

Cervical Spine Pathologies and Treatments

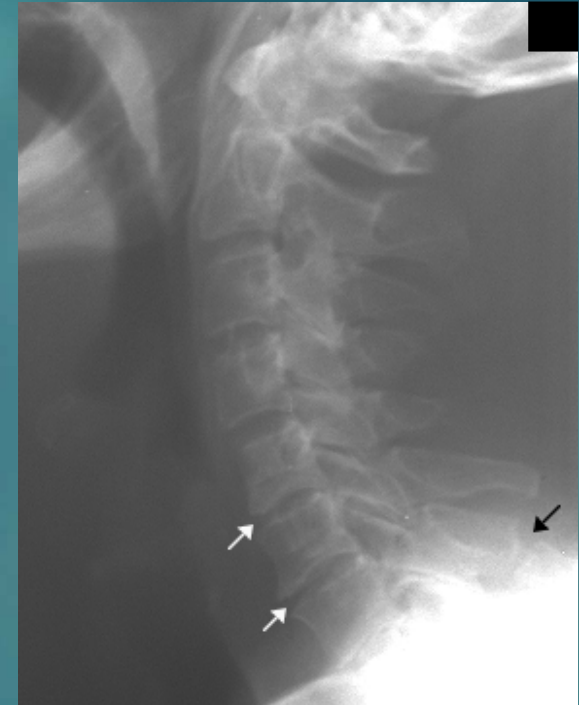
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Degenerative Disease of the Spine

- Degenerative processes of aging occur at different rates, locations, and modalities, based on the unique attributes of individuals (factors known to influence degenerative diseases of the spine include lifestyle, work patterns, diet, and even genetics)



Normal



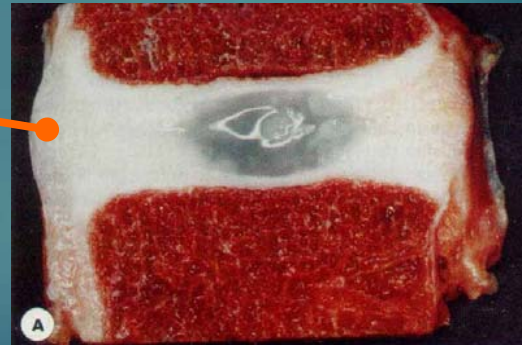
Degenerative

Cervical Spondylosis

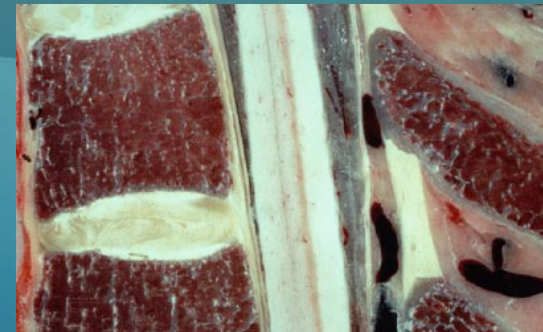
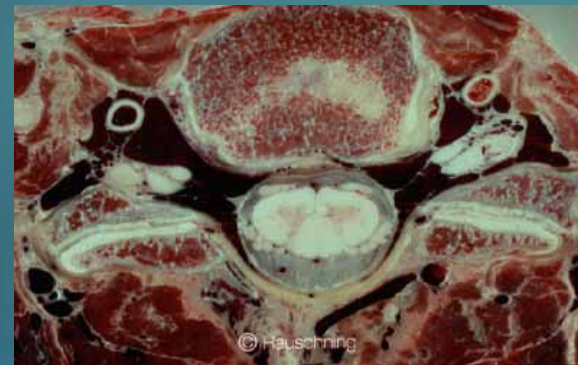
- Cervical spondylosis is a general term encompassing a number of degenerative conditions
 - Degenerative disc disease (DDD)
 - Spinal stenosis
 - With or without degenerative facet joints
 - With or without the formation of osteophytes
 - With or without a herniated disc
- One single component as a diagnosis is rare

Degenerative Disc Disease

- The process is thought to begin in the annulus fibrosis with changes to the structure and chemistry of the concentric layers
- Over time, these layers suffer a loss of water content and proteoglycan, which changes the disc's mechanical properties, making it less resilient to stress and strain



Normal
Pathology



Degenerative Disc Disease

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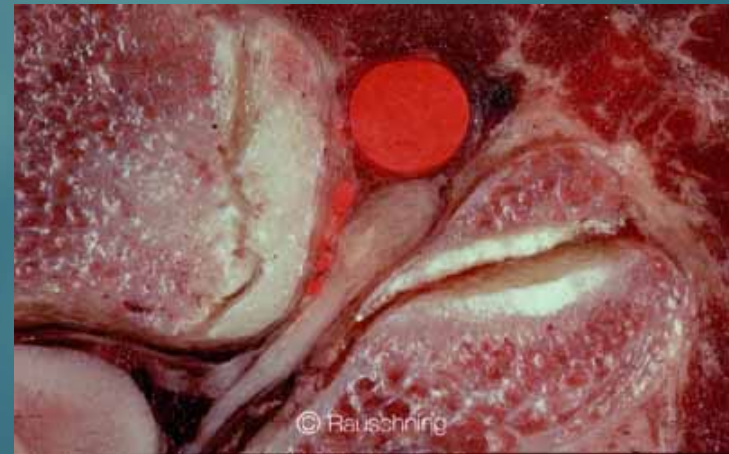


Degenerated
Pathology



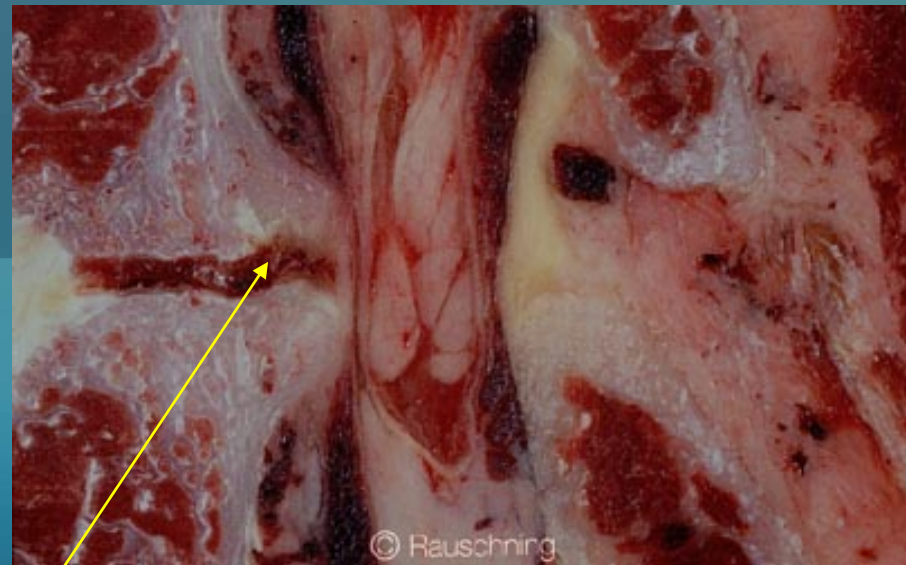
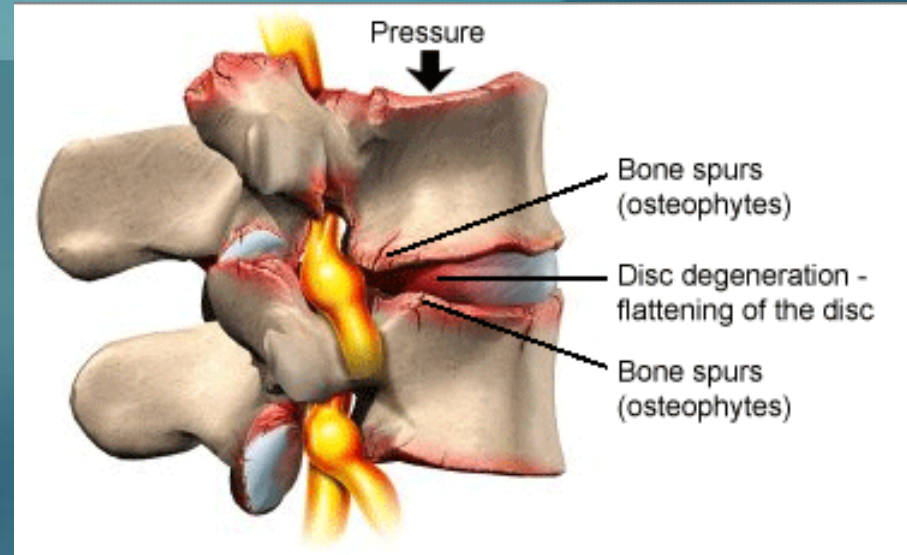
Degenerative Disease: Facet Joints

- Changes in disc structure and function can lead to changes in the articular facets, especially *hypertrophy* (overgrowth), resulting from the redirection of compressive loads from the anterior and middle columns to the posterior elements



Degenerative Disease: Osteophytes

- There also may be hypertrophy of the vertebral bodies adjacent to the degenerating disc; these bony overgrowths are known as *osteophytes* (or bone spurs)



Herniated Nucleus Pulposus

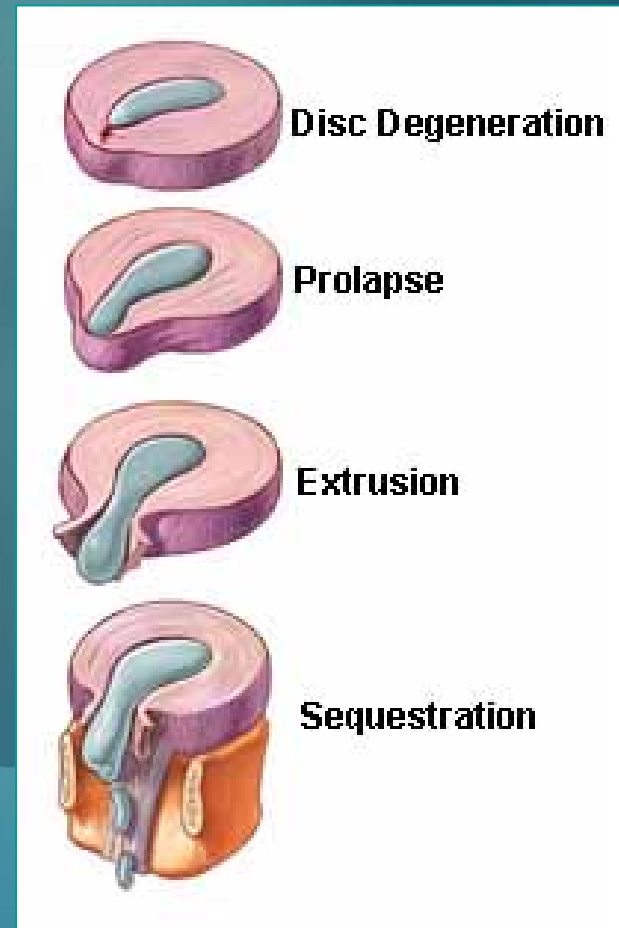
- The progressive degeneration of a disc, or traumatic event, can lead to a failure of the annulus to adequately contain the nucleus pulposus
- This is known as *herniated nucleus pulposus* (HNP) or a herniated disc



Herniated Nucleus Pulposus

Varying degrees

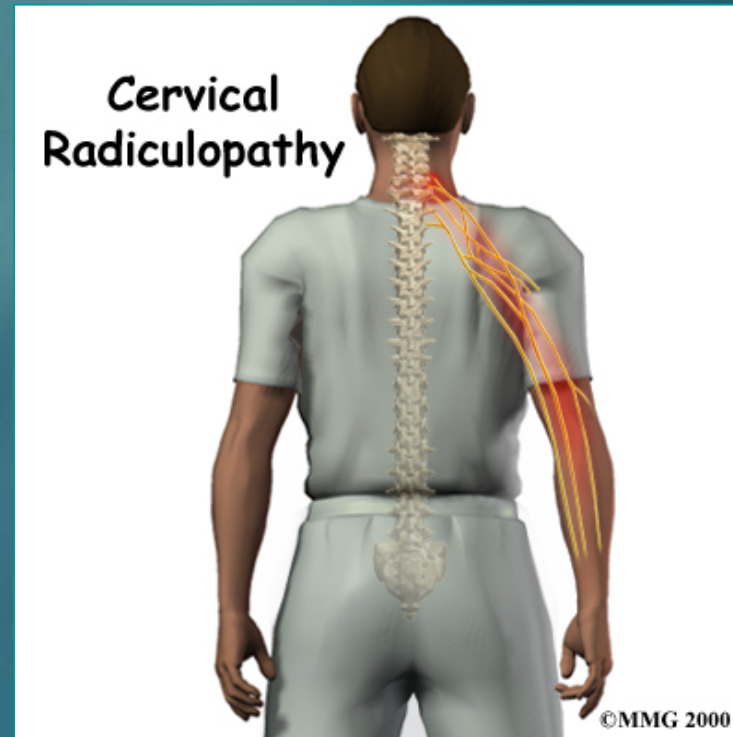
- Disc bulge
 - Mild symptoms
 - Usually go away with nonoperative treatment
 - Rarely an indication for surgery
- Extrusion (herniation)
 - Moderate/severe symptoms
 - Nonoperative treatment



Herniated Nucleus Pulposus

- Symptoms
 - Neck pain
 - Shoulder pain
 - Arm pain
 - Dysthesias
 - Anesthesias

May resemble carpal tunnel syndrome, rotator cuff problems, or gout



Herniated Nucleus Pulposus

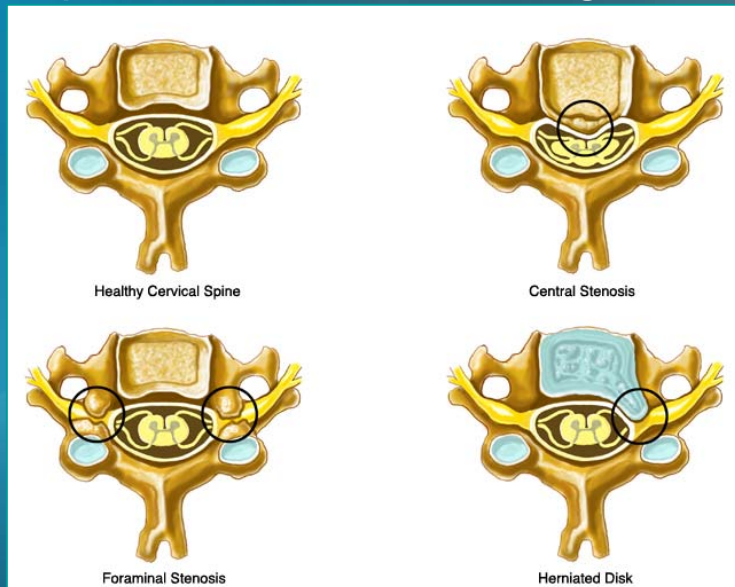
- Diagnosis
 - Magnetic resonance imaging (MRI)/patient examination
 - Motor deficit is an indication of spinal cord compression and requires urgent surgery
 - Not all HNPs are symptomatic



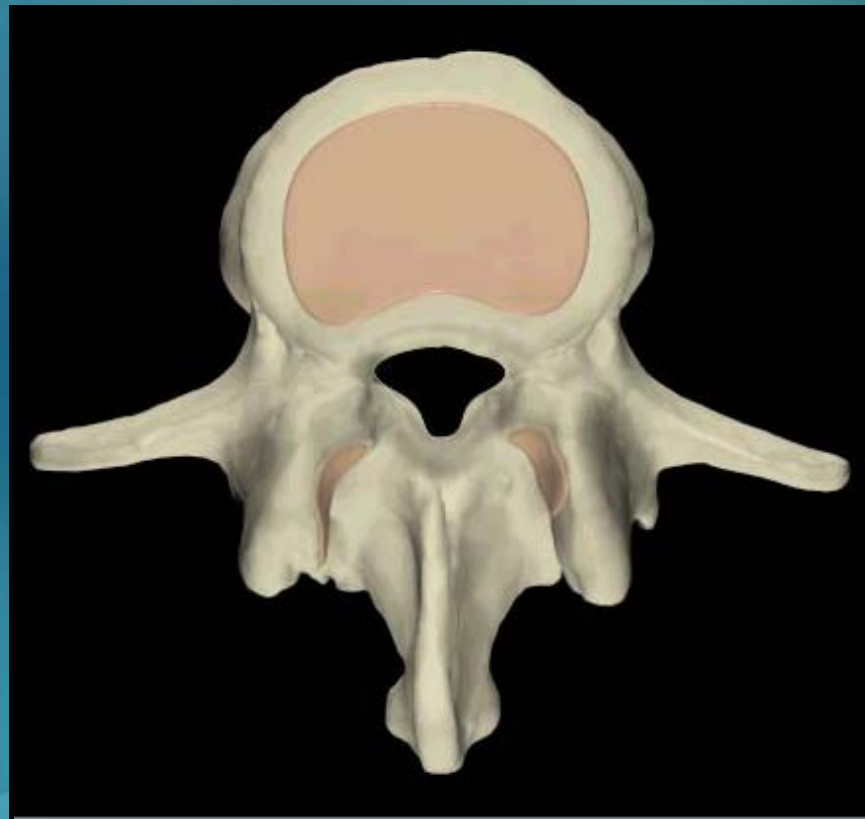
Sagittal T2-weighted MRI

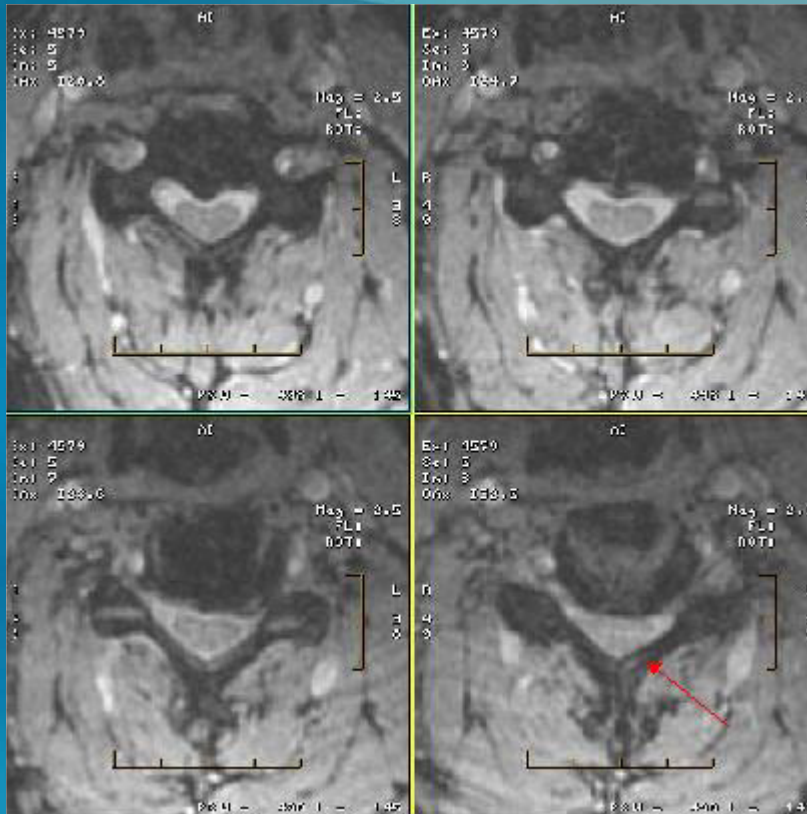
Spinal Stenosis

- Grouped as “spinal stenosis”
 - Central stenosis
 - Narrowing of the central part of the spinal canal
 - Foraminal stenosis
 - Narrowing of the foramen resulting in pressure on the exiting nerve root

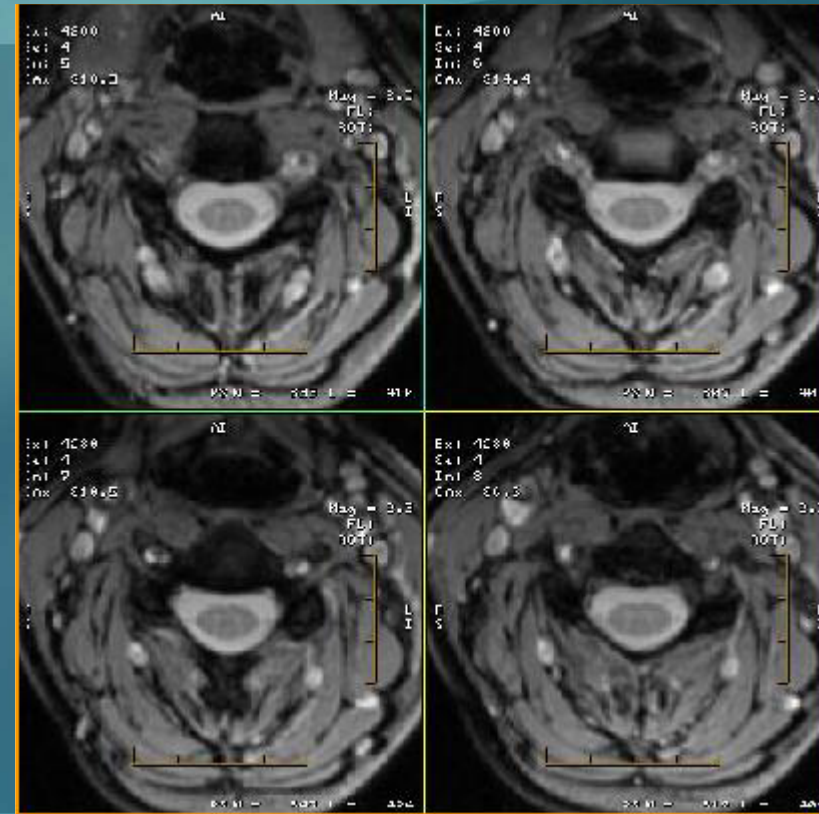


Spinal Stenosis





Stenotic



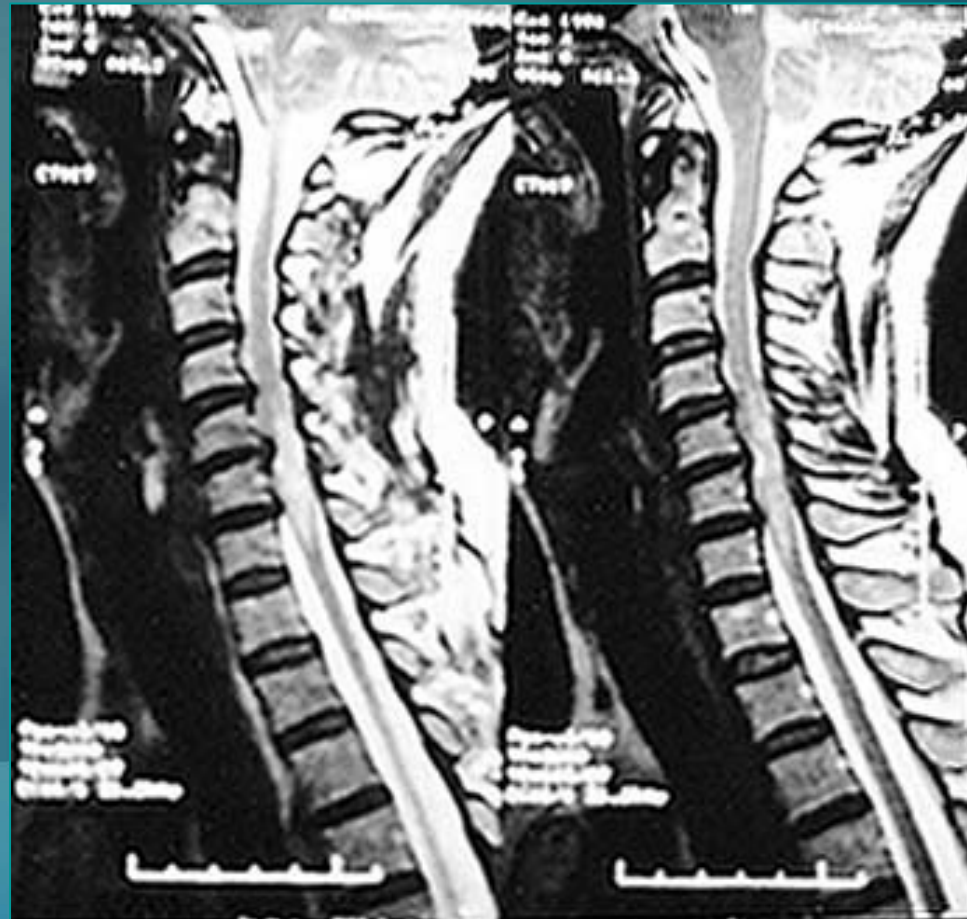
Normal



T2- and T1-weighted sagittals at midspine showing spinal canal stenosis from C4/C5/C6 level

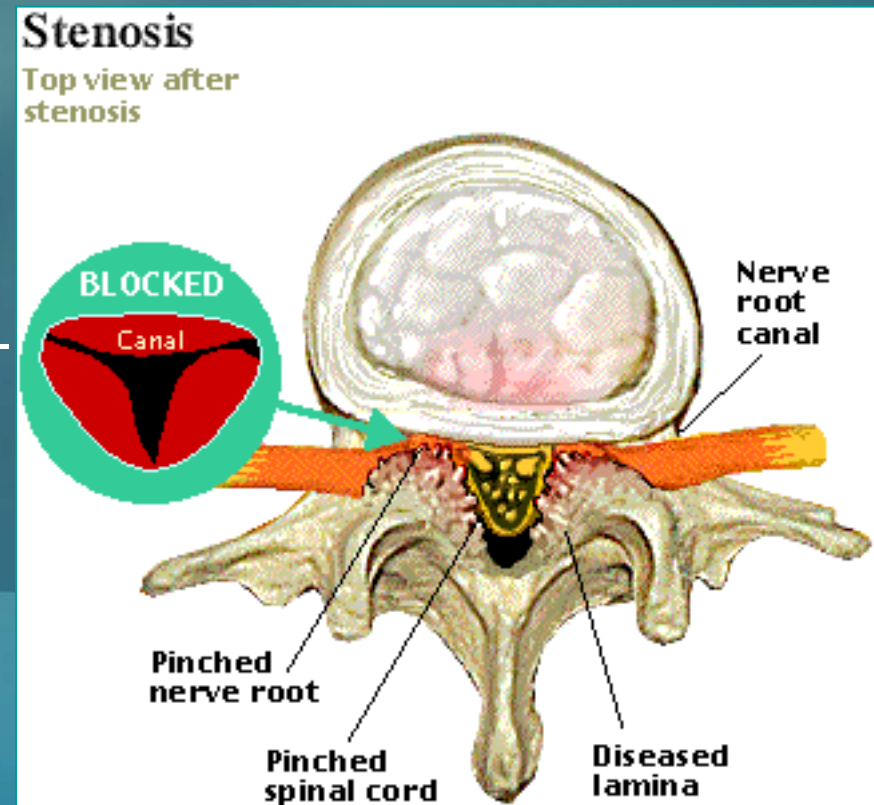
Spinal Stenosis

- Symptoms
 - Neck pain
 - Pain, dyesthesias, anesthetics in arms and hands
 - Bilateral



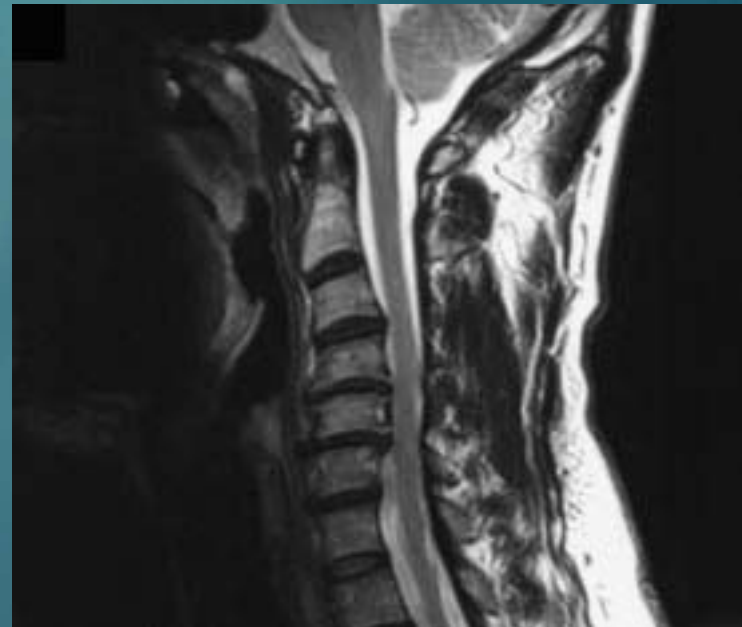
Spinal Stenosis

- Diagnosis
 - MRI/computerized tomography (CT) scan/patient examination
- Failure of nonoperative care — minimum 6 months
 - Rest, nonsteroidal anti-inflammatory (NSAID) medication, physical therapy, epidural steroid injections



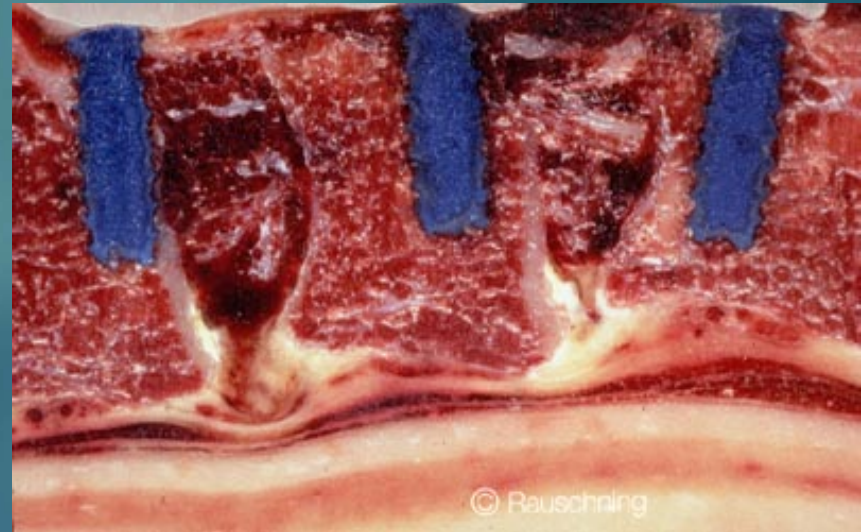
Cervical Spondylotic Myelopathy

- The most common type of spinal cord dysfunction in patients older than 55 years
- Onset is usually insidious, with long periods of fixed disability and episodic worsening
- The first sign is commonly gait spasticity, followed by upper-extremity numbness and loss of fine motor control in the hands



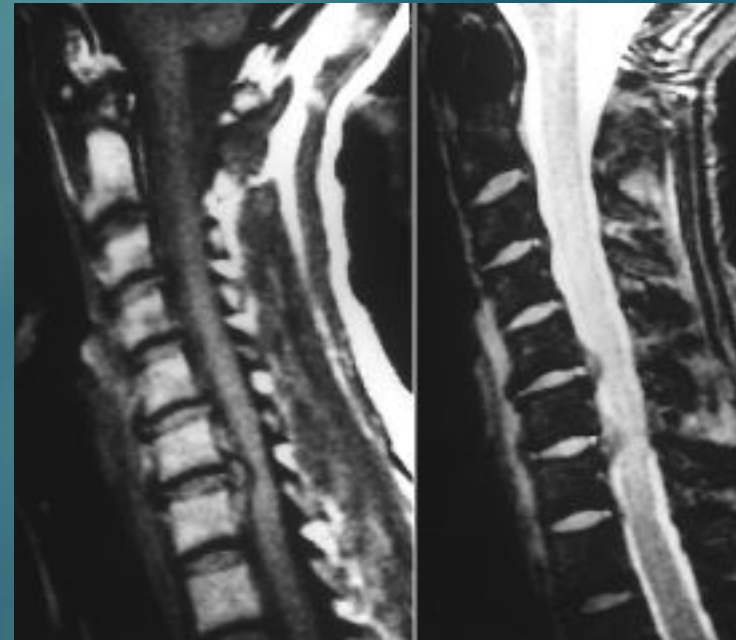
Cervical Spondylotic Myelopathy

- Unlike most degenerative conditions of the back and neck, conservative treatment is not indicated
- Performing surgery relatively early (within 1 year of symptom onset) is associated with a substantial improvement in neurologic prognosis
- Delay in surgical treatment can result in permanent impairment



Cervical Spondylotic Myelopathy

- Symptoms
 - Pain in the neck, subscapular area, or shoulder
 - Anesthesias or paresthesias in the upper extremities
 - Sensory changes in the lower extremities
 - Motor weakness in the upper or lower extremities
 - Gait difficulties
 - “Upper motor neuron” findings; “lower motor neuron” findings



Cervical Spondylosis Without Myelopathy

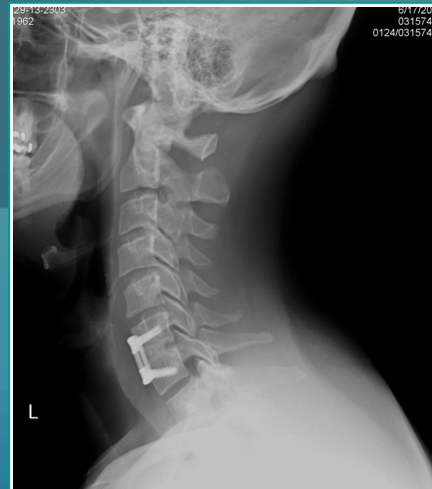
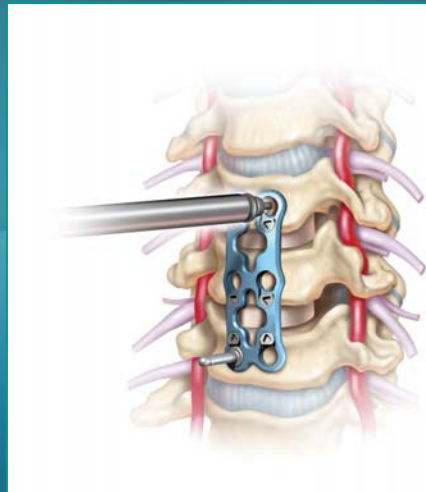
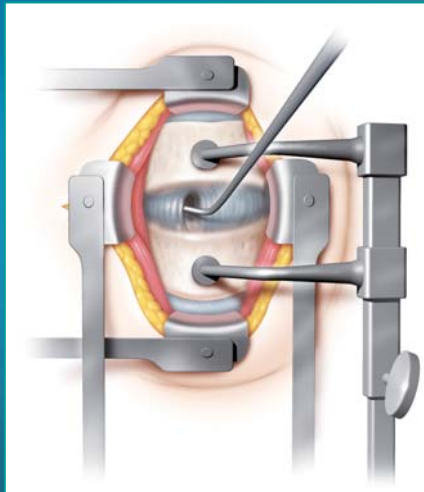
- Surgical care
 - For radicular/neurologic symptoms
 - Not for axial neck pain
 - Dependent on the anatomy and the lordosis of the affected segments, and surgeon preference
 - Anterior cervical discectomy and fusion
 - Anterior cervical corpectomy (multiple levels)
 - In some cases, adjunct posterior-instrumented fusion

Cervical Spondylotic Myelopathy

- Surgical care
 - Posterior cervical fusion—instrumented
 - Dependent upon the anatomy and the lordosis of the affected segments, and surgeon preference
 - Posterior cervical fusion
 - Laminoplasty
 - May involve an adjunct anterior fusion procedure to address spondylosis

Anterior Cervical Discectomy and Fusion (ACDF)

- High success rate >90% for 1 level
 - Multilevels
 - Disc removal/decompression
 - Use of microscope
 - Bone graft or other material for fusion
 - Usually with plating



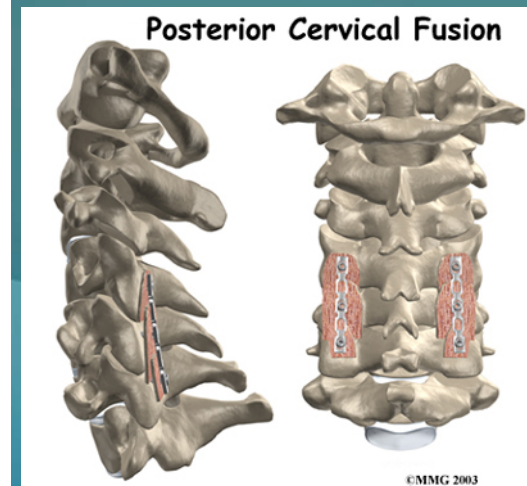
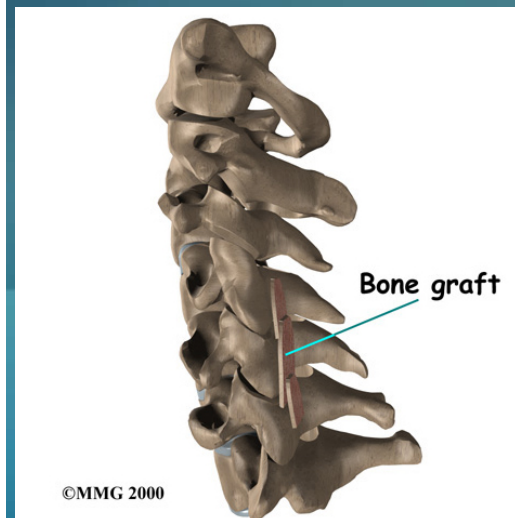
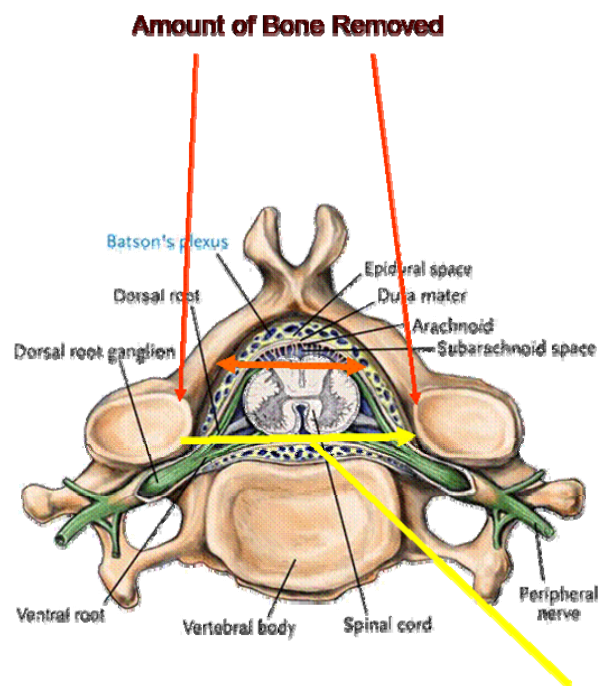
Anterior Cervical Corpectomy (and Fusion)

- Multilevel spondylosis/spondylotic myelopathy
 - Disc and vertebra removal
 - Decompression
 - Use of microscope
 - Bone graft or other material for fusion
 - Always with plating



Posterior Cervical Fusion

- Cervical spondylotic myelopathy
 - Decompression
 - Bone graft or other material for fusion
 - Instrumentation



Laminoplasty

- Stenosis
- Spondylotic myelopathy
 - Laminae are hinged laterally like an open door, creating more space
 - Nerve and cord decompression

