

SPINA BIFIDA

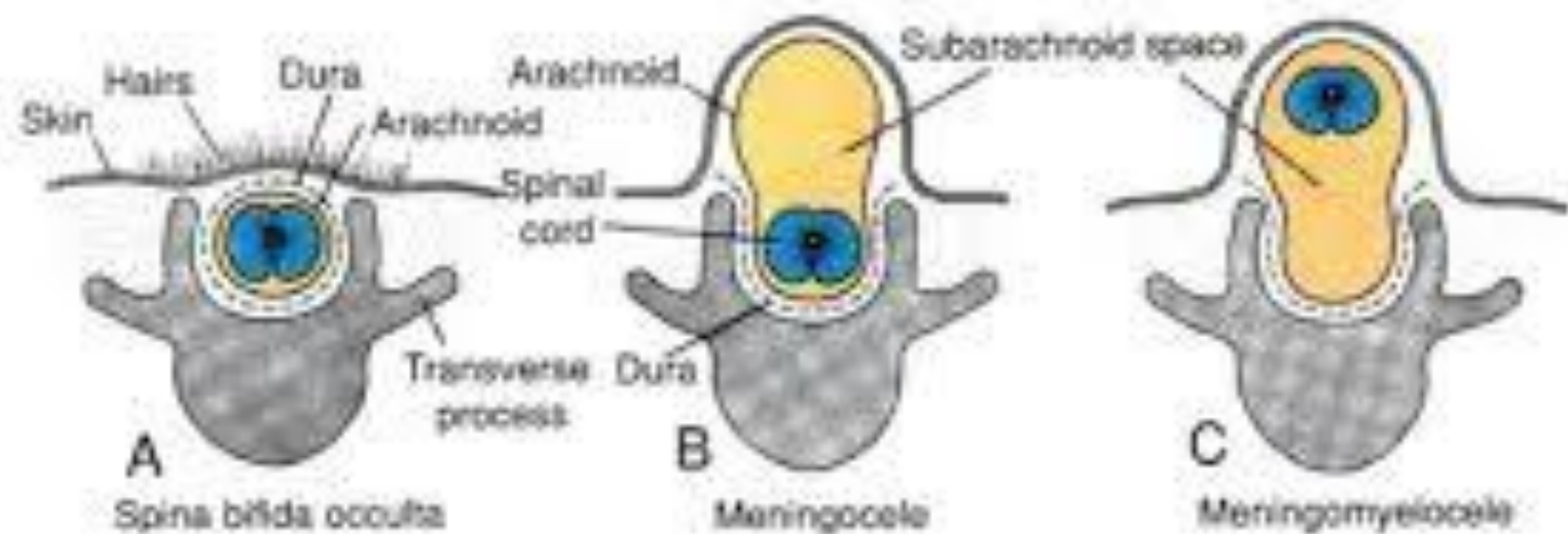
Definition :

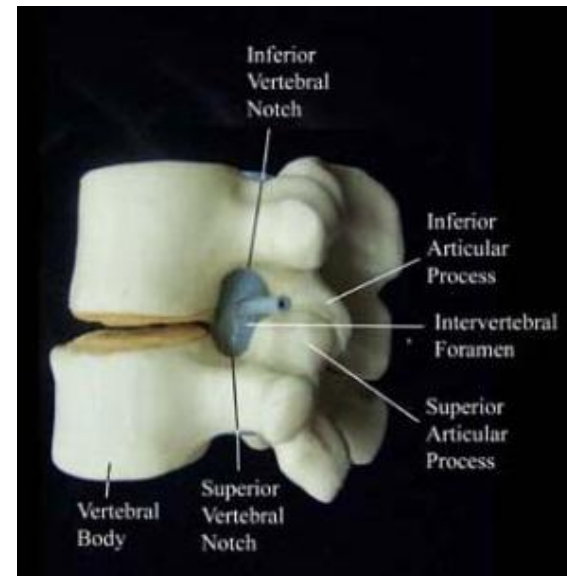
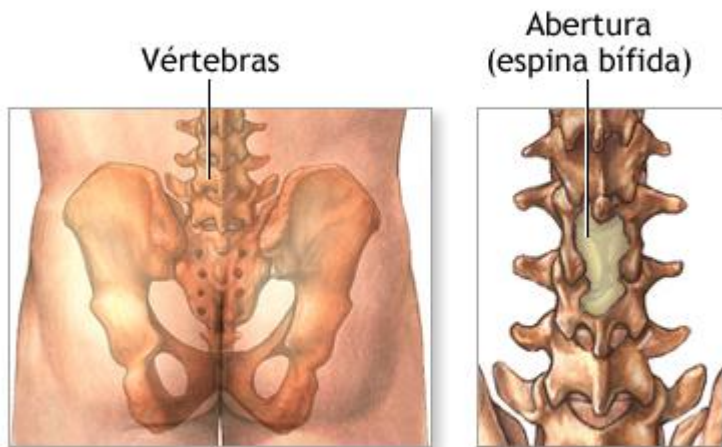
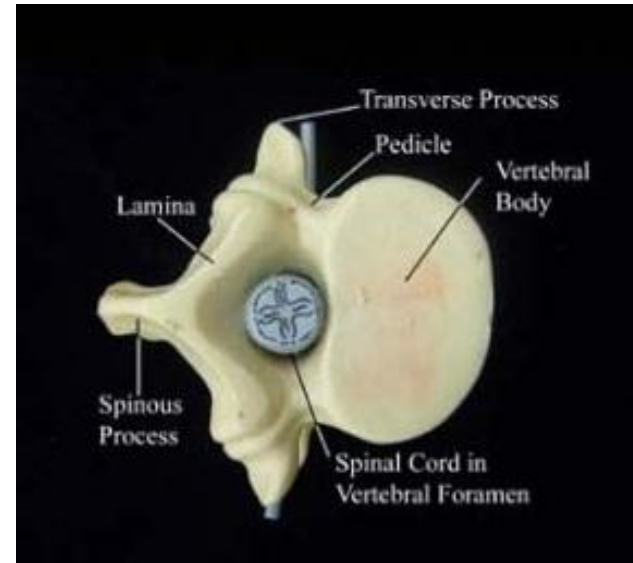
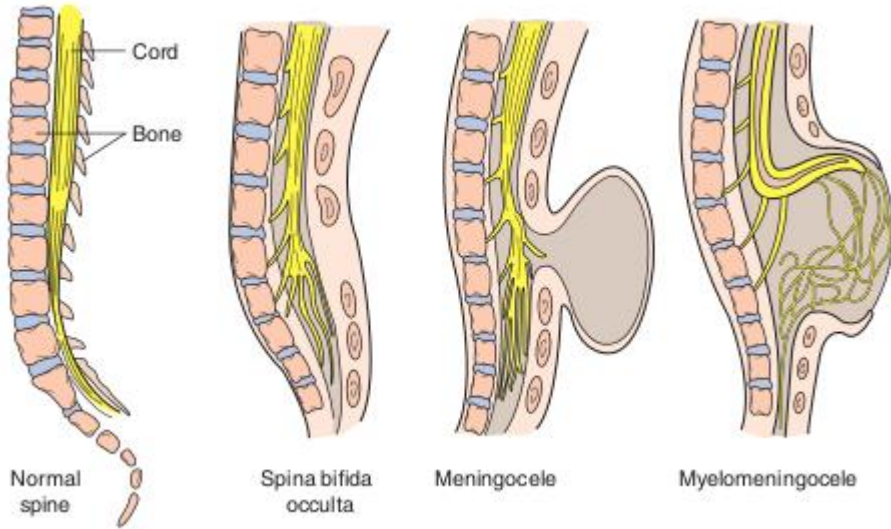
It is a **congenital abnormality** with **developmental defect in the spinal column** with **incomplete closure of vertebral canal due to failure in fusion of vertebral arches** ± protrusion and dysplasia of the spinal cord or its membranes

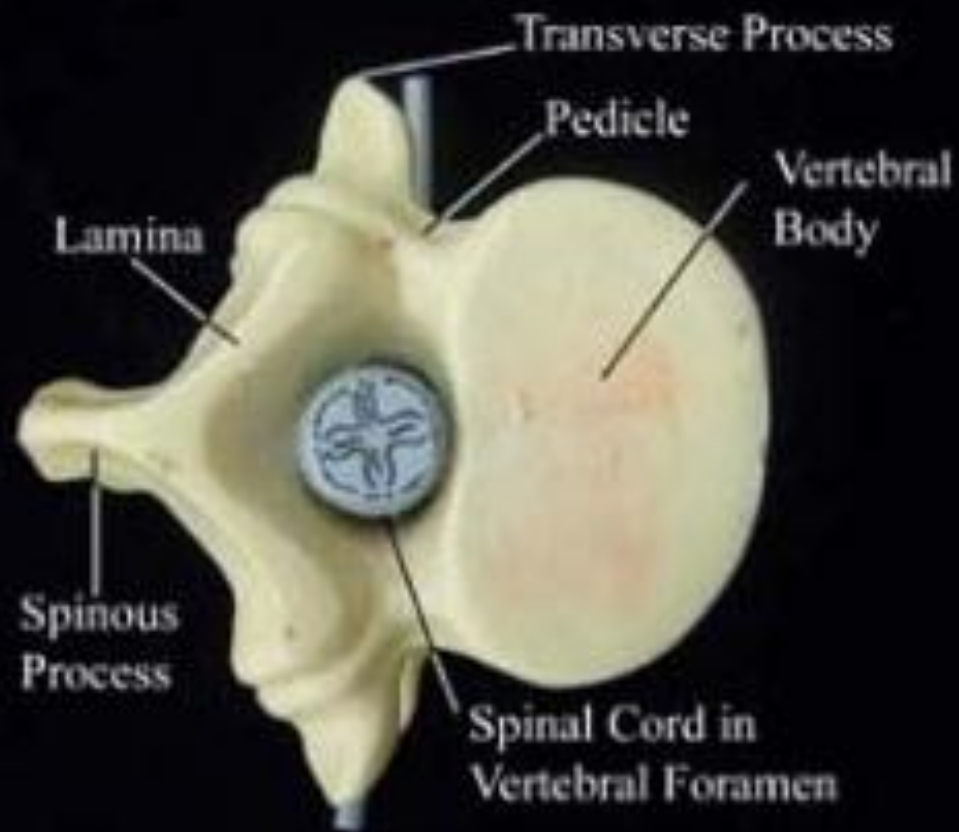
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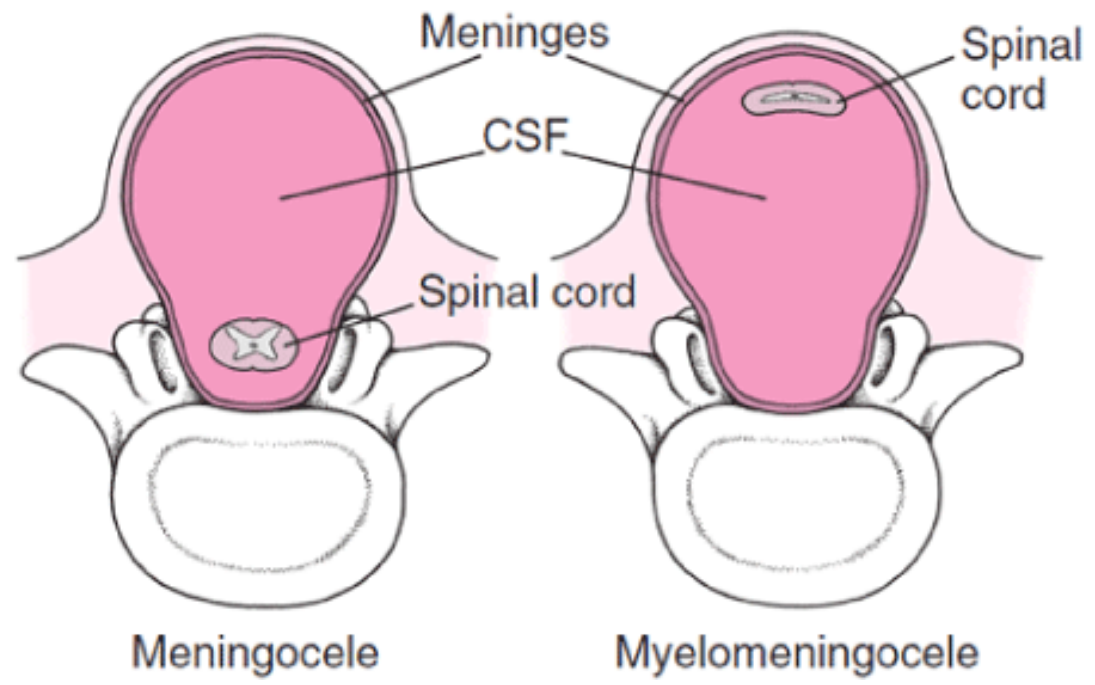
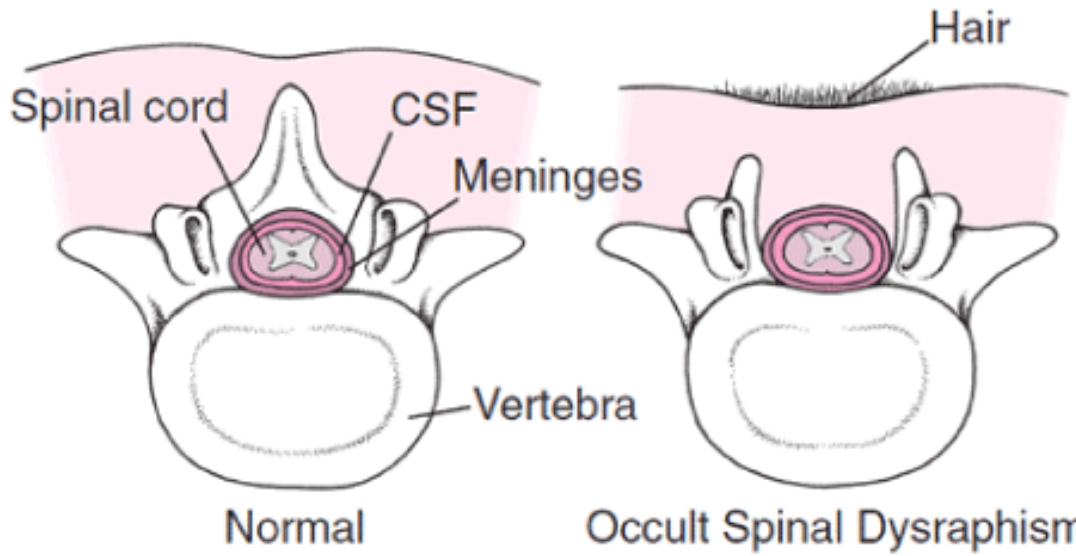
- ✓ It arises in the first few weeks of gestation, with unknown cause
- ✓ It arises when one vertebrae does not close normally and leave the spinal cord exposed
- ✓ It is a midline defect of the: **Skin, bone, spinal column and spinal cord.**

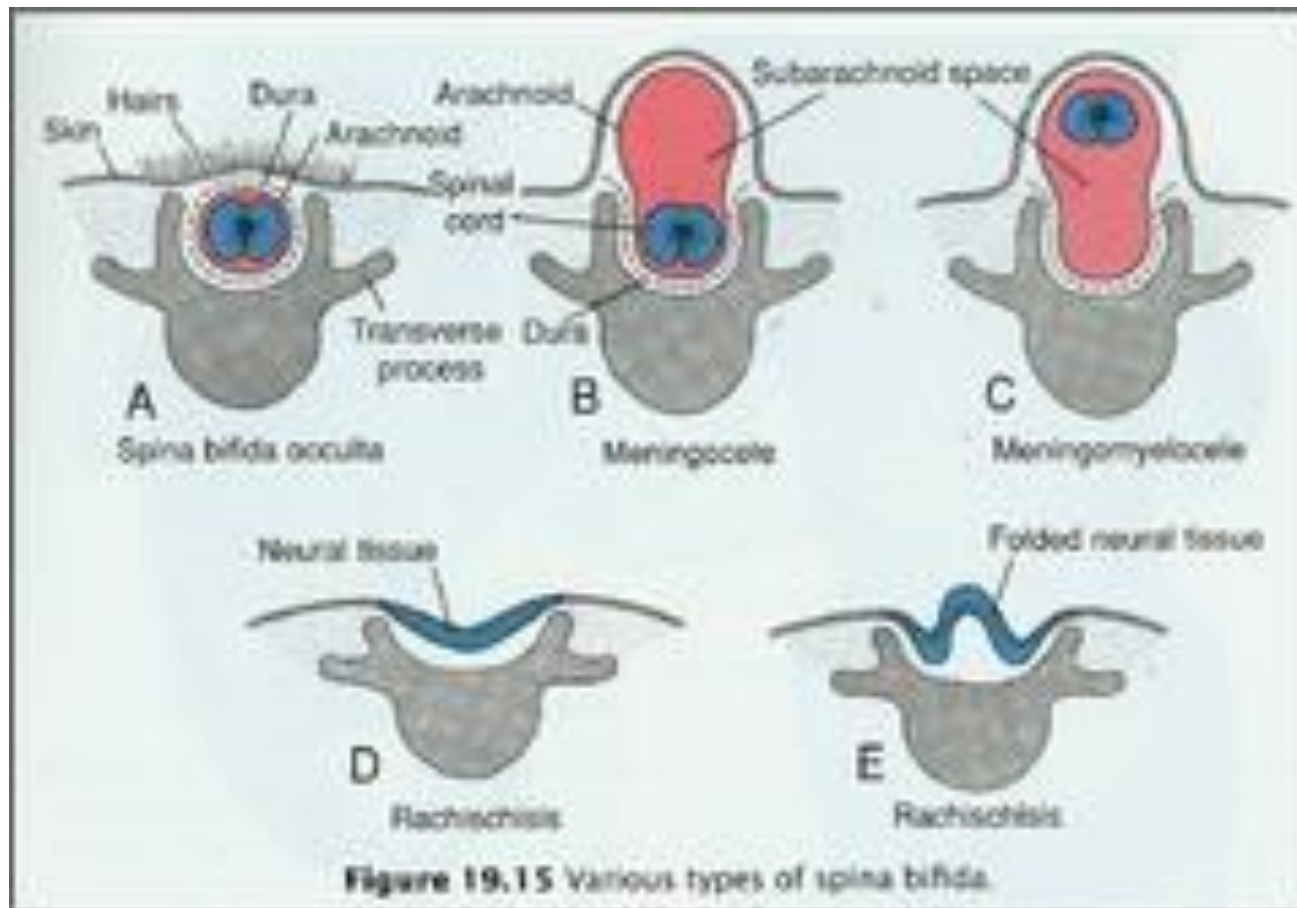
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Types of Spina Bifida

1- Closed : Occulta = hidden

2- Opened: Cystica = Manifesta

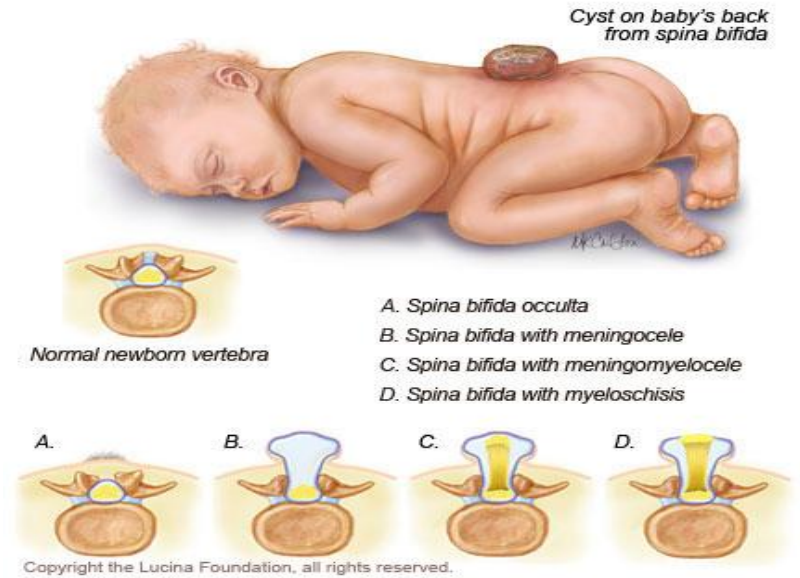
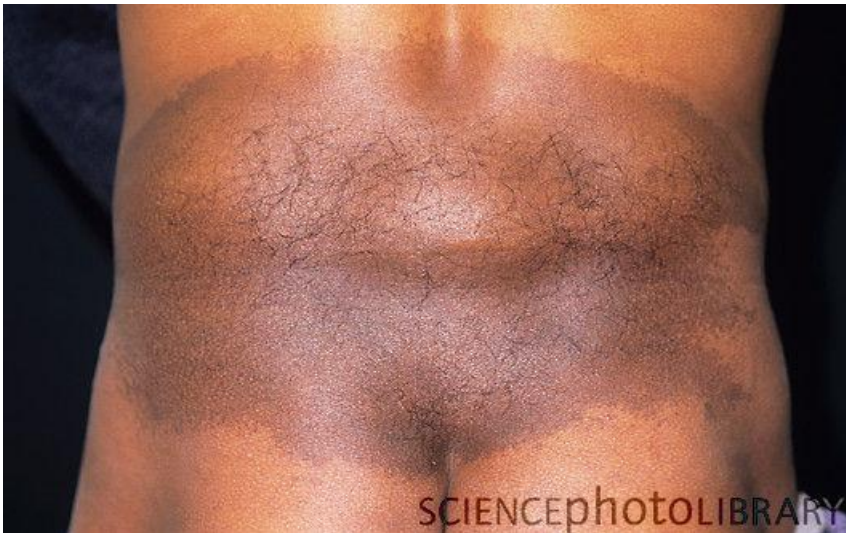
Occulta :

- Mildest form of spina bifida
- The outer part of some of the vertebrae are not complete
- The split in the vertebrae is so small that the spinal cord does not protrude
- The condition is asymptomatic
- Bony abnormality seen by X – ray
- Nerves may be involved when associated with hairy patch or other skin changes

Cystica:

1- Meningocele:

- Vertebral arches are unfused & with herniation of the meninges part of the cord or nerves root may present in the sac but they conduct impulses normally.
- Meningocele is covered by the outer layer of skin and the inner layer of meninges which communicate with meninges lining the spinal subarachnoid space



2- Myelomeningocele:

- ❖ Sac contains neural elements that protrude through the spinal defects
- ❖ The overlying skin is thin & leaks of spinal fluid
- ❖ Secondary infection is common ,
Neurological and Orthopaedic problem are present.
- ❖ Hydrocephalus

Clinical Picture

It will **differ according to the level of lesion** (most **common site is lumbosacral region**)

- ❖ Flaccid paralysis, muscle weakness, wasting, decreased or absent tendon reflexes
- ❖ Decreased or absent exteroceptive & Proprioceptive sensation
- ❖ Rectal & bladder incontinence, Hydrocephalus, Sever vasomotor changes
- ❖ Paralytic or congenital deformities as in club foot , pes cavus.
- ❖ Pressure ulceration due to poor sensation, Osteoporosis , soft tissue contracture
- ❖ Physical emotion& mental delay

Prognosis:

With successful closure of simple meningocele prognosis is good

Myelomeningocele die from infection, if survive after proper closure ----- stationary disability

Impairments associated with spina bifida:

- **Physiological changes** occur below level of lesion : Abnormal NCV
Lead to changes in muscle tone
- **Anatomical changes below level of lesion:**
- Musculoskeletal deformities(Scoliosis), osteoporosis
- Joint&extermity deformities, damaged nerve tissue
- Diminished growth of non Wt bearing joints

Complication & team work:

1- Mass& Hydrocephalus.....Neurosurgon

2- Movement disorders, Deformity.....PT

3- Bowel& Bladder Disturbance.....Urologist

4- Social& Psychological problem.....Psychiatrist& Social worker

PT EXAMINATION:

Inspection:

- ✓ Tuft of hair, subcutaneous lipoma or dimple may be observed in occulta
- ✓ Localised sac in cystic type, increased head size,
- ✓ Deformity of Lower limb as flexion: Abd & int rotation of hip, flexion or hyper extension knee, equinous or calcenous deformity of foot, scoliosis or lordosis of spine
- ✓ Skin ulceration and soft tissue injury due to pressure

Palpation:

Bony defect, subcutaneous lipoma, Loss of sensation and muscle bulk

3- Measurement:

a- Tape measurement : Head L.L (long& round)

b- Goniometer test ROM

4- Muscle Testing

5- Functional Test (UP & Low Limb)

1- Upper Limb Exercises: Children with spina bifida needs to compensate weakness in their legs and trunk : Strong arms assist for ADL such as:

- ❖ Helping in sitting without trunk stability
- ❖ Using hand-operated mobility aids: wheel chair, crutches
- ❖ Periodically rise from chair to relieve pressure symptoms on skin
- ❖ Transferring from seat to toilet, Standing up from chair
- ❖ Extending the arms to lift the seat off the floor
- ❖ Press- up with pillows under the knees and feet

2- Poor Sitting balance:

Children with spina bifida with sever high level have a poor sitting balance due to :

Lack of dynamic stability(weak trunk muscles)

Weak trunk muscles,

Paralysed leg to counterbalance movement of upper limb

Lack of sensation from buttocks ,

lower limb(no proprioception, feedback on base of balance from Lower limb)

Large head (hydrocephalus)

How to overcome Poor Sitting balance:

- Head control Exercises
- Strengthening exercises of back muscles and balance Exercises (Rolling, getting from prone to sit)
- Special seats to provide adequate support
- Regular relive the pressure is necessary

P.T Modalities:

Extensive PT program should be applied in cases of partial paralysis

- ❖ Electrotherapy to relieve pain and induce relaxation
- ❖ Passive movement and passive stretching to maintain available ROM prevent soft tissue contracture
- ❖ Active exercises to prevent muscle imbalance
- ❖ Hydrotherapy when skin is intact to improve ROM
- ❖ Gait training by using Braces

Bladder management:

- Renal disease is responsible for all cases of death in spina bifida, So bladder care is vital for spina bifida children
- Aims: 1- prevent infection 2- establish a satisfactory method of emptying of bladder

- A Patient with spina bifida may have one of the following:

1- Automatic Bladder: is found in children with cyst above T10-11 pressing on cord lead to hyper reflexia of all muscle below level of injury. The muscle will contract in response to certain degree of filling that lead to open the sphincter

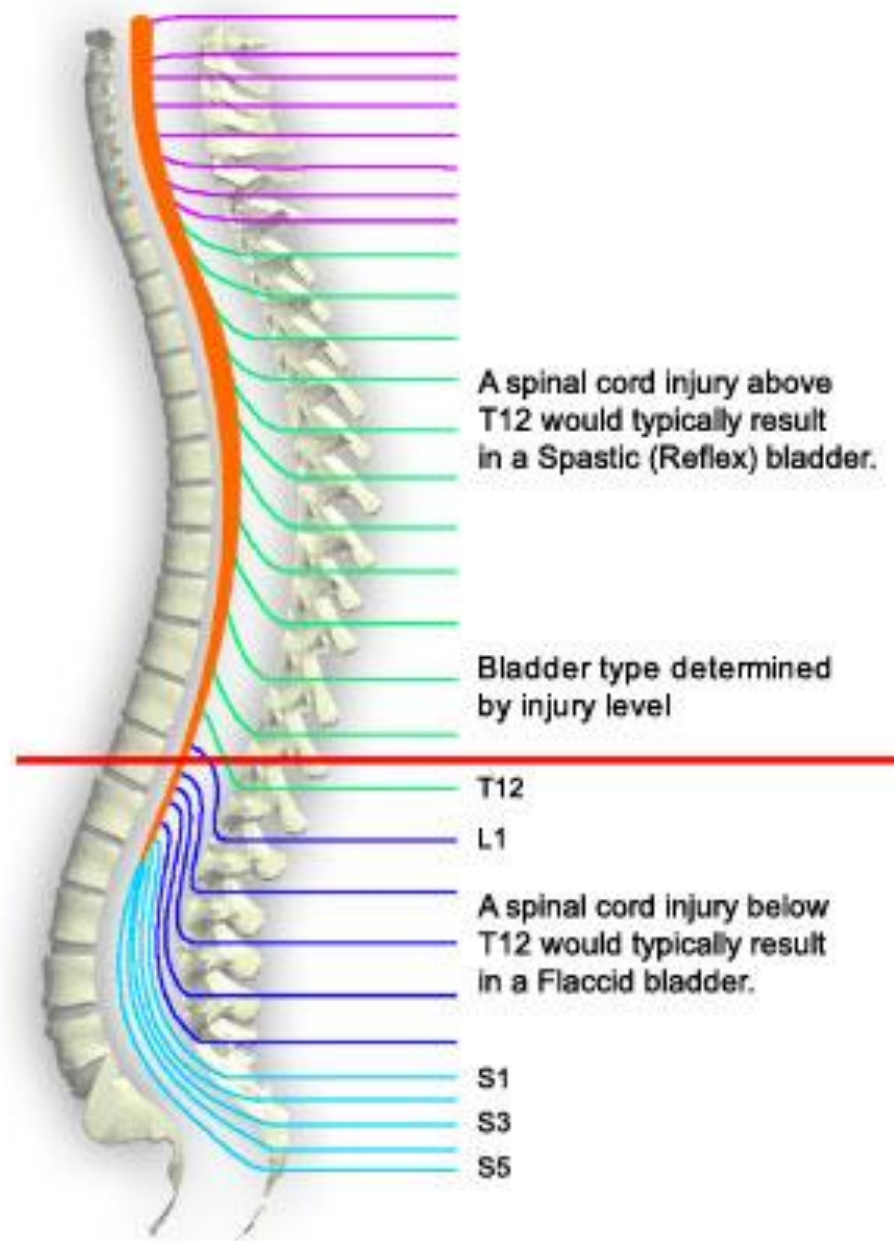
Empty the bladder should be performed every one hour and the baby will remain dry.

2- Autonomous bladder(non- reflex): Most common in spina bifida patient

Atonic bladder, No reflex action, used suprapubic manual pressure to empty bladder every hour should be carried out by parents to keep the child dry until be mature enough to do it by himself.

Bowel management:

- ❖ Bowel training performed when the patient is on full diet
- ❖ Glycerin suppository in the morning followed 15 minutes later by digital evacuation
- ❖ Correct diet and fluids
- ❖ Evacuation should be conducted by parents till child be mature enough



- **Sensation:**

- Children will lack sense of pain temperature touch pressure.
- They cannot protect themselves from hot water and burn.
- They have insensitive feet
- Care should be taken to Ankle foot orthosis from pressure

Proprioception:

- ❖ Lack of proprioceptive feedback from muscles lead to lack of tactile kinetic feedback
- ❖ They rely on visual input only to develop sense of body awareness difficulty in maintain balance and upright sitting

Orthosis:

Ankle Foot Orthosis

Early walking is better than wheel chair in children with high level of lesion in spina bifida

Two orthosis are used to maintain reciprocal gait pattern and enabling standing

Reciprocating gait orthosis and hip guidance orthosis

Prerequisites of fitting orthosis:

- 1- No more than 20 degree of hip flexion
- 2- knee and foot can be rendered in plant grade





**End
Questions?**

