


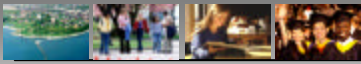

Orthopaedic Neurology

Cervical Cord Lesions: Tetraplegia

Stanley Hoppenfeld, MD

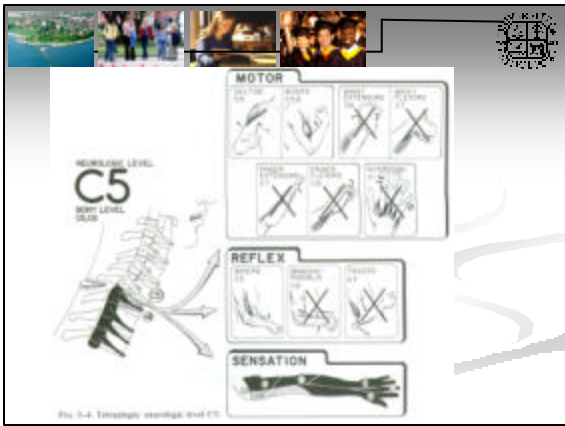
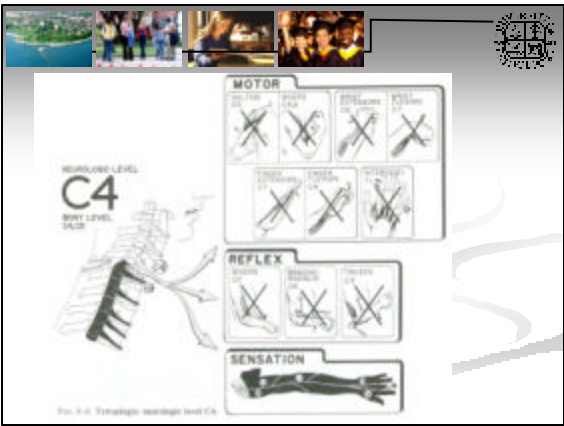
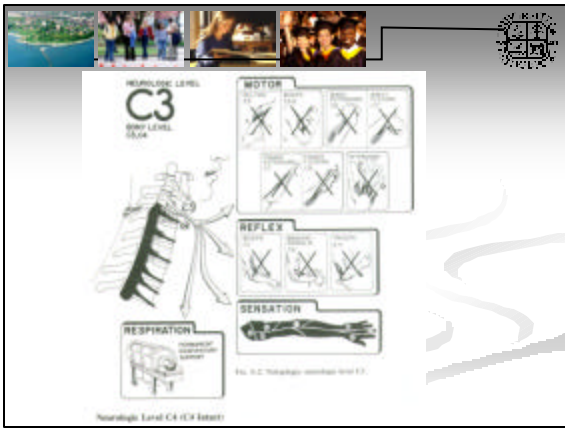
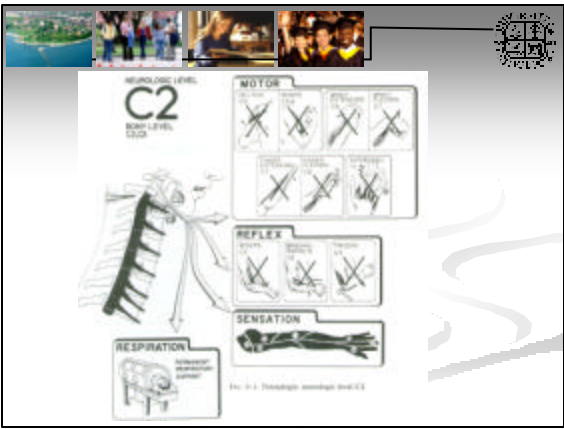


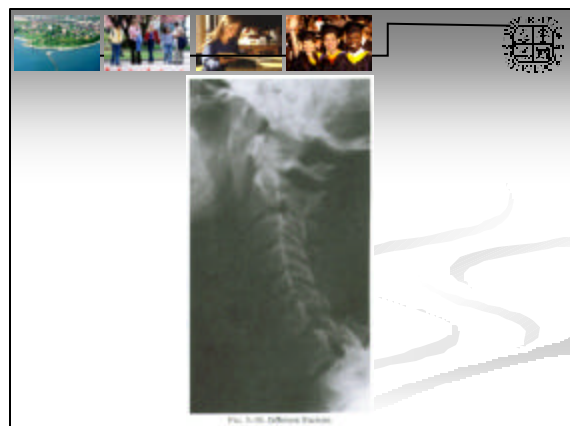
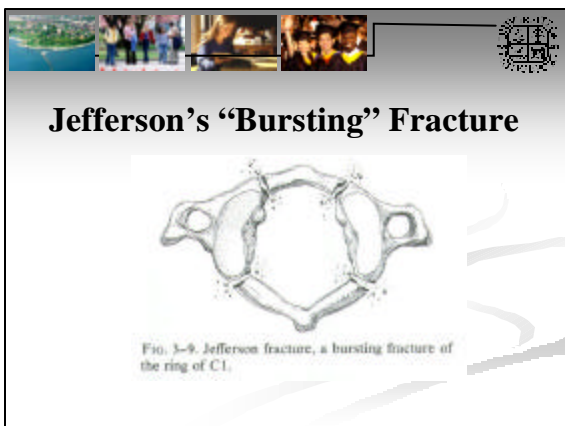
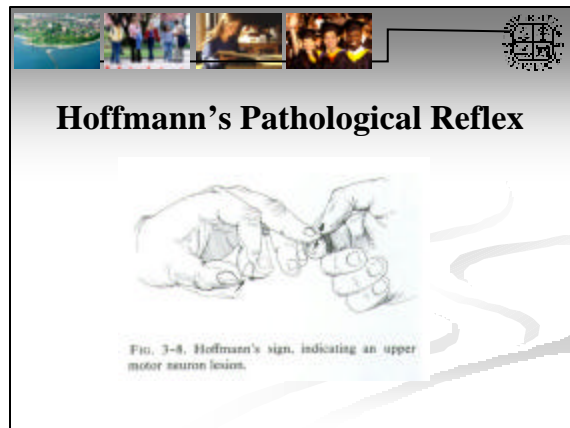
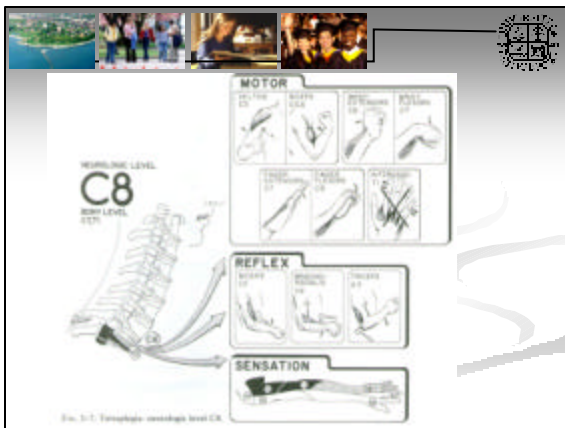
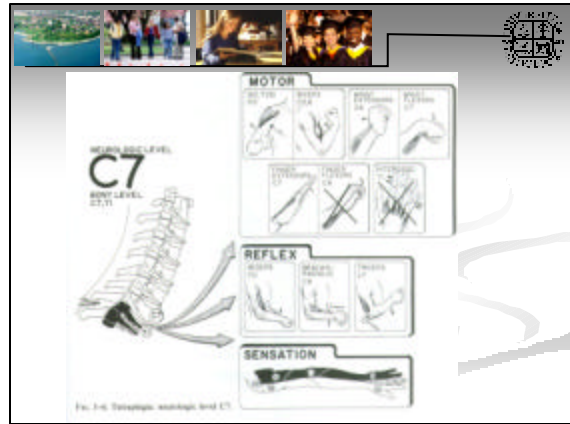
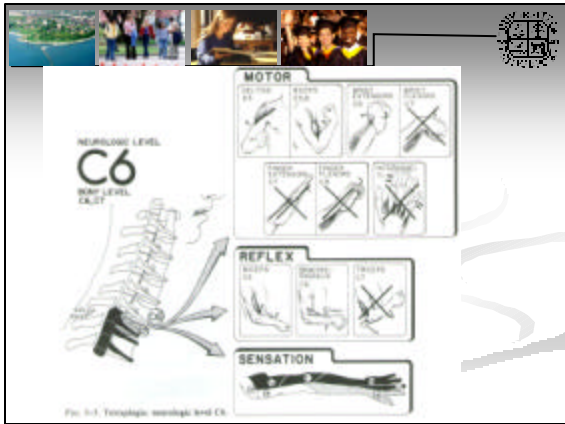
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Tetraplegia or Quadriplegia

- *Tetraplegia or quadriplegia as it is more commonly known, means paralysis involving all four extremities.*





Hangman's Fracture of C2

Fig. 3-12. Hangman's fracture: a fracture that separates the body of C2 from its posterior elements.

Fig. 3-12. Hangman's fracture.

Odontoid Fracture of C2

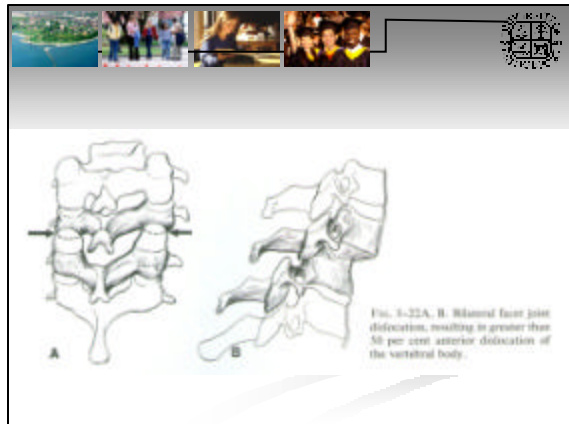
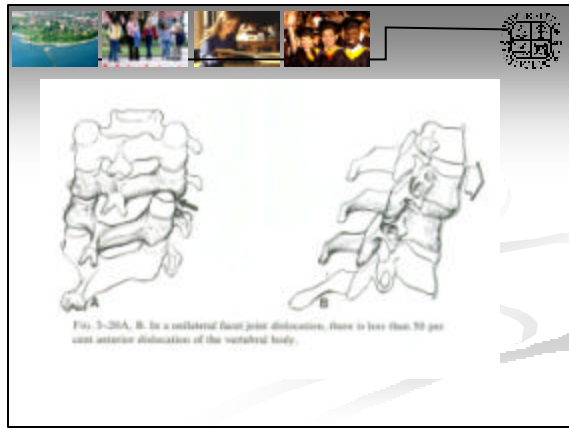
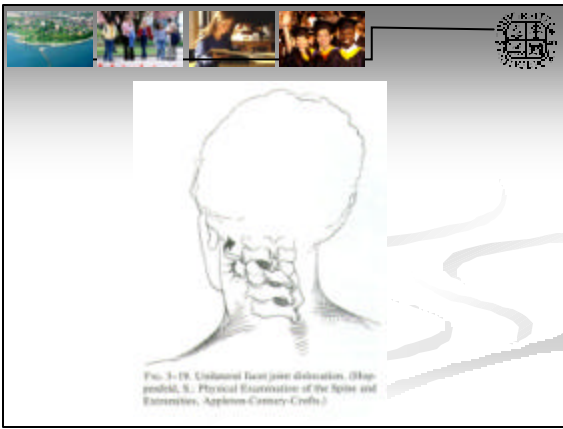
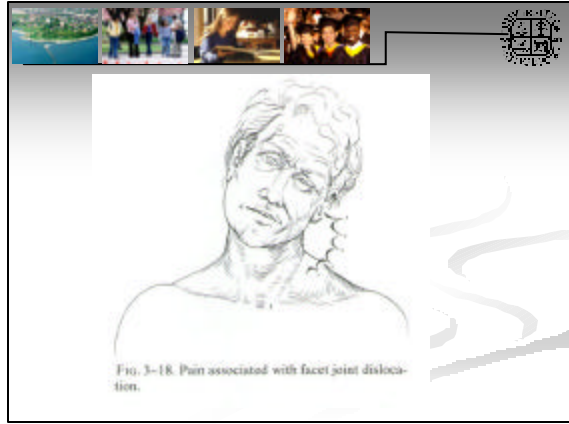
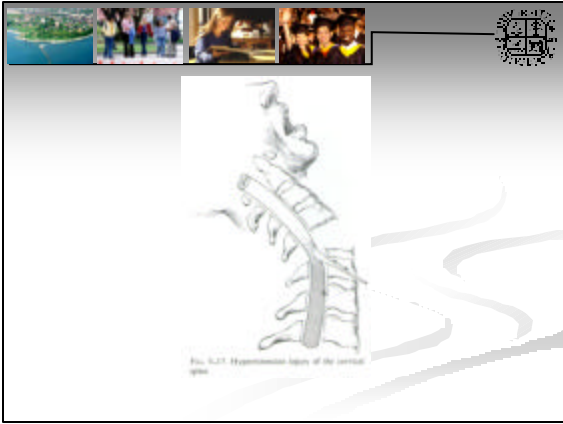
Fig. 3-13. Odontoid fracture.

Fig. 3-14. Odontoid fracture.

Cervical Compression Fracture
Hyperflexion Injury of the Cervical Spine

Fig. 3-15. Cervical compression fracture, caused by hyperflexion of the neck.

Fig. 3-16. Cervical spine compression fracture.





Activities of Daily Living

Respiration

- C3 or higher is incompatible with life and would require permanent ventilation
- C4-5 produces respiratory insufficiency and increases risk with an upper respiratory infection

Activities of Daily Living

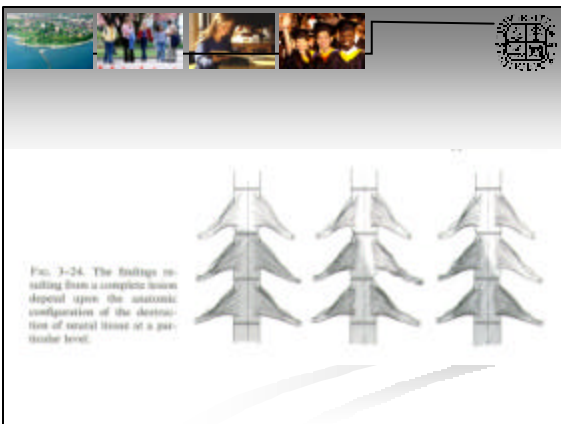
Wheelchair

- C6 and below permits manipulation of a wheelchair
- C6 presents transfer problems due to lack of innervation of the triceps

Activities of Daily Living

Crutches

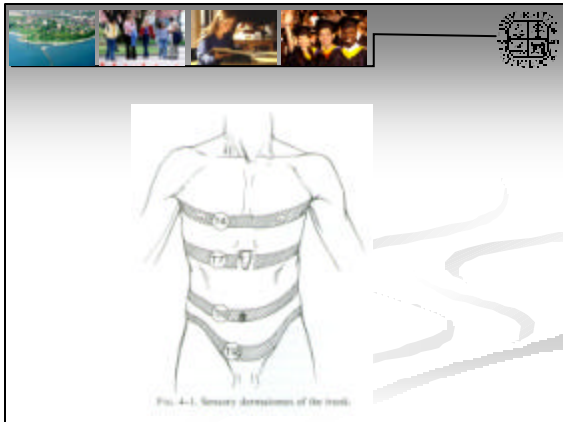
- Complete cord lesions at C8 and above prevent use of crutches due to loss of grip strength



Spinal Cord Lesions Below T1

Including the Cauda Equina

- *Paraplegia is the complete or partial paralysis of the lower extremities and lower portion of the body.*



Sensory Evaluation

- Sensory evaluation is easier than the motor evaluation

Motor Evaluation

- Motor testing of the intercostal muscles involves observation of the respiratory activity

Motor Evaluation

- Abdominal and paravertebral muscles innervated by T7 – T12 (L1)
- Half sit-up tests are not performed during acute stage
- Beevor's Sign

L1 Neurologic Level

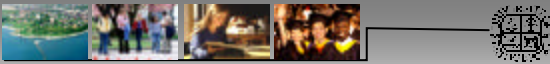
L1 Intact

- Some hip flexion but complete paralysis of lower extremities
- No sensation inferior to L1 sensory band
- Initially LE DTR's are absent
- When spinal shock wears off, the reflexes become exaggerated
- Loss of bowel and bladder function

L2 Neurologic Level

L2 Intact

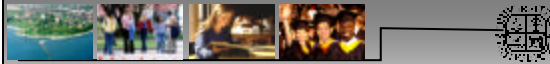
- Partial function of iliopsoas and adductors
- No sensation below L2 sensory band
- Minimal patellar reflex possible
- No voluntary control of bowel and bladder



L3 Neurologic Level

L3 Intact

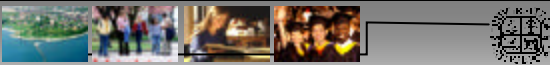
- Partial function of quadriceps and adductors
- Full strength of iliopsoas
- Sensation is normal to level of knee
- Decreased patellar and absent Achilles
- No bowel and bladder control



L4 Neurologic Level

L4 Intact

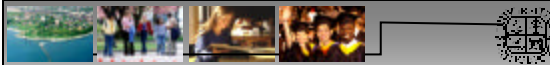
- Iliopsoas, adductors, and quadriceps motor WNL
- Tibialis inverts and dorsiflexes foot
- Sensory loss to L5 and S1,2,3,4
- No voluntary control of bowel and bladder function



L5 Neurologic Level

L5 Intact

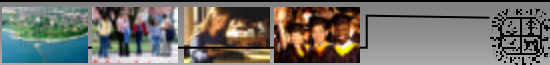
- Gluteus maximus does not function with hip flexion deformity
- Partial function of gluteus medius
- Knee flexors function partially with medial hamstring but not the lateral hamstrings
- Dorsiflexion deformity of foot due to plantar flexors and evertors absent



L5 Neurologic Level

L5 Intact

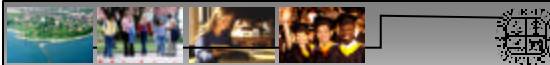
- Lower extremities have normal sensation except at lateral side and plantar surface of foot
- Medial hamstring and patellar DTR WNL but achilles is zero +
- No control of bowel and bladder function



S1 Neurologic Level

S1 Intact

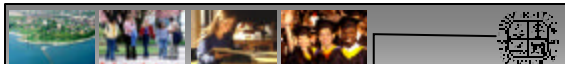
- Slight gluteus maximus weakness
- Weakness in soleus and gastrocnemius
- Clawing of toes due to weakness of intrinsic muscles



S1 Neurologic Level

S1 Intact

- Sensation in lower extremities WNL
- Perianal anesthesia
- DTR for LE are 2+
- No bowel or bladder function



Pathologic Reflex
Babinski Sign is Present


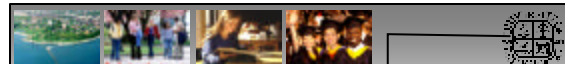
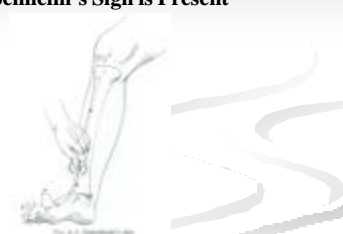
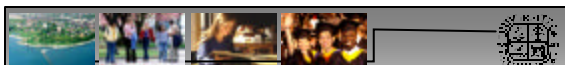


FIG. 4-2. Babinski's sign.



Pathologic Reflex
Oppenheim's Sign is Present

Normal Superficial Reflex
Cremasteric Reflex

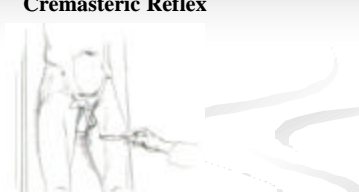


FIG. 4-4. The cremasteric reflex. (Hess, 1961, 6.) Physical Examination of the Spine and Extremities, Appleton-Century-Crofts.

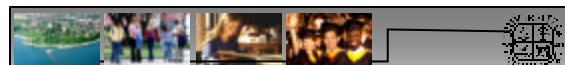
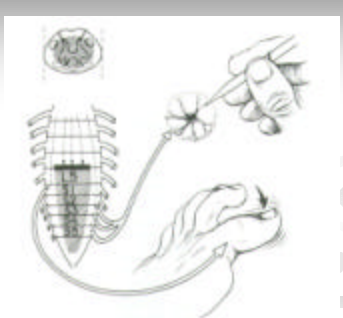



FIG. 4-5. Sacral spines.

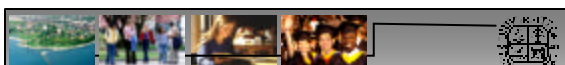
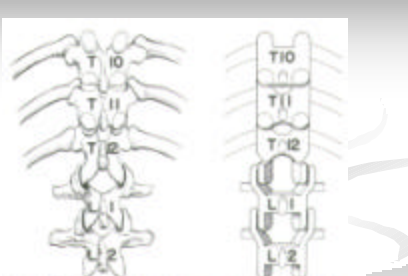



FIG. 4-6. Differences in facet joint anatomy of the thoracic and lumbar spines.

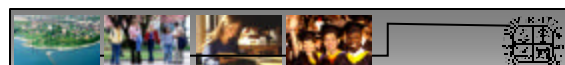
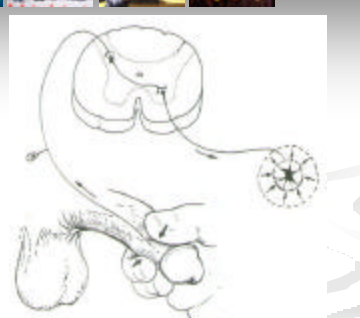



FIG. 4-7. The bulbocavernosus reflex.

