What's New in My Specialty:

Interventional Pain Management

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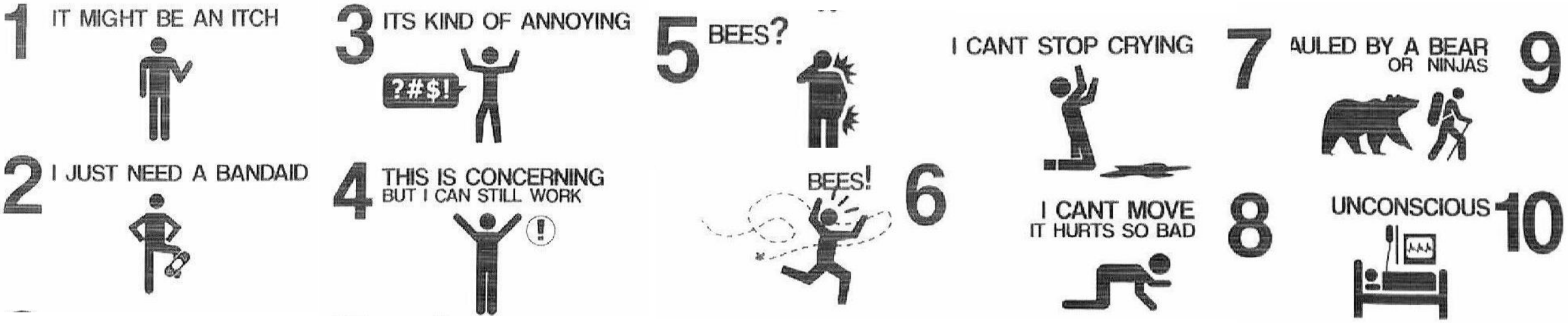
FINANCIAL DISCLOSURES

This presentation has no ineligible company content, promotes no ineligible company, and is not supported financially by any ineligible company. I receive no financial remuneration from any ineligible company related to this presentation.

My Background

- Anesthesia and Interventional Pain Management
- Trained back east
- Moved to be near family
- Solo physician, amazing PA and team
- 100% Pain

Pain Scales


1
IT MIGHT BE AN ITCH
2
I JUST NEED A BANDAID
3
ITS KIND OF ANNOYING
?#$!
4
THIS IS CONCERNING
BUT I CAN STILL WORK
5
BEES?
BEES!
6
I CANT STOP CRYING
7
I CANT MOVE
IT HURTS SO BAD
8
AULED BY A BEAR
OR NINJAS
9
UNCONSCIOUS
10

Interventional Pain Management

- A specialized medical approach aimed at diagnosing and treating chronic pain through minimally invasive procedures
- Employs targeted interventions that directly address the underlying cause of pain
- Goal: reduce pain levels, enhance physical function, improve well-being

Objectives

- Back pain for chronic pain paradigm
- Interventional techniques
- Interesting pearls (CRPS, EDS, cauda equina)
- Medications: buprenorphine and ketamine

Back Pain

- 80% adults will have back pain in their lifetimes (1)
- Back symptoms account for about 1% of all ambulatory visits (2)
- Prevalence ranges from 20-40% (1,3)

(1) Cassidy JD, Carroll LJ, Côté P. The Saskatchewan health and back pain survey. The prevalence of low back pain and related disability in Saskatchewan adults. Spine (Phila Pa 1976). 1998 Sep 1;23(17):1860-6; discussion 1867. doi: 10.1097/00007632-199809010-00012. PMID: 9762743.
(2) Centers for Disease Control and Prevention. National Ambulatory Medical Care Survey: 2010 Summary Tables. http://www.cdc.gov/nchs/data/ahcd/namcs_summary/2010_namcs_web_tables.pdf (Accessed on September 30, 2014).
(3) Papageorgiou AC, Croft PR, Ferry S, Jayson MI, Silman AJ. Estimating the prevalence of low back pain in the general population. Evidence from the South Manchester Back Pain Survey. Spine (Phila Pa 1976). 1995 Sep 1;20(17):1889-94. doi: 10.1097/00007632-199509000-00009. PMID: 8560337.

Back Pain Pearls

- Nothing beats good history and physical exam
- Imaging only after 6 weeks if pain persists
- Red flags (weakness, continence issues, saddle anesthesia) indicate urgency or emergency
- Patient education is key: remain active (no bed rest), most episodes get better
- Consider physical therapy referral, NSAIDs, relaxants, and SNRI; APAP, SSRI, lidocaine patches don't add much

Casiano VE, Sarwan G, Dydyk AM, et al. Back Pain. [Updated 2023 Dec 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK538173/

What's the Pain Generator?

- Pain generator: the thing that causes the hurt (there's always one)
  - Facets, disc height loss (DDD), spasm, SIJ dysfunction, hip disease
  - May not be clear on physical exam or imaging that these hurt
  - Diffuse disease on imaging could mean 1, many, or no pain generators
- BEWARE of non-pain generators: degenerative changes are extremely common and will be found in majority of all imaging (disc desiccation, facet disease, herniations)

DDx

Differential diagnosis of low back pain

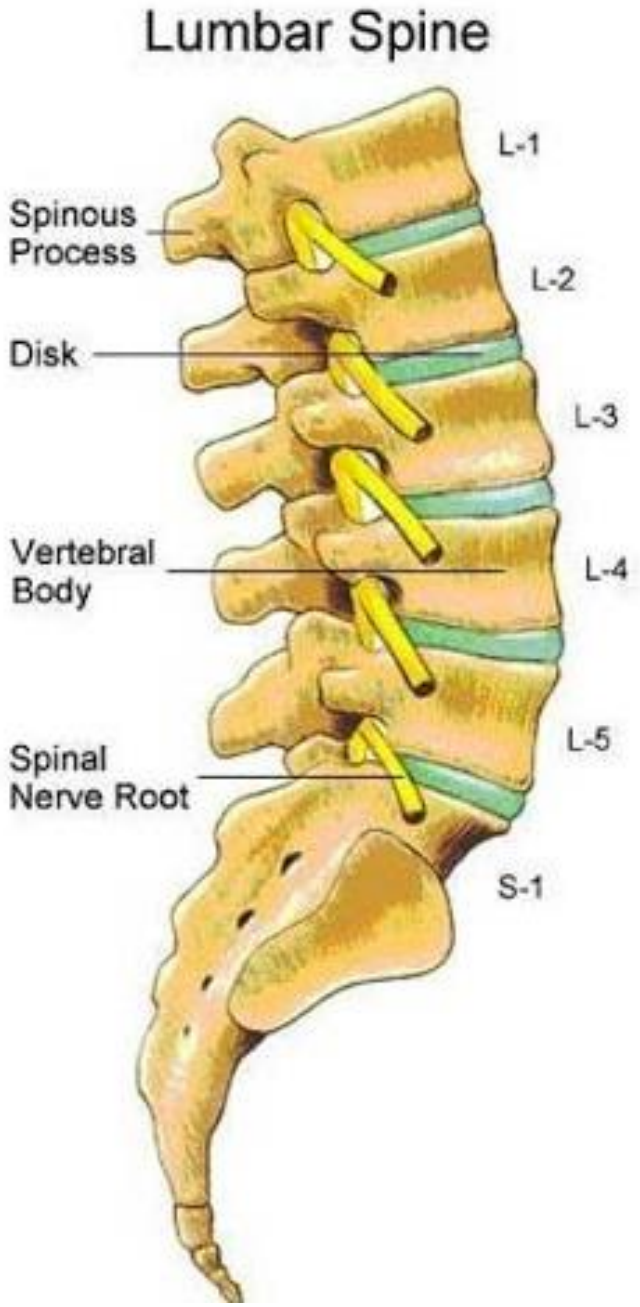
Mechanical low back pain	Nonmechanical spine disease	Visceral disease
Lumbar strain	Neoplasia • Multiple myeloma • Metastatic carcinoma • Lymphoma and leukemia • Spinal cord tumors • Retroperitoneal tumors	Pelvic organs • Prostatitis • Endometriosis • Chronic pelvic inflammatory disease
Degenerative disease • Discs (spondylosis) • Facet joints (osteoarthritis)	Infection • Osteomyelitis • Septic discitis • Paraspinous abscess • Epidural abscess	Renal disease • Nephrolithiasis • Pyelonephritis • Perinephric abscess
Spondylolisthesis	Inflammatory arthritis (often HLA-B27-associated) • Ankylosing spondylitis • Psoriatic spondylitis • Reactive arthritis • Inflammatory bowel disease	Aortic aneurysm
Herniated disc	Scheuermann disease (osteochondrosis)	Gastrointestinal disease • Pancreatitis • Cholecystitis • Penetrating ulcer
Spinal stenosis	Paget disease	Fat herniation of lumbar space
Osteoporosis		
Fractures		
Congenital disease • Severe kyphosis • Severe scoliosis • Possible type II or type IV transitional vertebra*		
Possible spondylolysis		
Possible facet joint asymmetry		

Deyo RA. Early diagnostic evaluation of low back pain. J Gen Intern Med 1986; 1:328, with kind permission from Springer Science + Business Media B.V. Copyright © 1986.

DDx

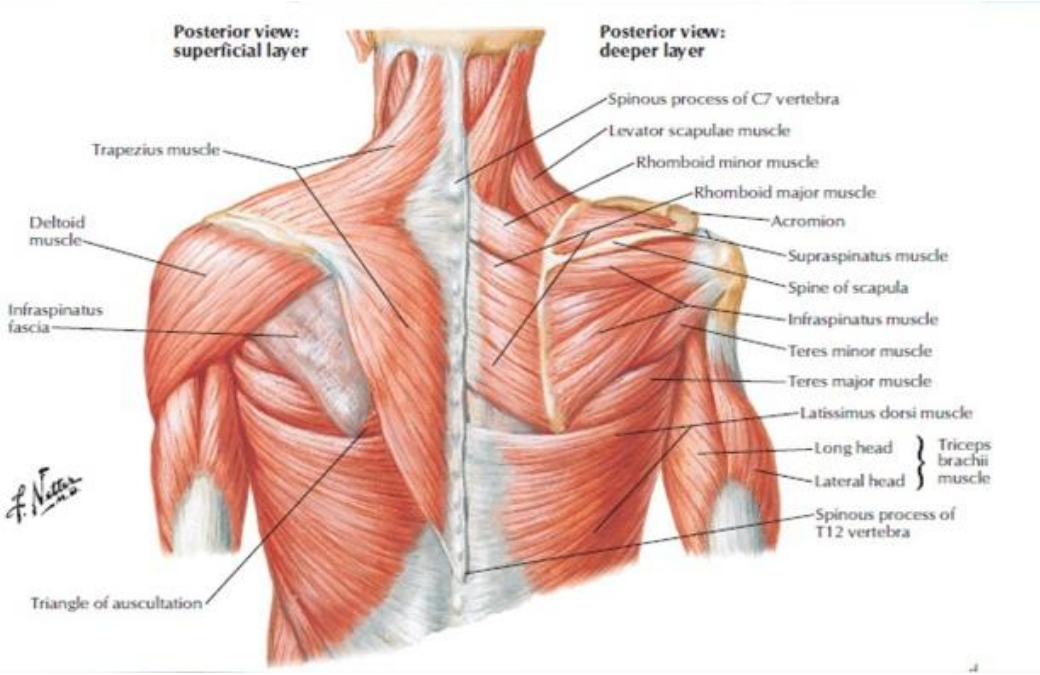
MECHANICAL

- **Muscles**
- **Bones**
- **Nerves**
- **Discs**

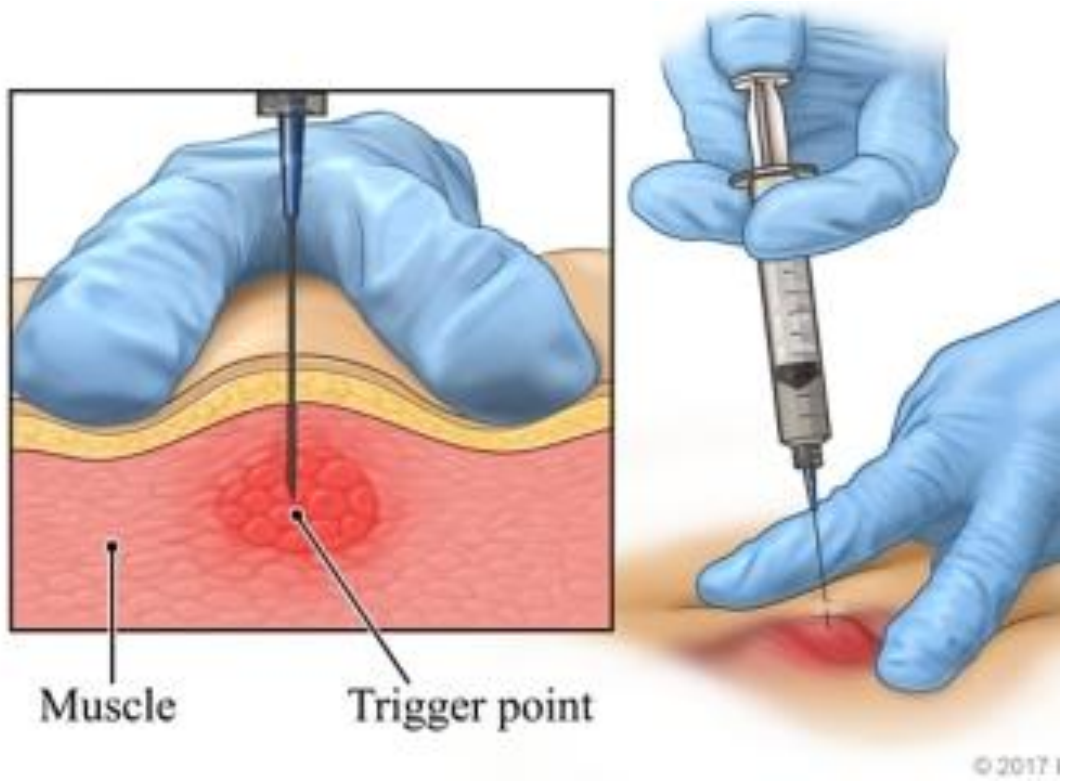


Muscle

- Paraxial
- Tender or tight to the touch
- Can 'lock' someone up
- Usually a preceding event or trauma
- Spasm is a very common manifestation of an acute injury
- Heat, stretching, NSAIDs, relaxants, TPI, PT, Botox, resolve underlying issue



Trigger Point Injection



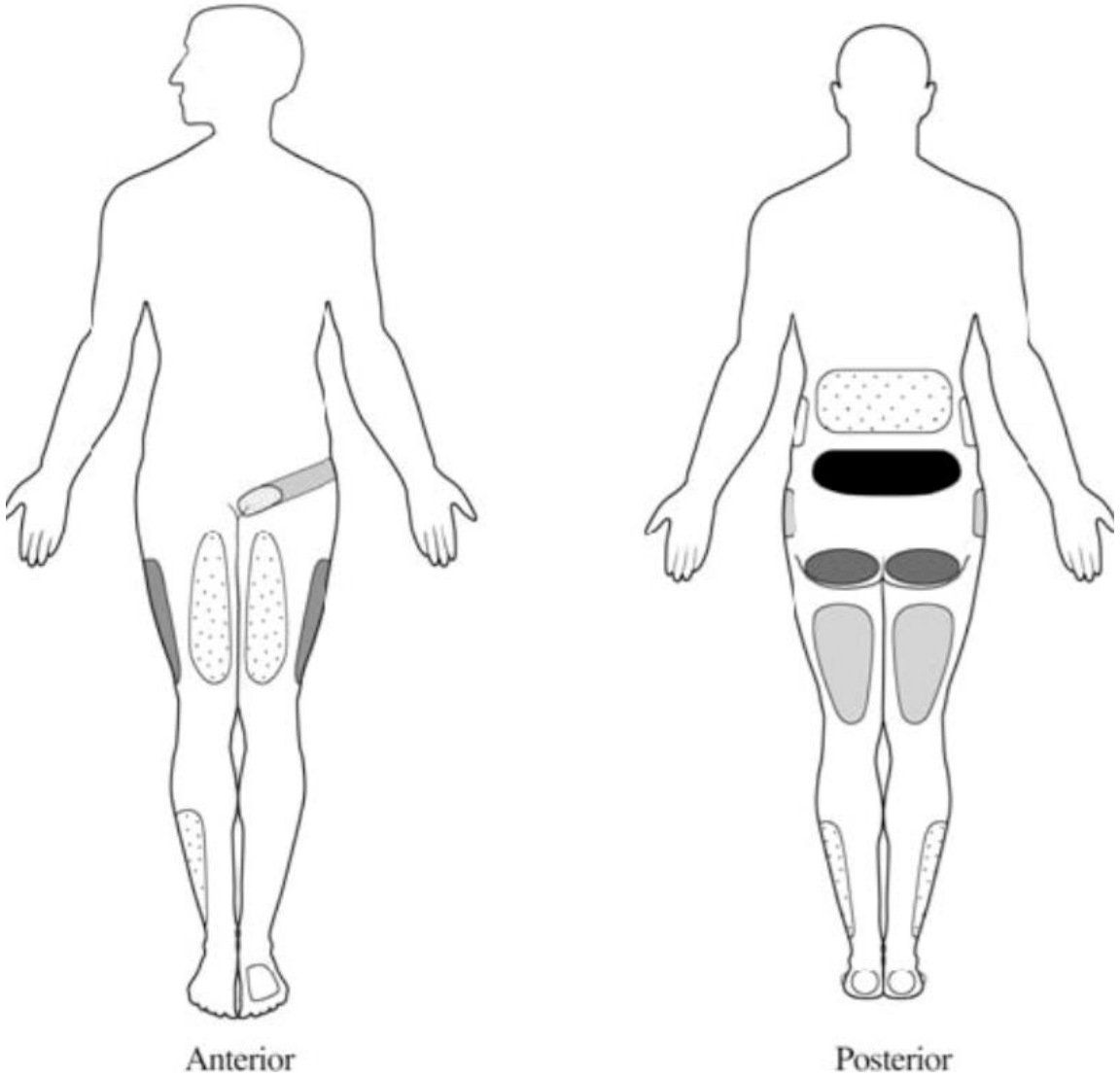
Joints

- Pain is bandlike and localized
- Facet pathology on imaging prevalence 40-85%, increasing with age, but painful source much less often
- Diagnostic facet blocks (medial branch blocks) are used to diagnose facet mediated pain but false positives/negatives occur – systematic approach is critical to minimize/eliminate diagnostic error
- NSAIDs, PT (light exercise, stretching, Yoga), spinal manipulation, acupuncture, psychology
- Facet steroid (limits), RFA

Murtagh FR: Computed tomography and fluoroscopy guided anesthesia and steroid injection in facet syndrome. Spine (Phila Pa 1976) 1988;13:686-9.

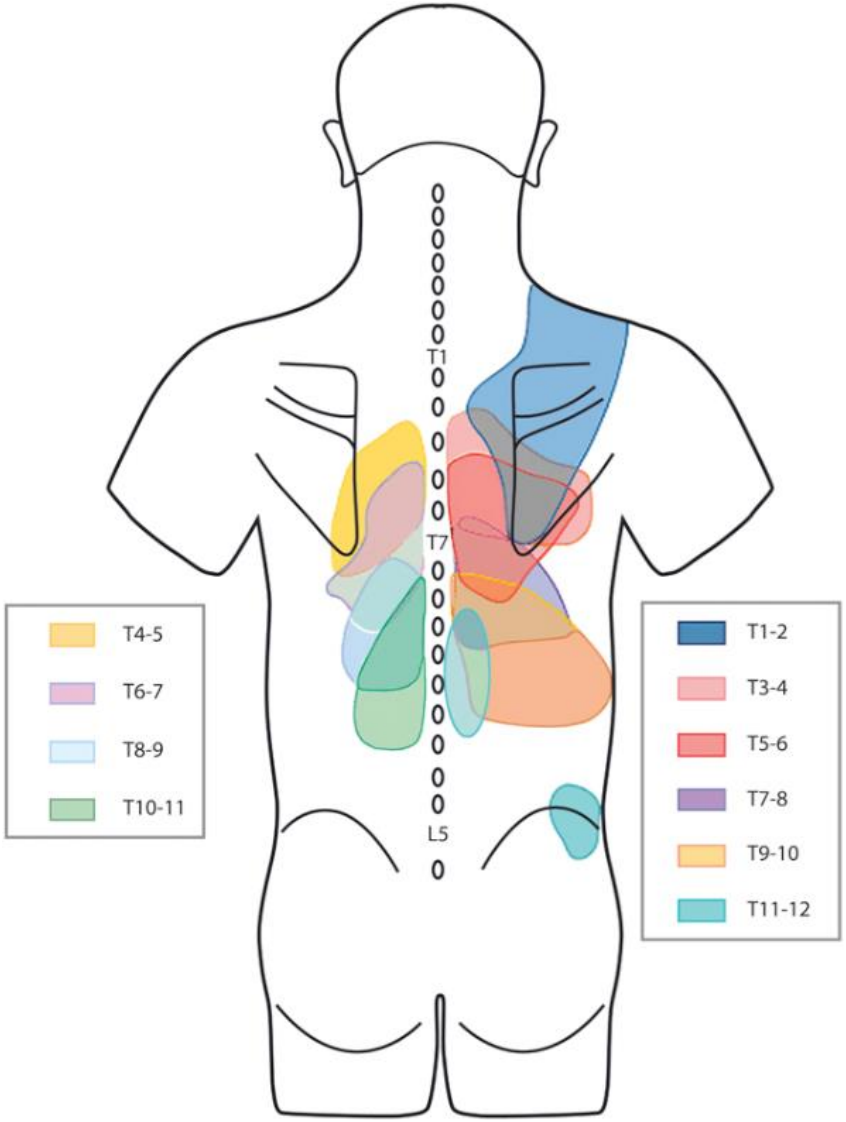
Lumbar Facet Referral

- Most common referral patterns are darker
- Each joint can refer to a number of locations



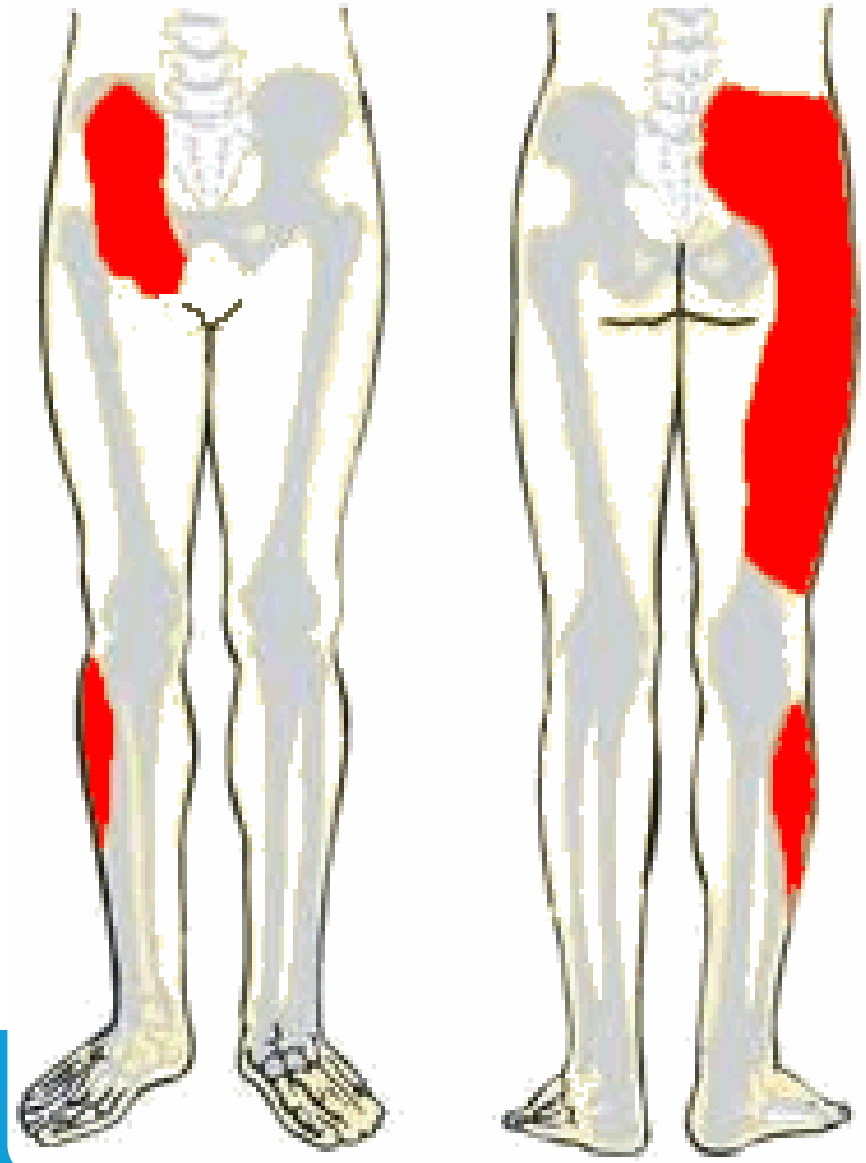
Cohen SP, Raja SN. Pathogenesis, diagnosis, and treatment of lumbar zygapophysial (facet) joint pain. Anesthesiology. 2007 Mar;106(3):591-614. doi: 10.1097/00000542-200703000-00024. PMID: 17325518.

Thoracic Facet Referral



- Paraspinal regions around the thoracic spine. There tends to be significant overlap between the levels.

Dreyfuss P, Tibiletti C, Dreyer SJ. Thoracic zygapophyseal joint pain patterns. A study in normal volunteers. Spine (Phila Pa 1976). 1994 Apr 1;19(7):807-11. doi: 10.1097/00007632-199404000-00014. PMID: 8202799.



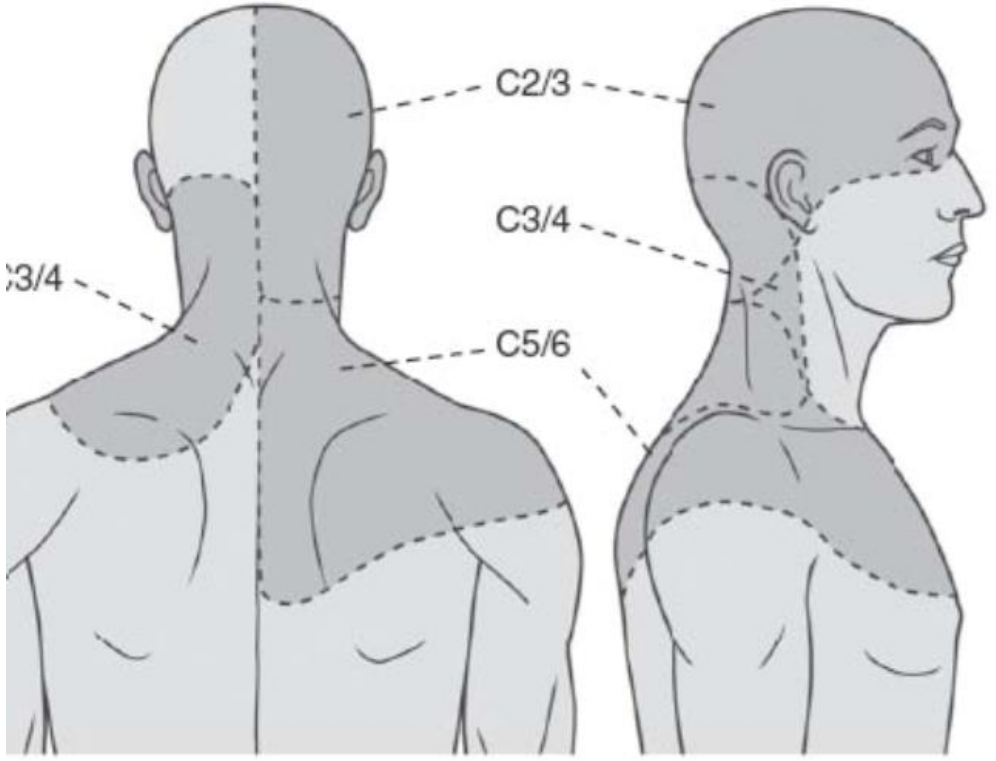
Sacral Joint Referral

- Prevalence 15-30% in all patients with low back pain
- Bilateral synovial joint surrounded by fibrous capsule, supported by ligaments and pelvic muscles
- Dorsal rami of L4-S3 nerve roots
- Injury capsular injury, ligamentous tension, muscle inflammation, shearing, fracture, arthritis
- Risks include prior lumbar fusion, scoliosis, leg length discrepancies, repetitive trauma (athletic activity), pregnancy, HLA-B27 spondyloarthrop., gait abnormalities
- Localized to a strip (3x10 cm) inferior PSIS (posterior superior iliac spine) - point tender
- See referral maps, extensively variable and looks like radicular pain in some
- (L5-S1 distribution)

Kurosawa D, Murakami E, Aizawa T. Referred pain location depends on the affected section of the sacroiliac joint. Eur Spine J. 2015 Mar;24(3):521-7. doi: 10.1007/s00586-014-3604-4. Epub 2014 Oct 5. PMID: 25283251.
Barros G, McGrath L, Gelfenbeyn M. Sacroiliac Joint Dysfunction in Patients With Low Back Pain. Fed Pract. 2019 Aug;36(8):370-375. PMID: 31456628; PMCID: PMC6707638.

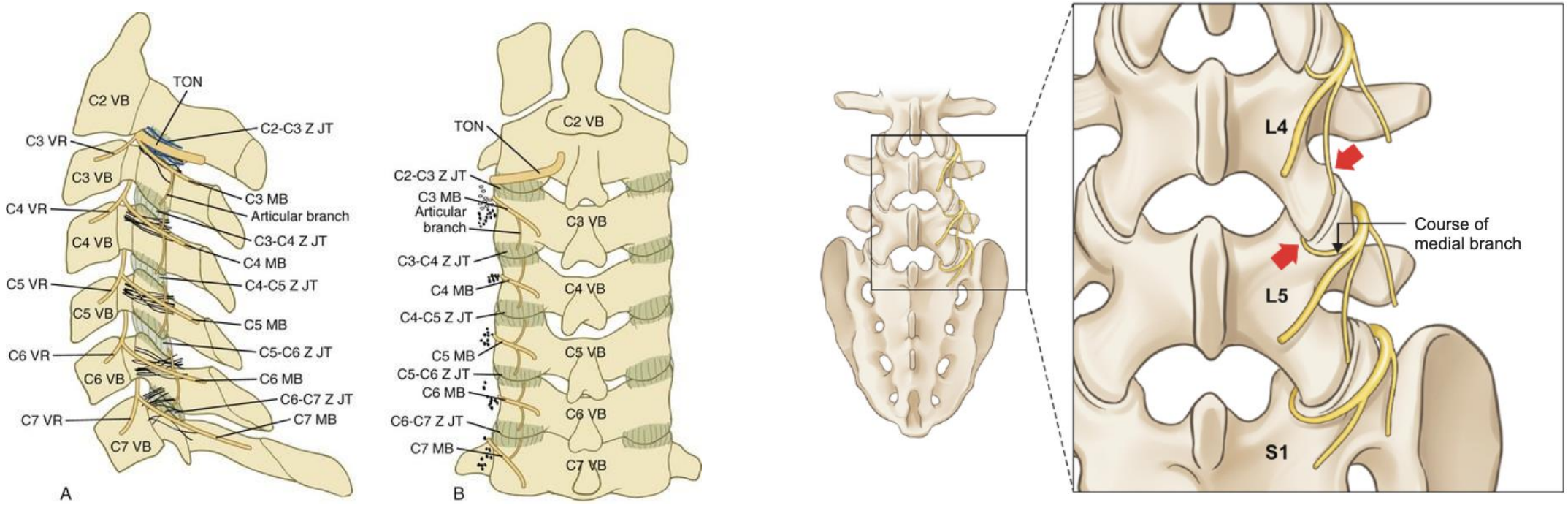
Cervical Facet Referral

- Upper cervical facets are a common source of pain and headache
- Lower cervical facets are felt in the lower neck and trapezius region



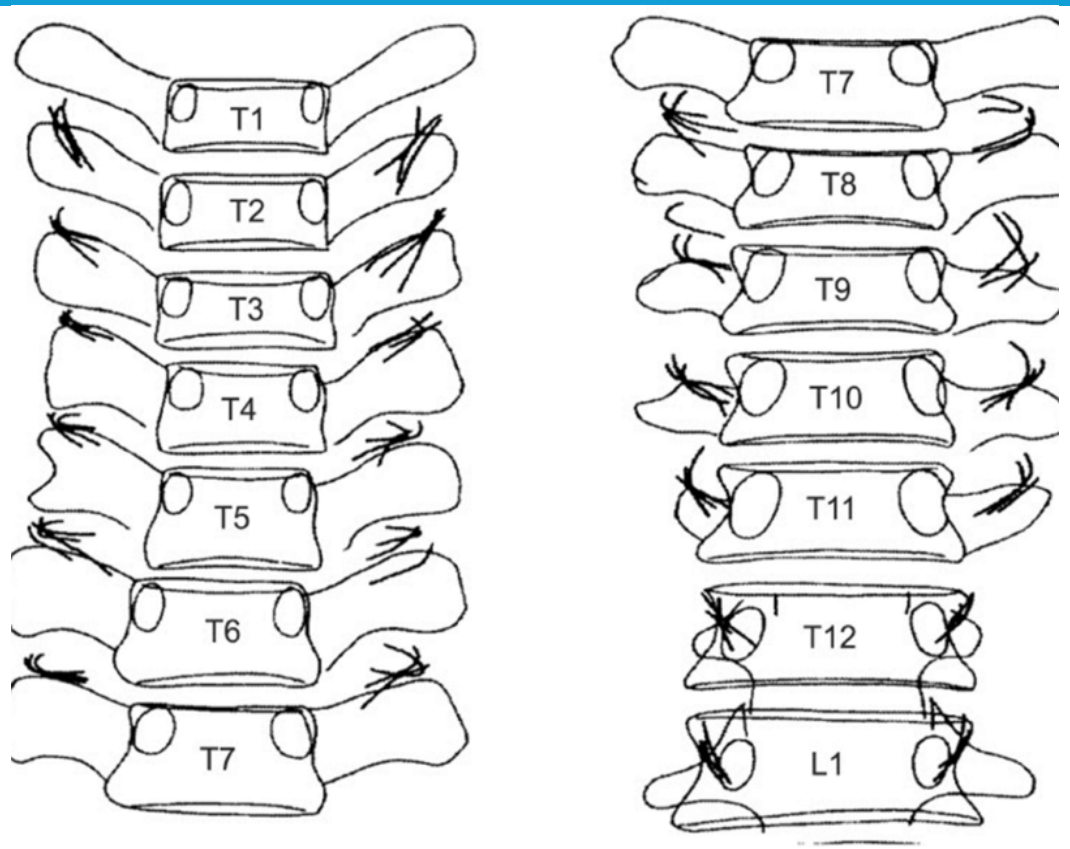
Bogduk N, Marsland A. The cervical zygapophysial joints as a source of neck pain. Spine (Phila Pa 1976). 1988 Jun;13(6):610-7. PMID: 3175750.

Medial Branch Block and Facet Injection



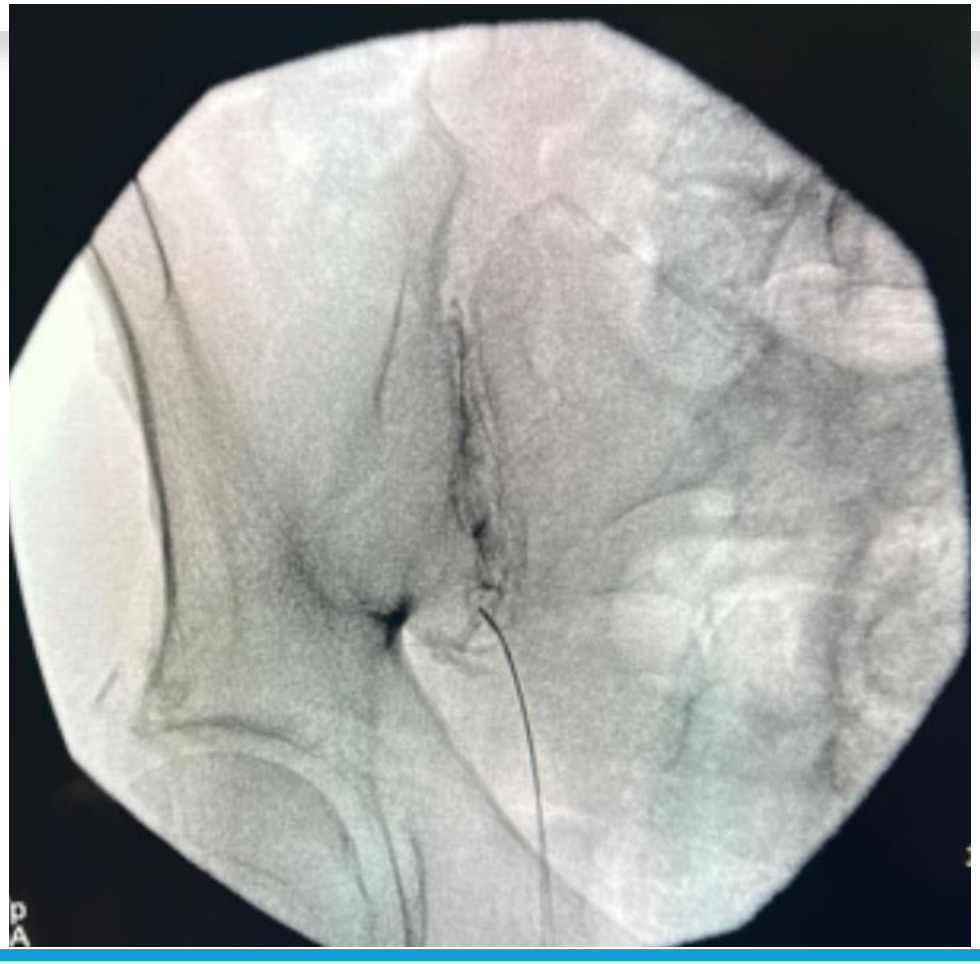
Won HS, Yang M, Kim YD. Facet joint injections for management of low back pain: a clinically focused review. Anesth Pain Med (Seoul). 2020 Jan 31;15(1):8-18. doi: 10.17085/apm.2020.15.1.8. PMID: 33329784; PMCID: PMC7713865.

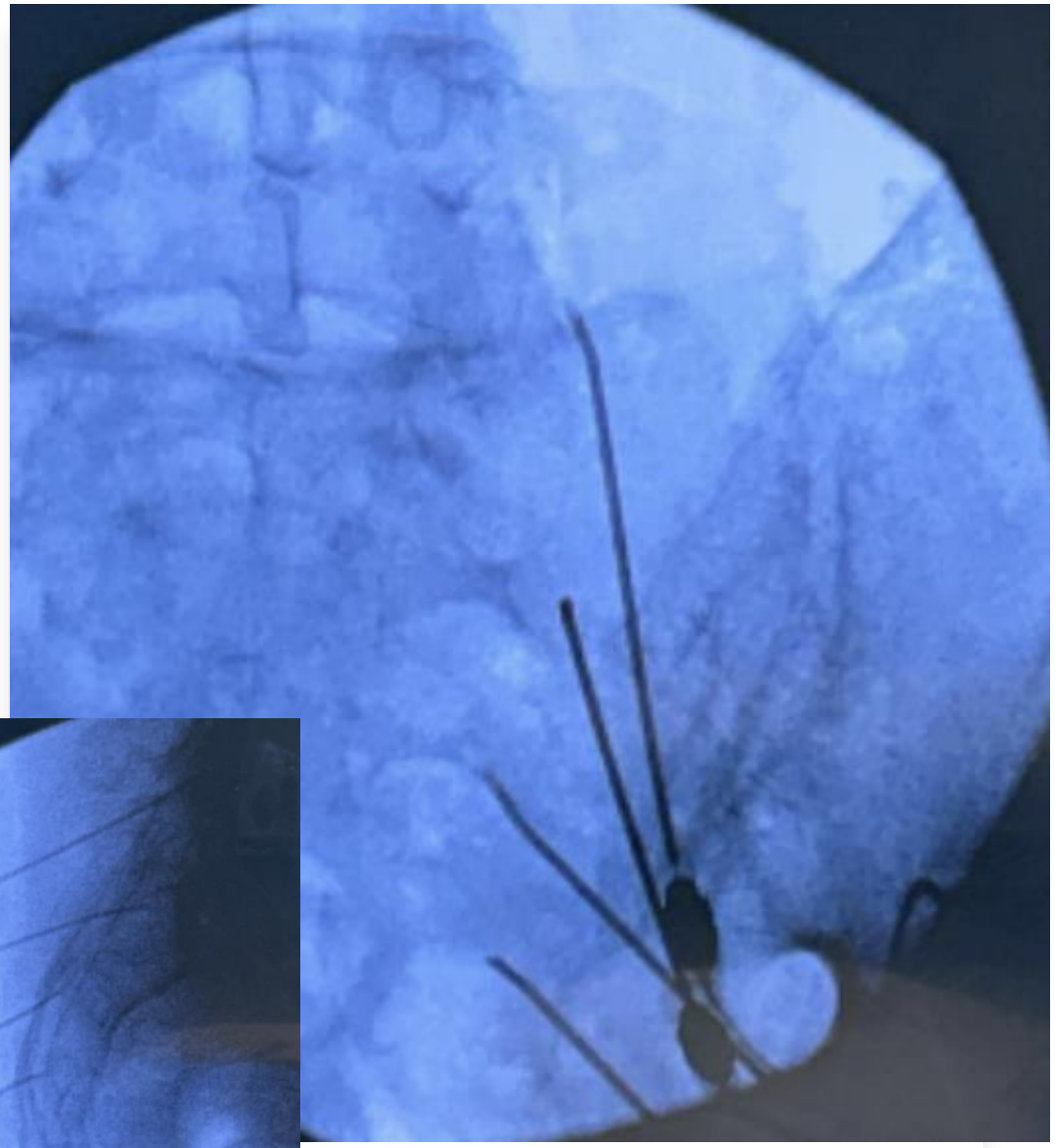
Medial Branch Blocks Thoracic Spine



Bogduk N (ed). Practice Guidelines for Spinal Diagnostics and Treatment Procedures,. International Spine Injection Society (ISIS) 2004

SIJ Injection, Sacral RFA





Ehlers-Danlos Syndrome

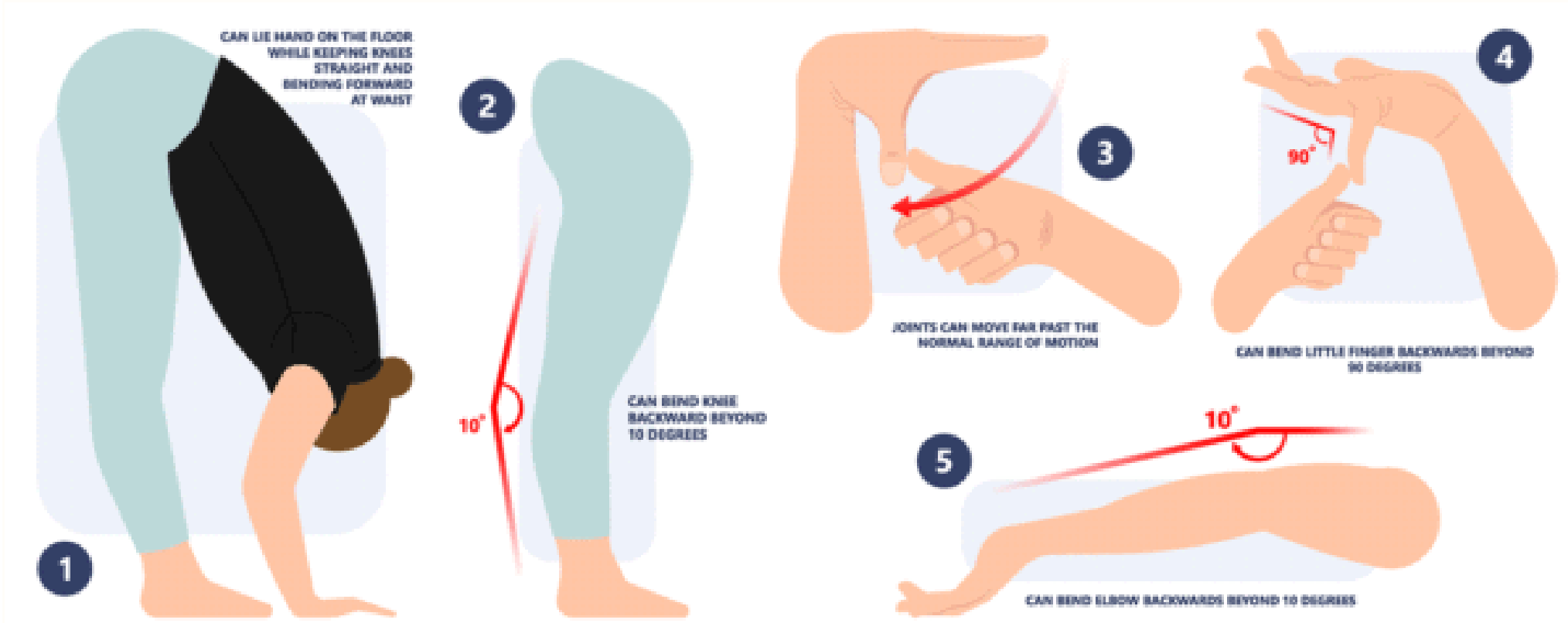
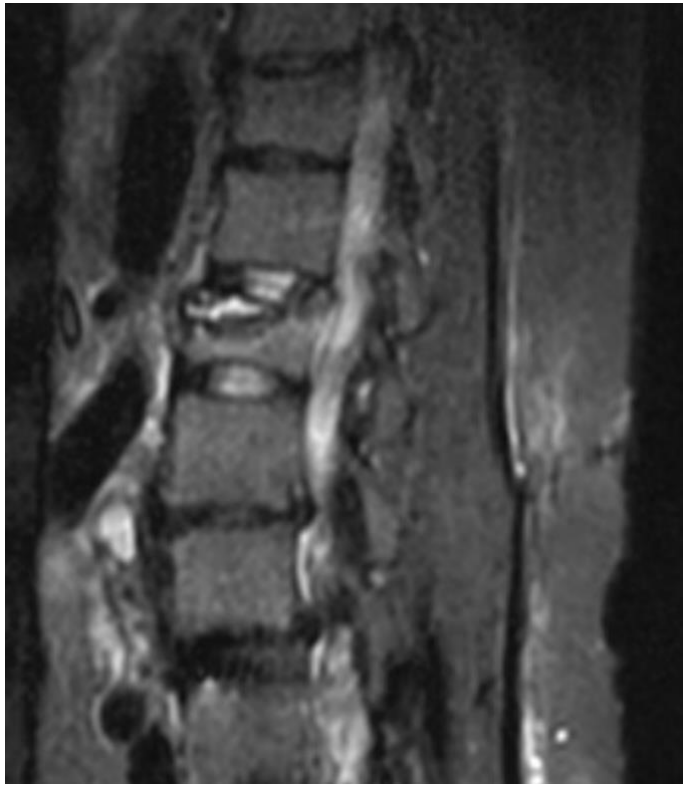


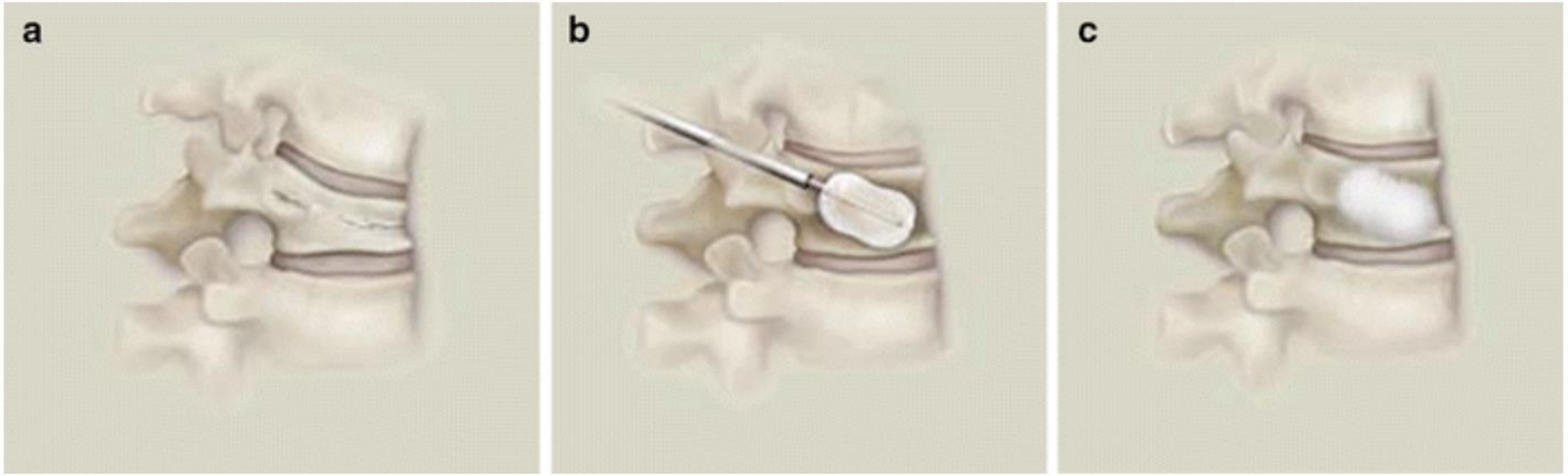
Image: https://regenexx.com/blog/injection-treatment-for-eds-patients/

Vertebral Compression Fracture

- Not an emergency but painful
- If height loss, can be seen on xray
- Wedge vs. Burst is the shape
- Treat with conservative care: back brace and NSAIDs, analgesics
- Consider kyphoplasty after 6 weeks



Kyphoplasty

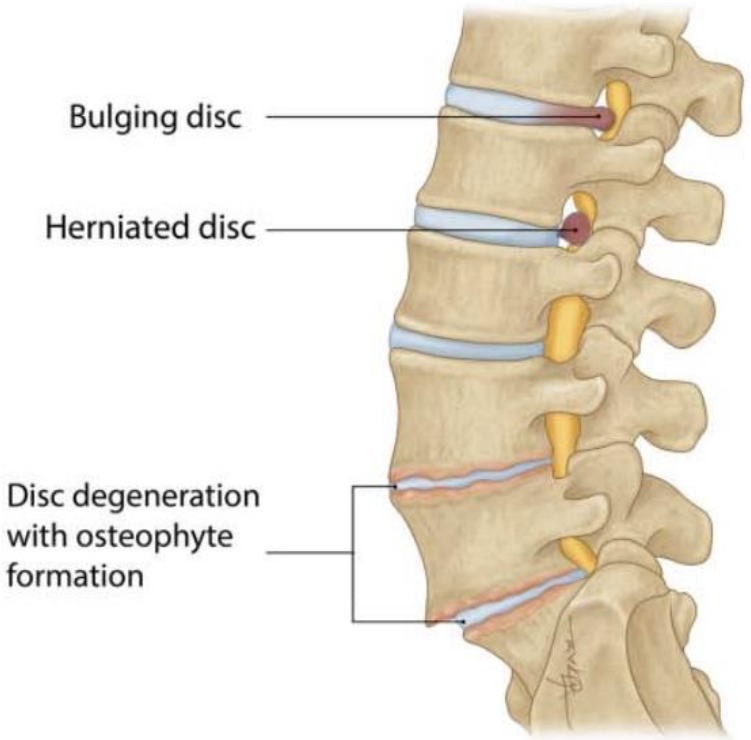


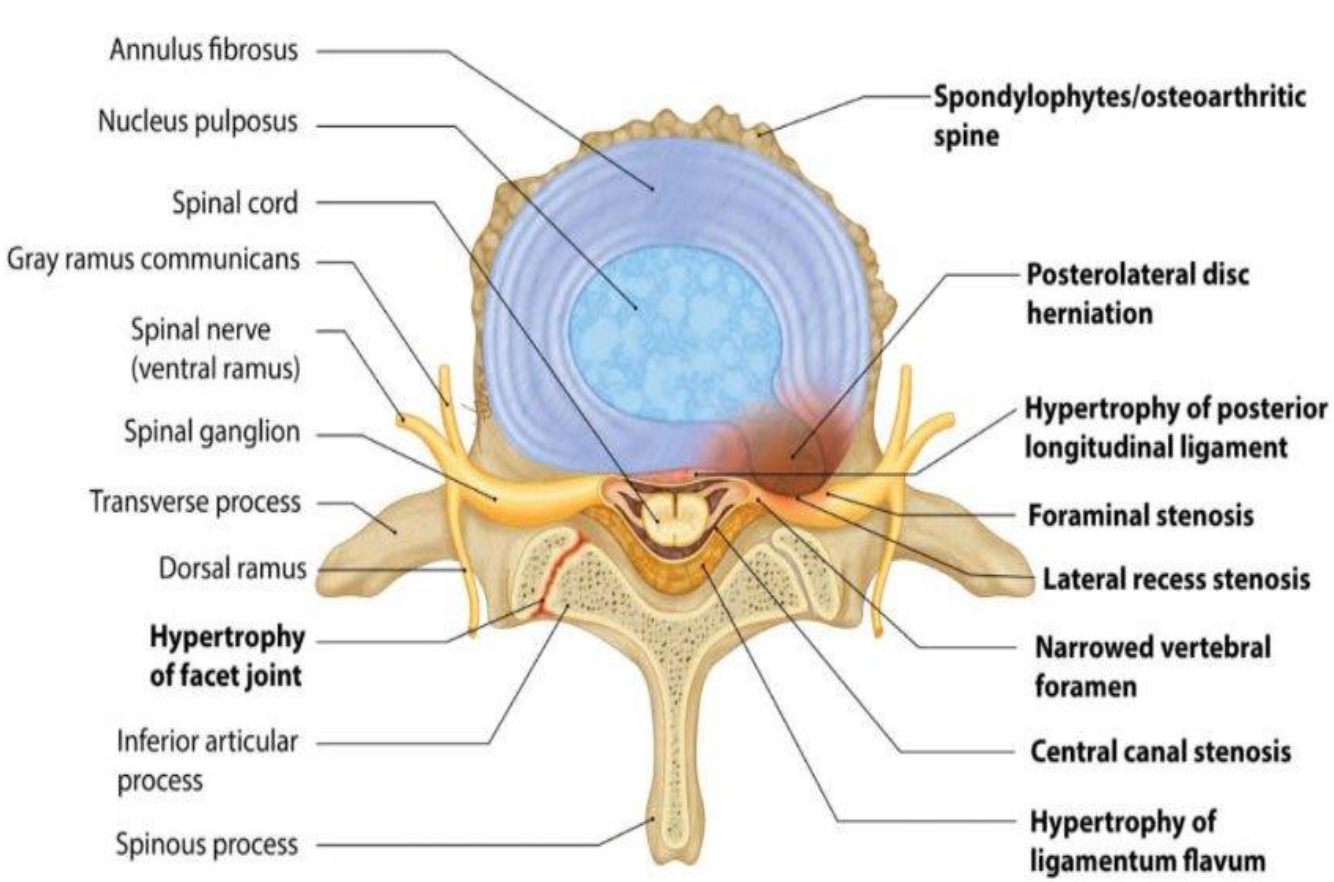
Achatz G, Riesner HJ, Friemert B, Lechner R, Graf N, Wilke HJ. Biomechanical in vitro comparison of radiofrequency kyphoplasty and balloon kyphoplasty. Eur Spine J. 2017 Dec;26(12):3225-3234. doi: 10.1007/s00586-017-5035-5. Epub 2017 Apr 27. PMID: 28451858.

Spinal Stenosis

- Narrowing of central canal, lateral recess, or neural foramen
- Normal part of aging
- Claudication is the pain or fatigue that comes with prolonged ischemia
- Neurogenic claudication occurs when ischemia and/or compression occurs in nerves to legs
  - Standing erect decreases spinal canal diameter
  - Walking increases metabolic demand
  - **Shopping cart sign**

Spinal Stenosis





Gandhi J, Shah J, Joshi G, Vatsia S, DiMatteo A, Joshi G, Smith NL, Khan SA. Neuro-urological sequelae of lumbar spinal stenosis. Int J Neurosci. 2018 Jun;128(6):554-562. doi: 10.1080/00207454.2017.1400973. Epub 2017 Dec 4. PMID: 29098915.

Spinal Stenosis

- **History:** pain non-specific: low back, anterior thighs, calves

- **Exam:** may be normal; possible focal weakness and/or absent DTR
  - UNLOADED extension exacerbates and flexion improves

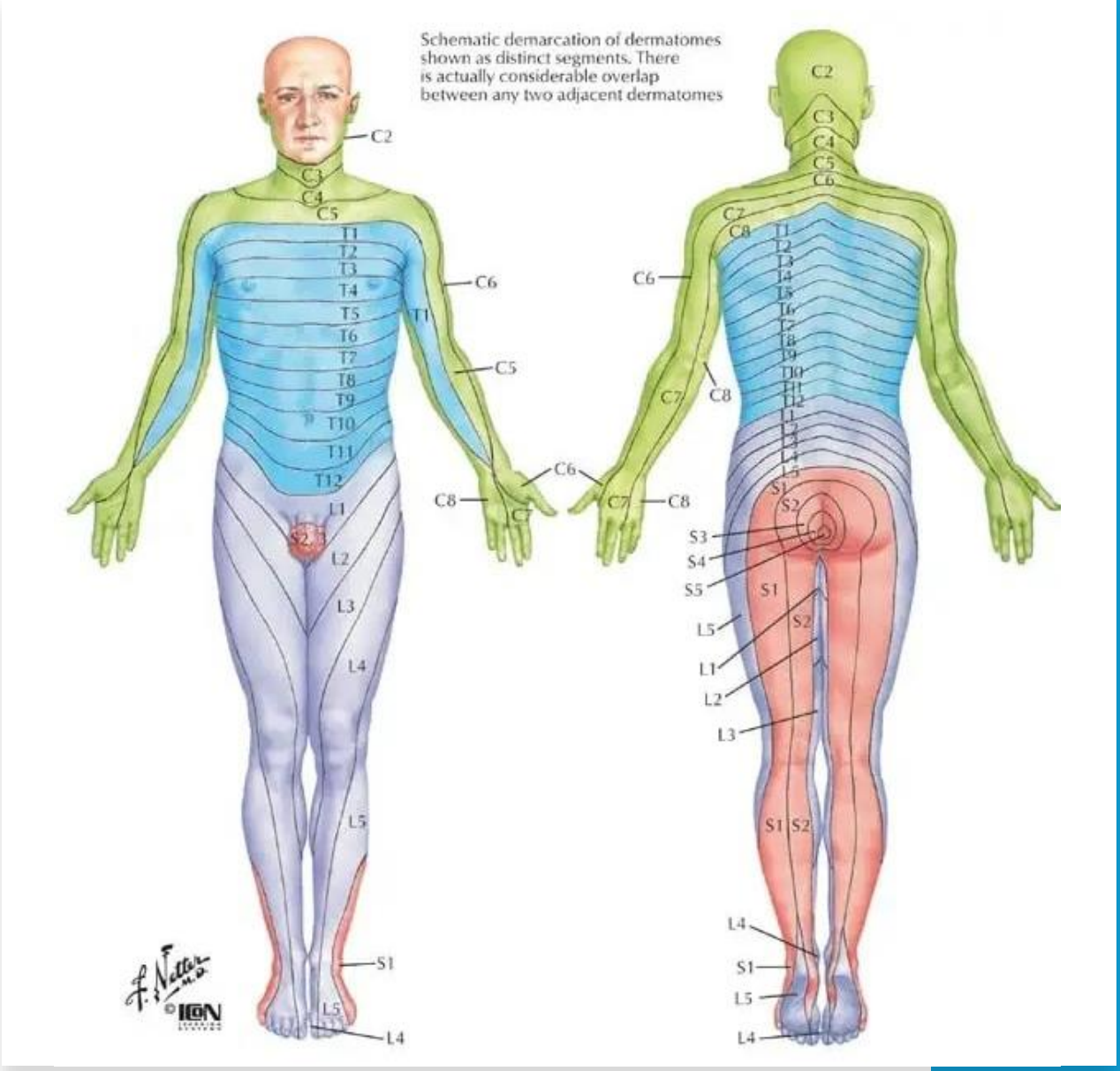
- **Imaging:** MRI is image of choice, CT myelogram if MRI contraindicated

- **Treatment:** PT (stretch, strengthen, aerobic), NSAID, analgesics, ESI,
  avoid downhill ambulation and excessive lumbar extension

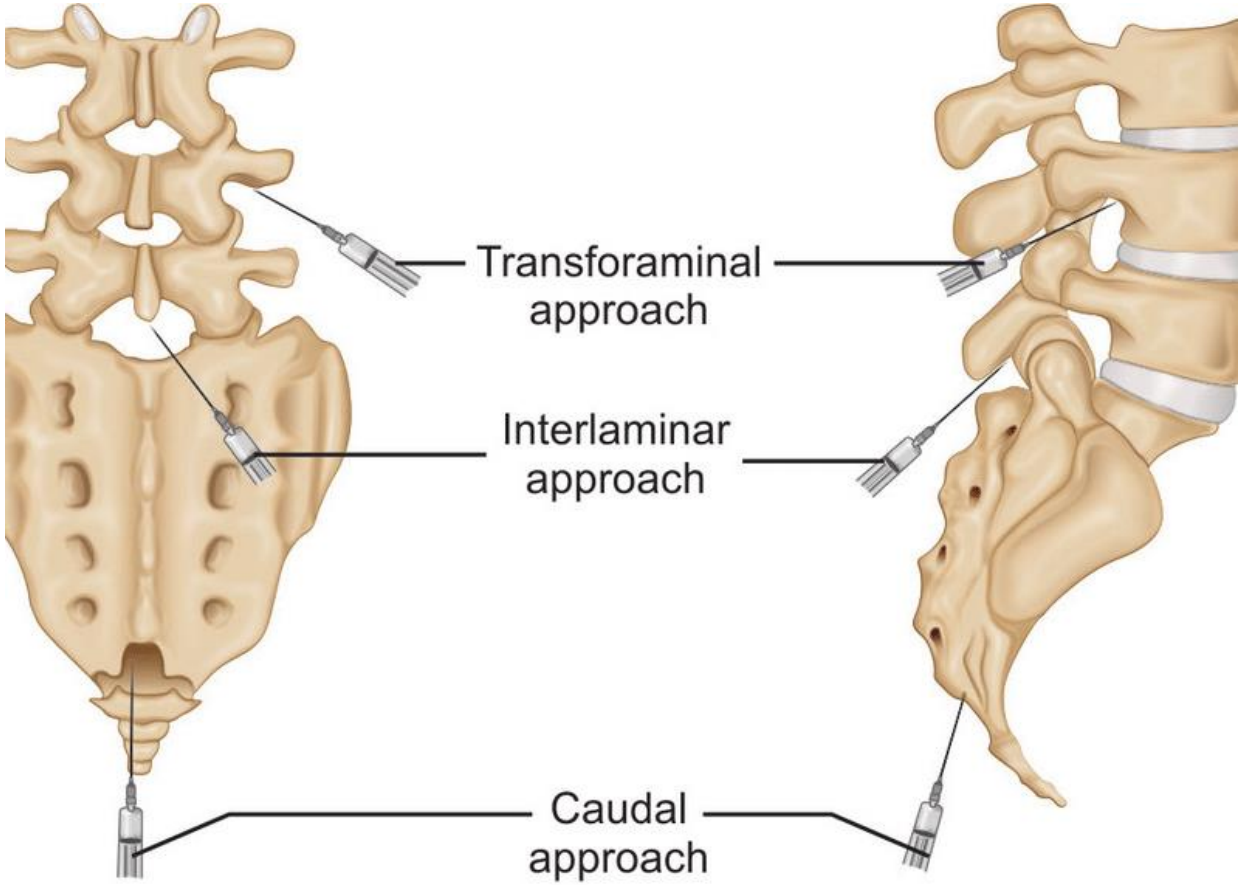
Radiculopathy

- Incidence of radicular pain in LBP: 10-40%

- Pinched nerve root in lateral recess or neuroforamen
- Dermatomal pattern
- Radiating pain, numbness/tingling, weakness, and gait abnormalities
- Neurotension signs (SLR, prone hip extension, slump test)
- NSAIDs, gabapentinoids, opioids
- TFESI, decompression

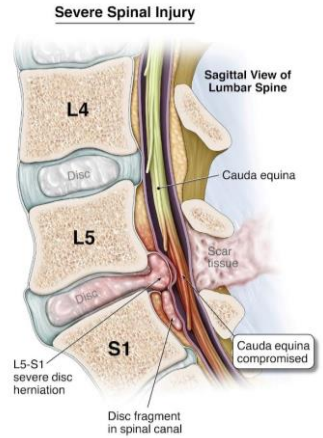


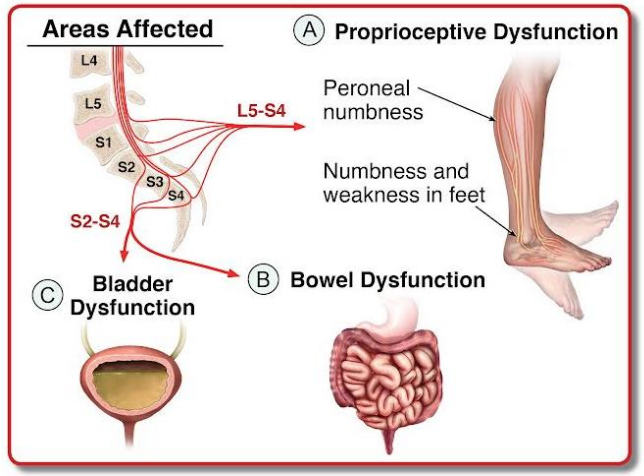
Epidural


Transforaminal approach
Interlaminar approach
Caudal approach

Cauda Equina Syndrome

- Severe unremitting back pain AND:
  - Lower extremity weakness
  - Saddle anesthesia
  - BB incontinence (clarify)
- ED ASAP, may need urgent decompression





Images: https://cmglaw.com/articles/cauda-equina-syndrome/

Complex Regional Pain Syndrome

- Neuropathic pain disorder defined by
  - **allodynia** (pain to non-noxious stimulus)
  - **hyperalgesia** (increased sensitivity to pain)
  - **sudomotor** (sweat gland) changes
  - **vasomotor** (blood vessel) changes
  - **trophic** changes
- Disproportionate pain that persists beyond healing (fracture, trauma, surgery)
- Pain dysregulation in the sympathetic and central nervous system

CRPS

- CRPS I (reflex sympathetic dystrophy) - occurs in absence of (visible) nerve trauma
- CRPS II (causalgia) - occurs in the setting of known nerve trauma
- Typically in limbs, follows a regional (not dermatomal or peripheral) pattern and may spread proximally and contralaterally

- Budapest Criteria:
  - pain > trauma
  - ≥1 symptom: sensory, vasomotor, sudomotor/edema, motor/trophic (atrophy)
  - ≥2 signs: sensory, vasomotor, sudomotor/edema, motor/trophic (atrophy)

Sympathetic Block, Infusions

- Stellate ganglion (face, arms)
- Celiac and splanchnic plexus (visceral)
- Lumbar sympathetic (legs)
- Superior hypogastric (pelvic)
- Ganglion impar (perineal)
- Infusions: ketamine, lidocaine

Ketamine

- Intravenous anesthetic with the ability to provide profound analgesia at a 10th of anesthetic dose
- When administer to a certain blood concentration of prolong period of time, can induce remission of centralized pain for 3 to 8 weeks at a time
- When administered a certain concentration for a short period of time, promotes in sprouting in the brain which produce immediate relief of suicidal ideation or multi period of time

Buprenorphine

- Originally synthesized for the purposes of providing opioid analgesia with limited depression side effects
- Use predominantly on outpatient basis for substance use disorder during the 90s and 2000s
- Has long been and is currently well received as an analgesic agent
  - Formulations such as topical patches and buccal films have increased accessibility
- Controversy on whether to continue or discontinue during perioperative, though both options are possible

Questions?

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