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Goals

- Recognize, evaluate and treat potentially urgent/emergent neurologic conditions in spine patients
- Understand some of the underlying pathology related to these conditions

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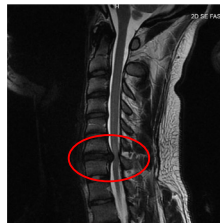
Myelopathy

- Myelopathy is compression of the spinal cord either in the cervical or thoracic spine
- Myelopathy cannot take place in the lumbar spine
- Myelopathy presents in a different manner than radiculopathy (compression of nerve roots but not the spinal cord)

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Cervical Myelopathy

- Compression of the spinal cord in the cervical spine
- May involve upper and/or lower extremities
- Can be vague and not painful



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Cervical Myelopathy

- Symptoms:
 - Paresthesia to all 4 extremities
 - Gait or balance disturbance
 - Weakness
 - Urinary retention
 - Radicular pain

Symptoms	Number of patients (%)
Numbness of face	14 (34.6%)
Numbness of arms	41 (84.6%)
Numbness of legs	34 (67.4%)
Hand clumsiness	23 (46.1%)
Gait disturbance	25 (49.8%)
Urinary incontinence	32 (63.7%)
Sphincter disturbances	19 (37.9%)
Sudden paraparesis	7 (14%)
Spinal	
• Impairment of arms	35 (67.3%)
• Impairment of legs	47 (89.3%)
Spastic gait	49 (95.9%)
Impaired vibration sense of wrist	23 (44.7%)
Impaired vibration sense of ankle	32 (62%)
Reduced pinprick sense in arm	20 (38.3%)
Reduced pinprick sense in leg	32 (62%)
Weakness of arms	22 (42.3%)
Weakness of legs (spastic paraparesis)	11 (21.2%)
Reduced pinprick sense with a level of trunk	9 (17.3%)

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Cervical Myelopathy

- Evaluation:
 - Thorough neurologic exam
 - MRI or CT myelogram

Sign	Positive finding	Sensitivity	Specificity
Sustained clonus	Rhythmic flexion and extension of the ankle, at least three beats, after a sudden and sustained dorsiflexion at the ankle	13%	100%
Babinski sign	Extension of the great toe with abduction of the remaining toes when a nocuous stimulus is applied from the base of the lateral aspect of the calcaneus upward to the base of the toes	13%	100%
Hoffmann sign	Opposition of the thumb and slight flexion of the fingers after flexing the middle finger (Figure 5-116) (www.youtube.com/watch?v=UgTQrmtat)	59% to 67%	85%
Inverted brachioradialis reflex, also labeled inverted supinator sign	Tapping of the styloid process of the radius results in absence of brachioradialis muscle contraction and flexion of the wrist and slight finger supination (Figure 5-116) (www.youtube.com/watch?v=UgTQrmtat)	51%	85%
Babinski reflex	Stroking the sole of the foot results in a vigorous contraction of the ipsilateral extensor facies lata	Not reported	
Lhermitte sign	Flexion of the neck results in a shooting, electrical sensation down the same	Not reported	

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Cervical Myelopathy

- Causes:
 - Degenerative
 - Disc herniation
 - Trauma
 - OPLL
 - Epidural Abscess
 - Tumor



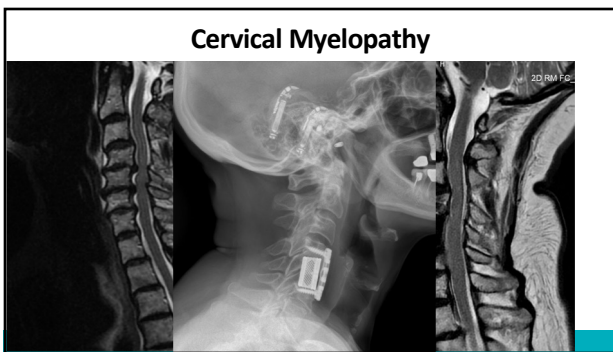
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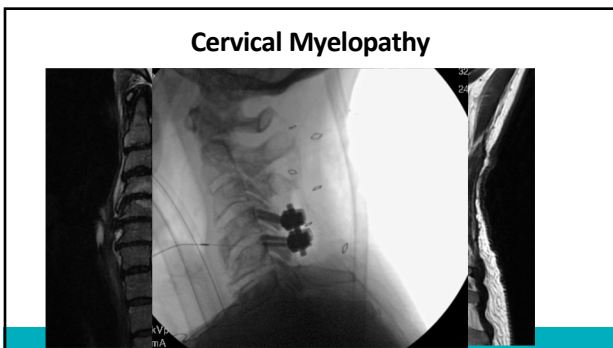
Cervical Myelopathy Treatment

<ul style="list-style-type: none">• Non Surgical<ul style="list-style-type: none">- Only if mild symptoms with no functional deficit- Symptom management with medications and PT	<ul style="list-style-type: none">• Surgical<ul style="list-style-type: none">- More common as patients presenting for evaluation likely have significant symptoms and there is significant risk of symptomatic progression
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Thoracic Myelopathy

- Basically the same as Cervical myelopathy but does not involve the upper extremities

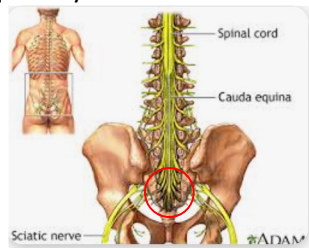


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Cauda Equina Syndrome

- Compression of the lumbosacral nerve roots leading to dysfunction of voluntary control of the bladder, urethral and anal sphincter

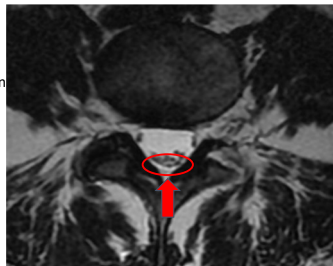
Functionally an intraneural compartment syndrome



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Cauda Equina Syndrome

- Presentation
 - Lower extremity radicular pain
 - Perianal/Genital parasthesias
 - Incomplete/complete loss of voluntary bladder control
 - Bowel incontinence



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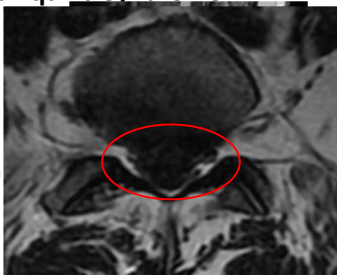
Cauda Equina Syndrome

- Evaluation
 - Examination must include full neurologic assessment including evaluation of rectal tone and perianal sensation
 - Advanced imaging (MRI/Myelogram) STAT

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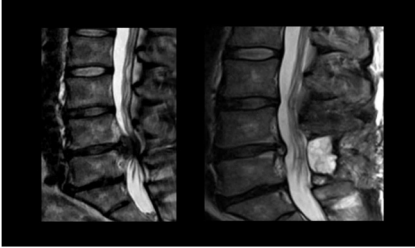
Cauda Equina Syndrome

- Causes
 - Disc herniation
 - Tumor
 - Epidural abscess
 - Fracture
 - Epidural hematoma/seroma



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Cauda Equina Syndrome



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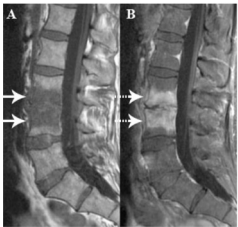
Cauda Equina Syndrome

- Treatment
 - Emergent decompression of the involved levels with or without stabilization
- Prognosis
 - improved outcomes in bowel and bladder function and resolution of motor and sensory deficits when decompression performed within 48 hours of the onset of symptoms
 - residual bladder deficits may persist despite successful decompression
 - motor recovery may continue up to 1 year post-op
 - bladder function may continue to improve up to 16 months post-op

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Discitis/Osteomyelitis


- Infection involving some combination of discs/vertebrae of the cervical/thoracic/lumbar spine
 - May or may not have epidural abscess or associated psoas abscess if in lumbar spine



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Discitis/Osteomyelitis

- Presentation
 - Typically present with atraumatic worsening pain at the infected site
 - Occasionally present with systemic symptoms i.e. malaise, fever, fatigue
 - History will often include recent infection at other sites (UTI, pneumonia)



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Discitis

- 50-60% of cases in lumbar spine
- 30-40% in thoracic spine
- ~10% in cervical spine

Risk factors:

- Uncontrolled diabetes
- Immunosuppression (e.g., corticosteroids)
- Recent systemic infections (e.g., pneumonia)
- Intravenous drug use
- Promised patients
- Sickle cell disease
- Cocaine users



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Discitis/Osteomyelitis


- Evaluate:
 - Thorough neurologic evaluation
 - Assess for any history of recent infections or other potentially contributory medical history that puts patient at risk

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Discitis/Osteomyelitis

Workup

- Xray/CT - helpful to evaluate bony destruction/erosion
- MRI - Most sensitive/specific to thoroughly evaluate soft tissue extension (Epidural or psoas abscess)
- CBC, ESR, CRP, blood cultures




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Discitis/Osteomyelitis

Treatment:

- Broad spectrum Abx
- CT guided biopsy
- IV antibiotics based on biopsy
- May require surgical stabilization if bony destruction creates instability



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Discitis/Osteomyelitis

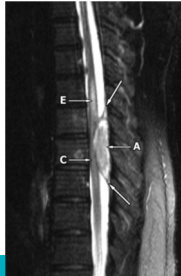
Staphylococcus aureus	203 (68.8)
Methicillin-susceptible <i>S. aureus</i>	115 (33.3)
Methicillin-resistant <i>S. aureus</i>	88 (25.5)
Gram-negative bacteria	75 (21.7)
<i>Escherichia coli</i>	38 (11.0)
<i>Klebsiella pneumoniae</i>	14 (4.0)
Enterobacter species	5 (1.4)
Nontyphoidal <i>Salmonella enterica</i>	4 (1.2)
<i>Pseudomonas aeruginosa</i>	4 (1.2)
Other gram-negative bacteria ^a	10 (2.9)
Streptococcus species	39 (11.3)
Viridans group streptococci	20 (5.8)
Streptococcus agalactiae	13 (3.8)
Streptococcus pneumoniae	4 (1.1)
Other streptococci ^b	2 (0.6)
Coagulase-negative staphylococci ^c	10 (2.9)
Enterococcus species	10 (2.9)
Anaerobe ^d	5 (1.5)

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Discitis/Osteomyelitis With Epidural Abscess


Treatment:

- If a lumbar epidural abscess or small non-compressive abscess and neuro intact can consider nonop
- More commonly if epidural abscess will require decompression with evacuation of abscess often on urgent/emergent basis



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Ankylosed Spine Fractures



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Ankylosed Spine Fractures

- Fractures through a fused(ankylosed) segment of spine
- Often appear insignificant but potentially very unstable
- High risk for epidural hematoma



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Ankylosed Spine Fractures



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Ankylosed Spine Fractures

Eval:

- Thorough neurologic exam
- Advanced imaging including CT scan of entire spine
- Low threshold for MRI entire spine as well

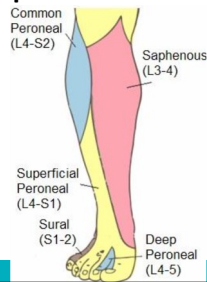
Treatment:

- Can consider bracing if neurologically intact and not grossly unstable
- More commonly multilevel fixation for stability

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Foot Drop

- Inability to dorsiflex ankle due to dysfunction of tibialis anterior muscle
 - Typically caused by either compression of L4 or L5 nerve roots
 - Can be caused by peroneal neuropathy with nerve compression around proximal fibula



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Foot Drop

• Eval:

- Thorough neuro exam
- MRI lumbar spine
- EMG affected leg

• Treatment:

- If neural compression on MRI likely needs decompression
- If EMG findings consistent with peroneal neuropathy or peripheral neuropathy and no nerve compression on MRI may need surgical decompression of the nerve

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C5 palsy

- Weakness with shoulder abduction (deltoid) and biceps
- Can happen atraumatically
- MRI cervical spine and if stenosis at C4-5 will likely require urgent decompression
- Rule out shoulder pathology

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Thank You



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