



CA Mod3

Disc Pathology

Decompression Therapy

Basics

Case Presentation

55 yo male (Matt) presents to office

Factory worker

6 mo off and on pain in lower back getting progressively worse

VAS 4/10 but has gone to a 9/10 after working

Starting to travel down legs to thighs to big toe (tingling)

Has trouble as day progresses

Tried OTC meds, only temp help

No previous episodes

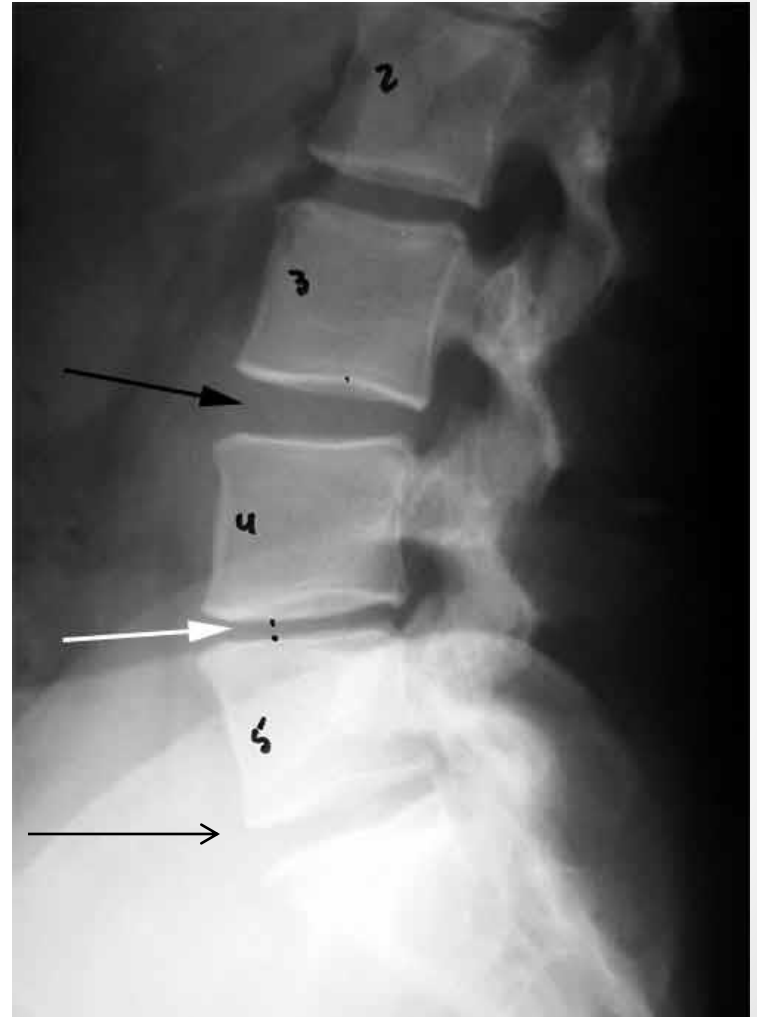
No previous spinal surgery

Plain film

normal

Degeneration

Degeneration



MRI

Normal



Disc Desiccation



Options Patients Have

Nothing

Back Surgery

Physical Therapy

Chiropractic

Massage

Pain Management

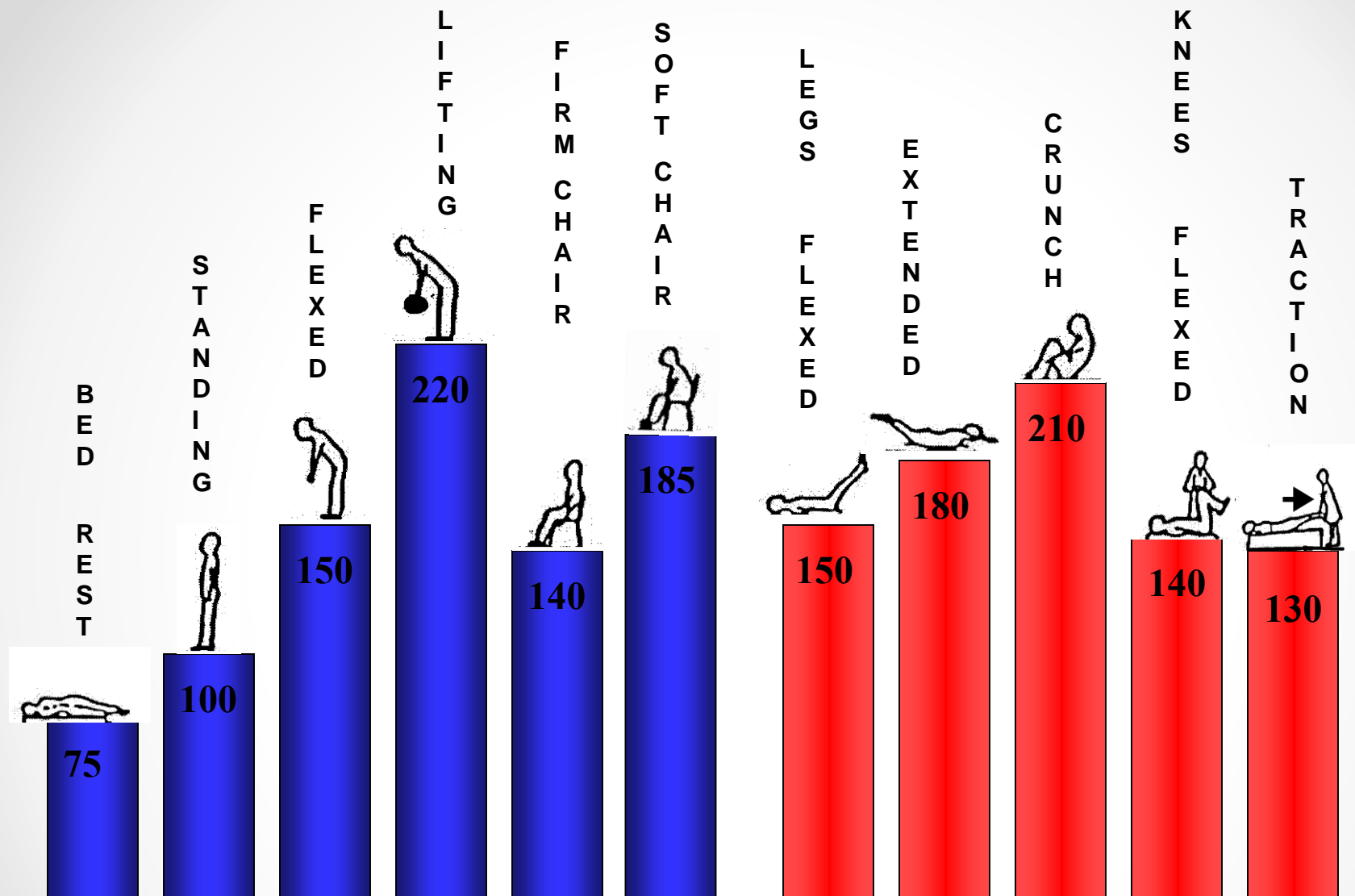
Medicine/Drugs

Decompression



2 items directly effect the disc

- Surgery
- Traction (obtaining a decompressive effect)

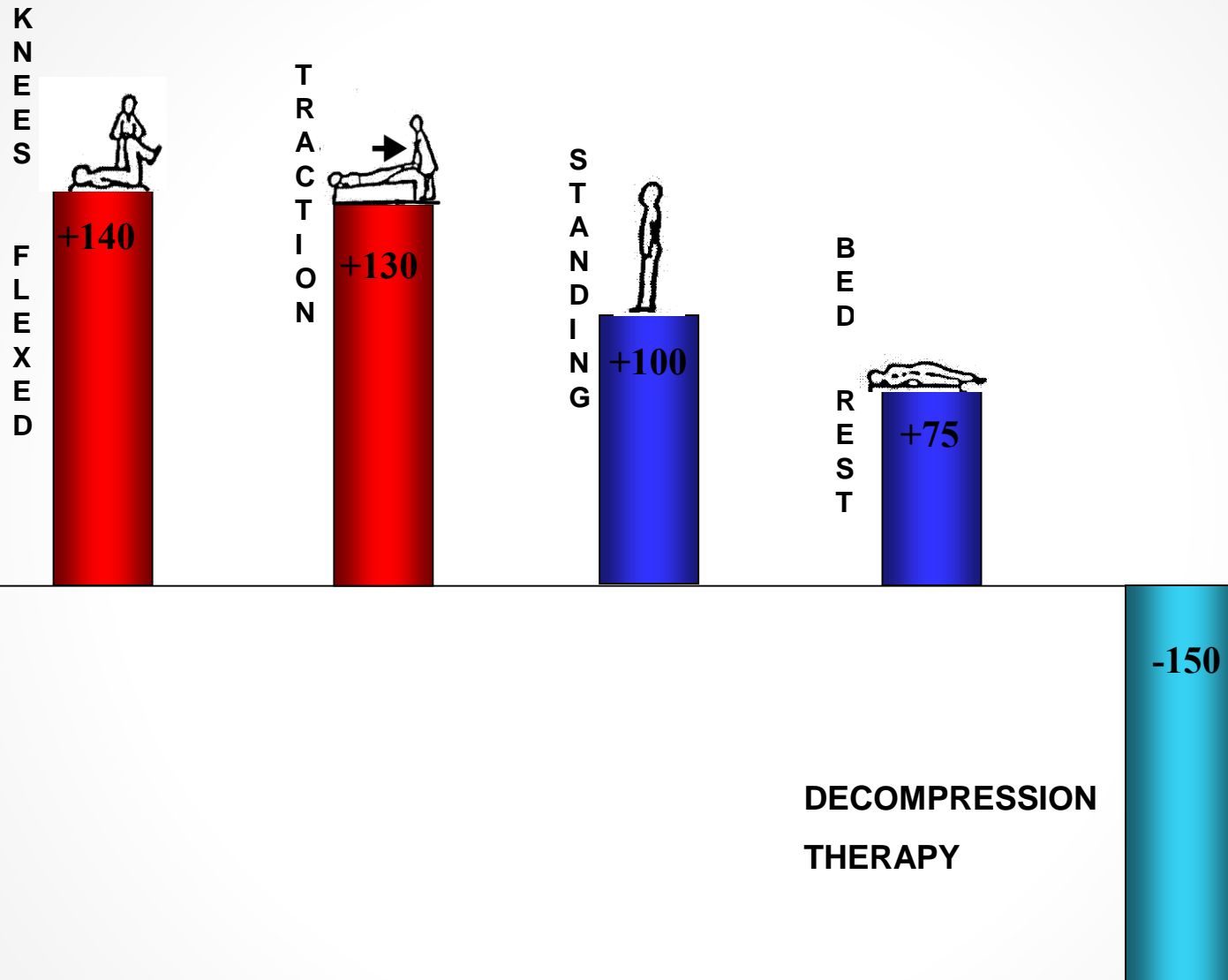


[Ergonomics](#). 2001 Jun 20;44(8):781-94.

Comparison of intradiscal pressures and spinal fixator loads for different body positions and exercises.

[Rohlmann A](#)¹, [Claes LE](#), [Bergmann G](#), [Graichen F](#), [Neef P](#), [Wilke HJ](#).

INTERVERTEBRAL DISC PRESSURES



Decompression Therapy Tables

- In approximately 1985 Dr. Allan Dyer, a former Minister of Health from Ontario, Canada (and, coincidentally, a pioneer in the development of the external cardiac defibrillator) invented a treatment table for low back disc problems that proved to be a revolutionary improvement in the treatment of low back pain.

It was not available in the United States until approximately 1996, when it gained FDA clearance.

1st Generation

The original Vax D



Table Designs

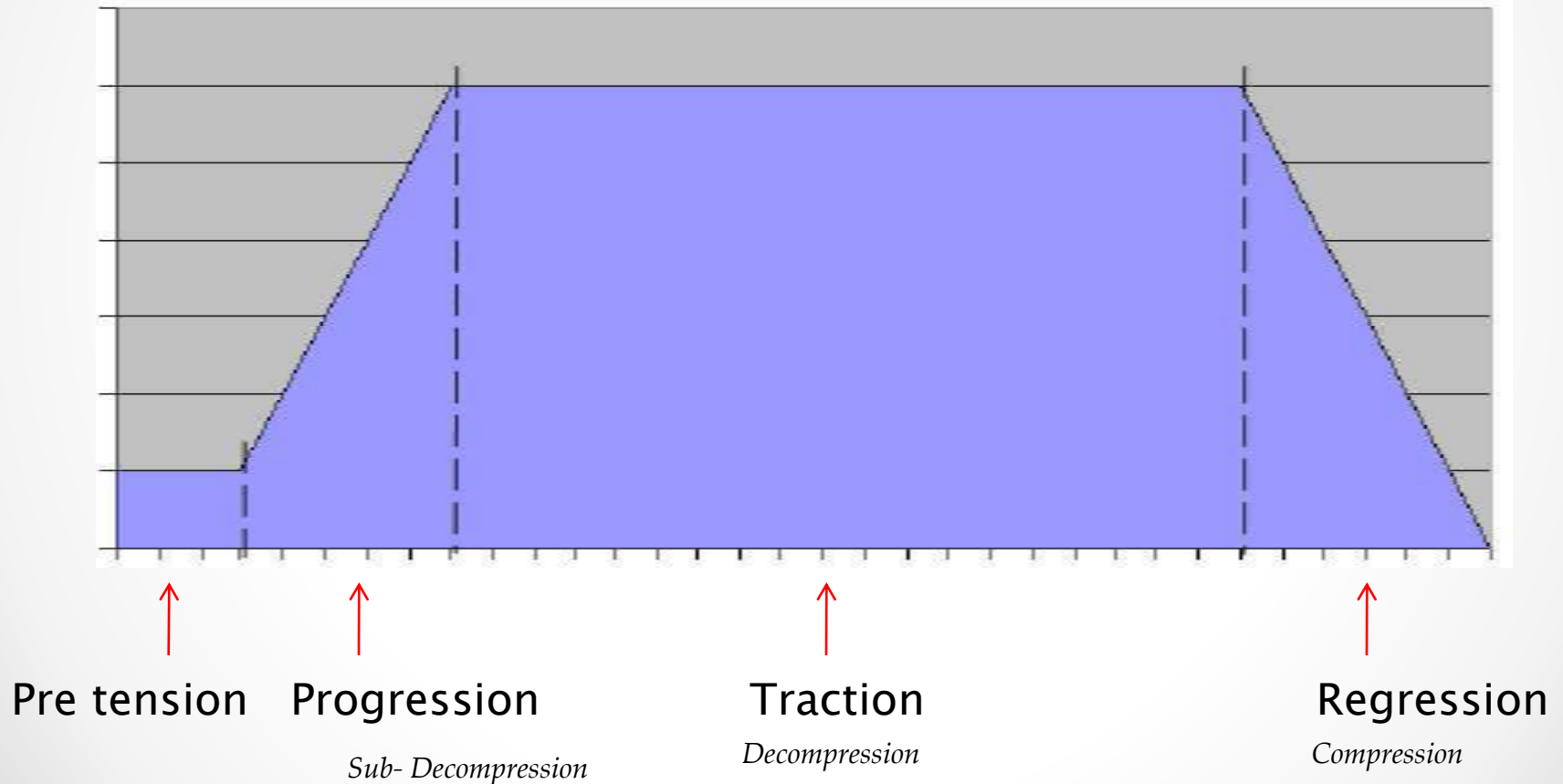


Pull patterns?

What are they used



Pattern Descriptions



Progression Stage

Usually performed in a stepwise fashion for patients prone to myospasm.

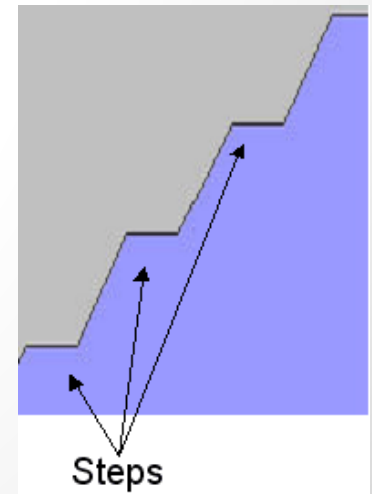
Step progression towards traction phase allows musculature to relax

Tense musculature (usually protective spasm) takes 10-15 sec to relax at each step
- Muscle spindle gets to adapt to new length of muscle and reduces its firing rate

Acute patients = more steps

Chronic = less steps

As patient progresses, fewer steps can be used



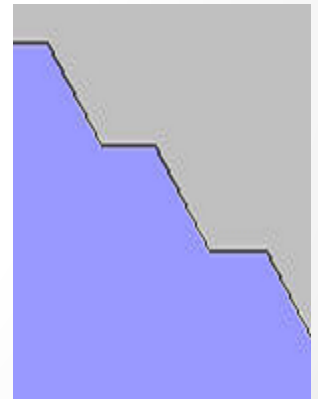
Regression Phase

Designed to allow muscle adaptation to “reloading” forces.
Usually longer than progression phase

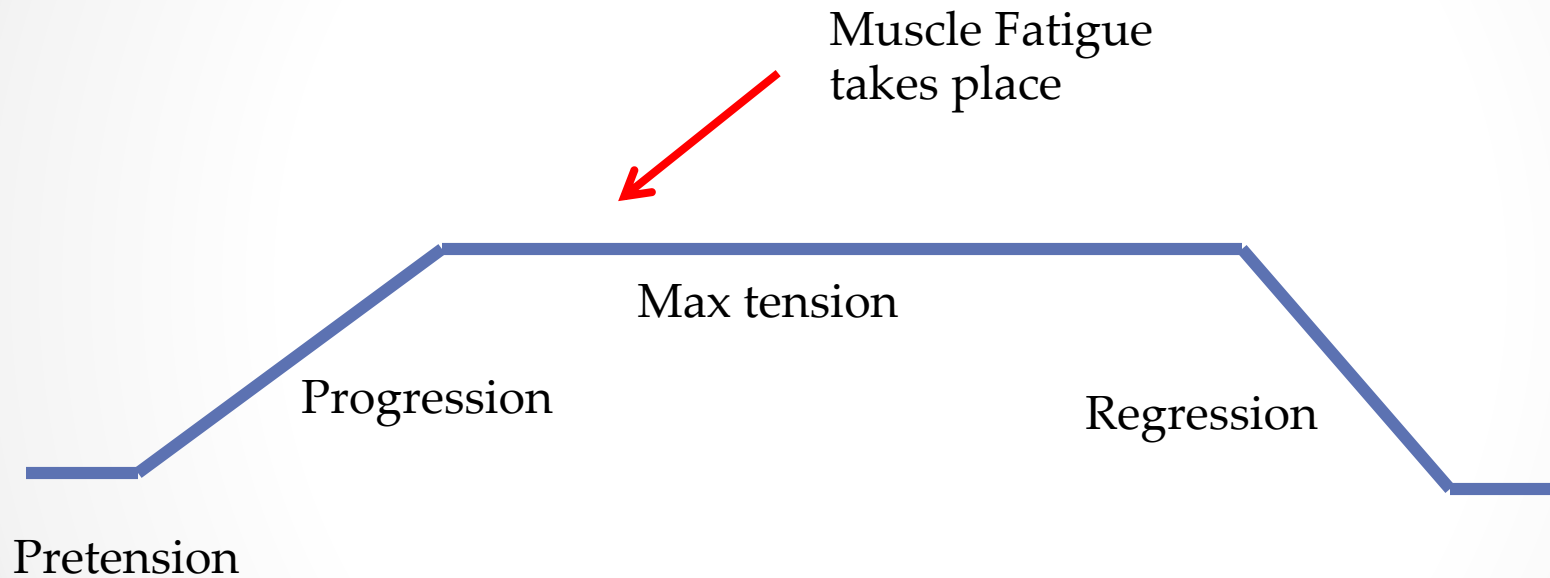
Acute= Longer regression needed/ or stair steps needed to be added to prevent muscles from going back into spasm

Chronic = shorter regression time needed

NOTE: *If pt is going fine during treatments but keeps getting myospasms after treatment is finished check the regression phase, it might be too short or abrupt.*



Static traction



Intermittent traction

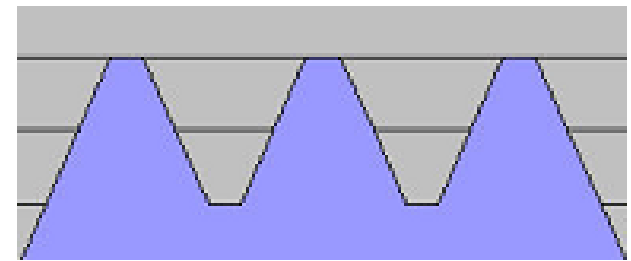
Literature supports better outcomes

Most widely used form of mechanical traction

Covers more treatment perimeters for varied pathology

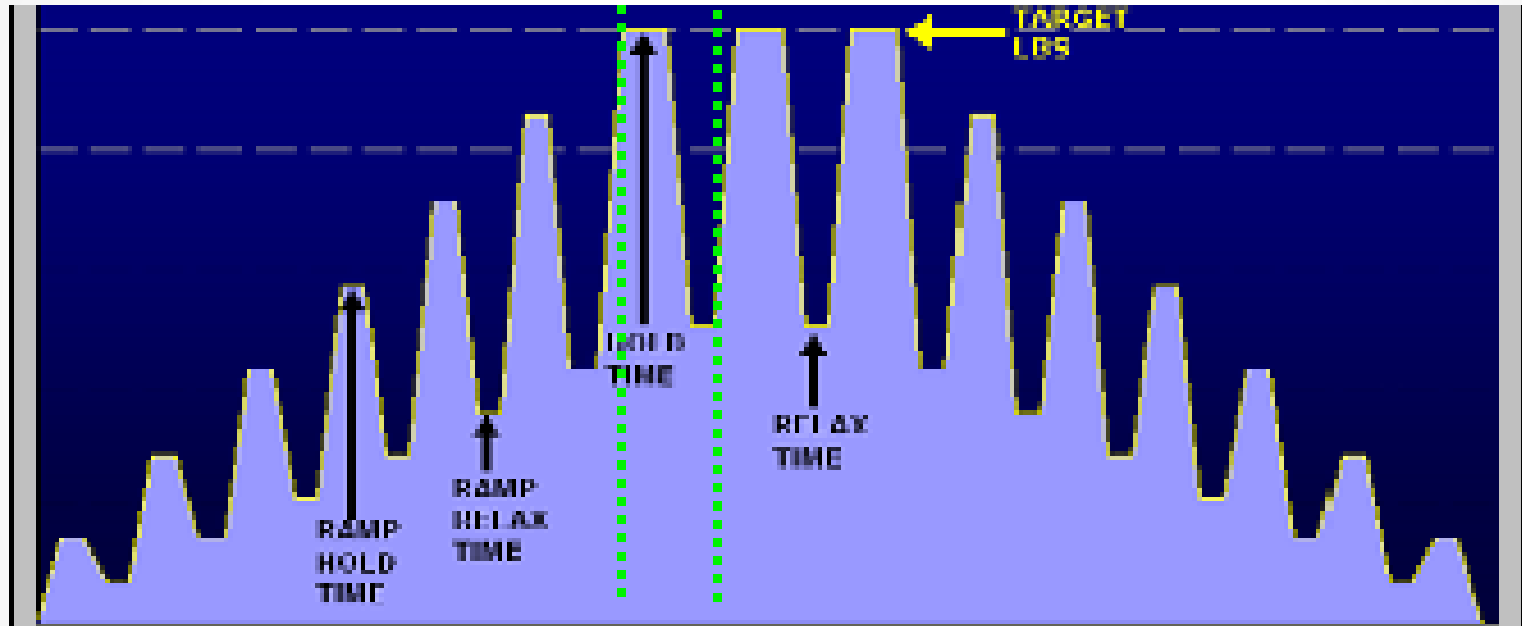
Acute conditions = Longer hold/rest times

Chronic conditions = shorter hold/rest times



Intermittent traction

Progressive short Pull patterns



Mild mm tone or guarding present in patient.
PNF stretching effect on soft tissue. Facet syndrome, increase circulation, flushing effect for inflammation.

Let's dig in

Closer look at disc pathology and degeneration

Inflammatory vs Mechanical Back pain

Severe Disc pathology patients will exhibit one or both of these conditions.

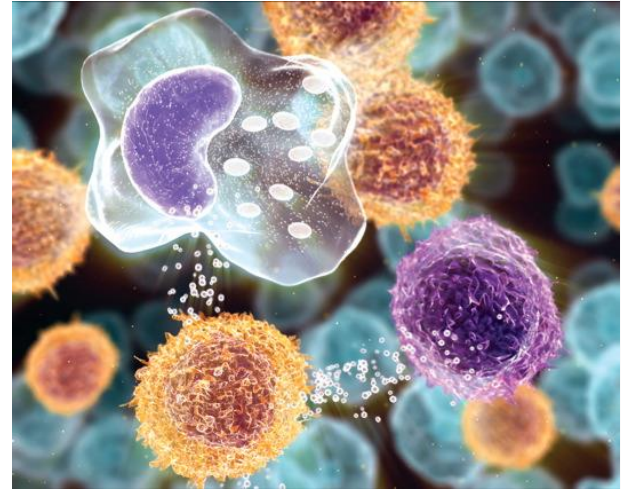
[Man Ther.](#) 2009 Jun;14(3):314-20. doi: 10.1016/j.math.2008.04.003. Epub 2008 Jun 13.

Mechanical or inflammatory low back pain. What are the potential signs and symptoms?

[Walker BF¹](#), [Williamson OD](#).

Chemical (Inflammatory)

- Pain that doesn't go away at night, awakens you.
- Improves with exercise, and walking throughout the day.
- Worse in the morning
- Can alternate sides.
Esp. in the glutes



Dr. Michael
Weisman MD

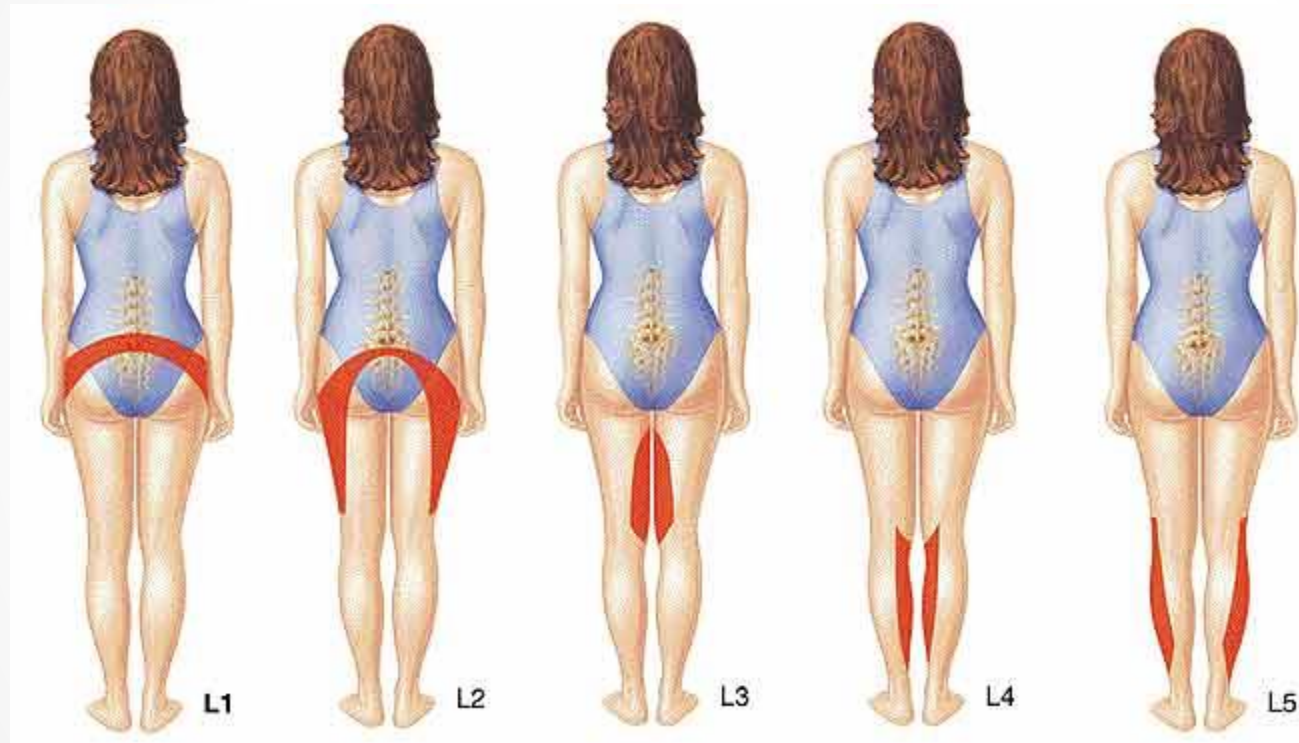
Mechanical



- **Back pain that goes away when you go to bed**
- **As day goes on gets worse**
- **Exercise increases pain**
- **Usually associated with a trauma, sneezing, lifting.**

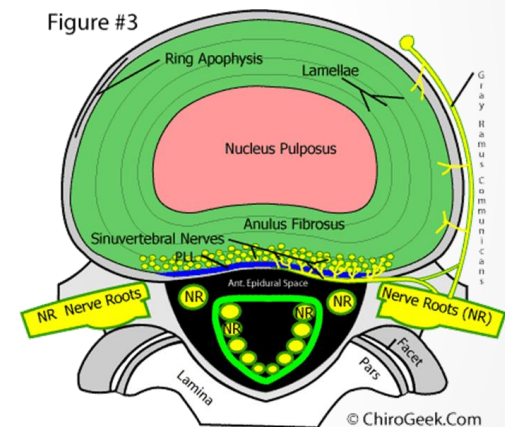
Dr. Michael Weisman MD

Mechanical pain patterns



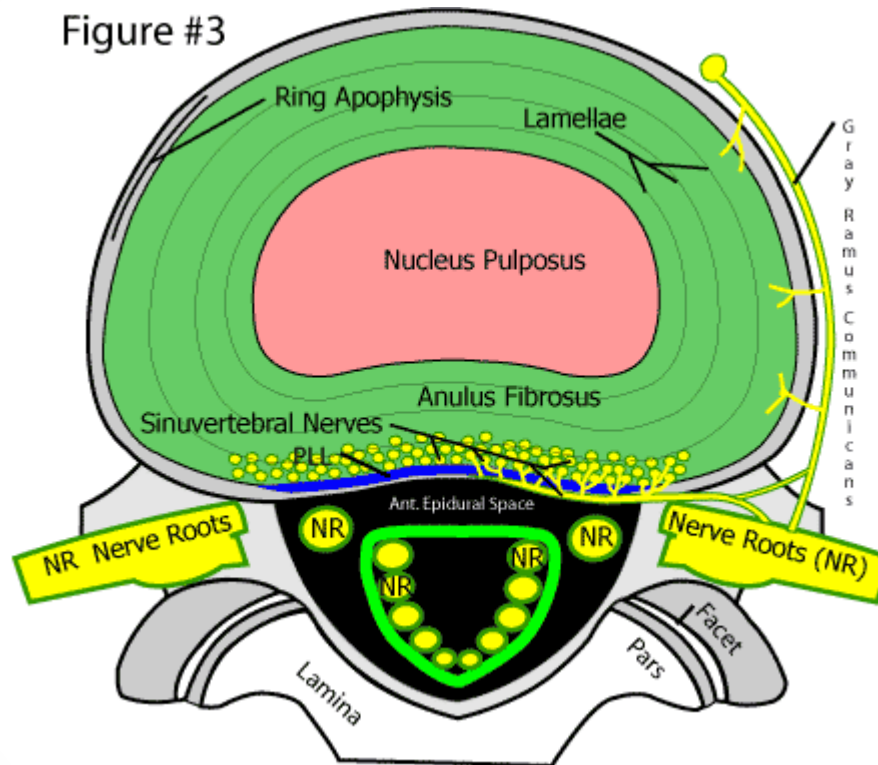
Anatomy 101

- Deeper look at the anatomy and physiology of the disc



Normal Disc

Figure #3



Drawings courtesy of “Chirogeek”

Basic Disc Anatomy

Annulus

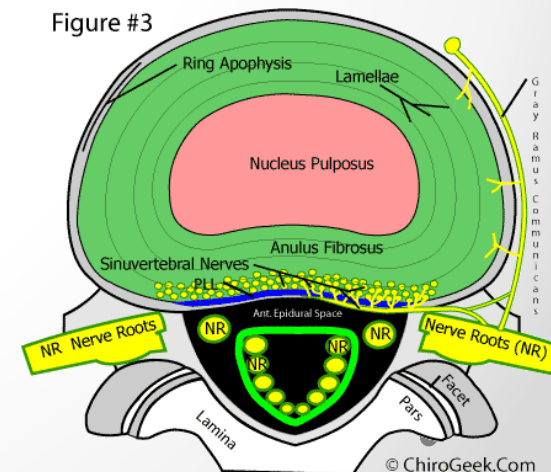
roughly 60-65% H₂O (rest is collagen matrix)

Nucleus

roughly 80% H₂O (rest is proteoglycan aggregates)

These two are composed primarily of 2 main components

1. Proteoglycan (nucleus)
2. Collagen (annulus)



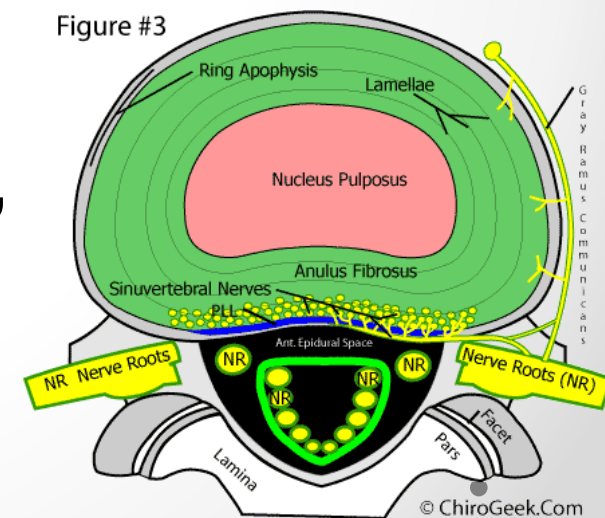
Nucleus

Substance consistency of toothpaste
80-85% water

Cells of nucleus produce structures called
“proteoglycan aggregates” these are hydrophilic.

Job is primary support of axial weight

Secondary is to “hold up the lamellae”



Annulus

Outer portion made up of “sheets” or “rings” usually around 15-25 layers

Layers are called lamellae

Lamellae are “glued” together by proteoglycan's

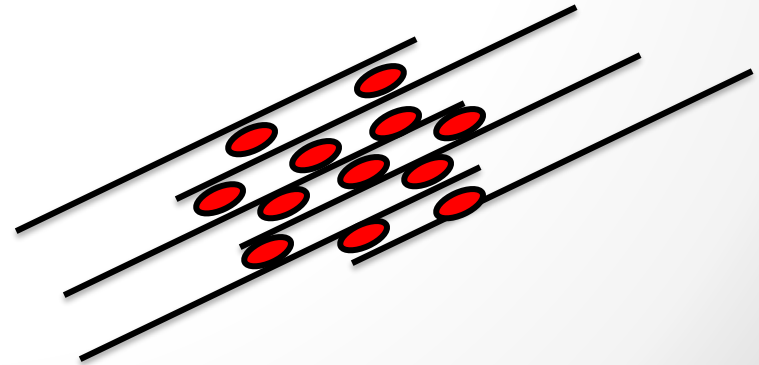
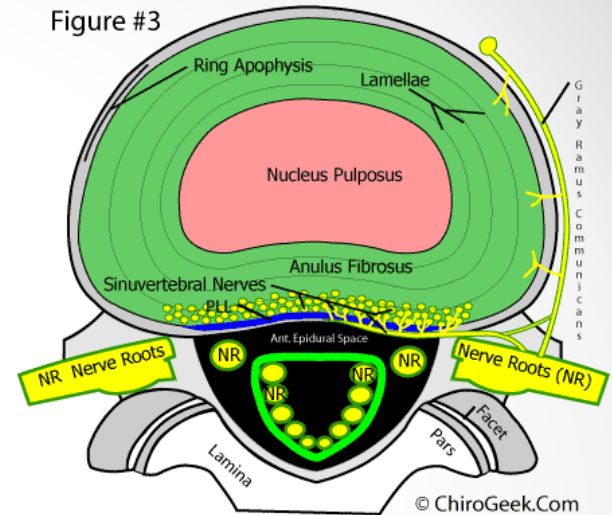
Fibers arranged at 60-70 degree angles to support shear forces

Supports the nucleus



● copy right 2016 Dr Bryan Hawley

Figure #3



Disc Anatomy Function

Normal Healthy Disc

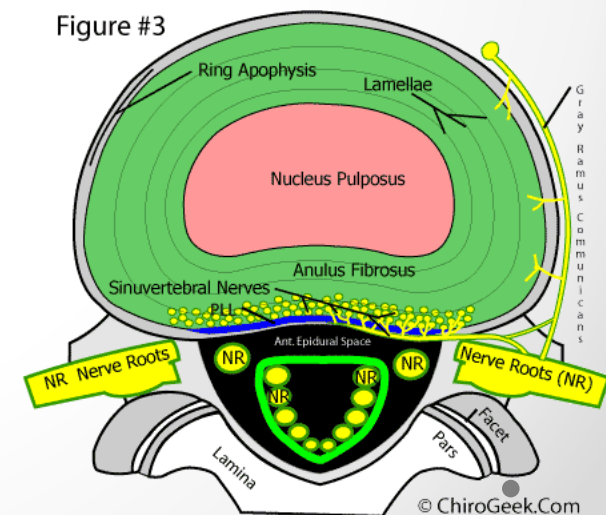
Nucleus supports the majority of the axial loads

Annulus provides support

Unhealthy Disc

Disc dehydration causes shifting of axial load to annulus.

Biochemical reactions take place.



Degeneration physiology

Increase in axial load causes increase in intradiscal pressure.

Proteoglycan synthesis stops (anhydrosis begins) Disc cells need @ 3atm to function normally.

What water is left is slowly being forced out.

H₂O leaves (H₂O is basic) and the disc becomes acidic, further diminishing cell reproduction.

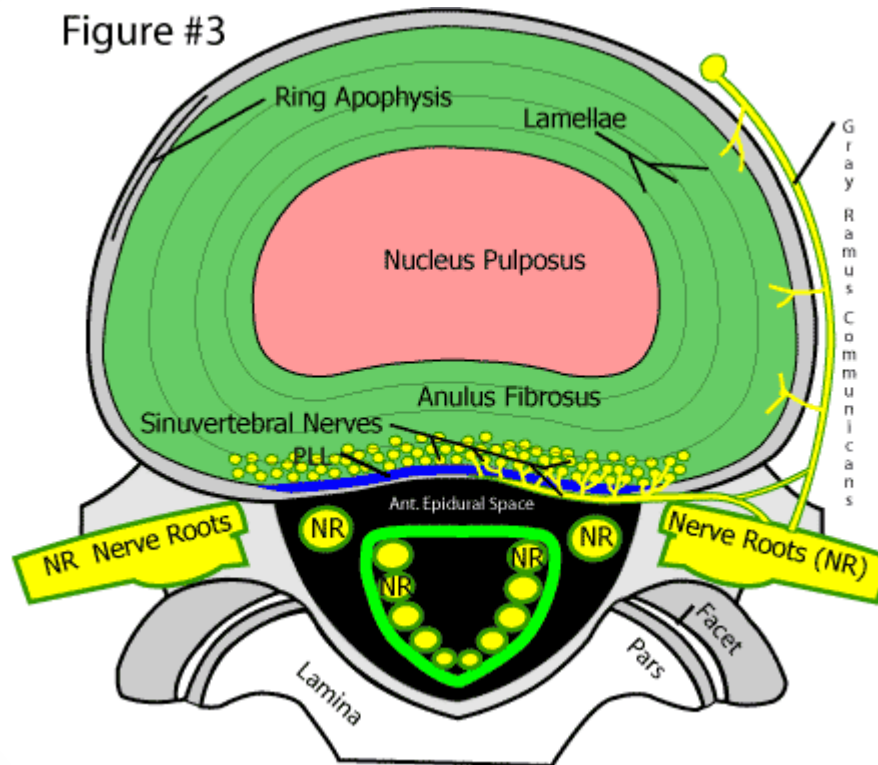
Nucleus deforms, shifts axial load to annulus causes lamellae to fold inward.

Classification of Disc Pathology

1. Disc Bulge – out pouching into epidural space
2. Protrusion- PLL Contained/Sub-ligamentous
3. Extrusion- Non Contained/Trans-ligamentous
4. Sequestered – Free fragment

Normal Disc

Figure #3



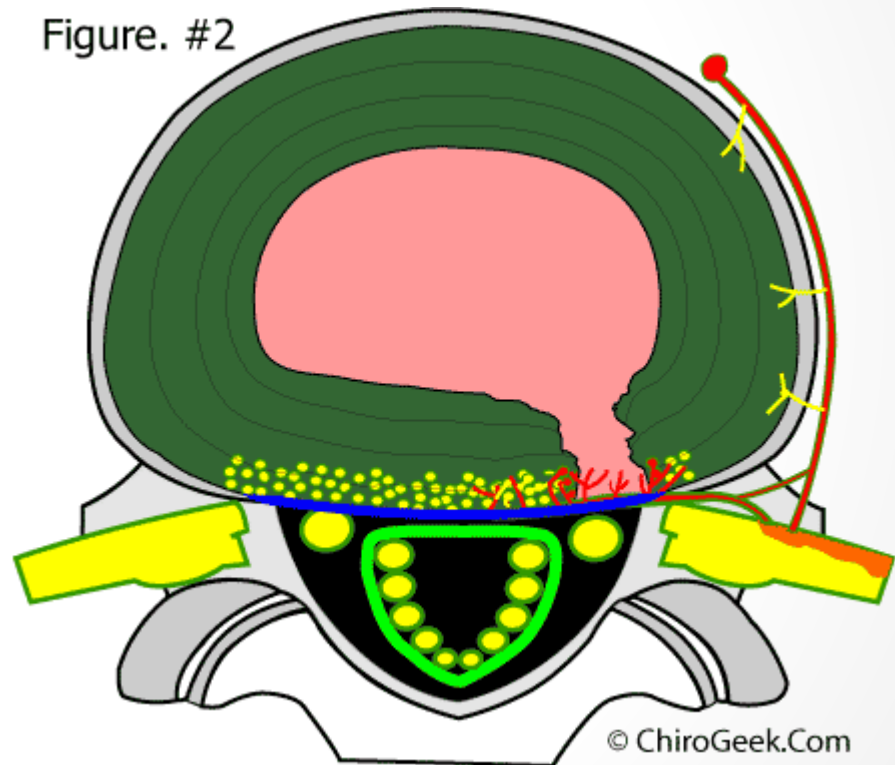
Drawings courtesy of “Chirogeek”

Disc Bulge

This is typically a Dallas Grade 3 and is usually the precursor to the herniated Disc.

PLL is intact, (but starting to bulge). Patient may not show signs on the MRI but may experience disc symptoms due to (IDD)

Figure. #2



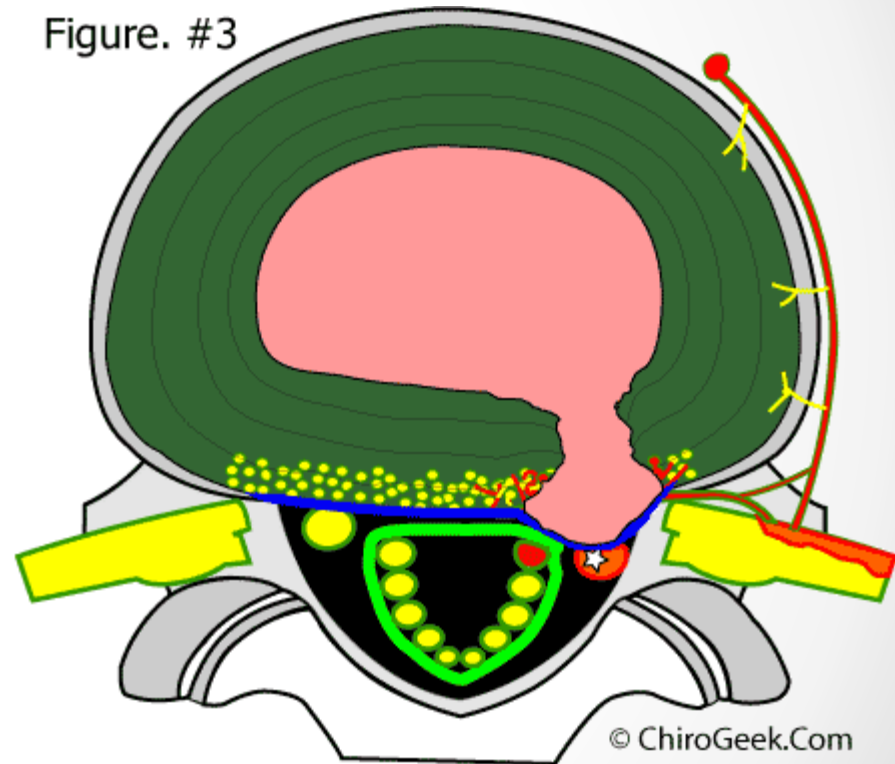
Disc Protrusion

PLL still intact and disc still contained.

Patient at this point will demonstrate pathology on MRI and will have positive disc findings.

Look for dermatomal patterns suggestive of nerve compression.

Figure. #3



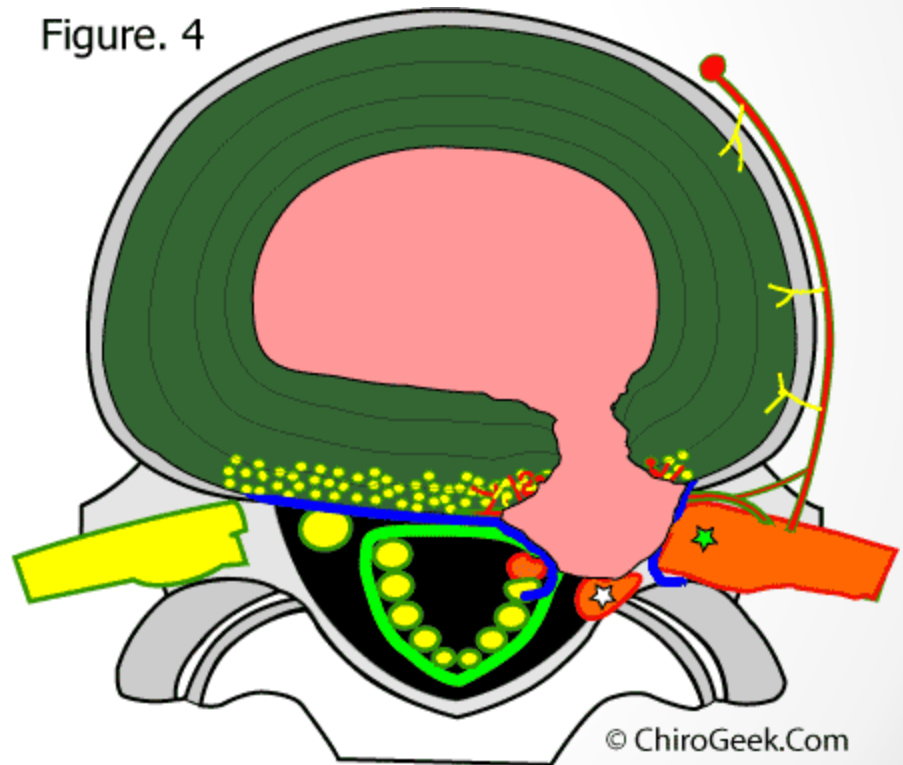
Disc Extrusion

PLL has been
compromised

Chemical Radiculitis
possible

Patient will have MRI
observations and
demonstrate disc
pathology in physical
exam.

Figure. 4

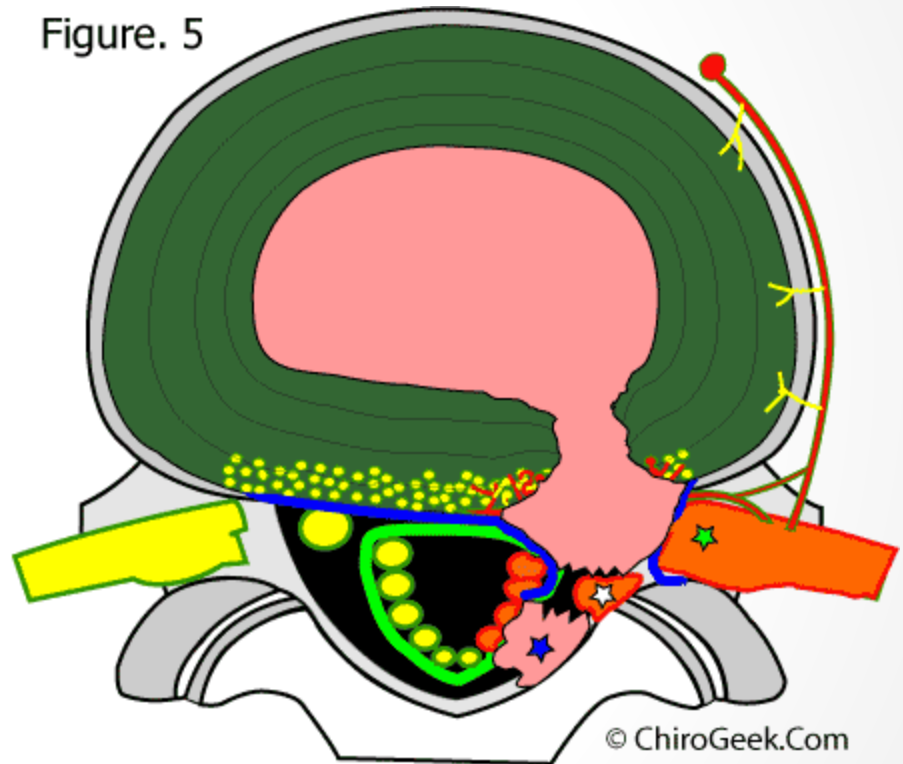


Disc sequestration

PLL is more compromised

Disc material has detached itself from the main body and now there is a free floating fragment within the epidural space.

Figure. 5



IDD

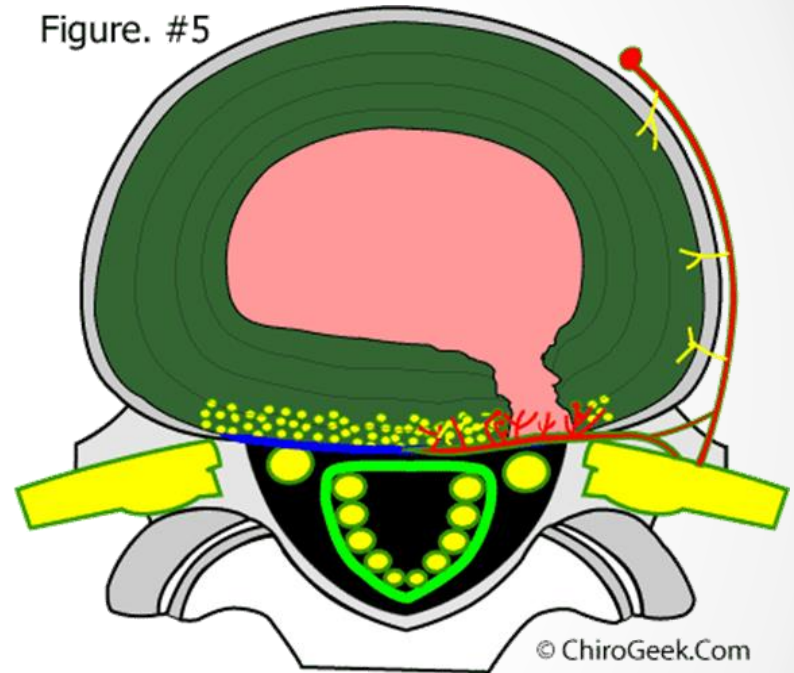
IDD (internal disc disruption)

Painful when reaches post 1/3 of annulus and Sinuvertebral nerve.

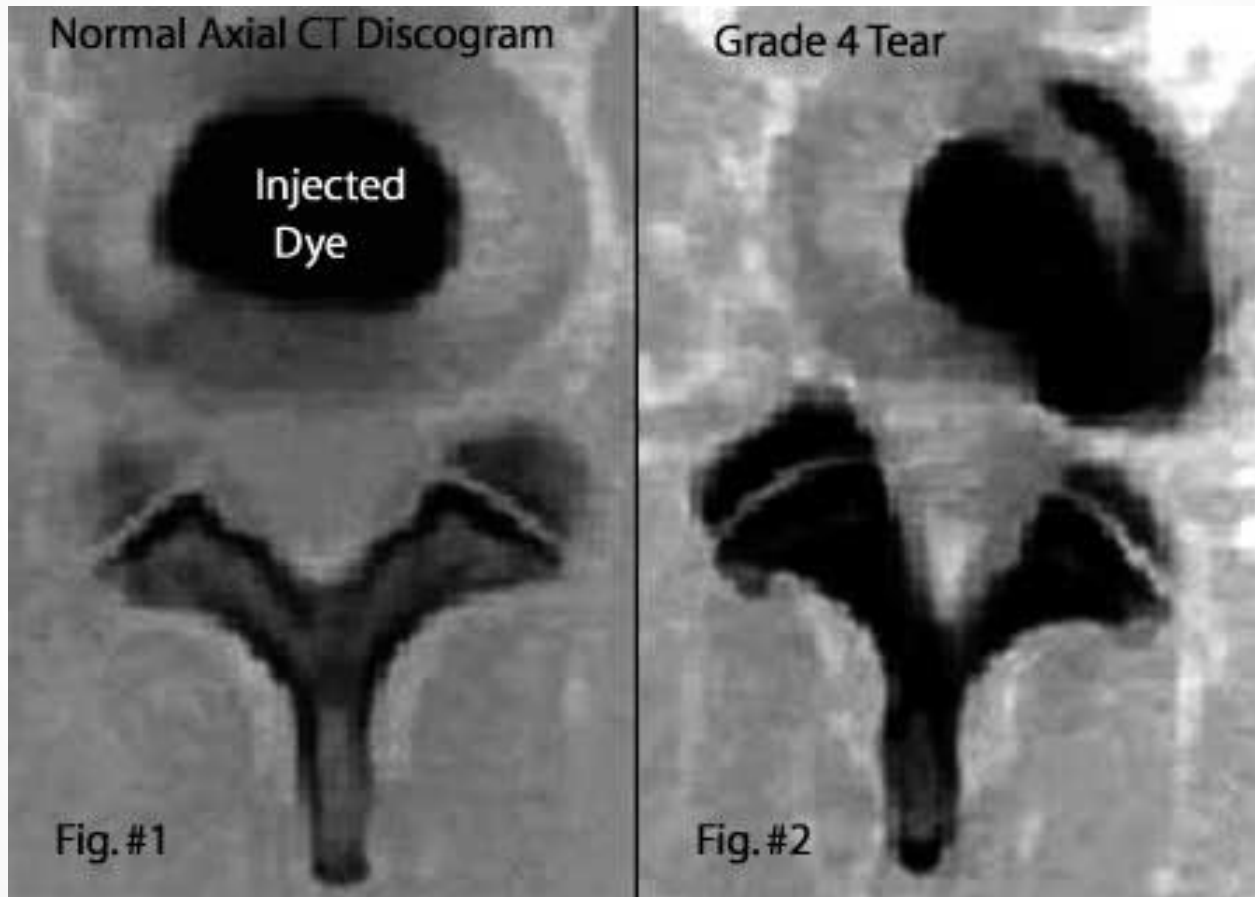
Possible Chemical radiculitis

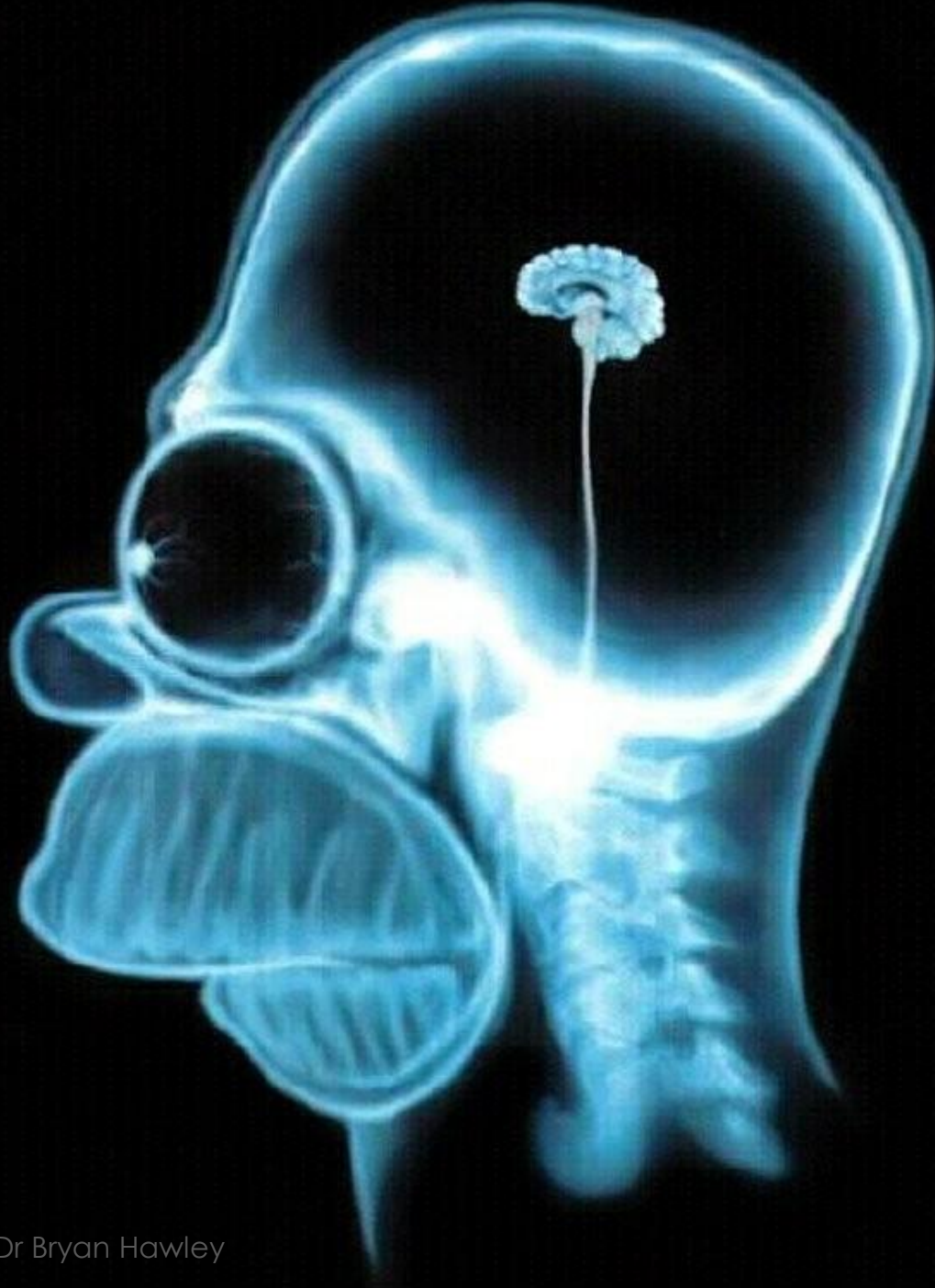
CT or Disco-gram to determine level of internal tear

Figure. #5



Discogram



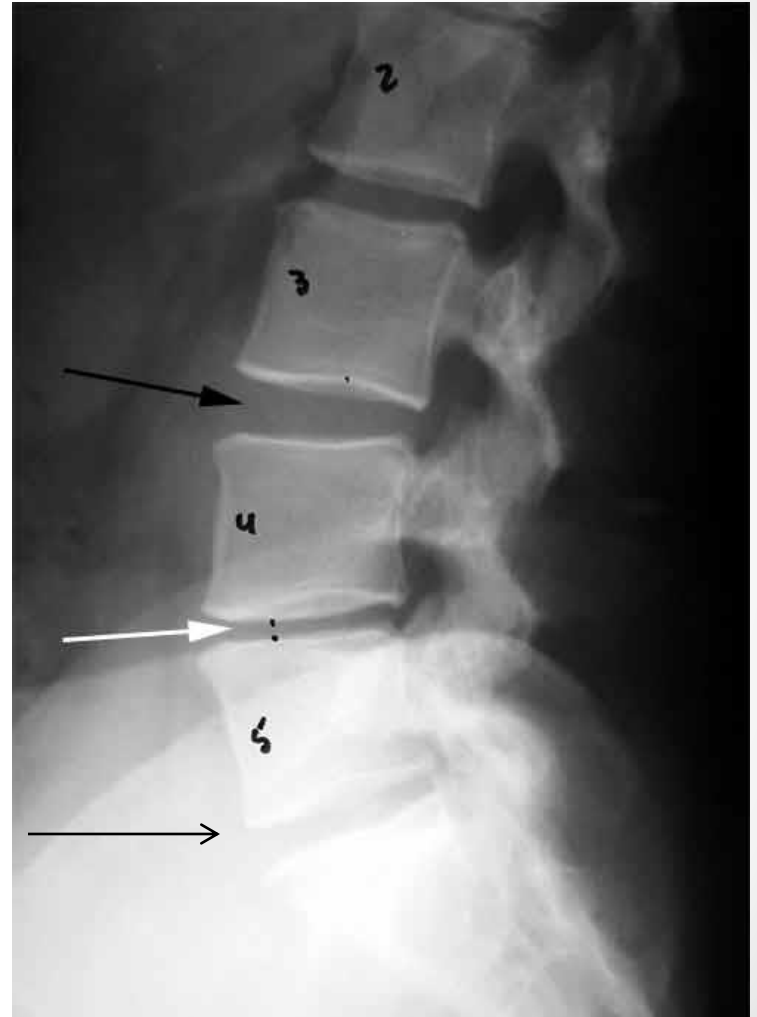


Plain film

normal

Degeneration

Degeneration



MRI

If patient has radiating extremity symptoms and or motor weakness then MRI is recommended.

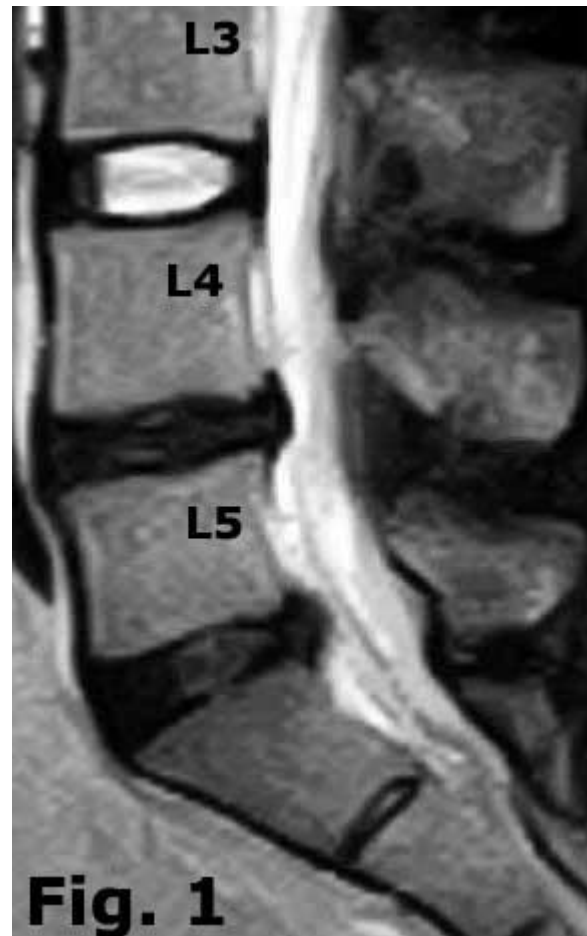
- **Open/Closed/Weight bearing**
- **Without Contrast**
- **With Contrast**
- **Pacemakers**

MRI

Normal



Disc Desiccation



Reading the MRI

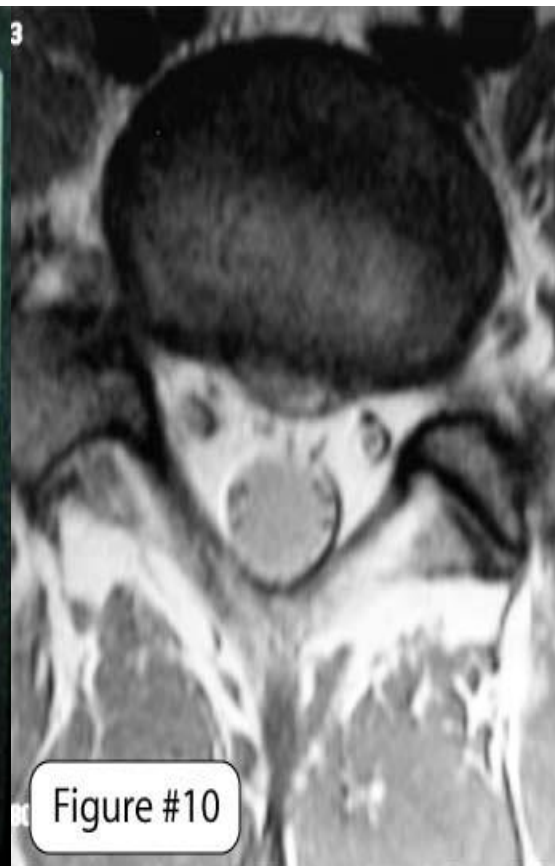


Figure #10

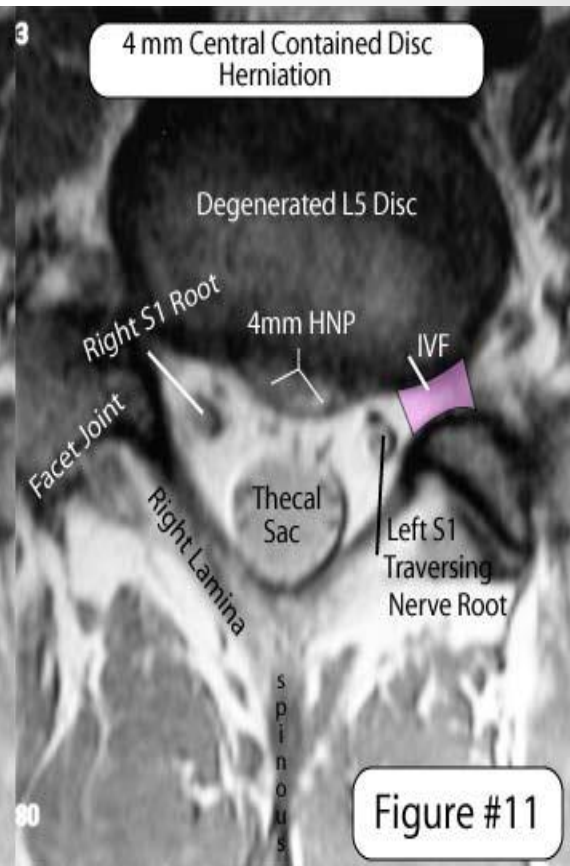
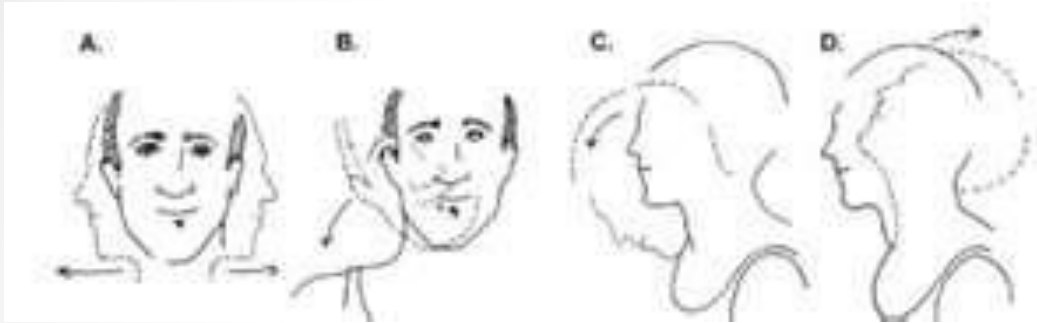


Figure #11

Cervical Disc Disease



Cervical ROM



Perform AROM
then PROM then
Resistive ROM on
the area that patient
feels discomfort.

Shoulder depression test



Indication for Dural Sleeve adhesions.

NOTE: If patient produces sharp pain then they may not be able to tolerate traction/decompression

Cervical compression



Positive produces local pain
and or radiculating pain.

Consider nerve
encroachment

Cervical distraction test



If relieves symptoms of pain and or radiculopathy consider nerve root compression syndrome.

If this is positive this is a good indicator that cervical traction/decompression will aide the patient.

Jacksons Compression



This is pos if pain is produced on the flexed side of the neck.

Indicates IVF stenosis,
facet(Uncovertebral joints),
and/or nerve root encroachment

Forward Head Posture

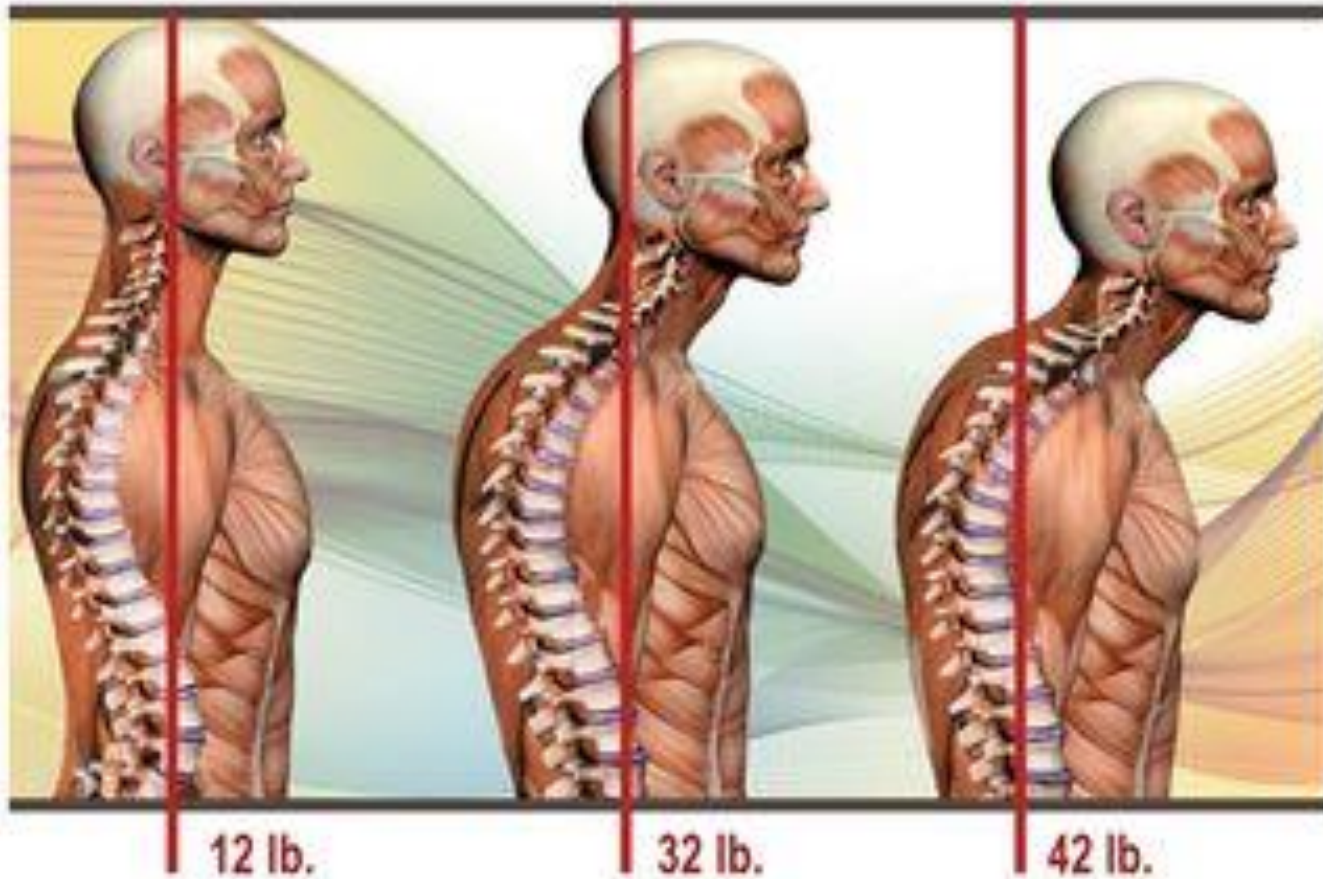


Figure 1

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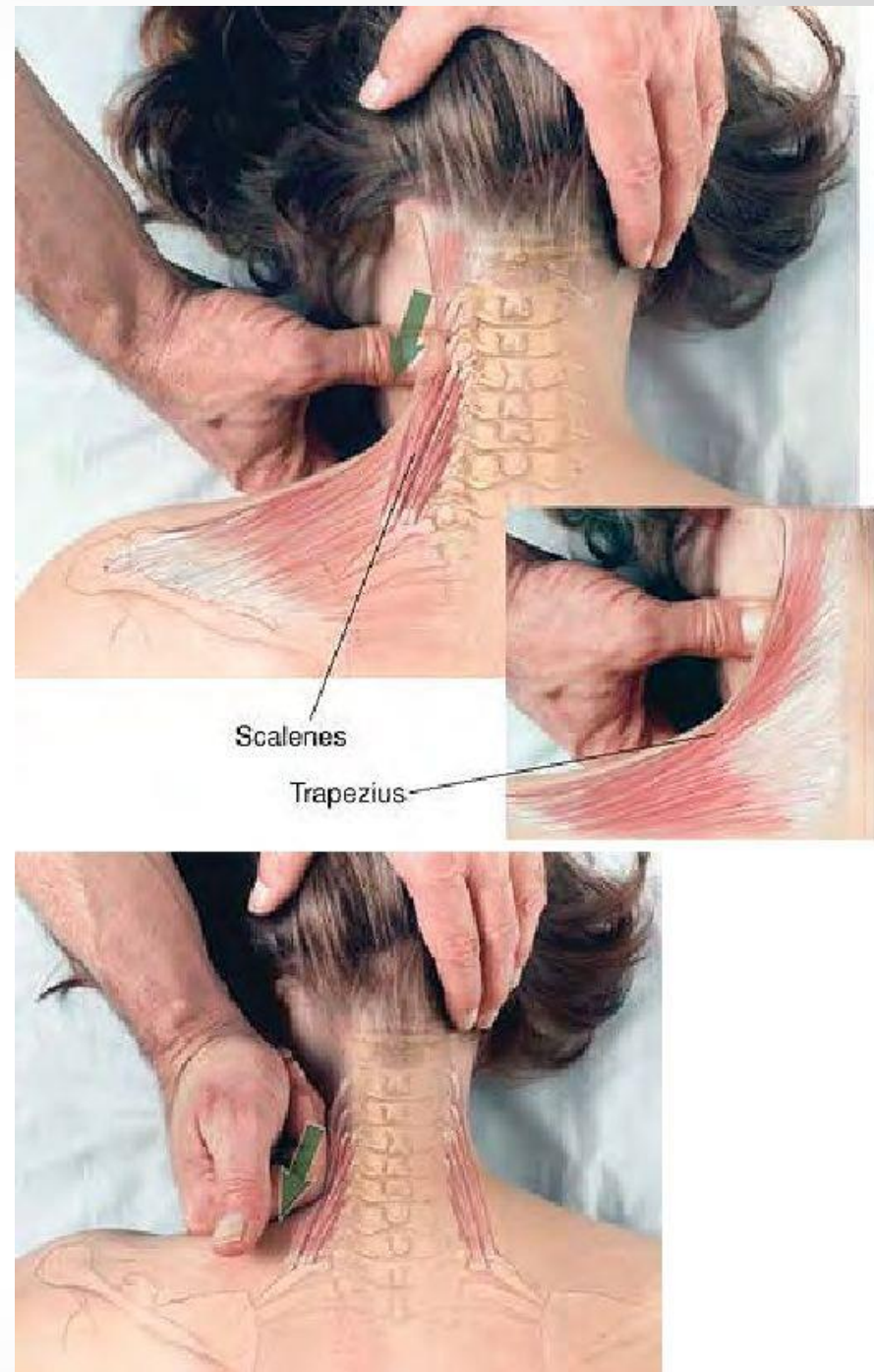


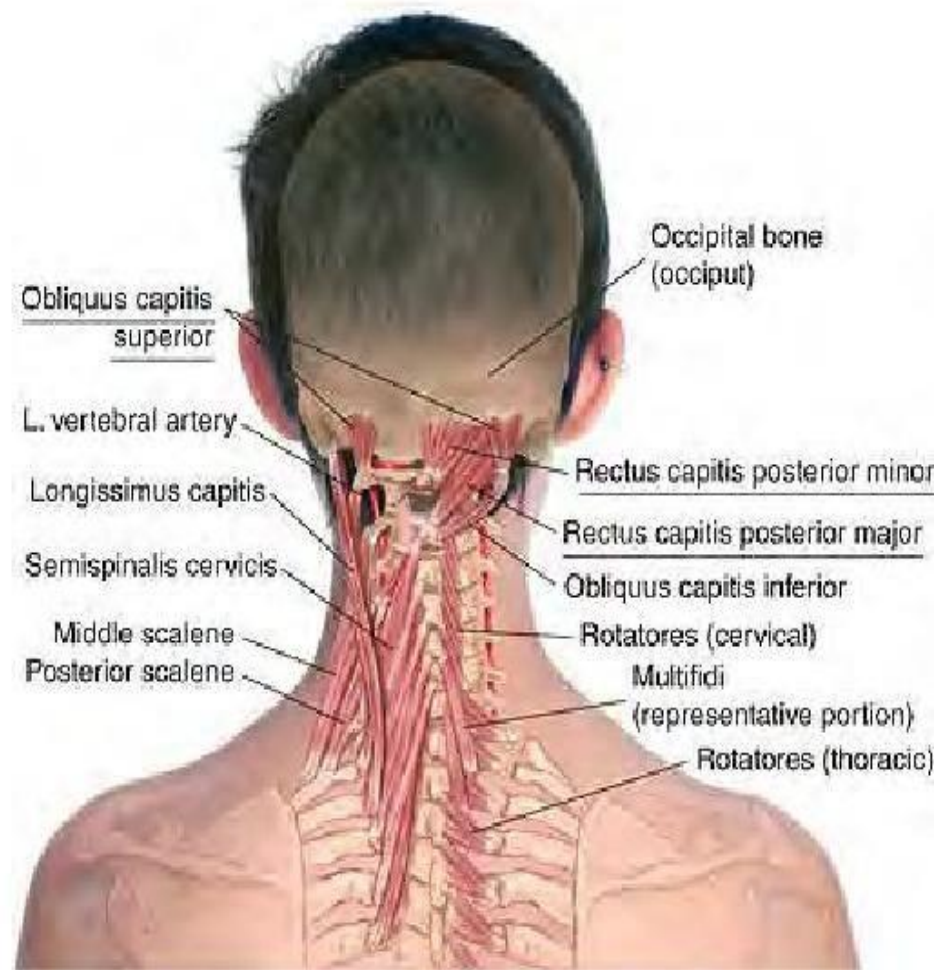
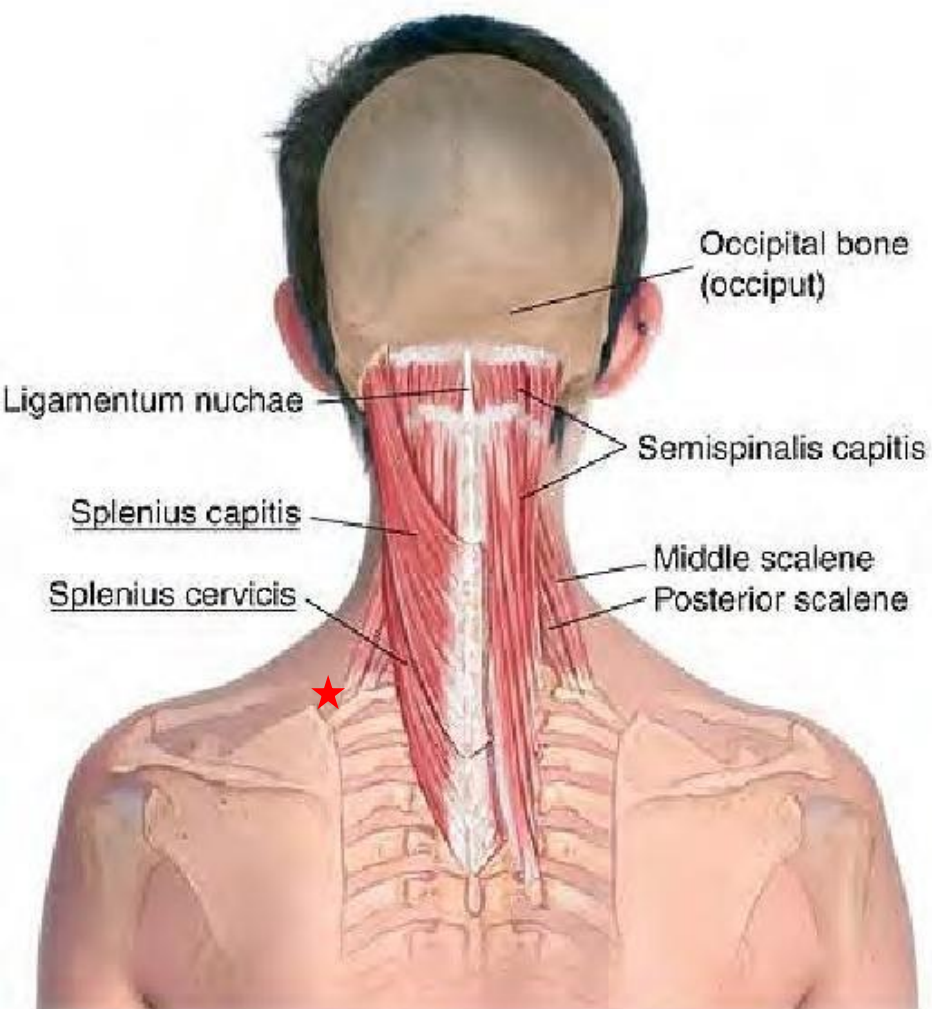
Normal Curve

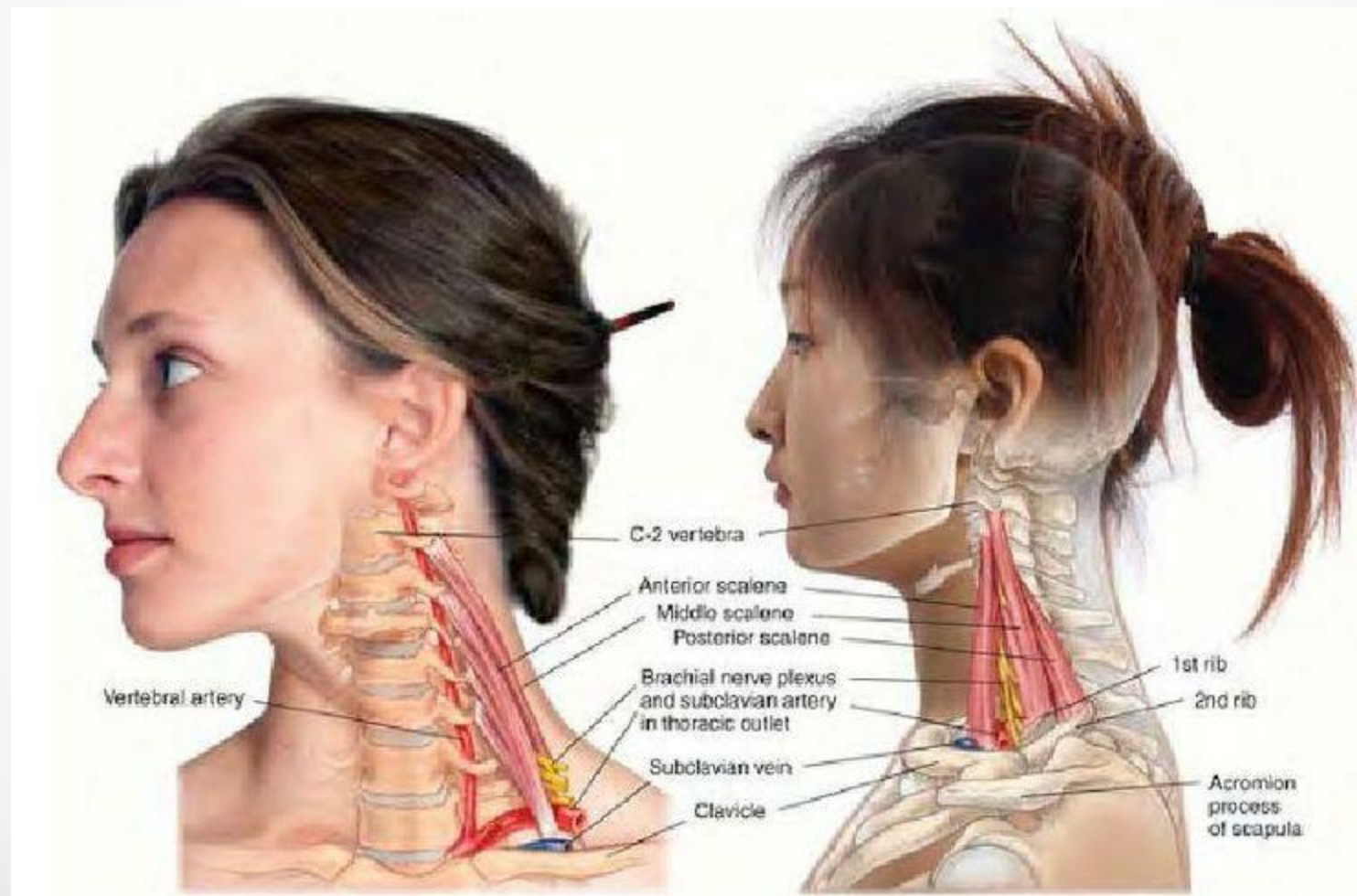


Reversed Curve

Cervical disc



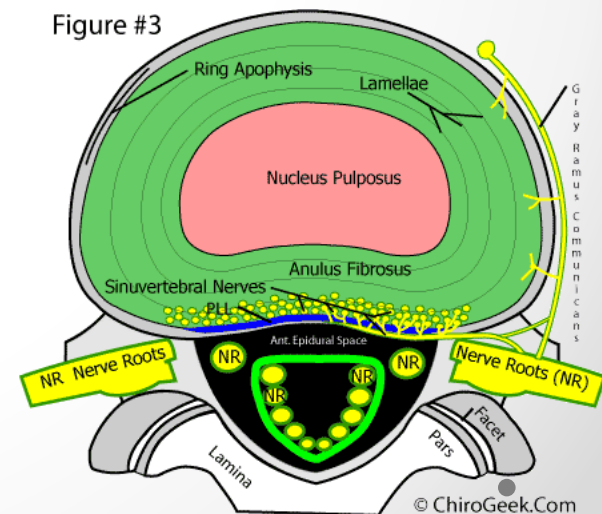




Twisting



Figure #3



Clinical Pearls

- Cervical Deflection
- Abdomen bolster if prone
- Fetal position
- Legs bent if supine
- Getting up off table
- No torsion

End of Disc and Decompression