

COMMON PEDIATRIC CONDITIONS

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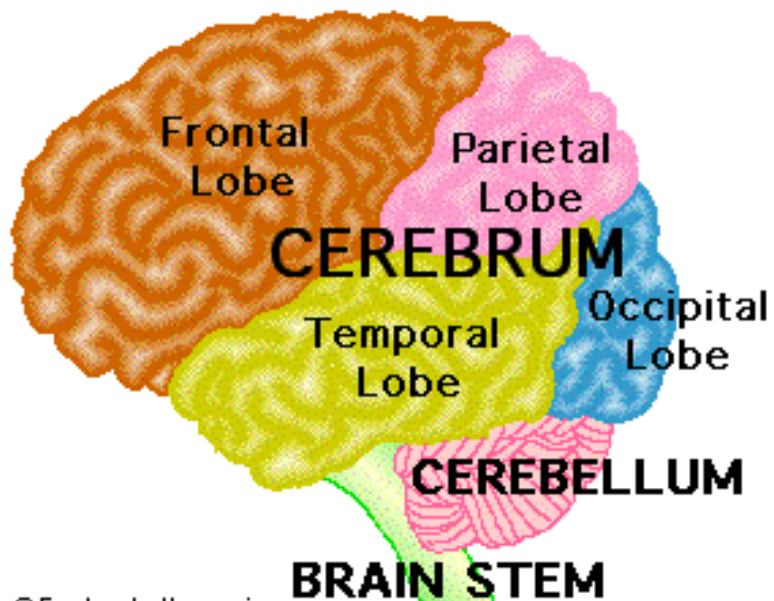
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Cerebral palsy

Cerebral palsy means 'brain *paralysis*'. It is *adisability* that affects movement and body position. Cerebral palsy (CP) is an umbrella term denoting a group of non-progressive, non-contagious motor conditions that cause physical disability in human development, chiefly in the various areas of body movement. It comes from brain damage that happened before the baby was born, at birth, or as a baby. The whole brain is not damaged, only parts of it, mainly parts that control movements. Once damaged, the parts of the brain do not recover, nor do they get worse. However, the movements, body positions, and related problems can be improved or made worse depending on how we treat the child and how damaged his or her brain happens to be. **The earlier we start, the more improvement can be made.**

Scientific consensus still holds that CP is neither genetic nor a disease, and it is also understood that the vast majority of cases are congenital, coming at or about the time of birth, and/or are diagnosed at a very young age rather than during adolescence or adulthood. It can be defined as a central motor dysfunction affecting muscle tone, posture and movement resulting from a permanent, non-progressive defect or lesion of the immature brain.

Cerebral refers to the cerebrum, which is the affected area of the brain. The disorder may often involve connections between the cortex and other parts of the brain such as the cerebellum. The term *palsy* in modern language refers to disorder of movement, but the word root "palsy" technically mean "paralysis", even though it is not used as such within the meaning of cerebral palsy



In many countries cerebral palsy is the most frequent cause of physical disability. In other countries it is second only to polio. About 1 of every 300 babies is born with or develops cerebral palsy.

How to recognize cerebral palsy

EARLY SIGNS:

- **At birth** a baby with cerebral palsy is often limp and **floppy**, or may even seem normal.

NORMAL



FLOPPY



Child hangs in upside down 'U' with little or no movement.

- Baby may or may not breathe right away at birth, and may turn blue and floppy. Delayed breathing is a common cause of brain damage.
- **Slow development** Compared to other children in the village, the child is slow to hold up his head, to sit, or to move around.



- He may not use his hands. Or he only uses one hand and does not begin to use both.



- **Feeding problems** The baby may have difficulties with sucking, swallowing and chewing. She may choke or gag often. Even as the child gets bigger, these and other feeding problems may continue.



- **Difficulties in taking care of the baby or young child.** Her body may stiffen when she is carried, dressed, or washed, or during play. Later she may not learn to feed or dress herself, to wash, use the toilet, or to play with others. This may be due to sudden stiffening of the body, or to being so floppy she 'falls all over the place'.

The baby may be so limp that her head seems as if it will fall off. Or she may suddenly stiffen like a board, so that no one feels able to carry or hug her.



Body stiffens like a board.

- The baby may cry a lot and seem very fussy or 'irritable'. Or she may be very quiet (passive) and almost never cry or smile.
- **Communication difficulties** The baby may not respond or react as other babies do. This may partly be due to floppiness, stiffness, or lack of arm gestures, or control of face *muscles*. Also, the child may be slow in beginning to speak. Later some children develop unclear speech or other speaking difficulties.



Although parents find it hard to know exactly what the child wants, they gradually find ways of understanding many of his needs. At first the child cries a lot to show what he wants. Later he may point with his arm, foot or eyes.

- **Intelligence** Some children may seem dull because they are so limp and slow moving. Others move so much and awkwardly they may appear stupid. Their faces twist, or they may drool because of weak face muscles or difficulty swallowing. This can make an intelligent child appear mentally slow.

About half of the children with cerebral palsy are mentally retarded, but this should not be decided too soon. The child needs to be given help and training to show what she is really like. Parents can often tell that she understands more than she can show.



With help and training, some children who have been considered retarded prove to be quite intelligent.



Even if a child can hear loud banging, he may not hear well enough to understand words.

Hearing and sight are sometimes affected. If this problem is not recognized, the family may think that the child lacks intelligence. Observe the child carefully and test him to find out how well he can hear and see.

- **Fits** (epilepsy, seizures, convulsions) occur in some children with cerebral palsy.
- **Restless behavior** Sudden changes of mood from laughing to crying, fears, fits of anger, and other difficult behavior may be present. This may partly be due to the child's frustration of not being able to do what he wants with his body. If there is too much noise and activity the child can become frightened or upset. The brain damage may also affect behavior. These children need a lot of help and patience to overcome their fears and other unusual behaviour.
- **Sense of touch, pain, heat, cold, and body position** are not lost. However, the children may have trouble controlling movements of their bodies and trouble with **balance**. Because of their damaged brains they may have difficulty learning these things. Patient teaching with lots of repetition can help.
- **Abnormal reflexes** Babies have certain 'early reflexes' or automatic body movements that normally go away in the first weeks or months of life. In children with brain damage, they may last much longer. However, these are only important if they affect how the child moves. **'Knee jerk' and other tendon-jump reflexes are usually over-active** (jump higher than normal). If you are not sure, testing for abnormal reflexes may help you tell cerebral palsy from polio.

Time frame of brain injury-

We only talk about cerebral palsy if the brain damage arises during one of the following periods:

Prenatal period: Conception to the onset of labor

Perinatal period: 28 weeks intrauterine to 7 days
postnatal

Postnatal period : First two (and some say five) years of life

After the age of 5 we speak of stroke or traumatic brain injury.

Etiology-

Prenatal

Prematurity (gestational age less than 36 weeks)

Low birth weight (less than 2500 g), which could be due to poor nutritional status of the mother



Maternal epilepsy

Hyperthyroidism.

Herpes simplex virus



Infections (TORCH =toxoplasmosis, rubella, cytomegalovirus, Severe toxaemia



- Drug abuse

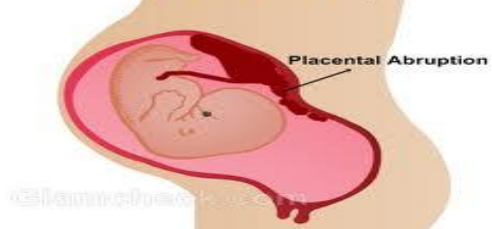


Trauma

Multiple pregnancies

Placental insufficiency

Placental Abruption



Perinatal

Prolonged and difficult labor

Vaginal bleeding at the time of admission for labor

Bradycardia

Hypoxia

Postnatal (0-2 years)

Central Nervous System infection (encephalitis, meningitis)

Hypoxia

Seizures

Neonatal hyperbilirubinemia

Head trauma

There is no way to predict which children's brain will be damaged by one of these factors, or to what the extent of the damage will be. None of these factors always results in brain damage; and even when brain damage occurs, the damage does not always result in CP.

E.g.: Some children may have an isolated hearing loss from their meningitis, others will have severe intellectual disability, and some will have CP (either alone, or with these other problems, too).

Types of CP-

Cerebral palsy has three main groups:

Spastic

Ataxic

Dyskinesic

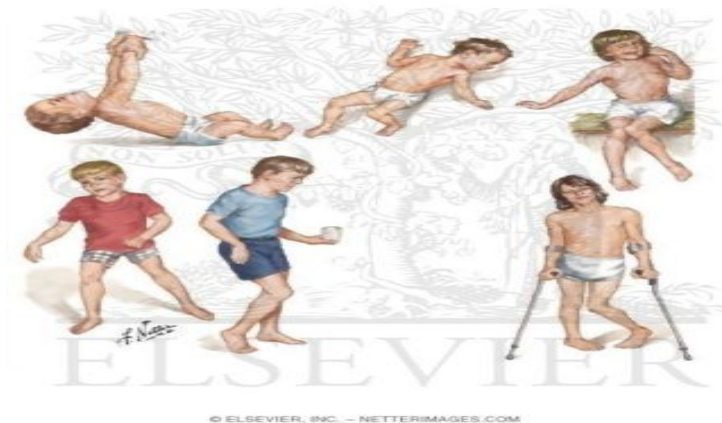
Even though they are clinically imprecise and may lack reliability among observers, these terms are conceptually useful.

- Spastic Cerebral Palsy is

characterised by at least two of:

1. Abnormal pattern of posture and/or movement
2. Increased tone (not necessarily constantly)
3. Pyramidal signs

(e.g. Babinski response)



Dyskinesic Cerebral Palsy is characterised by

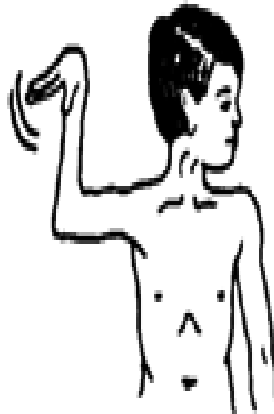
1. Abnormal pattern of posture and/or movement

2. Involuntary, uncontrolled, recurring, occasionally stereotyped movements of affected body parts

Dyskinetic Cerebral Palsy may be either

- *Athetotic* Cerebral Palsy, dominated by both hyperkinesia and hypotonia

Typical athetoid arm and hand movements may be as a regular shake or as sudden 'spasms'. Uncontrolled movements are often worse when the child is excited or tries to do something.



- *Dystonic* Cerebral Palsy, dominated by both hypokinesia and hypertonia. characterised by the twisting of the limbs, specifically the foot/leg or hand/arm.

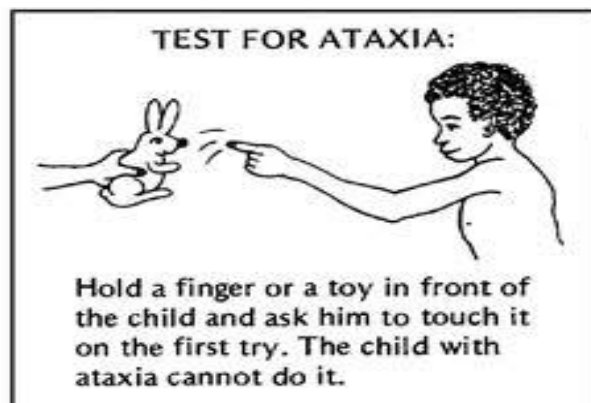


Ataxic Cerebral Palsy is characterised by

1. Abnormal pattern of posture and/or movement
2. Lost of orderly muscular co-ordination, so that movements are performed with abnormal force, rhythm and accuracy



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.



Cerebral palsy (CP)



Neurology Chapter of IAP

Strategies for Prevention of Preterm Births

Preterm Birth remains a tremendous challenge as Preterm infants take up a significant amount of health care resources and have increased mortality / morbidity. There has been a steady rise in preterm births since 1990 which has alarmed health care professionals despite efforts to prevent preterm births. This has contributed to the current concept of preterm birth as a syndrome in which multiple factors interact to promote premature parturition.

Preventive strategies :

Primary Strategies: Target women who will enter their reproductive years.

Secondary Strategies: Target women who have increased risk of Preterm birth.

Tertiary Strategies: Target women in whom preterm parturition has begun.

Efforts to prevent Prematurity

Category of Prevention Intervention

I) Primary

a) Before conception - Public Health policies

- Nutritional Supplements

- Cessation of smoking

b) After conception -

Nutritional Supplements

- Cessation of smoking

- Antenatal Care & Oral Hygiene

II) Secondary

a) Before conception - Repair of
defects in Uterus

- Home visits

- Antibiotics if needed to Rx infections

b) After conception - Reduction of Blood Pressure

- Reducing activity / Intensive Prenatal care

- Nutritional supplementation

- Antibiotics to treat urinary infections

- Hormonal Rx

- Stitch placement to close mouth of Uterus

III) Tertiary

- Early Diagnosis
- Cessation of labour pain
- Corticosteroids to help baby mature
- Prevention of streptococcal infection
- Treatment of early rupture of membranes
- Drugs to prevent onset of labour pains
- Routine Caesarean delivery

Reference:

CT.Lang & Jay d Lambs- Goals & strategies for prevention of preterm births-An obstetric perspective- Pediatric Clinics of North America-Vol56-no 3-june 2009.

Recommendations for Prevention of Cerebral Palsy As per- **International Classification Of Functioning, Disability & Health Frame Work, WHO 2002** "Money spent on prevention is money saved for cumulative benefit of society"

1] Primary Prevention –

This is important and most cost effective. Greatest emphasis should be laid on preventing impairment happening in the first instance itself.

Health services -

Immunization

- Nutrition-Iodine & Iron
- Before, during and after birth care and Prevention of Preterm births
- Prevention of stress & infections, Reduction of increased blood pressure & increased glucose in the mother and adequate maternal health care during pregnancy & delivery
- .Improve living conditions and negate poverty effects Public education & positive eugenics

2] Secondary Prevention-

Reduce disability affecting the body structure & function by medical & habilitation strategies of early

diagnosis ,early intervention and life span care. Minimize limitation in activities by personal & contextual factors & choices covering the five F's(Dr.Gorter) Family, Function ,Fitness, Future, Friendship in the context of fun .

3] Tertiary Prevention-

Improve participation in societal roles by enablement (education) & empowerment (earning ability) so as to ensure quality of life (overall assessment of well being in all domains) as per the expectations, values, societal norms & cultural beliefs of persons with disability & their families.

OUTLINE OF TREATMENT APPROACHES

Muscle Education and Braces (W.M. Phelps, 1949,1952):

15 modalities were described and specific combinations were used for the specific type of CP:

1. Massage for hypotonic muscles, but contraindicated in children with spasticity and athetoids.
2. Passive motion through joint range for mobilizing joints and demonstrating to the child the movement required.
3. Active assisted motion.
4. Active motion.
5. Resisted motion followed according to the child's capability.
6. Conditioned motion is recommended for babies, young children and mentally retarded children.
7. Synergistic motion which involves resistance to a muscle group in order to contract an inactive muscle group in the same synergy.
8. Combined motion is training motion of more than one joint.
9. Relaxation techniques used are those of conscious 'letting go' of the body and its parts.
10. Movement from relaxation is conscious control of movements once relaxation has been achieved. Mainly used for children to control involuntary movements.
11. Periods of rest are suggested for athetoids and children with spasticity.

12. Reciprocation is training movement of one leg after the other in a bicycling pattern in lying, crawling, knee walking and stepping.
13. Balance- Training of sitting balance and standing in braces.
14. Reach and grasp and release used for training of hand function.
15. Skills of daily living such as feeding, dressing, washing and toileting.

PROGRESSIVE PATTERN MOVEMENTS

- Temple Fay recommended that the cerebral palsied be taught motion according to its development in evolution. He regarded ontogenetic development as a recapitulation of phylogenetic development.
- He suggested building up motion from reptilian squirming to amphibian creeping through mammalian reciprocal motion 'on all fours' to the primate erect walking.

SYNERGISTIC MOVEMENT PATTERNS

- Signe Brunnstrom produced motion by provoking primitive movement patterns which are observed in foetal life or immediately after pyramidal tract damage.
- Reflex responses are used initially and later voluntary control of these reflex patterns is trained.
- Associated reactions are used as well as hand reactions.

PROPRIOCEPTIVE NEUROMUSCULAR FACILITATIONS

- Kabat (1959), Knott and Voss developed a system of movement facilitation techniques and methods for inhibition of hypertonus.
- Movement patterns based on patterns observed with functional activities are spiral and diagonal with a synergy of muscle groups.
- Sensory stimuli are skillfully applied to facilitate movement.
- Resistance to motion is used to facilitate the action of the muscles which form the components of the movement patterns.

NEUROMOTOR DEVELOPMENT

- Eirene Collins (1947, 1956) stressed neuromotor development as a basis for assessment and treatment.
- The mental capacity of the child would determine the results.

- Early treatment was advocated.
- Strict developmental sequence- the child was not permitted to use motor skills beyond his level of development.

NEURODEVELOPMENTAL TREATMENT WITH REFLEX INHIBITION AND FACILITATION (Bobath, 1965, 1971, 1975, 1980, 1984)

- Bobaths base assessment and treatment on the premise that the fundamental difficulty in cerebral palsy is lack of inhibition of reflex patterns of posture and movement.
- Features of the approach are:
 1. Reflex inhibitory patterns specifically selected to inhibit abnormal tone associated with abnormal movement patterns and abnormal posture.
 2. Sensory motor experience- The 'break down' of these abnormalities gives the child the sensation of more normal tone and movements.
 3. Facilitation techniques for mature postural reflexes.
 4. Keypoints of control are used by therapist to attempt to change the pattern of spasticity so that a child is prepared for movement and more mature postural reactions.
 5. All day management should supplement treatment sessions.

SENSORY STIMULATION FOR ACTIVATION AND INHIBITION (Margaret Rood,1962)

- Based on neurophysiological theories.
- Main features are:
 1. **Afferent stimuli-** Techniques of stimulation such as stroking, brushing, icing, heating, pressure, slow and quick muscle stretch, joint retraction and approximation, muscle contractions are used to activate, facilitate or inhibit motor response.
 2. **Muscles are classified-** 'light work muscle action' or 'heavy work muscle action.'
 3. **Reflexes-** eg, tonic labyrinthine, tonic neck, vestibular are used in therapy.
 4. **Ontogenetic development sequence** is strictly followed.

REFLEX CREEPING AND OTHER REFLEX REACTIONS (Vaclav Vojta, 1984, 1989)

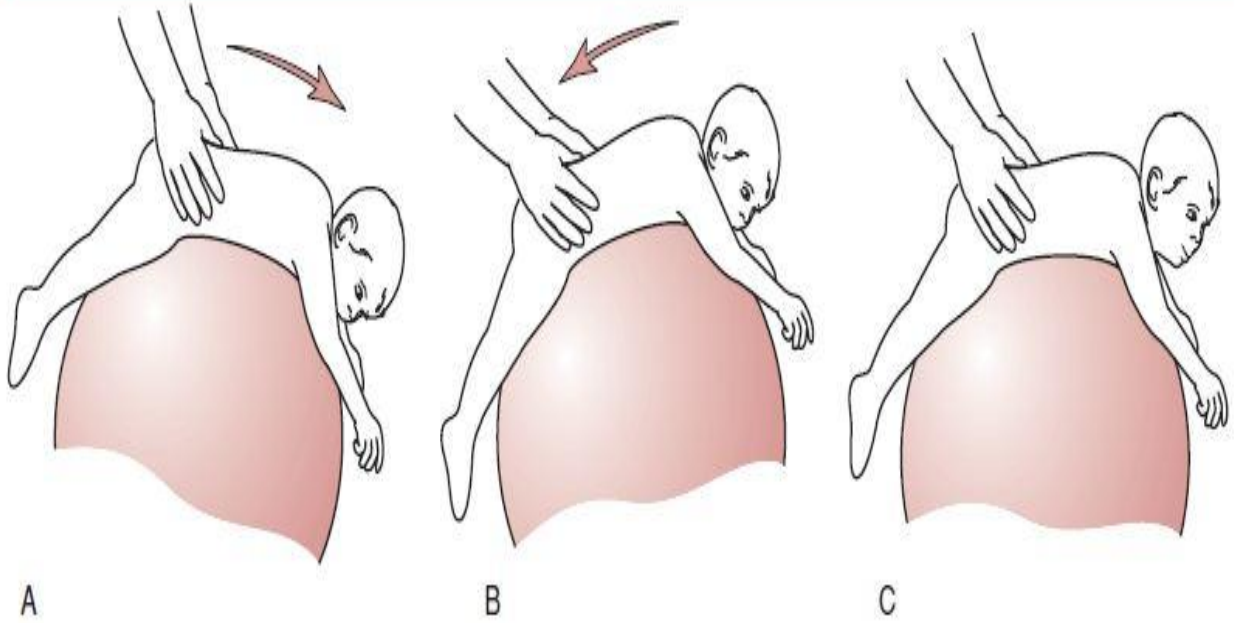
- **Reflex creeping-** The creeping patterns involving head, trunk and limbs are facilitated at various trigger points or reflex zones.
- **Reflex rolling-** Also used with special methods of triggering.
- **Sensory stimulation-** Touch, pressure, stretch and muscle action against resistance are used in many of the triggering mechanisms or in facilitation of creeping.
- **Resistance** is recommended for action of muscles.

CONDUCTIVE EDUCATION (Andreas Peto)

- A conductor is specially trained in the habilitation of motor disabled children in a 4 year course.
- A group of children (15-20) work together.
- An all-day programme- A fixed time-table is planned.
- Sessions of movements take place mainly on and bedside slatted plinths and with ladder-backed chairs.
- Rhythmic intention is used for training the elements or movements.
- Learning principles are basic to the programme.

PHYSIOTHERAPY MANAGEMENT ACCORDING TO FUNCTIONAL ABILITY

EXERCISES FOR IMPROVING NECK CONTROL



USE OF THE BALL FOR TONE REDUCTION AND HEAD LIFTING



HANDS CROSSED FOR RETRACTORS STRETCHING

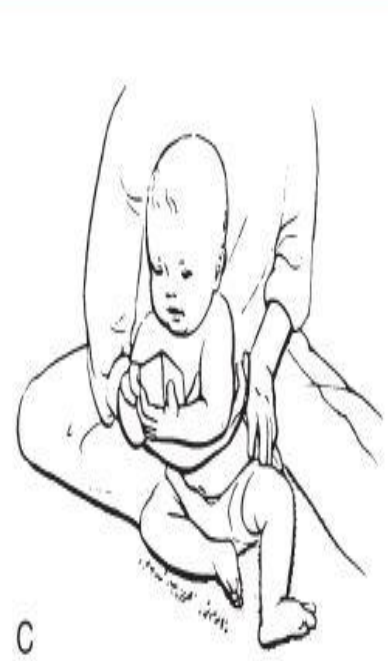
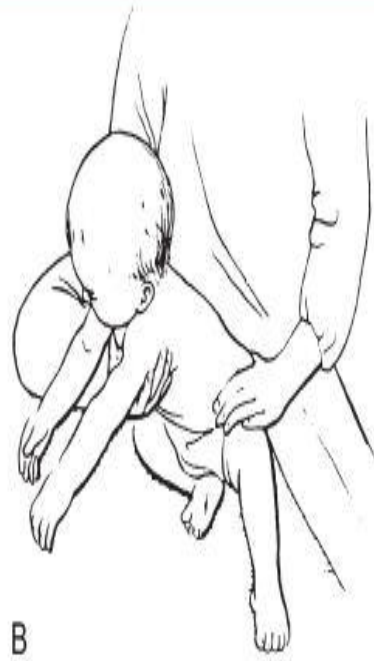


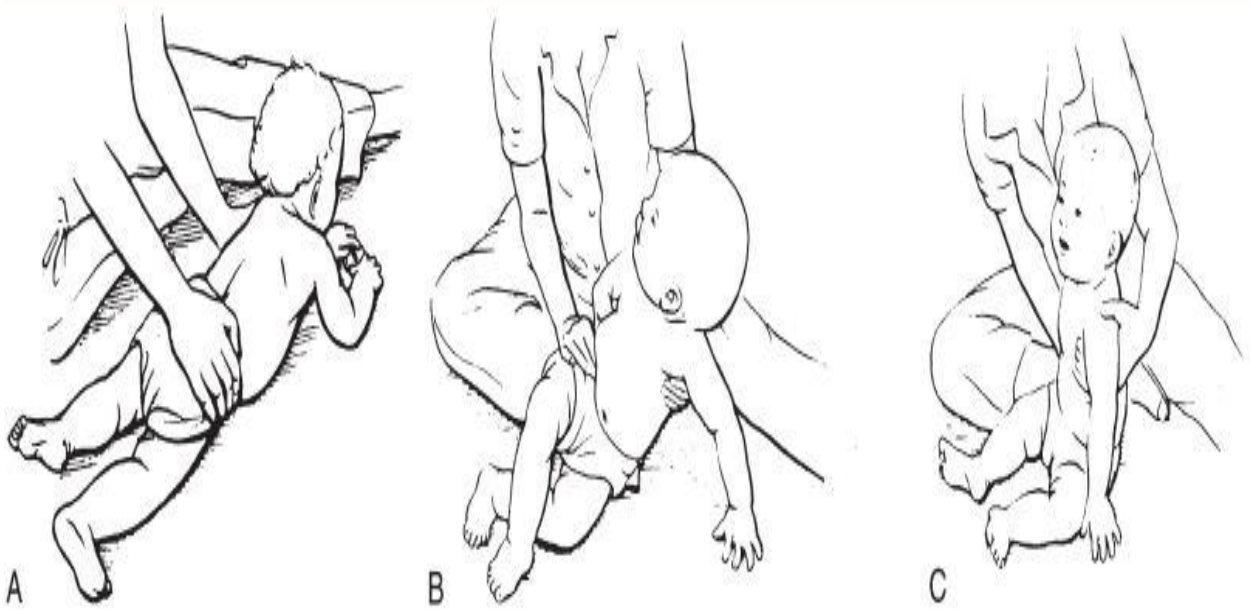
AUDIO VISUAL STIMULI FOR IMPROVING NECK CONTROL



WEIGHT SHIFTING AND REACHING IN PRONE

EXERCISES TO IMPROVE SITTING BALANCE





SITTING TO PRONE and PRONE TO SITTING



LIFT LEG AND TOUCH IT



LIFT BOTH HAND



SUPINE CYCLING



PUSHING BALL IN SITTING (FORWARD AND FORWARD WITH ROTATION)



DIAGONAL REACHING



REACHING SITTING over GYM BALL



THERABAND EXERCISES



PRONE PUSH UPS



PRONE PUSH UPS ON SWISS BALL





ARM AND LEG LIFTS IN PRONE KNEELING

EXERCISES TO IMPROVE STANDING BALANCE



HALF KNEEL TO STAND



BALL THROWING



HAMSTRINGS AND LONG ADDUCTORS STRETCHING



SHORT ADDUCTORS STRETCHING



LATERAL STEP UP



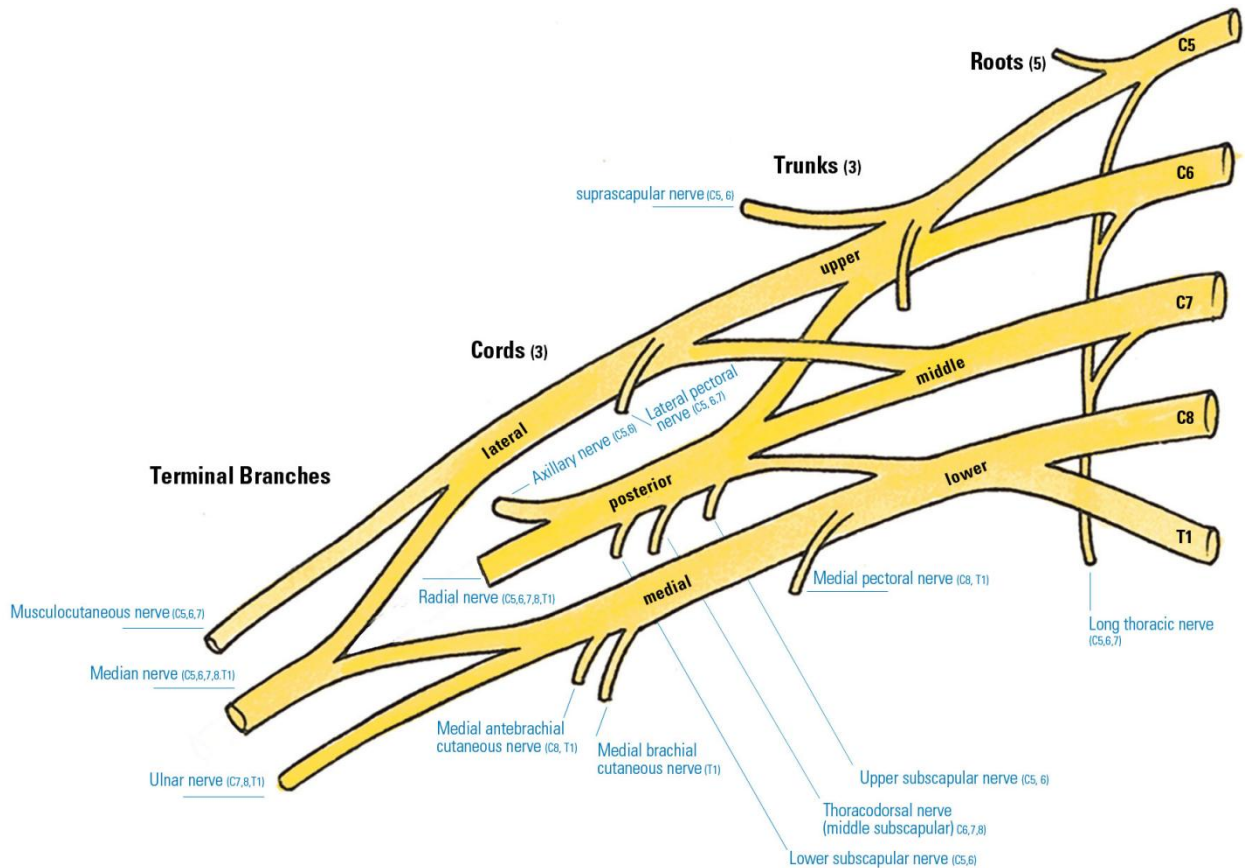
FORWARD STEP UP



STEPPING IN DIFFERENT DIRECTIONS

Erb's Palsy

- A type of **brachial plexus injury** which causes paralysis of the muscles causing movement of the upper arm and rotation of the forearm due to an injury to the upper part of the brachial plexus specially the **C5 (mainly) & C6 (partly)** nerve roots.

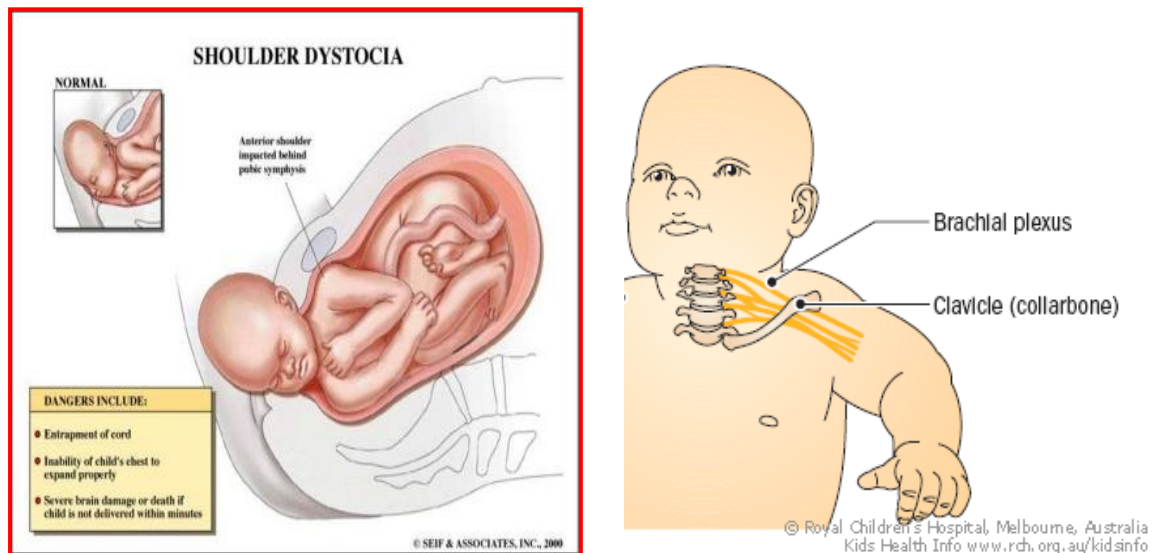


- Commonly seen in neonates following a difficult birth, hence also termed as obstetrical palsy.
- Cause: Undue separation of head from shoulder.



IN NEONATES - Mainly due to obstetrical causes like-

- Shoulder dystocia
- Large birth weight and/or maternal diabetes
- Breech presentation
- Second stage of labour lasting more than 60 minutes
- Assisted delivery
- Intrauterine torticollis
- Fracture clavicle



Position of the limb: Arm hangs by the side; it is adducted & internally rotated; forearm is extended & pronated (‘policeman’s tip hand’).

Reflexes-

- Biceps & supinator jerks are lost.
- Asymmetric Moro’s reflex

Functional limitations-

- Inability to reach and grasp by affected extremity.
- Inability to perform tasks requiring bilateral manual abilities such as catching a large ball or lifting a large object.

- ADL that requires bilateral upper extremities (dressing and undressing, tying shoes).
- Movements from prone or supine may always be done from one side causing delayed balance reaction.

Creeping on all fours may not be possible.

Biomechanical problem:

Loss of motor control causing altered scapulohumeral rhythm



Inability of rotator cuff muscles to control humeral head gliding during shoulder elevation



Resultant weakness of rotator cuff muscles+ weak deltoid muscle cause impingement of scapulohumeral soft tissue



Degeneration of rotator cuff muscles



Compensation by scapular muscles in elevating arm in presence of weakened rotator cuff muscles



Irritation & trigger points in upper trapezius & rhomboids

Sensory status testing:

Using **Naraka`s sensory grading system** for children with BPI.

S0: is no reaction to painful or other stimuli.

S1: is reaction to painful stimuli but none to touch.

S2: is reaction to touch but not to light touch.

S3: Normal sensation.

Problem list:

- Inability to abduct and externally rotate shoulder, flex the elbow, supinate the forearm, extend the wrist and fingers due to motor weakness.
- Decreased/ absent over a small area over the lower part of deltoid. .
- Trophic and vasomotor changes in affected dermatomes.

Role of physiotherapy:

Aims:

1. To improve motor control of the extremity.
2. Prevent tightness and contracture .

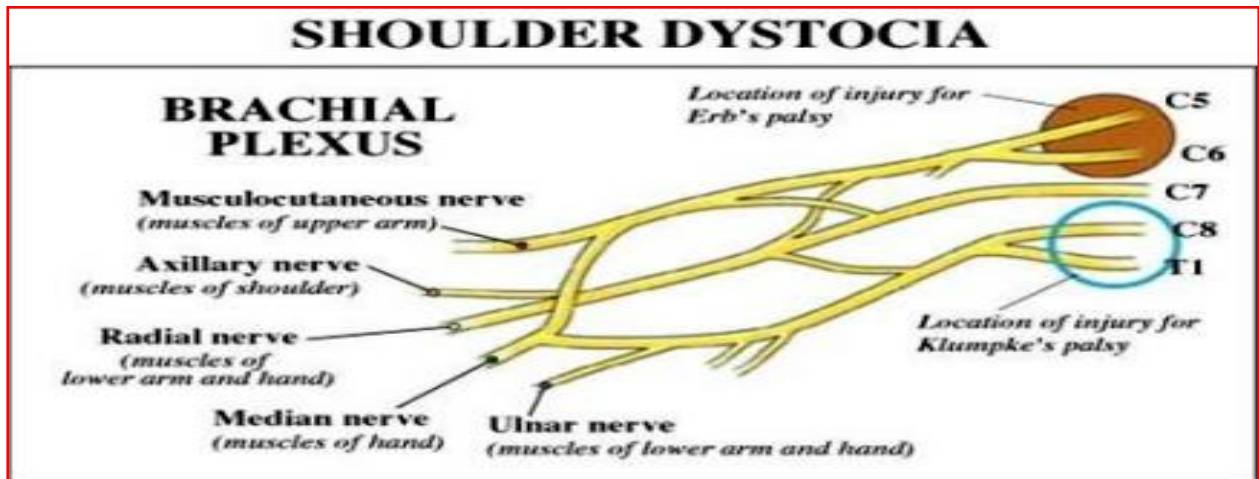
Means:

1. Neuromuscular electrical stimulation.
2. Passive movements of affected extremity.
3. Facilitation of active use affected extremity.
4. Parent education: Do's and Don't's
 - when sleeping the arm can be placed towards abduction, external rotation & forearm in supination.
 - lying on the involved limb to be avoided.
 - forced elbow supination may cause radial head dislocations and ulnar bowing, hence to be avoided.
 - picking the child under the axilla or pulling his/her arm should be avoided.
5. Post operative management after nerve transfer and tendon transfer by muscle re-education and facilitation of active use of hand.



Klumpke's Palsy

- It was first described by **Augusta Dejerine Klumpke** in 1885, hence also termed as Dejerine –Klumpke`s palsy.
- A type of **brachial plexus injury** which causes paralysis of the intrinsic muscles of hand & ulnar flexors of wrist & fingers due to an injury to the lower part of the brachial plexus specially the **T1(mainly) & C8 (partly)** nerve roots.



- Commonly seen in neonates following a difficult birth, hence a type of obstetrical palsy.
- Cause- Undue abduction of the arm as birth injury.

Problem list:

1. **Muscles paralyzed** are the intrinsic muscles of hand, ulnar flexors of wrist & fingers (FCU, ulnar part of FDS, FDP claw hand-there is hyperextension at MCP joints & flexion at IP joints (Intrinsic minus position) resulting in inability to make fist and grasp objects by affected hand.
2. **Cutaneous anaesthesia** & analgesia in a narrow zone along ulnar border of forearm & hand.

3. **Vasomotor changes**- skin areas with sensory loss are warmer due to arteriolar dilation & drier due to absence of sweating because of loss of sympathetic activity.
4. **Trophic changes**- long standing cases lead to dry & scaly skin. Nails crack easily with atrophy of pulp of fingers.
5. **Horner's syndrome**
 - Ptosis(drooping of eyelid)
 - Miosis(constriction of pupil)
 - Anhidrosis (absence of tear secretion)
 - Enophthalmos(retrusion or retraction of eyeball) &
 - Loss of ciliospinal reflex (due to injury to sympathetic fibres to head & neck that leave spinal cord through T1).

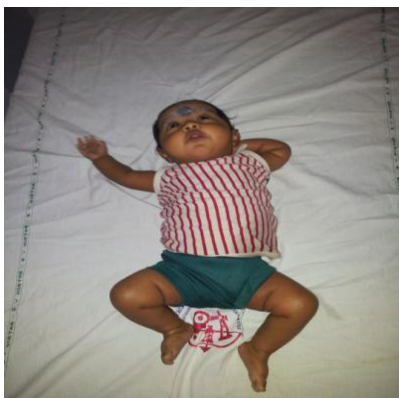
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Brachial Plexus Injury

- Traumatic BPI due to road traffic accidents can cause paralysis of muscles of upper extremity
- Types according to severity: neuropraxia, axonotemesis and neurotmesis
- Types according to site: pre-ganglionic and post ganglionic

Complications of brachial plexopathies

- Progressive contractures.
- Deafferentation pain; this occurs when the nerve roots are avulsed in preganglionic lesions. The cells in the dorsal column are robbed of their nerve supply. After the injury (days to weeks), spontaneous signals are generated by these cells, which result in intractable pain for the patient.
- Bony deformities.
- Shoulder dislocation
- Agnosia of the affected limb

Problem list:

1. Weakness in the myotomes corresponding to the affected nerve root level.
2. Loss of sensation in the dermatomes corresponding to the affected nerve root level.
3. Horner's syndrome, if T1 nerve root affected.

Role of physiotherapy:

Aims:

1. To improve motor control of the extremity.
2. Prevent complications like tightness, contracture and deformity.

Means:

1. Neuromuscular electrical stimulation
2. Strengthening of spared and partially affected muscles

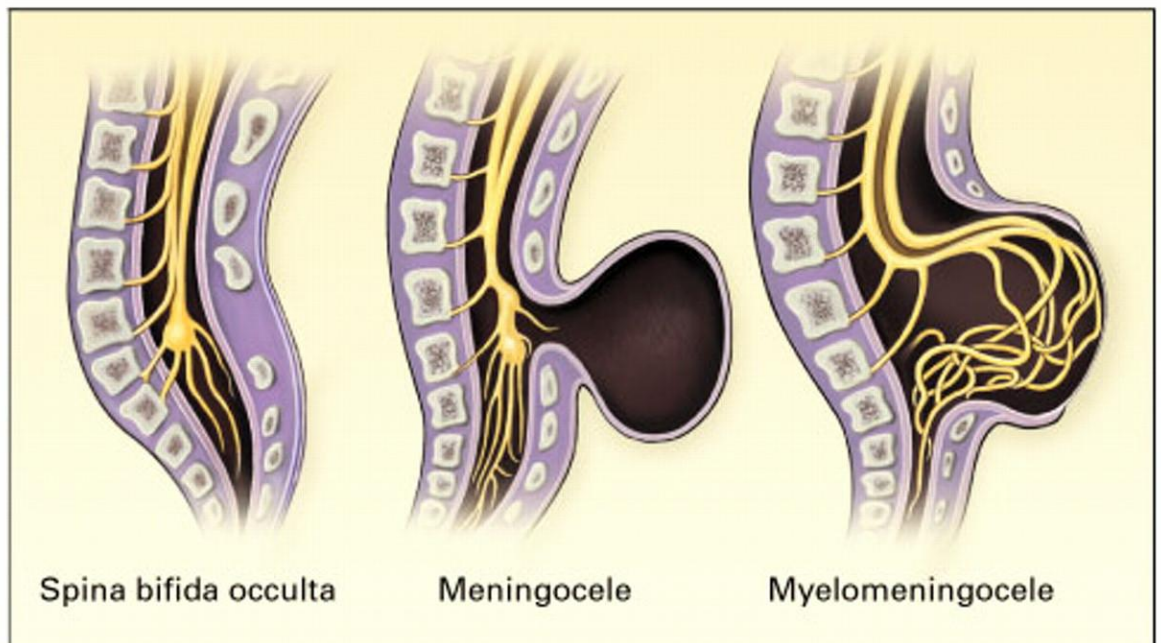
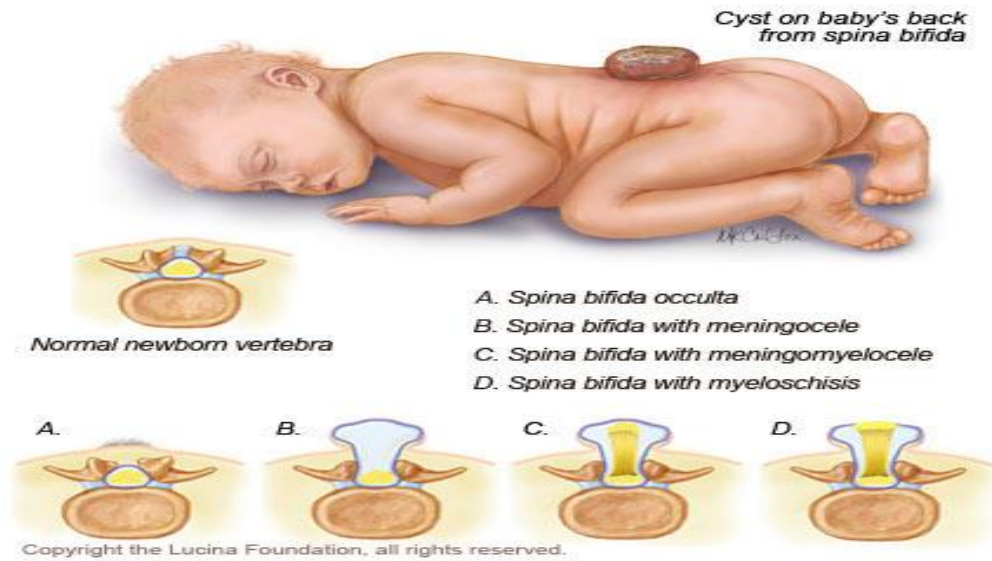
3. Functional training of affected limb

4. Prevention of tightness, contracture and deformity



Spina Bifida

- It is a developmental congenital disorder caused by the incomplete closing of the embryonic neural tube.
- Categories: spina bifida occulta, spina bifida cystica with meningocele, and spina bifida cystica with myelomeningocele.



- *Occulta* is Latin for "hidden". This is the mildest form of spina bifida. The outer part of some of the vertebrae is not completely closed. The splits in the vertebrae are so small that the spinal cord does not protrude. The skin at the site of the lesion may be normal, or it may have some hair growing from it; there may be a dimple in the skin, or a birthmark.
- The least common form of spina bifida is a posterior meningocele (or meningeal cyst). The meninges are forced into the gaps between the vertebrae. As the nervous system remains undamaged, individuals with meningocele are unlikely to suffer long-term health problems, although cases of tethered cord have been reported.
- In individuals with myelomeningocele, the unfused portion of the spinal column allows the spinal cord to protrude through an opening result in most severe complications. The meningeal membranes that cover the spinal cord form a sac enclosing the spinal elements.
- One of the most common birth defects with a worldwide incidence of about 1 in every 1000 births.

Problem list:

1. Leg weakness and paralysis
2. Decreased sensation leads to pressure sores and skin irritations
3. Orthopedic abnormalities (i.e., club foot, hip dislocation, scoliosis)
4. Bladder and bowel control problems, including incontinence, urinary tract infections, and poor renal function

Role of physiotherapy:

Aims:

1. Prevention and correction of spinal and limb deformities as much as possible.
2. Prevention of pressure sores.
3. Independence in bowel and bladder management.

Means:

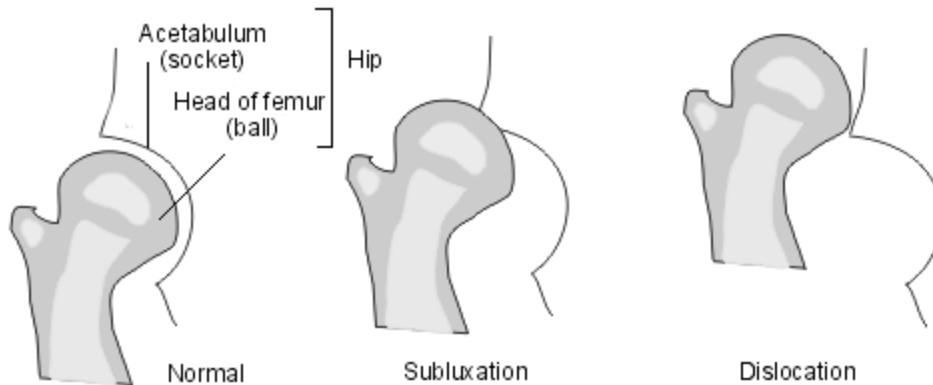
1. Strengthening of spared and partially affected muscles.

2. Regular pressure relieving and care of areas of diminished sensation.
3. Self intermittent catheterization for bladder management and timed voiding program for bowel management.
4. Wheelchair prescription with adequate cushion for anaesthetic areas.
5. Functional training.



Developmental dysplasia of the hip:

- DDH, formerly known as congenital dislocation of hip, is a congenital or developmental deformation or misalignment of the hip joint.
- Hip dysplasia can range from barely detectable to severely malformed or dislocated.
- The condition can be bilateral or unilateral.



Crowe Classification:

Class	Description	Dislocation
Crowe I	Femur and acetabulum show minimal abnormal development.	Less than 50% dislocation
Crowe II	The acetabulum shows abnormal development.	50% to 75% dislocation
Crowe III	The acetabula is developed without a roof. A false acetabulum develops opposite the dislocated femur head position. The joint is fully dislocated.	75% to 100% dislocation
Crowe IV	The acetabulum is insufficiently developed. Since the femur is positioned high up on the pelvis this class is also known as "high	100% dislocation

hip dislocation".	
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Problem list:

1. Limping gait.
2. Constant and/or debilitating pain.
3. Impaired mobility later in life.
4. Possible consequence of non treatment is developing early arthritis, sometimes even during teenage years.

Role of physiotherapy:**Aims:**

1. To prevent further increase in degree of dislocation.
2. To keep the femoral head in a position optimal for the development of the hip joint.
3. To maintain the reduction when achieved.
4. To delay the onset of arthritis.
5. To reduce pain.

Means:

1. Parent education about the carrying position (hip abducted around the waist).
2. Positioning of hip in abduction with pillows etc.
3. Strengthening of weak structures especially hip abductors.
4. Stretching of tight structures especially hip adductors.
5. Gait training with appropriate orthosis.



Guillain Barre' Syndrome

- It is an acute polyradiculoneuropathy affecting the peripheral nervous system causing ascending paralysis and sometimes respiratory involvement.
- With prompt treatment by immunoglobulins or plasmapheresis, together with supportive care, the majority will recover completely.

Problem list:

1. Weakness of muscles upper limb, lower limbs as well as trunk.
2. Graded loss of sensation in all limbs distally (glove and stocking pattern).
3. Difficulty in swallowing and respiration if bulbar involvement.

Role of physiotherapy:

Aims:

1. To facilitate motor recovery.
2. To prevent formation of pressure sores.
3. To prevent disuse atrophy of muscles.

Means:

1. Passive, active assisted, active and resisted exercises according to the strength of muscles.
2. Regular pressure relieving and skin inspection in areas of diminished sensation.
2. Neuromuscular electrical stimulation.



Juvenile Rheumatoid Arthritis

- Also known as juvenile idiopathic arthritis (JIA)
- Juvenile refers to an onset before age 16, idiopathic refers to a condition with no defined cause, and arthritis is the inflammation of the synovium of a joint.

Problem list:

1. Pain and swelling in multiple joints especially small joints of hand.
2. Stiffness in multiple joints.
3. Contractures and deformities in later stages.

Role of physiotherapy:

Aims:

1. To reduce pain and stiffness
2. Prevention of deformity.

Means:

1. Modalities to reduce pain and swelling.
2. Exercises to maintain and improve joint range of motion and strength of muscles.
3. Gentle mobilization to affected joints and mild stretching of tight structures.
4. Joint protection techniques.





Infantile Hemiplegia

- A condition that may be noted at birth or develop in the first six months of life. It probably is caused by a cerebrovascular accident in utero or in the perinatal period.
- It occurs more often in boys than girls, and affects the right side of the body twice as often as the left.

Problem list:

1. Spasticity in muscles of upper (biceps commonly) and lower limb (gastrosoleus commonly) at one side of body.
2. Weakness in the muscles of affected side of body.
3. Asymmetrical posture and weight bearing.
4. Difficulty in using affected upper extremity in activities of daily living.

Role of physiotherapy:

Aims:

1. To improve motor control of affected side
2. To facilitate normal alignment as far as possible.

Means:

1. Strengthening of weak structures and stretching of tight structures.
2. Weight shifting exercises and biofeedback to facilitate bilaterally symmetrical weight bearing.
3. Constrain Induced Movement Therapy (CIMT) to facilitate of use of affected upper extremity.
4. Gait training.



Congenital Talipes Equino Varus

- The affected foot looks like it has been rotated internally at the ankle. Without treatment, people with club feet often appear to walk on their ankles or on the sides of their feet.
- It is a relatively common birth defect, occurring in about one in every 1,000 live births.

Problem list:

1. Visible, cosmetically unacceptable deformity.
2. Abnormal weight bearing.
3. Difficulty in wearing shoes.
4. Pain in later stages.

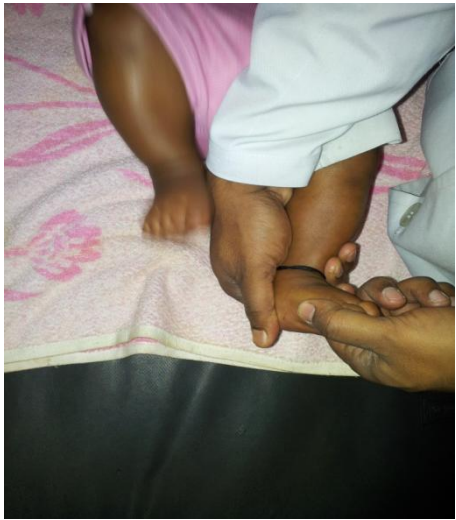
Role of physiotherapy:

Aims:

1. To normalize alignment as much as possible.
2. To minimize pain if present.

Means:

1. Stretching of tight structures and strengthening of weak structures.
2. Post operative management- In early post op days, pain management, positioning to maintain correction and active movements in pain free range. Then progressing to strengthening of evertors and dorsiflexors of foot and stretching of invertors and plantarflexors with weight bearing as tolerated.



Blount's Disease

- A growth disorder of the tibia (shin bone) that causes the lower leg to angle inward, resembling a bowleg.
- Also known as "tibia vara"
- Occurs in young children and adolescents. The cause is unknown but is thought to be due to the effects of weight on the growth plate.
- In some cases, surgery may be performed.

Problem list:

1. Cosmetically unacceptable deformity.
2. Early arthritis due to malalignment.

Role of physiotherapy:

Aims:

1. To normalize alignment as much as possible.
2. To prevent recurrence of deformity after surgical correction.

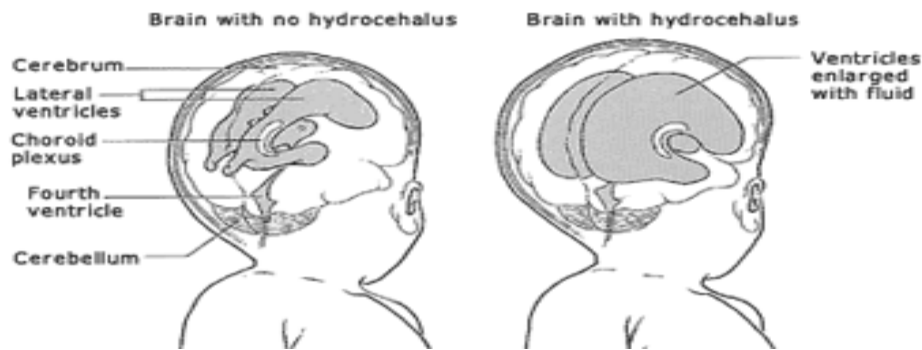
Means:

1. Positioning with strapping of knees and spacing between feet.
2. Lateral shoe wedge prescription.
3. Post operative management of pain, maintenance of correct alignment, strengthening of the muscles incised and weight bearing as tolerated (WBAT).



Hydrocephalus

- It is a medical condition in which there is an abnormal accumulation of cerebrospinal fluid (CSF) in the ventricles of the brain.



Hydrocephalus can be caused by impaired CSF flow, reabsorption, or excessive CSF production.

- The most common cause of hydrocephalus is CSF flow obstruction, hindering the free passage of cerebrospinal fluid through the ventricular system and subarachnoid space (e.g., stenosis of the cerebral aqueduct or obstruction of the interventricular foramina – secondary to tumors, hemorrhages, infections or congenital malformations).
- Hydrocephalus can also be caused by overproduction of cerebrospinal fluid (relative obstruction) (e.g., Choroid plexus papilloma, villous hypertrophy).
- Bilateral ureteric obstruction is a rare, but reported, cause of hydrocephalus.

Based on its underlying mechanisms, hydrocephalus can be classified into **communicating** and **non-communicating** (obstructive). Both forms can be either **congenital** or **acquired**.

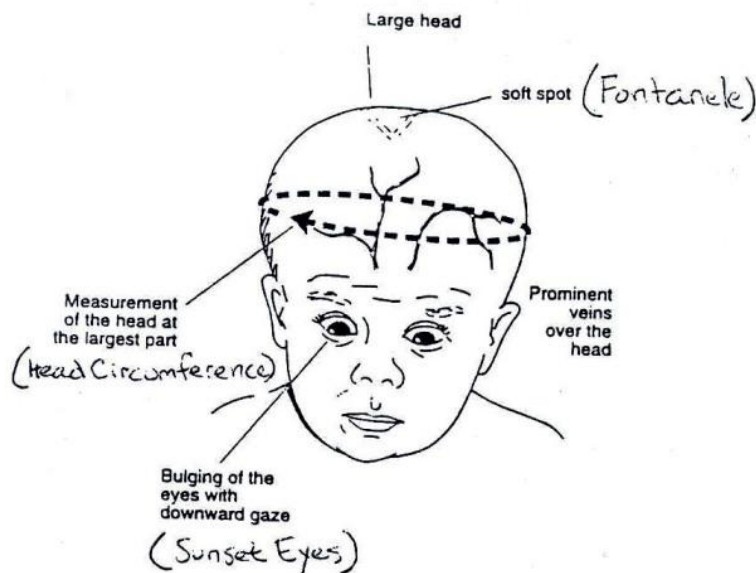
In infants with hydrocephalus, CSF builds up in the central nervous system, causing the fontanelle to bulge and the head to be larger than expected. Early symptoms may also include:

- Eyes that appear to gaze downward;
- Irritability;
- Seizures;
- Separated sutures;
- Sleepiness;

- Vomiting.

Symptoms that may occur in older children can include:

- Brief, shrill, high-pitched cry;
- Changes in personality, memory, or the ability to reason or think;
- Changes in facial appearance and eye spacing;
- Crossed eyes or uncontrolled eye movements;
- Difficulty feeding;
- Excessive sleepiness;
- Headache;
- Irritability, poor temper control;
- Loss of bladder control (urinary incontinence);
- Loss of coordination and trouble walking;
- Muscle spasticity (spasm);
- Slow growth (child 0–5 years);
- Slow or restricted movement;
- Vomiting .



Problem list:

1. Delayed developmental milestones.

2. Poor balance and coordination.

Role of physiotherapy:

Aims:

1. To facilitate motor control
2. To facilitate as normal development as possible

Means:

1. Functional training
2. Strengthening of weak muscles
3. Balance and coordination training



Down's Syndrome

- It is a genetic disorder caused by the presence of all or part of a third copy
- of chromosome 21. It is typically associated with physical growth delays, a particular set of facial characteristics and a severe degree of intellectual disability.
- Most common chromosome abnormality in humans.
- The face is flat and wide, a short neck, excessive joint laxity including atlanto-axial instability and short fingers.

Problem list:

1. Delayed developmental milestones.
2. Generalized weakness of muscles and ligamentous laxity.

Role of physiotherapy:

Aims:

1. To improve motor control, balance and gait as per child's requirements.
2. To promote normal development

Means:

1. Strengthening of muscles
2. Balance and coordination training
2. Functional training



Role of Occupational Therapy

From the time a child is diagnosed with a problem, parents worry about their child's quality of life, their ability to function, their health, their emotional status, their ability to be accepted and their future prospects. Occupational therapy can help quell some of those fears by fostering skills that will allow their child to play, interact with others, go to school, navigate the community and be productive within the workforce. Once the child masters skills within their own unique skill sets, parents will feel less overwhelmed by their child's condition.

Occupational therapy is an integral part of a child's overall treatment program. The goal of occupational therapy is to promote a child's ability to perform daily rituals and activities in a way that will enhance their quality of life and make possible the enjoyment of independent living.

During occupational therapy, a trained therapist will guide the individual in adapting, compensating, and achieving maximum function levels. They take into account physical functioning abilities and limitations, cognitive functioning levels (i.e., reasoning and processing skills), emotional needs and desires, and ability and willingness to adapt and compensate. The existing home environment and support system play an important role, as well.

The goal of therapy is to ensure a child achieves the highest level of functional performance within their home, school, public and work environments. Occupational therapy employs adaptive processes to teach a child to perform tasks required in the normal course of a day.

This is accomplished by focusing on:

Identifying adaptive methods a child can learn to complete tasks

Breaking down essential tasks into smaller, do-able steps, often modified

Capitalizing on the need for accomplishment, pride, enjoyment and independence

Developing in a child a sense of place in their environment, at school, and in the community

Everyday tasks

occupational therapy enables a child to respond to life's demands, setting the stage for him or her to develop relationships, care for themselves, provide for their own physical needs, pursue education, maintain employment, and achieve economic parity with their peers.

What a child learns in occupational therapy is put into practice in their daily rituals, from the time they wake up in the morning to get ready to go to therapy or school, finishing homework, playing with siblings, to putting on their pajamas for a good night's sleep.

The benefits for children are:

Developing a workable routine

Adapting to abilities, not limitations

Pursue interests, hobbies, activities

Interacting with others

Being part of a community

Performing tasks independently

Responding to the demands of everyday life

Perceiving the importance of tasks

Developing critical thinking skills

Coping with challenges and emotions

Learning to adapt and compensate

CASE STUDY

AUTISM

My child ___ was unable to speak properly , used to enjoy engaging in play with me, look at me to request to repeat his favourite song but does not smile and express pleasure. He cannot point to request or ask. He was having trouble at school and avoids academic tasks, does not follow directions. Peer relationships were also poor. He used to approach his sister pushes her to gain her attention unaware of how hard he is pushing her. He used to appear very aggressive .he had been asked to leave multiple schools due to behaviour that interfered with the learning and safety of himself and others

Eg running from classroom

Throwing chairs/desks

Hitting kicking others

Biting e.t.c.

After joining occupational therapy several activities were provided to use with in school home and social environment e.g squeezing balls, dancing , jumping on trampoline during breaktime carrying heavy objects such as books chairs and heavy school bags putty activities scooter boards tug of war swinging activities

With in three months he made incredible improvement. This was first time he made through a school without being asked to leave. Ther is also improvement in eye contact.

He still tended to be frustrated with new concepts in maths but used to feel proud of himself when succeeded

He is now able to focus regraspnumorous situations more than he ever had before

ASPERGERS

Before starting occupational therapy treatment my child _____ does 'not seem to be making any friends at school

His comprehension and expressions skills were age appropriate and he was doing well academically. He seemed to be very knowledgeable and can talk at great length about his favourite topics but use inappropriate gestures and tends to close conversations abruptly

With in a week of ot treatment there is marked improvement in classroom behaviour and interactions with the peer. He has transformed into a child who is comfortable and well liked by peers

ADHD

My child _____ Can be described as a verbally gifted child but with poor handwriting, concentration and attention

He often goes off tasks very quickly and does not finish the work which has been set. He used to become frustrated easily and had greater difficulty in sitting still

Although he could verbally relate a story but was unable to get it down into the paper . He was always losing things and needed frequent prompts to follow through on requests and routine activities

Because of lack of attention he rarely remembers the right book and seldom completes his homework. His school bag and diary used to be a complete mess

With in three months of ot treatment teachers began reporting improvement in attention and concentration. Everyone is describing him as a different child who also appeared much happier

Homework is no longer a chore for him and me. Handwriting is much organised now. He has started sitting with me for fem minutes while solving his own problems. Extended family members and neighbours are commenting on his increased confidence level as well as clarity of thinking and communication

CEREBRAL PALSY

My child _____ was born prematurely, developed jaundice on 2nd day of birth. and Have seizures 5 times a day . He was a fussy child, crying everytime. He was stiff like a stick and it used to be very difficult for me to make him sit on my lap. He does not seem to attached with me. He was totally uncooperative while eating and dressing and it make me tired while handling him.

He was growing very slowly as compare to the children of his age. He was not able to sit even at age five

A friend of us informed us about occupational therapy and we took consultation for occupational therapy and started the treatment program. After taking treatment for two months we started noticing a lot of changes. Now it is very easy to handle him while dressing and bathing activities.

Therapist taught us a lots of position of carrying the child and handling him while dressing and eating which results in increase in food intake and cooperation of child in other activities and now he appeared a much happier child. He has started interacting with me and family members. He is now able to play in sitting position.

Medication

Botulinum toxin injections are given into muscles that are spastic or sometimes dystonic, the aim being to reduce the muscle hypertonus that can be painful. A reduction in muscle tone can also facilitate bracing and the use of orthotics. Most often lower extremity muscles are injected. Botulinum toxin is focal treatment, meaning that a limited number of muscles can be injected at the same time. The effect of the toxin is reversible and a reinjection is needed every 4–6 months

Surgery

Surgery usually involves one or a combination of:

- Loosening tight muscles and releasing fixed joints, most often performed on the hips, knees, hamstrings, and ankles. In rare cases, this surgery may be used for people with

stiffness of their elbows, wrists, hands, and fingers. Selective Percutaneous Myofascial Lengthening (SPML) is one example.

- The insertion of a baclofen pump usually during the stages while a patient is a young adult. This is usually placed in the left abdomen. It is a pump that is connected to the spinal cord, whereby it sends bits of Baclofen alleviating the continuous muscle flexion. Baclofen is a muscle relaxant and is often given by mouth to patients to help counter the effects of spasticity.
- Straightening abnormal twists of the leg bones, i.e. femur (termed femoral anteversion or antetorsion) and tibia (tibial torsion). This is a secondary complication caused by the spastic muscles generating abnormal forces on the bones, and often results in intoeing (pigeon-toed gait). The surgery is called derotation osteotomy, in which the bone is broken (cut) and then set in the correct alignment.^[38]
- Cutting nerves on the limbs most affected by movements and spasms. This procedure, called a rhizotomy ("rhizo" meaning root and "tomy" meaning "a cutting of" from the Greek suffix *tomia*), reduces spasms and allows more flexibility and control of the affected limbs and joints.

Orthotics

Orthotic devices such as ankle-foot orthoses (AFOs) are often prescribed to achieve the following objectives: correct and/or prevent deformity, provide a base of support, facilitate training in skills, and improve the efficiency of gait.

The available evidence suggests that orthoses can have positive effects on all temporal and spatial parameters of gait, i.e. velocity, cadence, step length, stride length, single and double support. AFOs have also been found to reduce energy expenditure.

Other treatments

Cooling high-risk full-term babies shortly after birth may reduce disability.

Hyperbaric oxygen therapy (HBOT), in which pressurised oxygen is inhaled inside a hyperbaric chamber, has been studied under the theory that improving oxygen availability to

damaged brain cells can reactivate some of them to function normally. However, HBOT results in no significant difference from that of pressurised room air, and some children undergoing HBOT may experience adverse events such as seizures and the need for ear pressure equalisation tubes.

Prognosis

CP is not a progressive disorder (meaning the brain damage does not worsen), but the symptoms can become more severe over time due to subdural damage. A person with the disorder may improve somewhat during childhood if he or she receives extensive care from specialists, but once bones and musculature become more established, orthopedic surgery may be required. The full intellectual potential of a child born with CP will often not be known until the child starts school. People with CP are more likely to have learning disabilities, although these may be unrelated to IQ, and are more likely to show varying degrees of intellectual disability. Intellectual level among people with CP varies from genius to intellectually impaired, as it does in the general population, and experts have stated that it is important to not underestimate the capabilities of a person with CP and to give them every opportunity to learn.

The ability to live independently with CP varies widely, depending partly on the severity of each person's impairment and partly on the capability of each person to self-manage the logistics of life. Some individuals with CP require personal assistant services for all activities of daily living. Others only need assistance with certain activities, and still others do not require any physical assistance. But regardless of the severity of a person's physical impairment, a person's ability to live independently often depends primarily on the person's capacity to manage the physical realities of his or her life autonomously. In some cases, people with CP recruit, hire, and manage a staff of personal care assistants (PCAs). PCAs facilitate the independence of their employers by assisting them with their daily personal needs in a way that allows them to maintain control over their lives. Many states allow Medicaid beneficiaries to use their Medicaid funds to hire their own PCAs, instead of forcing them to use institutional or managed care.

People with CP can usually expect to have a normal life expectancy; survival has been shown to be associated with the ability to ambulate, roll, and self-feed. As the condition does not affect reproductive function, people with CP can have children and parent successfully.

According to OMIM, only 2% of cases of CP are inherited (with glutamate decarboxylase-1 as one known enzyme involved). There is no evidence of an increased chance of a person with CP having a child with CP.

Self-care

Self-care is any activity people do to care for themselves. For many children with CP, parents are heavily involved in self-care activities. Self-care activities, such as bathing, dressing, grooming and eating, can be difficult for children with CP as self-care depends primarily on use of the upper limbs. For those living with CP, impaired upper limb function affects almost 50% of children and is considered the main factor contributing to decreased activity and participation. Since the hands are used for many self-care tasks, it is logical that sensory and motor impairments would impact daily self-care. The extent of hand impairment depends on the location and degree of brain damage.

Sensory impairments can make getting dressed and brushing teeth difficult. Along with sensory impairments, motor impairments of the hand are thought to be responsible for difficulties experienced in daily self-care activities. However, motor impairments are more important than sensory impairments, with the most prevalent impairment being finger dexterity (ability to manipulate small objects). Finger dexterity is essential in fastening buttons, doing up zippers and tying shoelaces. With upper limb spasticity, it may be difficult to get dressed. If the individual with CP also has cognitive deficits, this may add a challenge to dressing and grooming.

Children with CP sometimes have oral sensory disturbances – they have too little or too much sensitivity around and in the mouth. An infant with CP may not be able to suck, swallow or chew and this can result in difficulty eating. As mentioned in the above paragraph, finger dexterity is the most prevalent motor impairment. Finger dexterity is essential for manipulating cutlery or bringing food to the mouth. Fine finger dexterity, like picking up a spoon, is more frequently impaired than gross manual dexterity, like spooning food onto a plate. Grip strength impairments are less common. Overall, children with CP may have difficulty chewing and swallowing food, holding utensils, and preparing food due to sensory and motor impairments.

The SCPE reported the following incidence of comorbidities in children with CP (over 4,500 children over age 4 whose CP was acquired during the prenatal or neonatal period were included):

- Mental disadvantage (IQ < 50): 31%
- Active seizures: 21%
- Mental disadvantage (IQ < 50) and not walking: 20%
- Blindness: 11%

The SCPE noted that the incidence of comorbidities is difficult to measure accurately, particularly across centres. For example, the actual rate of an intellectual impairment may be difficult to determine, as the physical and communicational limitations of people with CP would likely lower their scores on an IQ test if they were not given a correctly modified version.