

# LOW BACK PAIN: REHABILITATION AND MINIMALLY INVASIVE MANAGEMENT



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# Disclaimer

- We have no relevant conflicts of interests



# Objectives

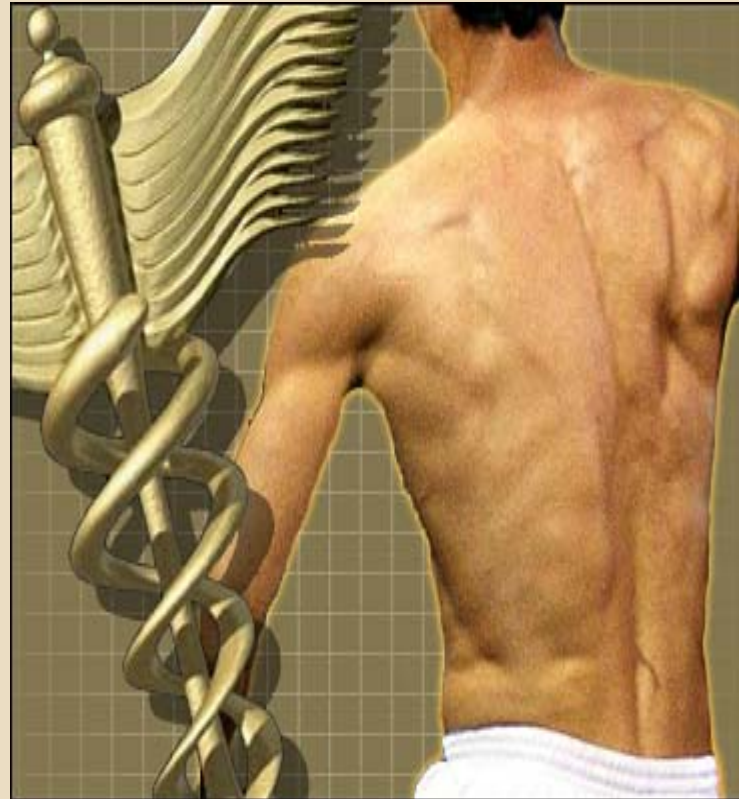
- Perform a functionally based evaluation of acute, subacute and chronic LBP
- Identify appropriate referrals to specialists
- List “red flags” in LBP requiring more assessment
- Differentiate muscular, facet, sacro-iliac and discogenic pain generators
- Generate treatment algorithms specific to the pain generator and stage in disease course

# Epidemiology of Pain

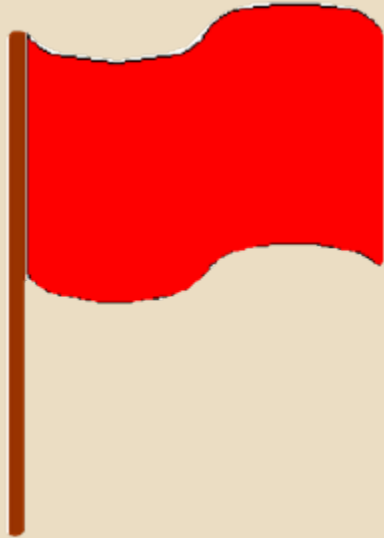
- ⦿ Within the US:
- ⦿ 40 million visit for new pain to PCP
  - Largest (41%) is for Musculoskeletal Pain Issues.
  - Acute Pain 15-20%
  - Sub acute Pain 50-60%
  - Chronic Pain 25-30%
- ⦿ **Low Back Pain** :Most common cause of work days missed
  - Annual incidence 15-20% of Adult population with a life time incidence of 60-85% of the population.
  - 14% US adults have serious Chronic back conditions.

# Case 1: Acute Low Back Pain

- 30 year old NASA mechanic injured low back 2 days ago.
- What are key components of the H&P?



# The “Red Flags”



- ⦿ Age > 50 years old
- ⦿ History of cancer, immunocompromise or deep infection
- ⦿ Bowel/bladder dysfunction
- ⦿ Fever, weight loss
- ⦿ Rapidly progressive or severe neurological deficits  
> 1 myotome

# Physical Exam

## Evidence Based

- ⦿ Straight leg raising
- ⦿ Atrophy
- ⦿ Point tenderness over single vertebrae
- ⦿ 3/5 SI provocation signs
- ⦿ Waddell's signs of non-organic pain

## “Soft Findings”

- ⦿ Range of motion
- ⦿ Muscle tenderness
- ⦿ SI tenderness

Atlas SJ, Deyo RA. Evaluating and managing acute low back pain in the primary care setting. J Gen Intern Med. 2001 Feb;16(2):120-31.

# Waddell's Signs

- >3/5 negatively correlates with outcomes from surgery and P.T.
  - Tenderness
  - Simulation
  - Regional (non-dermatome) disturbance
  - Distraction
  - Over-reaction

Waddell G Occupational low-back pain, illness behavior, and disability. Spine. 1991 Jun;16(6):683-5.



# Diagnostic Tests

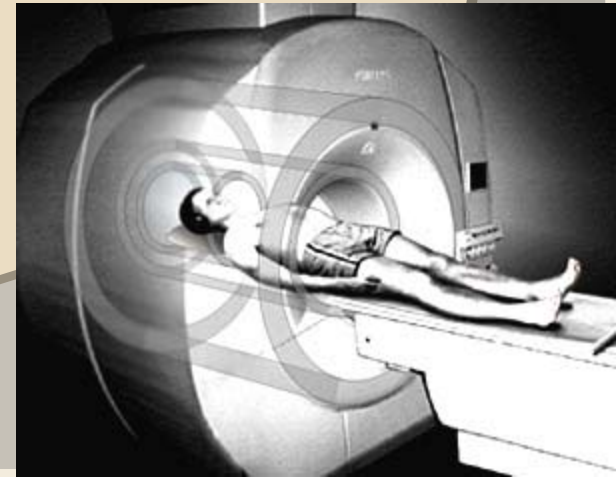
- What tests would you order?
- Plain radiography: only indications are for severe acute trauma (i.e., fx), scoliosis and spondylolisthesis

Atlas SJ, Deyo RA. Evaluating and managing acute low back pain in the primary care setting. *J Gen Intern Med.* 2001 Feb;16(2):120-31.

# MRI

- Best single test for the “red flags”
- Caveat: 63% of asymptomatic controls > 40 years old have disc bulges

Jensen MC, Brant-Zawadzki MN, Obuchowski N, Modic MT, Malkasian D, Ross JS. Magnetic resonance imaging of the lumbar spine in people without back pain. *N Engl J Med*. 1994 Jul 14;331(2):69-73.



# Treatment of Acute LBP

- What would you recommend for our patient?



# Treatment: Advice

- Return to work
- Appropriate restrictions
- Core strengthening
- Hip flexibility
- Ergonomics
  
- Devil's advocate: post office study
  - Daltroy LH, Iversen MD, Larson MG, Lew R, Wright E, Ryan J, Zwerling C, Fossel AH, Liang MH A controlled trial of an educational program to prevent low back N Engl J Med. 1997 Jul 31;337(5):322-8. injuries

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# P.T.: When to Order?

## ⦿ Indications:

- No improvement with home exercises  
> 1-2 wks
- Clear dysfunction in strength, ROM,  
body mechanics
- High risk occupation/work hardening
- Reoccurrence

# Case 2: Subacute LBP

- The same 30 year old NASA mechanic returns 6 weeks later, and now has pain down his left leg. He has no “red flags”.
- What are key components of the H&P?
- What test(s) would you order?

# Case 2: Continued

- MRI shows right paramedian disc bulge without nerve root impingement at L4-5.

- Now what?



# Subacute LBP

- ⦿ This is stage where diagnosis and treatment make the most difference.
- ⦿ Need to identify pain generator.
- ⦿ Need to define the patient's goals.





# Conventional thought

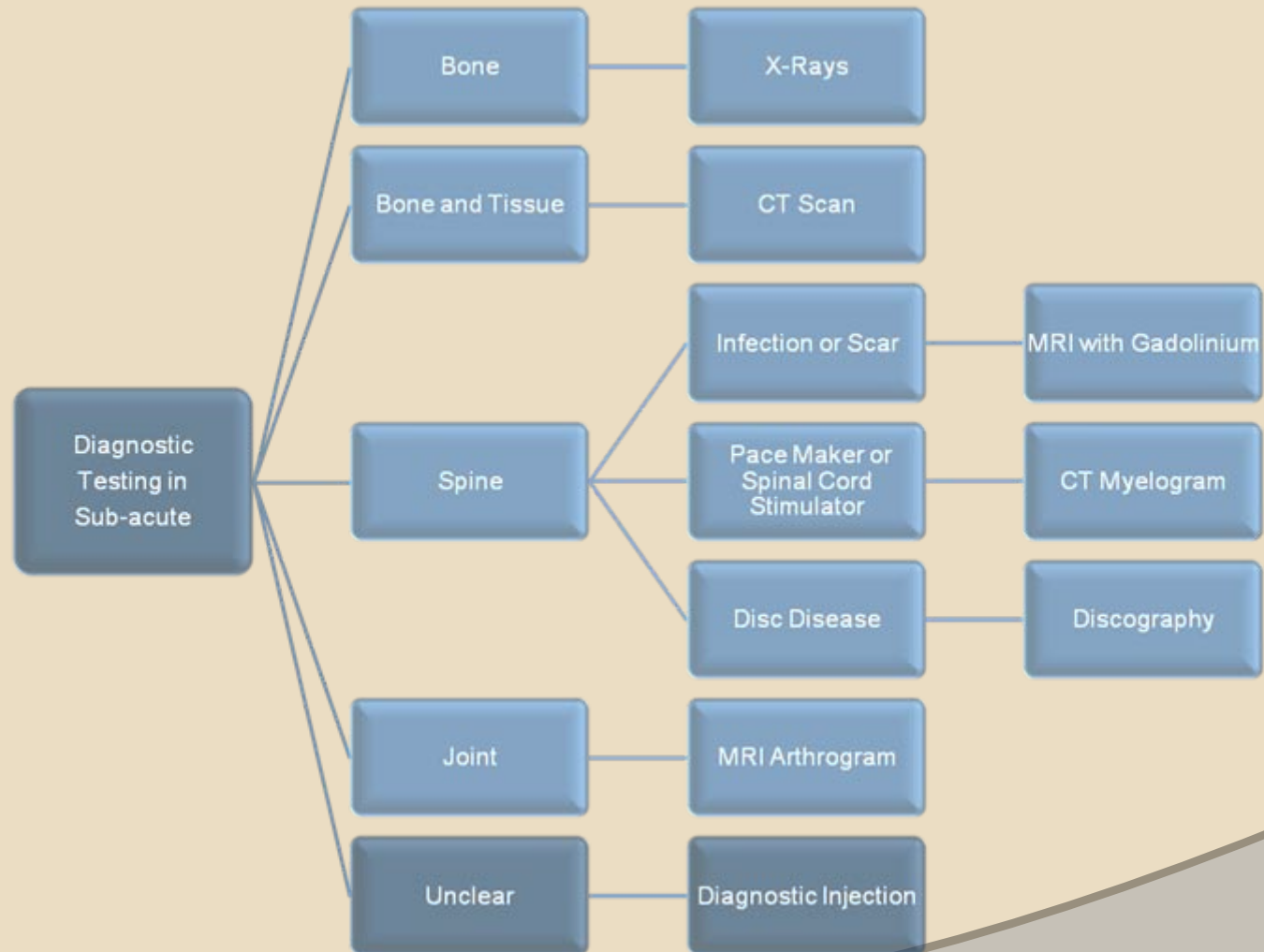
- Low back pain 80% to 90% resolving in about 6 weeks irrespective of the administration or type of treatment.
- 5% to 10% of patients developing persistent back pain.
- Relapse: Modern evidence 25%- 60% of patients have persistent pain, one year or longer after the initial episode.
- (141-167)

# Pain Generators

- Muscle
- Ligaments
- SI
- Vertebral body
- Facet joints
- Annulus
- Spinal nerves
- Sciatic (piriformis)
- Hip/pelvic pathology



# Image Studies



# Diagnostic Injections?

- ⦿ Indications:
  - Pain Pattern suggestive but not consistent
  - PE and Radiographic evidence: Non-focal or too complex
- ⦿ Proven valid method when:
  - Under Fluoroscopy
  - Placebo or Comparative Anesthetic Control Injection
- ⦿ Use:
  - Obtain Definitive Diagnosis
  - Prove Referral Pain Pattern
  - Unmask other Potential Pain Generators
    - When multiple pathologies or issues present.
- ⦿ American Society Interventional Pain Physicians ASIPP 2008 Interventional Guidelines
- ⦿ International Society of Interventional Spine ISIS 2007

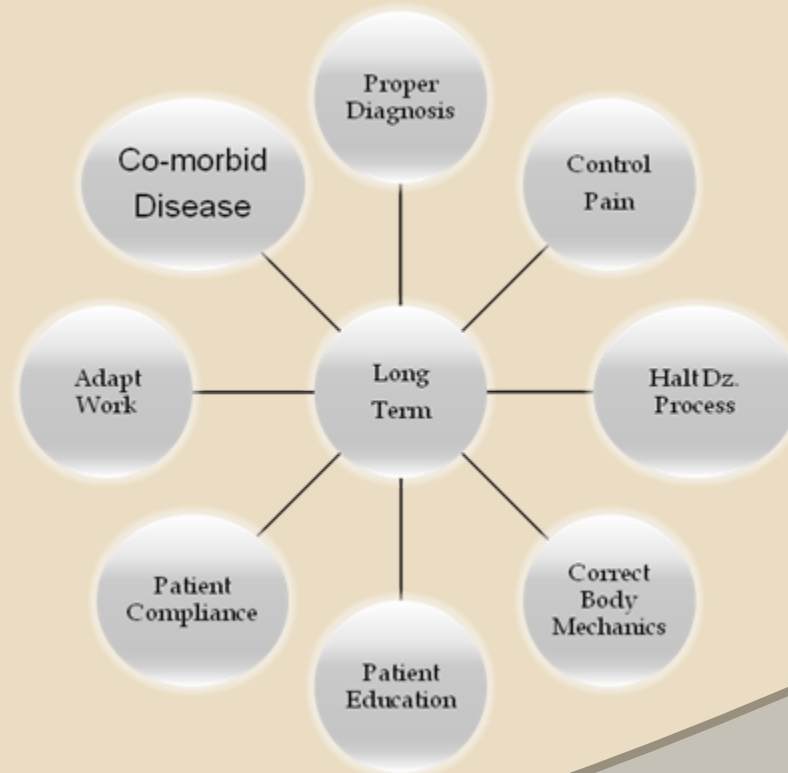
# “Therapeutic Injections”

## ◎ Pain Relief:

- Variable: Why?
  - Location / Pathology
  - Procedure type / Medication used
  - Post Procedure care
  - Patient Conditioning
  - Patient Co-morbid Factors
  - Poor - No Compliance with Recommendations.

In Subacute, need to start thinking about multi-modal approach for long term relief, but what step is most important?

1. Proper Diagnosis
2. Halt Inflammatory Process
3. Control Pain
4. Correct Mechanical Issues
5. Teach Adaptation; if uncorrectable
6. Educate patient for long term prevention



# Pain Generator: Facet

- ⦿ Pain Pattern
- ⦿ LBP with referral into LE down to knee
- ⦿ Neck with referral into the shoulder back or arm

# Pain Generator: Facet

- Signs and Symptoms:

- Pain Extension/Hyper-extension
- Pain Rotation
- Pain with Rotation & extension focal
- Pain rising from flexed position
- Pain on Palpation focal
- Decrease motion w/ Movement or Blot Maneuver

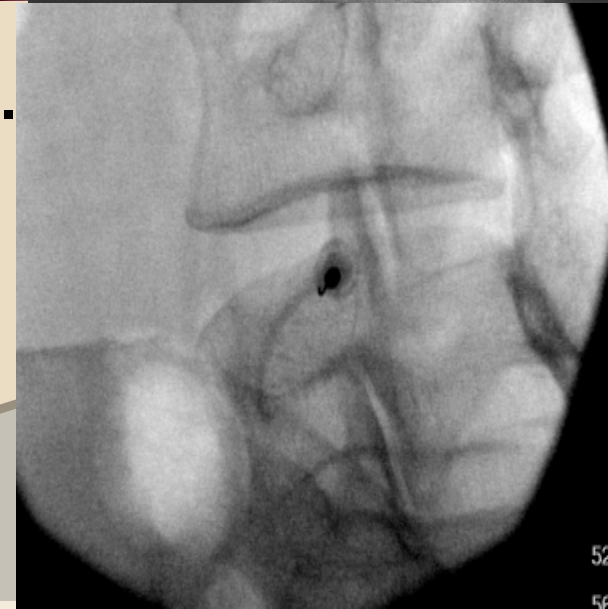
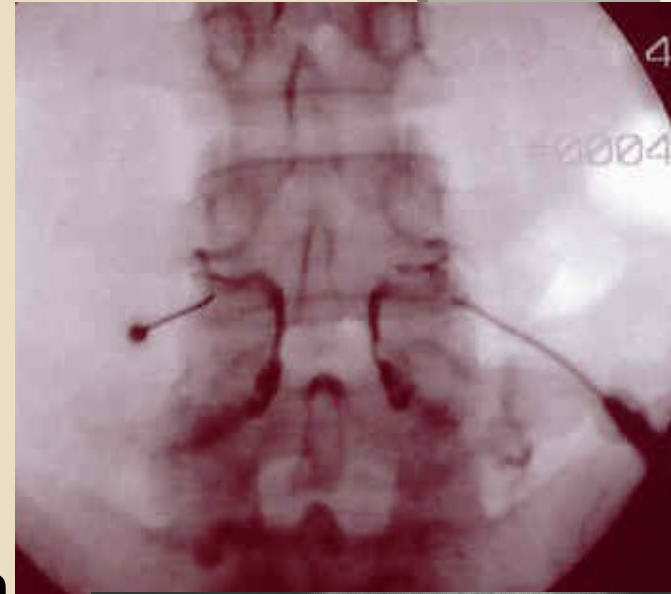
5 or more 92% PPV response to single Diagnostic

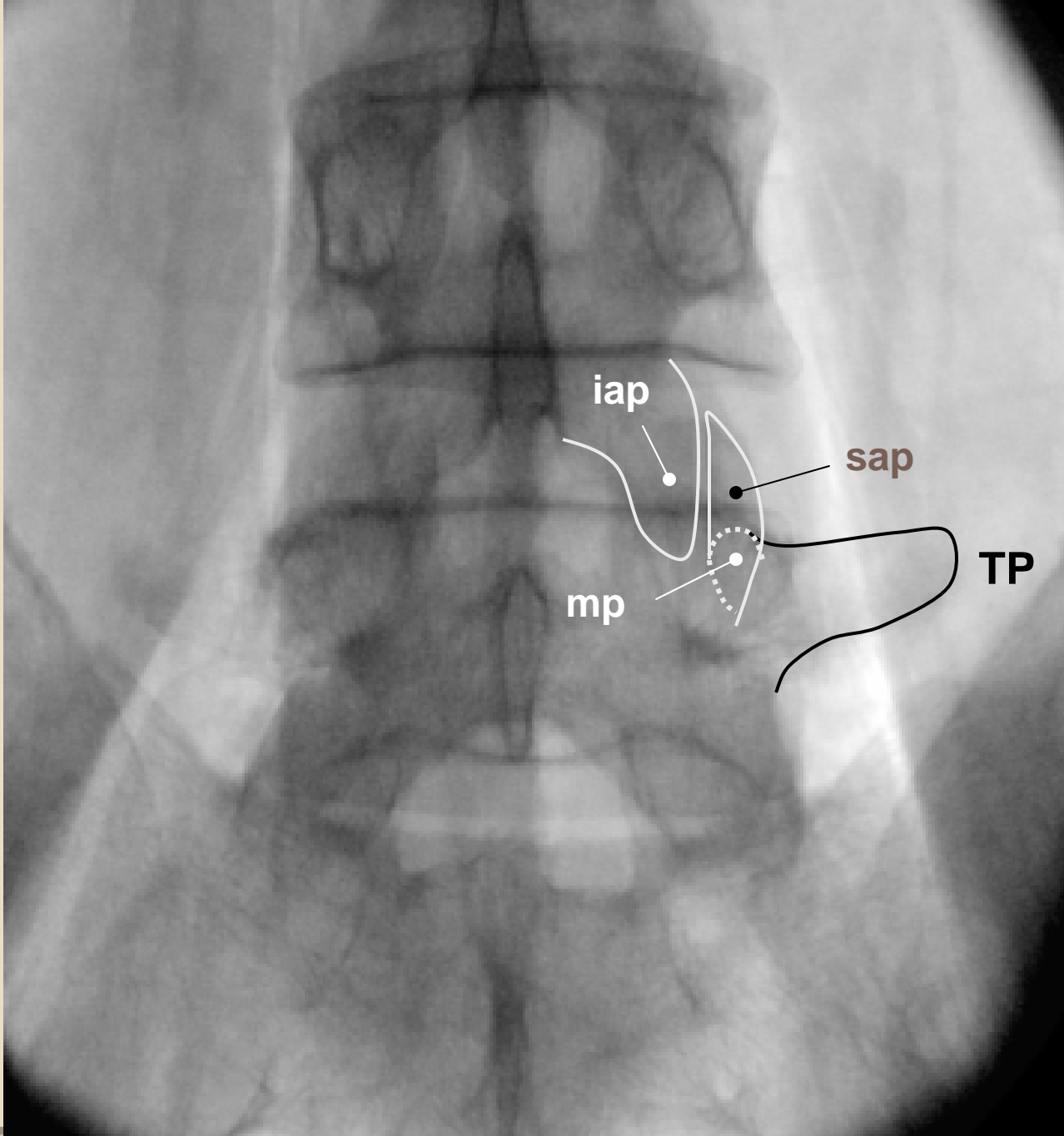
- Schwarzer AC, Aprill CN, Derby R, et al. Clinical features of patients with pain stemming from the lumbar zygapophyseal joints. Is the lumbar facet syndrome a clinical entity? Spine 1994b; 19: 1132-1137.



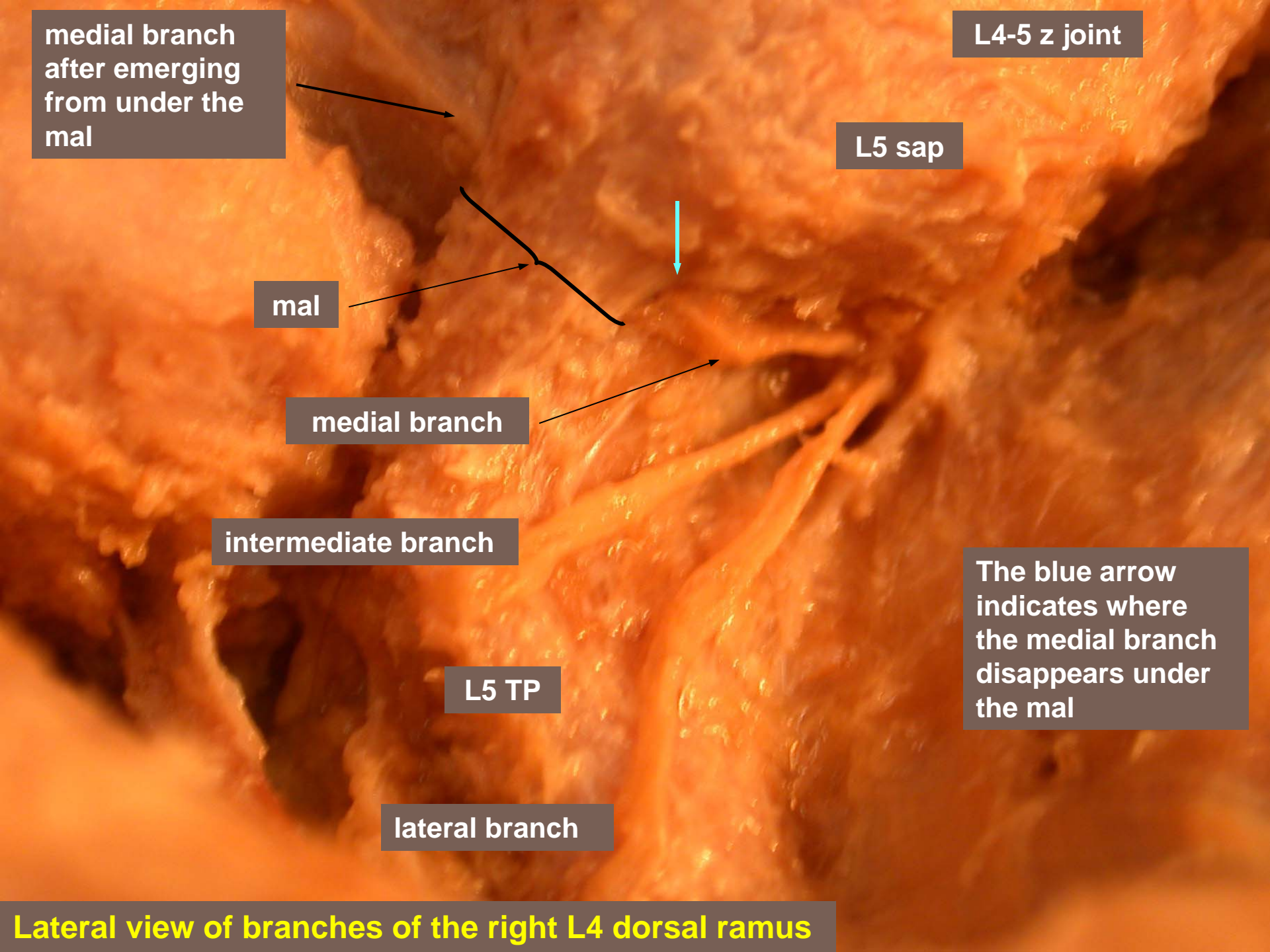
# Pain Generator: Facet

- ⦿ Diagnostic Injection
  - Facet Joint
  - Medial Branch
- ⦿ Both valid techniques when in conjunction with a control block.
- ⦿ Single injection 17-49% FFP





**AP VIEW: L5 vertebra for L4 medial branch neurotomy**



medial branch after emerging from under the mal

L4-5 z joint

L5 sap

mal

medial branch

intermediate branch

L5 TP

lateral branch

The blue arrow indicates where the medial branch disappears under the mal

Lateral view of branches of the right L4 dorsal ramus

# Facet Therapeutic

## ⦿ Joint Injection

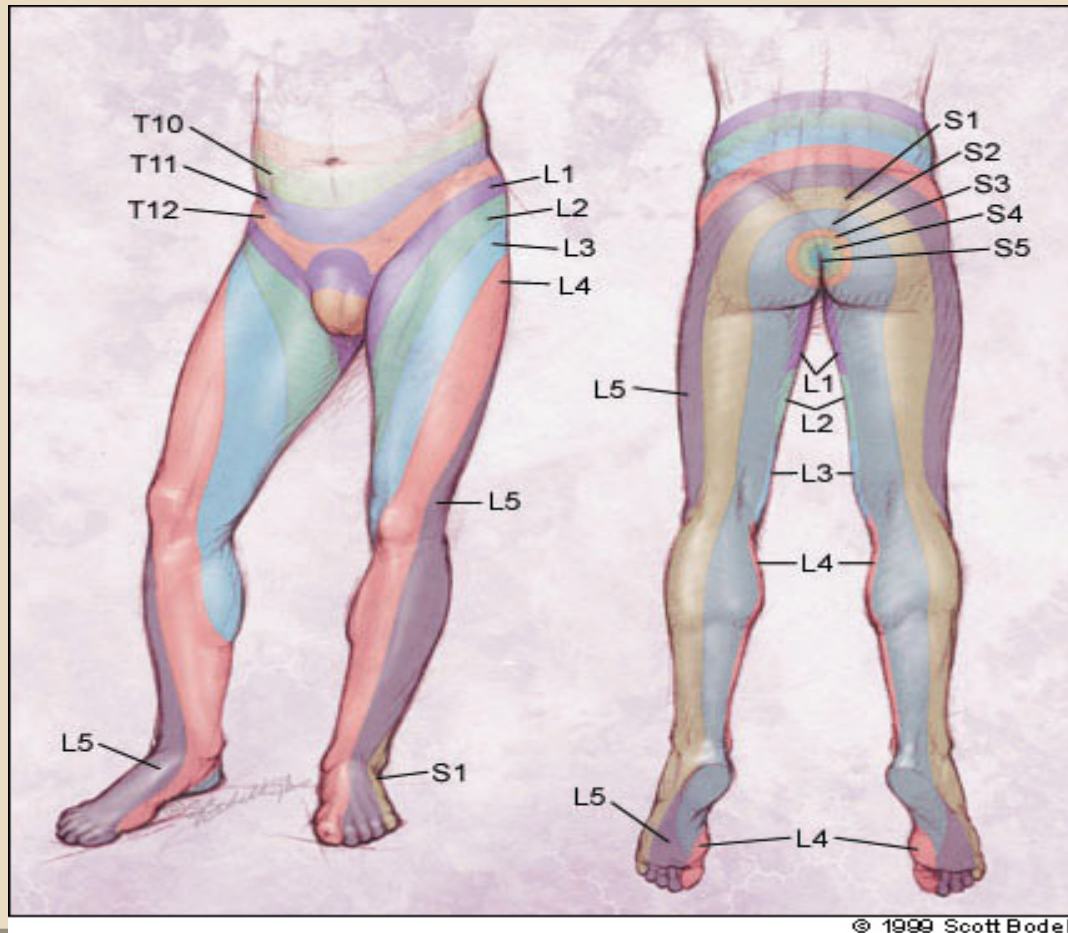
- 38-62% Significant relief 3 month
- 14-56% Significant relief 6 month

## ⦿ Radiofrequency of Medial Branch Nerve

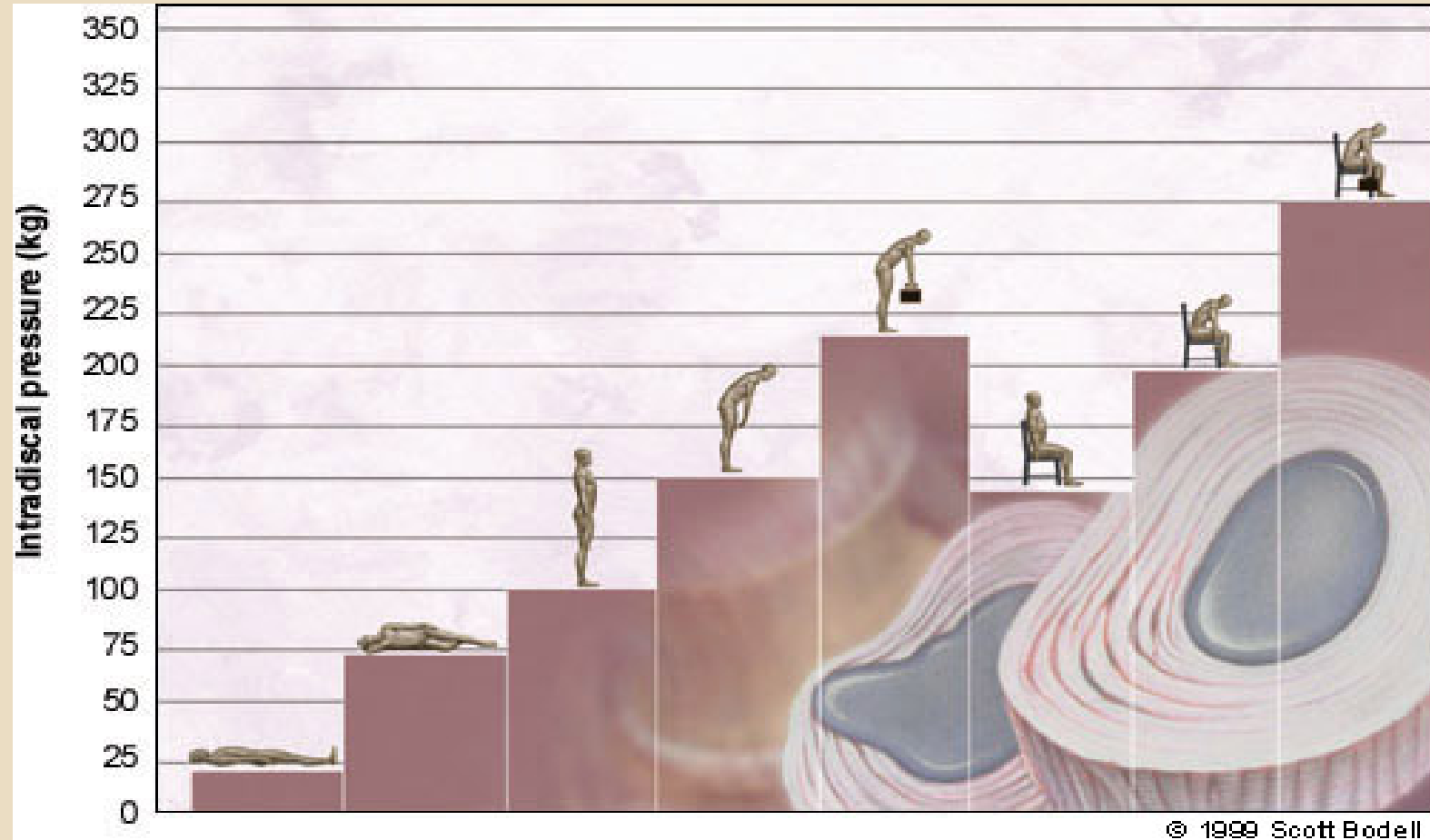
- 72-93% Significant relief 3 months
- 40-93% Significant relief 6 months
- 40-93% Significant relief 12 months

# Discogenic Pain

Disc level Location of pain Motor deficit



# Position and Disc Pressure



# Discography

## ⦿ Indications:

- To determine whether or not a lumbar disc is responsible for or contributing to, production of axial low back pain
- Unremitting LBP >4months
- Negative Diagnostic Imaging Studies
- Evaluation for Percutaneous disc Procedures
- Evaluation of postsurgical patient for recurrent disc herniation or pseudoarthrosis.

# Discography

- Multiple studies and protocol by various organizations
- No standard at this time.
- Carragee et al. 2000.
  - Against Discography state false + secondary to Somatization
  - Most studies contradict his findings. Derby 2006,07,08
  - Study Design flaws
- Manchikanti et al 2001; did not find any impact on discography with or without somatization disorder results similar.
- Bogduk 2006, 2008 found excellent corresponds for discography and determination of level and cause of pain issues with trained and tech. proper. 80% positive outcome when done properly .

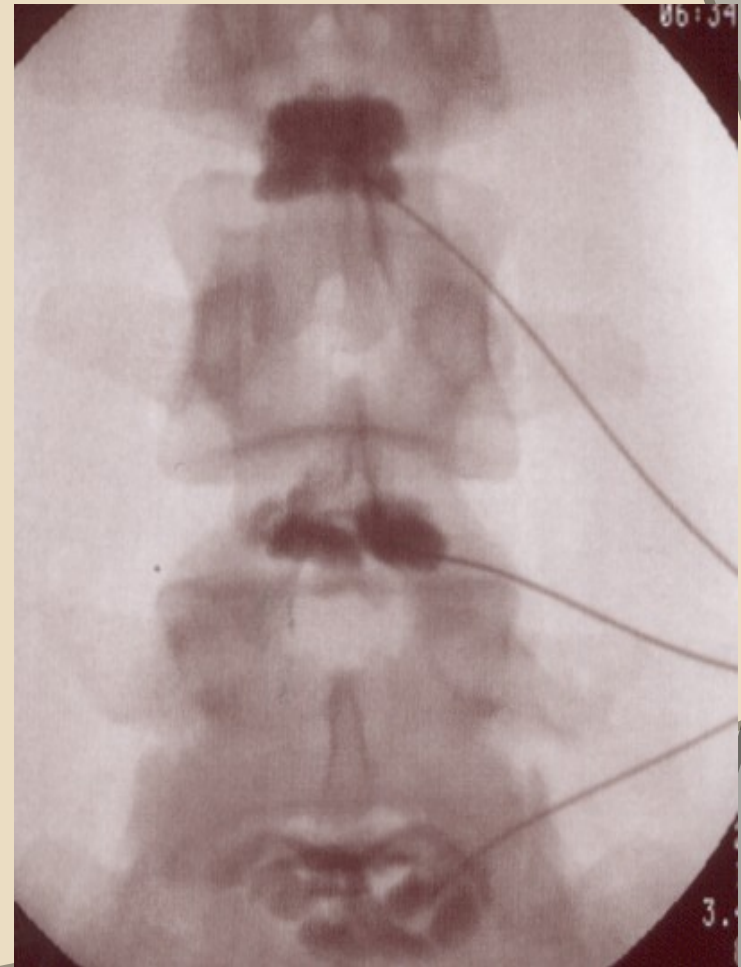


# Discography

- High intensity zone on T2-weight MRI sagittal images in the posterior annulus representative of a radial annular fissure
  - 90% positive predictive value with concordant discography
- Absence of HIZ does not exclude annular pathology or discogenic pain.
- Falco et al. ASIPP 2007.

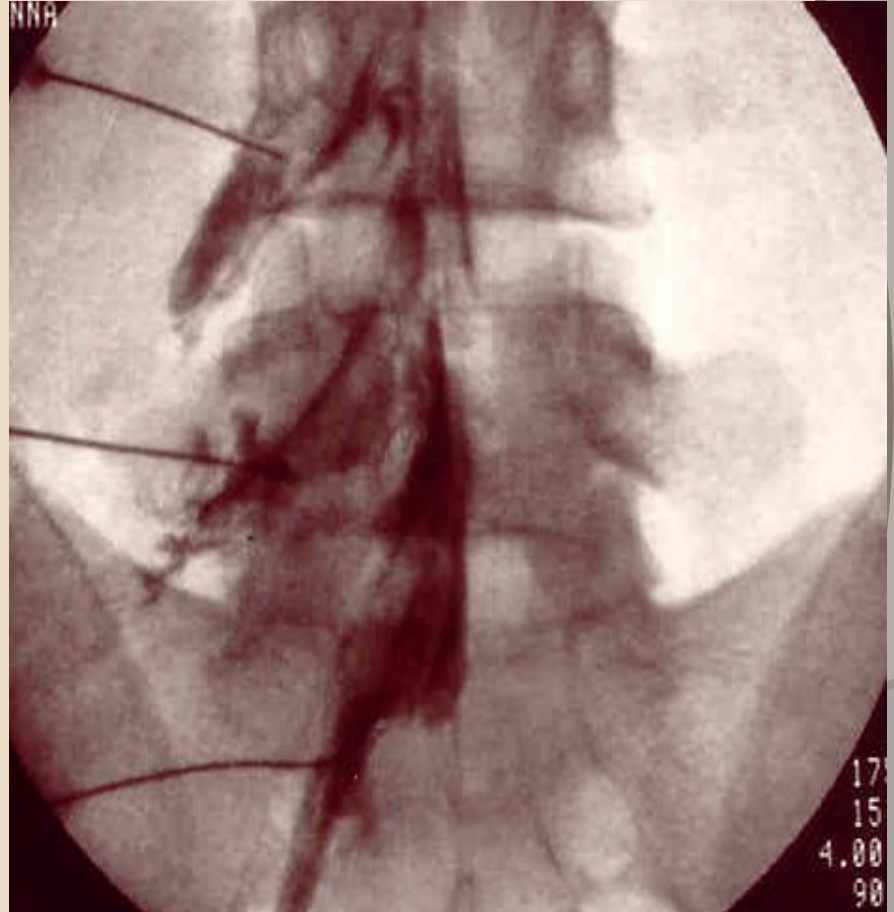
# What is measured?

- Open Pressure:
- Pain pressure:
- Max Pressure:
- Disc: Asymptomatic  
Painful
- Pain Score: \_\_\_\_ (8 or  
more)
- Normal Pain Different  
Pain
- Pain refers to:
- Contrast & Spread:  
Epidural Nucleus Annular  
Tear DDD
- Disc Height:



# Transforaminal ESI

- Indications
  - Disc pathologies
  - Failed back
  - Nerve Entrapment
  - Post-op Epidural Fibrosis
  - Radicular Pain
  - Assist in assessment of specific level when multi-level dz.
- Benefit
  - 6weeks: 63%-84%
  - 3months:63%-75%
  - 6months:56%-75%



# Translaminar ESI

## Indications

- Disc pathologies
- Low Back Pain and Strain
- Radicular Pain
- Spinal Stenosis pain(level below)
- Previous Surgery
- NOT Diagnostic

## Benefit

- 6weeks: 75 - 90%
- 3months: 75 - 90%
- 6months: 75 - 90%



# Hip and Groin Symptoms/Signs

	Anterior	Lateral	Posterior
Symptoms	Stairs, Twist, Ambulation, Pivoting	Side Lying, Gait Dysfunction, Post-Laminectomy	Lying, Sit, Post-Laminectomy, LBP, Gait dysfunction
PE	Palpation, Faber, IR, Thomas Test,	Palpation, Ober's	Palpation, Patrick's, Piriformis
Diagnosis	Intra-articular, Labrial, Psoas, Adductor Tendinitis	ITB Great Troch	SI joint Piriformis Ischial Bursitis Hamstring Tendonitis

# Anterior Workup

- Physical
- X-ray
- If Negative failed Conservative management:
- Consider:
  - Diagnostic hip Injection
  - MRI VS MRI Arthrogram

# Lateral Workup

- ⦿ Physical Examination
  - Leg Length
  - Gait Analysis
- ⦿ Diagnostic/Therapy
  - Stretching, Kenesiotaping
  - Injection
  - Modalities(Iontophoresis or US)

# Posterior Workup

## ⦿ Physical

- Pelvic Malrotation
- SI joint Stability
- Leg Length
- Gait Analysis
- Hamstring tightness

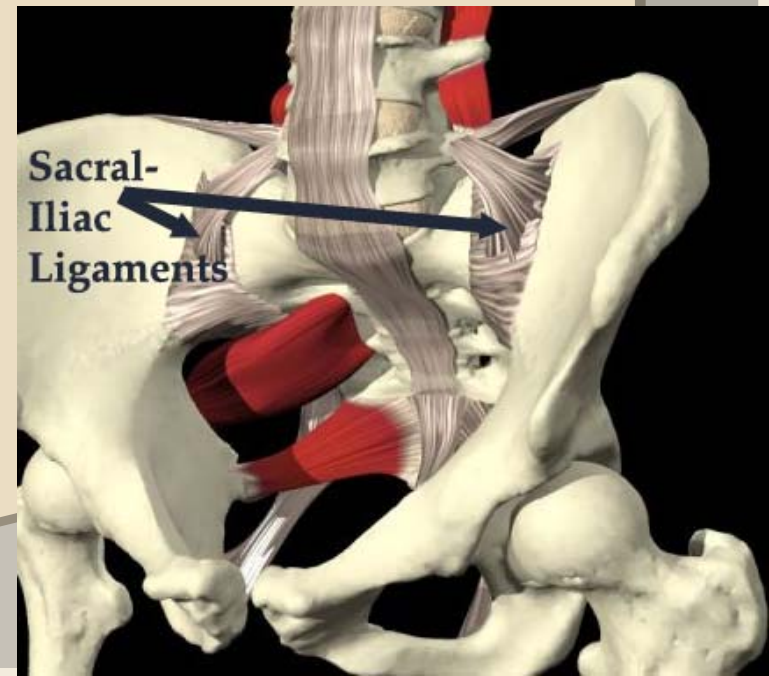
## ⦿ Diagnostic/ Therapeutic

- US, Stretching
- SI joint belt
- Diagnostic Injection with Control



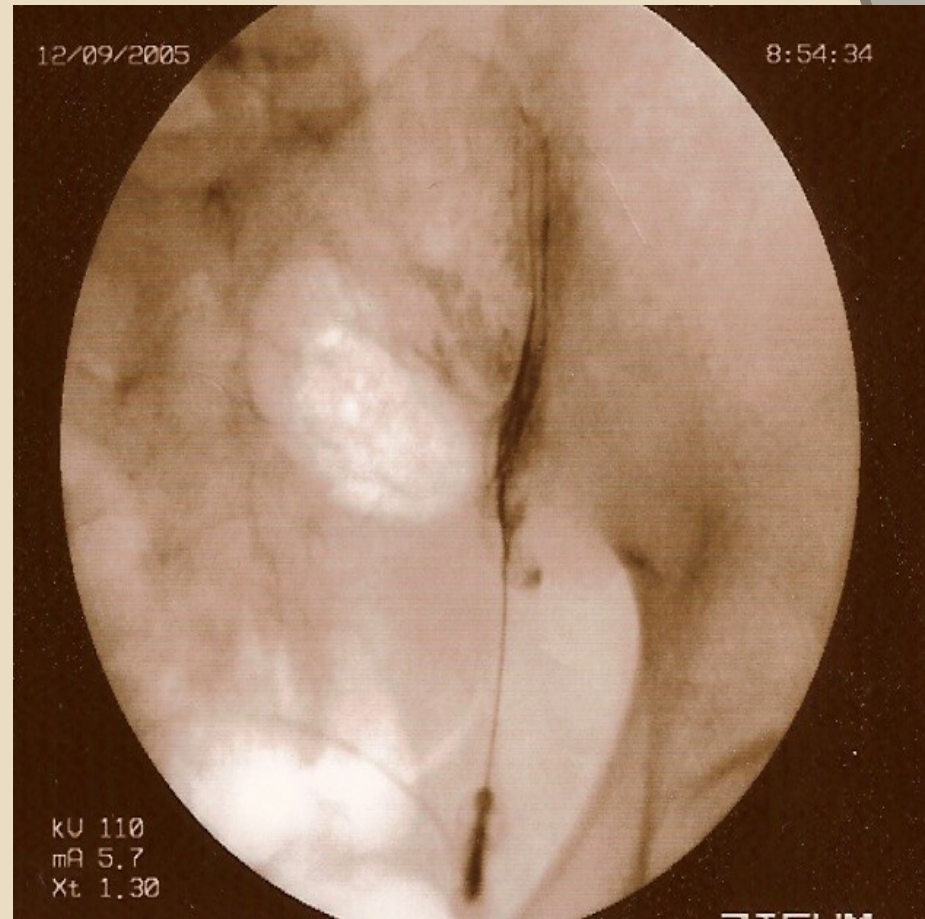
# Pain Generators: SI

- 3/6 pos. signs had sensitivity of 94% and specificity of 77%
  - Distraction
  - Compression
  - Gaenslen's (left and right)
  - Thigh thrust
  - Sacral thrust
- Compared to diagnostic block



# Diagnostic SI joint Injection

- ⦿ Without Control  
20-22% False  
Positive
- ⦿ With 90%+  
Accurate



# SI Therapeutic Injections

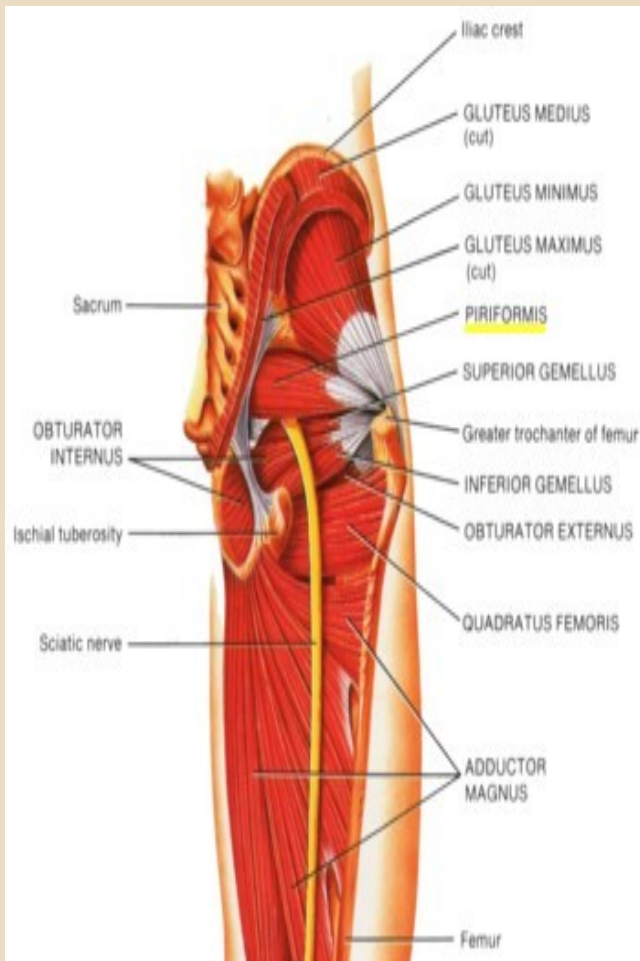
## ⦿ Steroid Injections

- 58-80% significant relief at 6 months.

## ⦿ Radiofrequency

- 64%-89% significant relief at 1 year.

# Pain Generator: Piriformis

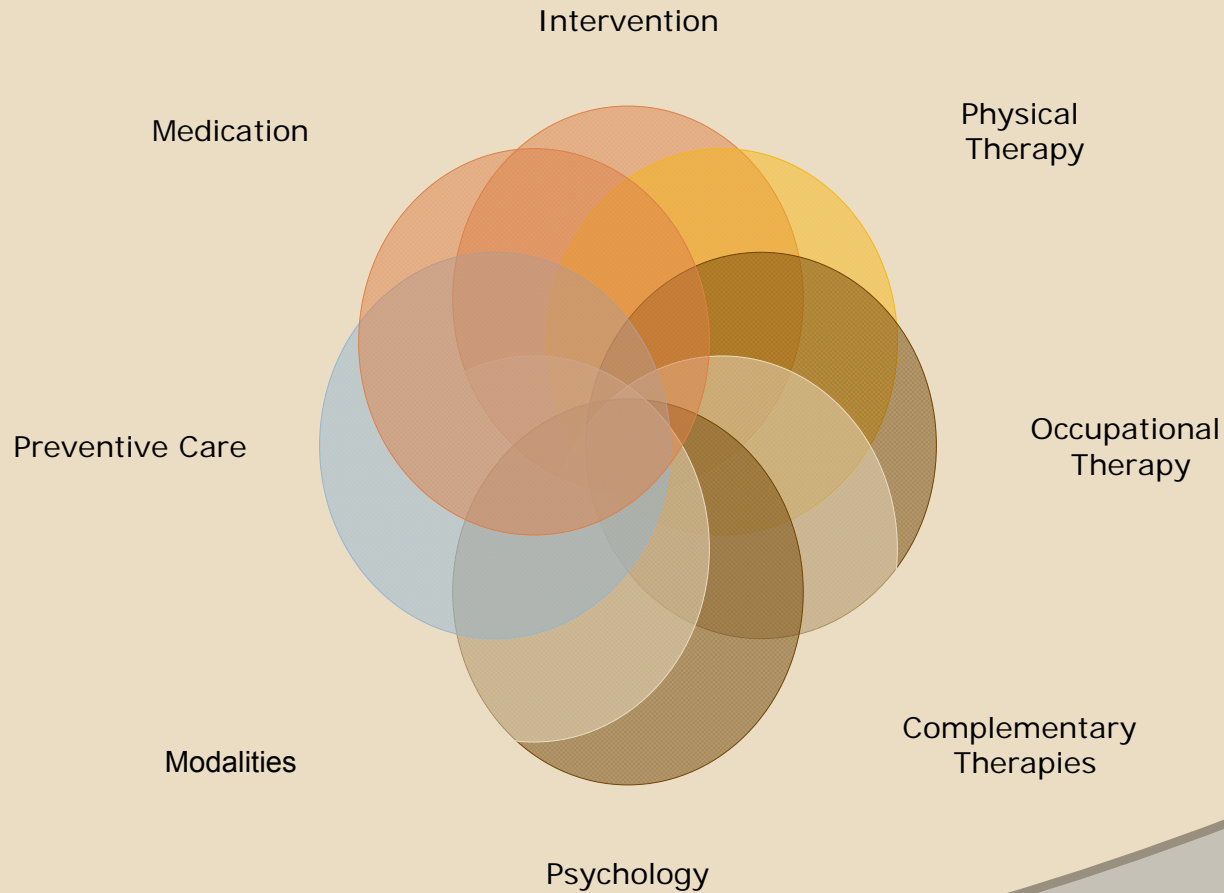


- True compression of sciatic nerve
- Can easily be confused for radiculopathy
- PE: sciatic pain with resisted ER of hip; Tinel's sign in mid-buttocks
- Treated w/ stretching, injection, rarely surgical release

# Case 3: Chronic Pain

- Your patient is now 1 year out from his injury, and has not returned to full duties.
- When is pain chronic versus persistent?
- How many of you have some type of discomfort today?
- Function

# Integrated Pain Management

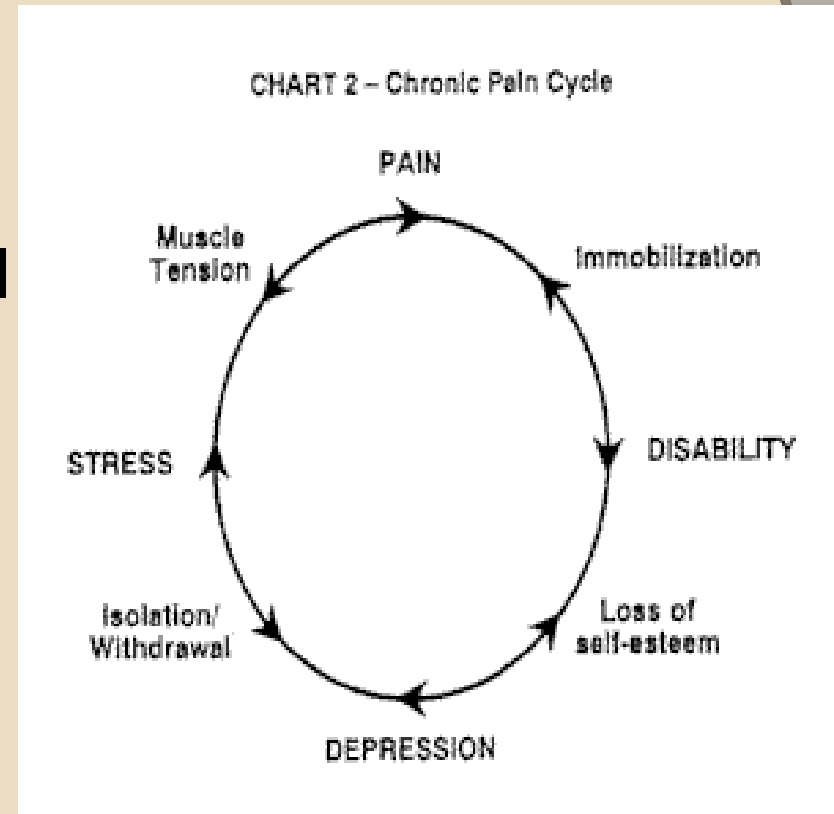


# Evaluation of Chronic Pain

- Functional questionnaires: Oswestry, Roland, SF 36
- Waddell's signs not helpful in chronic pain
- FCE not a lie detector

# Chronic Pain Behavior

- Chronic pain cycle
- Extrinsic locus of control
- Catastrophizing
- Childhood abuse





# Somatoform Disorders

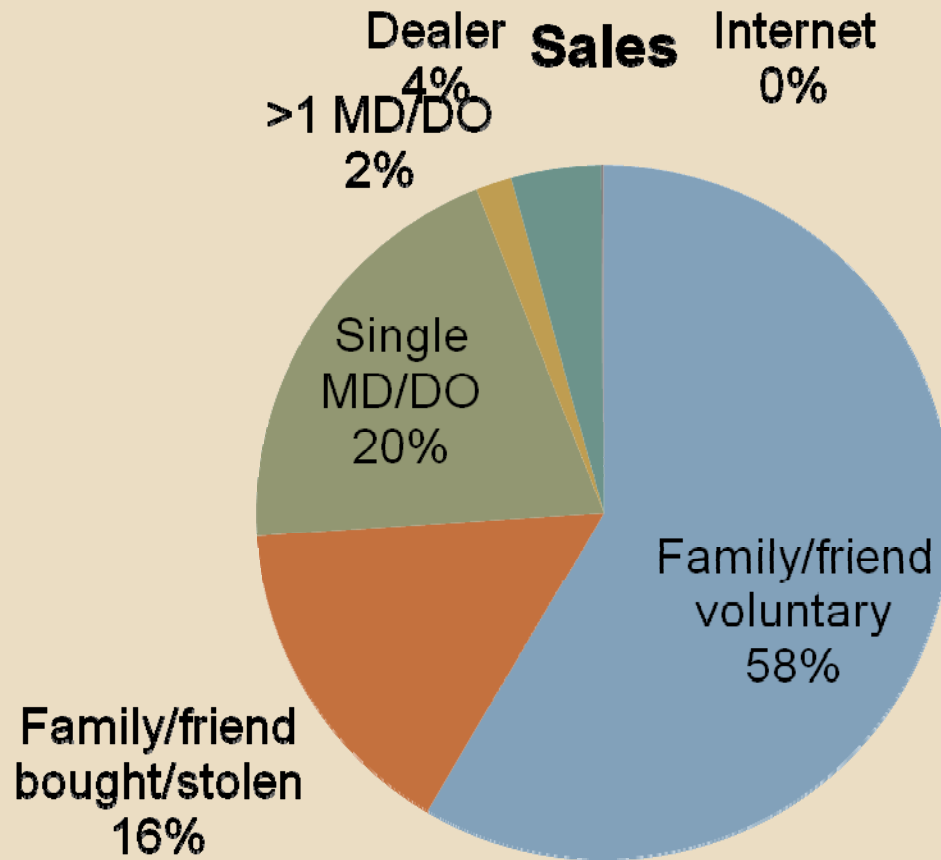
- ⦿ Somatization
- ⦿ Conversion disorder
- ⦿ Malingering

# Medication

- Appropriate medications can improve VAS (50-90%) and function
- Long-acting + short acting opioids combined
- Monitoring

Trescott AM, et al. Opioids in the management of chronic non-cancer pain: ASIPP guidelines. Pain Physician 2008; 11 (2s):S5-62.

# Where Drugs are Diverted From



Manchikanti L, et al. Opioids in the management of chronic non-cancer pain: ASIPP guidelines. Pain Physician 2008; 11 (2s):S63-88.

# Interventions

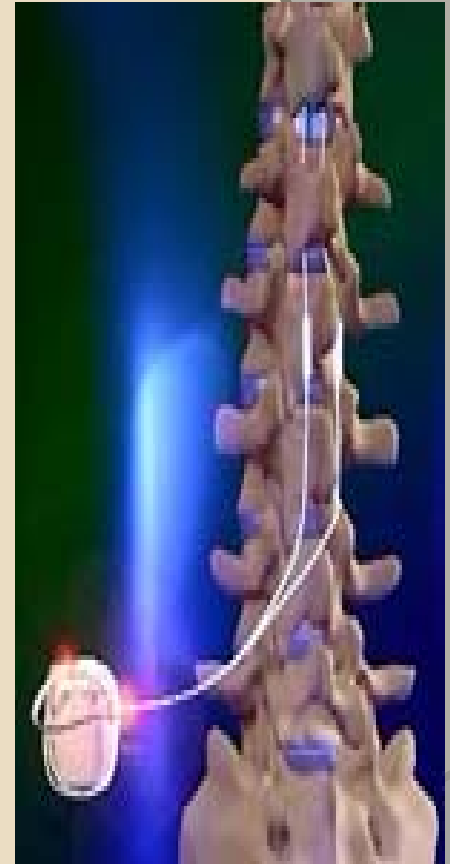
## ⦿ Spinal cord stimulators

- Successful in 65% of failed back surgery patients at 2 yrs
- North RB, Kidd DH, Petrucci L, Dorsi MJ. Spinal cord stimulation electrode design: a prospective, randomized, controlled trial comparing percutaneous with laminectomy electrodes: part II-clinical outcomes. *Neurosurgery*. 2005 Nov;57(5):990-6; discussion 990-6.

## ⦿ Intrathecal opioid pumps

- Current literature supports for chronic moderate to severe non-cancer pain who failed other treatments. 57-78% reduction in pain at 5 years  
Smith HS et al. Intrathecal drug delivery. *Pain Physician* 2008;11(2s): s 89-104

## ⦿ Pulsed Radiofrequency

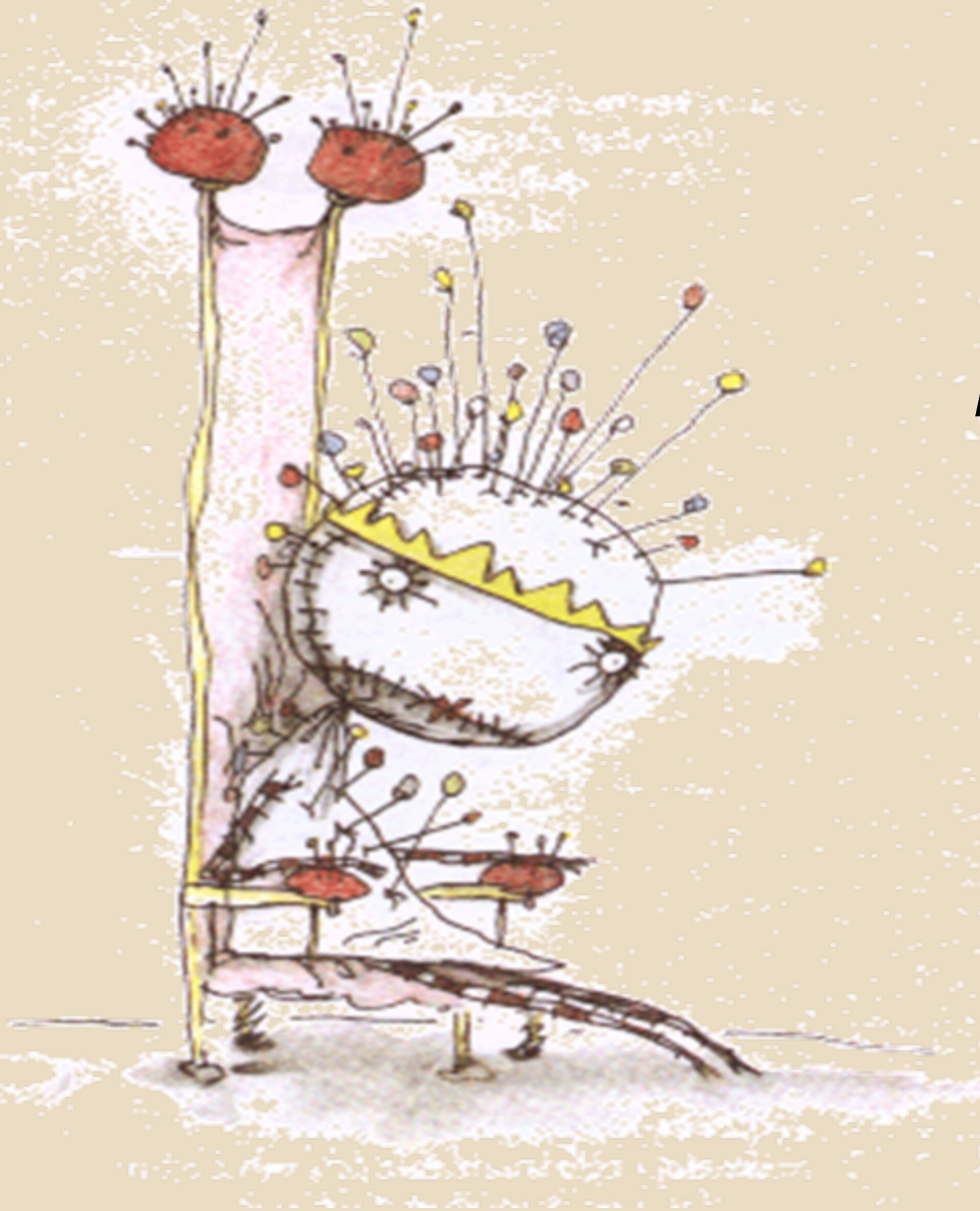


# Functional Restoration



- Interdisciplinary, intensive
- Goal driven
- Heavy focus on behavior, positive feedback
- Outcomes:

Guzmán J, Esmail R, Karjalainen K, Malmivaara A, Irvin E, Bombardier C. BMJ 23;322(7301):1511-6, 2001 .



*Pain is a more terrible  
lord of mankind than  
even death itself.*

➤ Albert Schweitzer