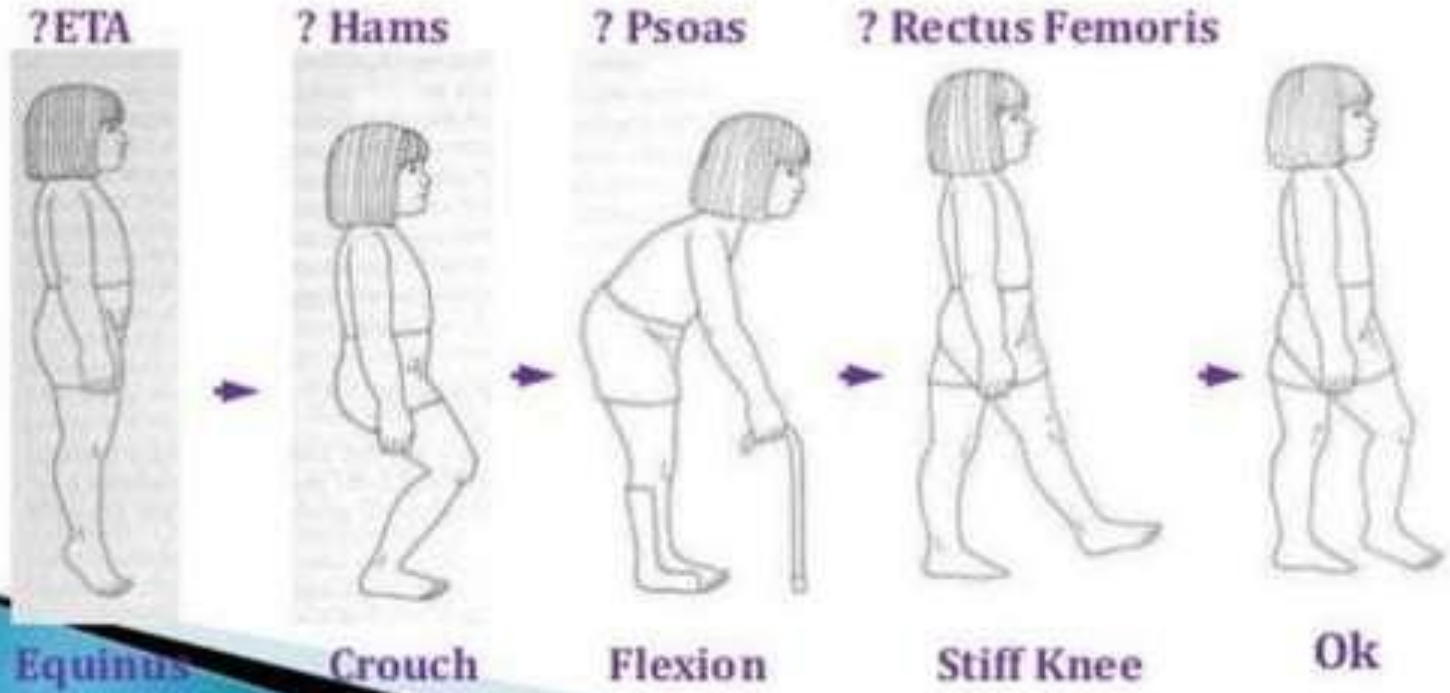
1. **Orthopedic surgery**

   Orthopedic surgery may be required to correct contracture or spastic deformities, to provide stability for an uncontrolled joint, to address bone malalignment, and to provide balanced muscle power.

   Example for orthopedic surgery: tendon transfer, muscle lengthening, and spinal deformities.

Timing For Orthopaedic Surgery

Surgery should not be unduly staged one by one
(with each birthday)



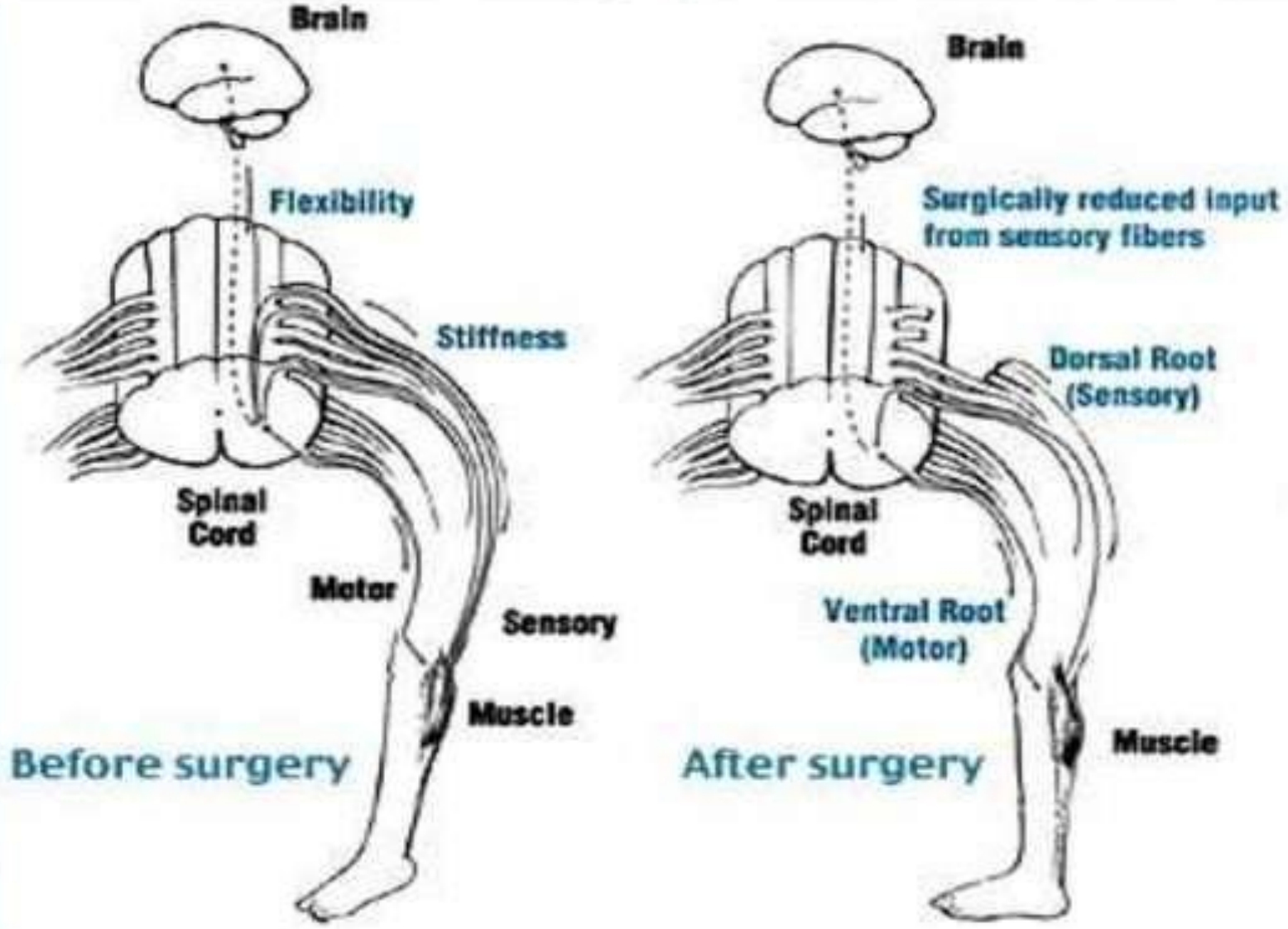
2. Selective dorsal rhizotomy (SDR)

Selective dorsal rhizotomy (SDR) is a surgical procedure that can help children with particularly severe muscle stiffness in their legs to improve their walking. The operation involves cutting some of the nerves in the lower spinal column, which can help relieve leg stiffness.

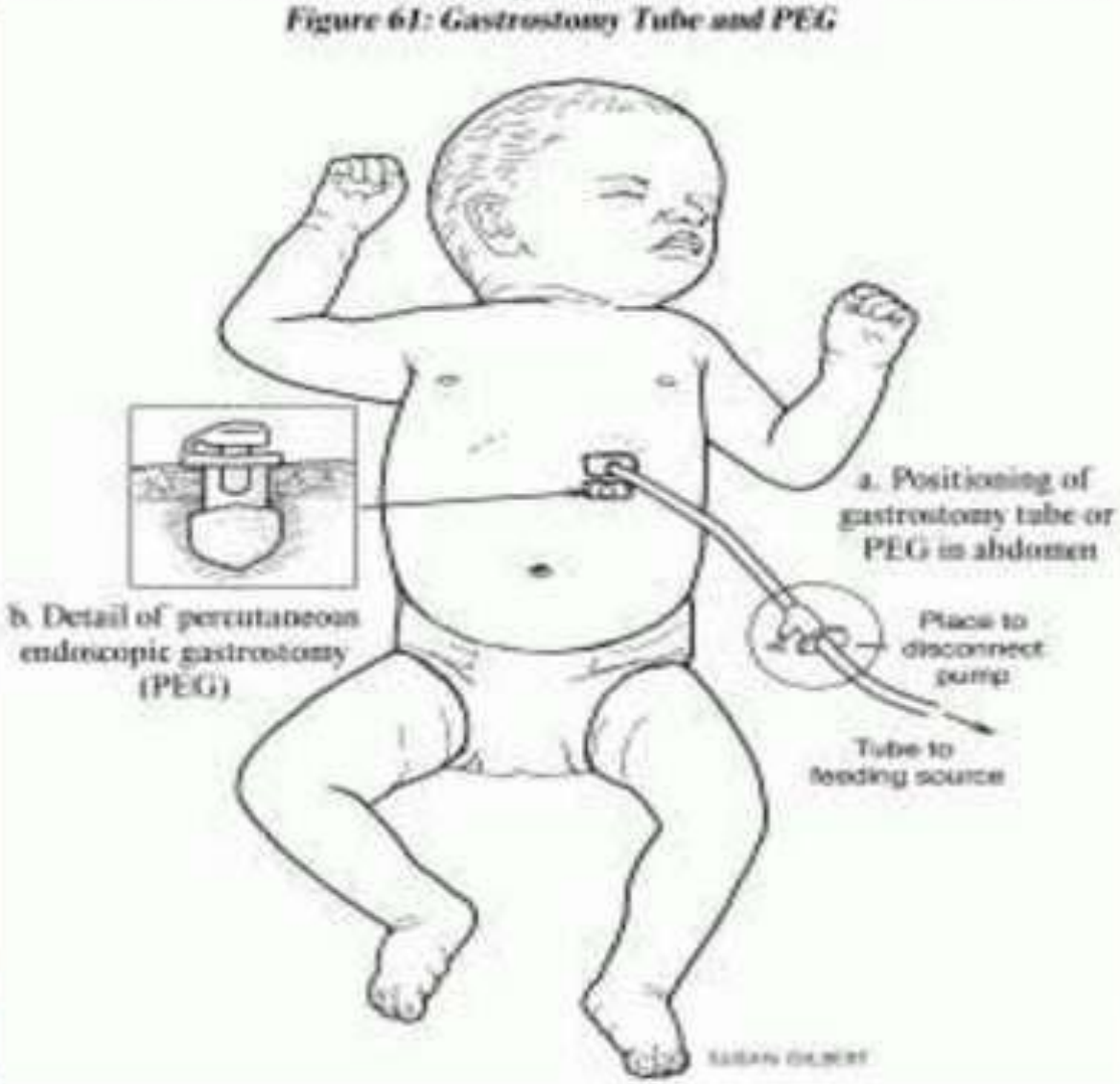
3. Gastrostomy

Surgery may performed to improve feedings, correct gastroesophageal reflux disease and correct associated dental problems.

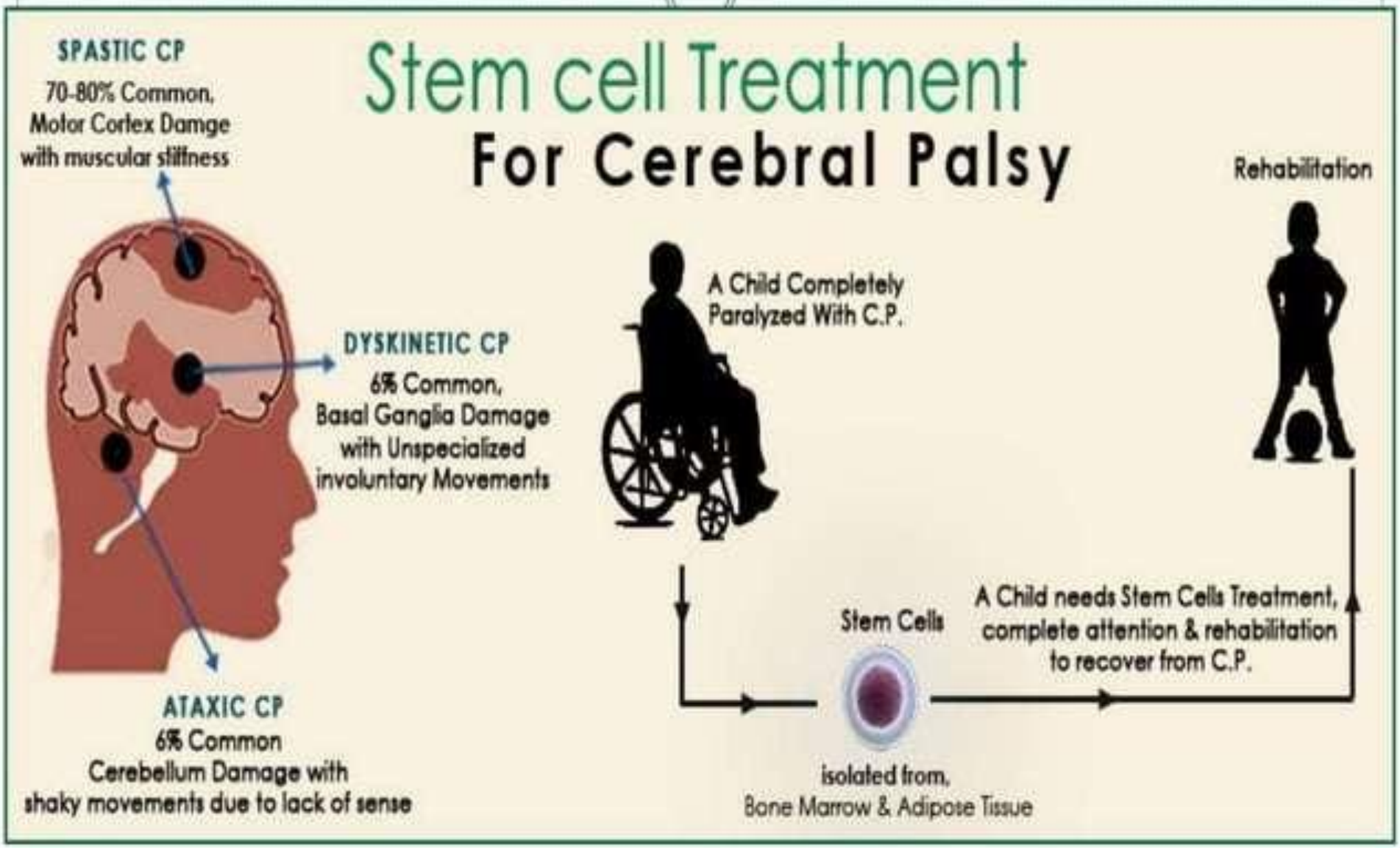
Selective Posterior Rhizotomy



Gastrostomy



Recent Advance...



Nursing responsibility

- Assessment of infants for abnormal muscle tones, inability to achieve milestones, and persistence of neonatal reflexes .
- Reinforce the therapeutic plan and assist the family devising and modifying equipment and activities to continue the therapy program the home.
- Encourage parents to define their concerns, acknowledge the concerns as genuine, and ask the parents what approach.
- Ensure as adequate nutritional and caloric intake.
- Monitor the body weight.
- Assistance and advice parents to administration medication through gastrostomy tube to prevent clotting.

- Flush the feeding tube with more water after administration medication.
- Immunization should be administered to prevent childhood illness and protect against respiratory tract infections such as influenza.
- Educate families in the principle of family centered care and parents professional collaboration.

In Summary...

10 THINGS I DIDN'T KNOW ABOUT CEREBRAL PALSY

(UNTIL I HAD A KID WITH CEREBRAL PALSY)

1. Cerebral palsy isn't so rare.
2. It's caused by brain damage.
3. There are different kinds.
4. There are varying degrees.
5. It messes with muscles big & small.
6. It can make you tight or loose.
7. It can be different every day.
8. There is no cure.
9. It doesn't disable your personality.
10. You shouldn't feel bad for people with cerebral palsy.

In Popular Culture...

Spandan is a critically aclaimed social family drama directed by two IITians which revolves around a daughter with Cerebral Palsy.

Arun Shourie with his son Aditya, on whom he has written a book - Does He know a mother's heart?

Thank You & Wear Green!

First Wednesday of October, every year!