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Chronic Low Back Pain

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Chronic Low Back Pain

- Definition: pain that persists for 12 weeks or longer, even after an initial injury or underlying cause of acute low back pain has been treated.
- About 20% of people affected by acute low back pain develop chronic low back pain with persistent symptoms at one year.
- More than 30% of U.S. adults report experiencing low back pain in the preceding 3 months.

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Costs

- The economic impact of chronic low back pain stems from prolonged loss of function, resulting in loss of work productivity, treatment costs, and disability payments.
- Estimates of these costs range from $12.2 to $90.6 billion annually.
- Disorders of the lumbar spine are among the most common medical problems in western countries, affecting up to 80% of people at some time during their lives.

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Surgery

- Disappointing results.
- Significant risk of operative and post-operative complications, including 20% risk of failed back surgery syndrome.
- 33% success rate for discogenic LBP.
- For non-radicular pain fusion is no more effective than intensive rehabilitation.

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Evaluation

- Initial evaluation should attempt to place patients into one of the following categories:

1. Non-specific low back pain.
2. Back pain associated with radiculopathy or spinal stenosis.
3. Back pain referred from a nonspinal source.
4. Back pain associated with another specific spinal cause.

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Differential Diagnosis

- Myofascial pain (sprain/strain, fibromyalgia)
- Facet syndrome
- Degenerative disc disease
- Annular tear
- Disc bulge/herniation
- Spinal stenosis
- Segmental instability (spondylolisthesis)
- Arthritis
- Segmental dysfunction
- Sacroiliac dysfunction
- Hip fracture
- Hip DJD
- Hip bursitis/synovitis
- Knee DJD
- Rheumatologic (PMR, AS)
- Vertebral compression fracture
- Sacral insufficiency fracture
- Radiculitis/Radiculopathy
- Polyradiculoneuropathy
- Plexopathy
- Peripheral neuropathy
- Motor neuron disease (ALS)
- Myopathy
- AVM
- Malignancy/Paraneoplastic Syndrome
- Infection
- Herpes zoster
- Referred pain (viscerosomatic reflex)
- CNS mediated pain
- Psychogenic factors

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Red Flags

- Abnormal gait with lack of heel to toe ambulation
- Absence of perineal reflex
- Acute presentation of bilateral sciatica
- Acute urinary retention
- Drop foot or inability to dorsiflex the foot
- Intravenous drug abuse
- Progressive neuromotor or sensory loss
- Recent diagnosis of malignancy
- Recent infection
- Recumbent worsening of pain
- Saddle block anesthesia
- Urinary and/or bowel incontinence

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Imaging

- In the absence of red flags, plain-film radiography, magnetic resonance imaging (MRI), or computed tomography (CT) is not warranted in the acute presentation of low back pain and does not modify patient outcomes.
- Consider x-rays in cases of recent trauma or osteoporosis.
- Consider CT or MRI if specific clinical indications (e.g., history of cancer with potential metastases, known aortic aneurysm, progressive neurologic deficit).
- Do not order an electromyogram for low back pain unless there is leg pain or sciatica.

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Self Care

Types of self-care include:

- exercise
- using heat or warm pack
- using a ice or cold pack
- using medicines
- using breathing and relaxation techniques
- getting a therapeutic massage
- managing stress
- resuming every-day-activities such as going to work
- resuming exercises such as walking and stretching
- practicing yoga
- getting enough sleep
- quitting tobacco use

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Pharmacologic Agents

- Acetaminophen
- Herbal therapies (devil's claw, white willow bark, topical cayenne)
- Muscle relaxants (short term use)
- NSAIDS
- Opioids
- Tramadol (Ultram)
- Tricyclic antidepressants
- If radiculopathy, gabapentin

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Nonpharmacologic Options

- Chiropractic
- Physical therapy (exercise, traction)
- Massage
- Behavior therapy (CBT, progressive relaxation, biofeedback)
- Acupuncture
- Yoga

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Chiropractic

- Chiropractic focuses on restoring spinal range of motion by removing joint fixations.
- Small improvement in pain and function in chronic low back pain for up to 6 months.
- During chiropractic patients may:
  - learn lifestyle changes to improve posture and movement (lifting, reaching and getting in and out of bed)
  - use exercises to increase flexibility and improve the movement of joints.
  - learn about healthful foods, vitamins and herbal or natural products that can decrease pain, muscle spasms, and swelling (inflammation).
  - utilize pain relieving modalities.

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Questions?

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Interventions

- Epidural steroid injections
- Facet joint injections
- Medial branch blocks
- Radiofrequency neurotomy
- Intradiscal steroid injection
- Si joint injection
- Percutaneous intradiscal radiofrequency therapy
- Spinal cord stimulators
- Vertebroplasty/kyphoplasty

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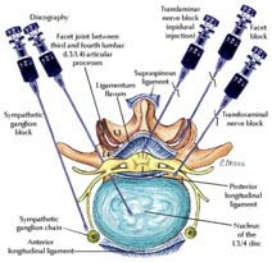
Interventions



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Epidural Steroid Injections: Indications

- Not beneficial for chronic LBP.
- May be helpful for acute exacerbation of chronic LBP.
- Radicular symptoms due to herniated disk - either mechanical nerve compression or chemical radiculitis.
- Neuroclaudicatory symptoms due to spinal stenosis.
- Acute herpes zoster, post-herpetic neuralgia.
- Discogenic pain.
- Adhesive arachnoiditis/"failed back surgery" syndrome.

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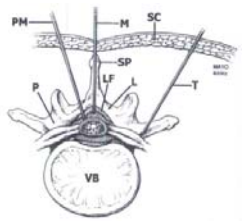
Approaches



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Interlaminar ESI

- Close to the targeted pathology.
- Lower volume/higher concentration delivered.
- Higher risk of puncture of dural sac.
- Spread of medication is usually unilateral - symptomatic side.

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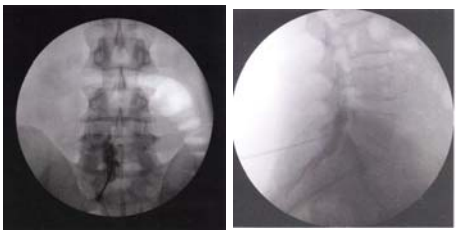
Interlaminar ESI



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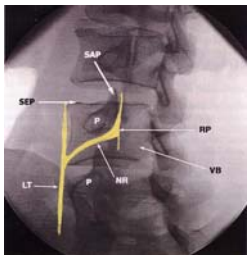
Transforaminal ESI



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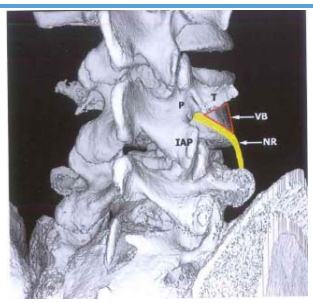
Transforaminal ESI



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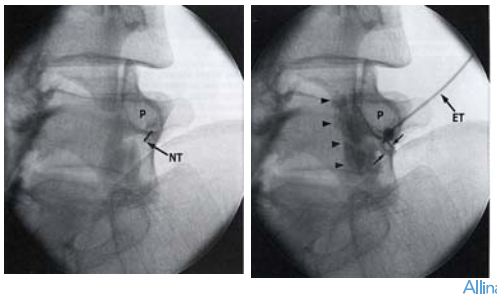
Transforaminal ESI



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Results

- Riew JBJS 2000
  - N=55 operative candidates with HNP.
  - Post conservative care x 6 weeks.
  - Fluoro guided ESI vs. Saline.
  - TFESI approach.
  - 33% of control and 71% of treatment group chose not to have surgery.

Riew KD, Yin Y, Gilula L, Bridwell KH, Lenke LG, Lauryssen C, Goette K. The effect of nerve-root injections on the need for operative treatment of lumbar radicular pain. A prospective, randomized, controlled, double-blind study. J Bone Joint Surg Am. 2000;82:1589-93.

- Follow-up: JBJS 2006
  - 21 of 29 treatment group patients contacted.
  - 17 of 21 still had not had surgery.
  - Conclusion: Majority of patients with lumbar radicular pain who avoid surgery for at least one year after TFESI will continue to avoid surgery for a minimum of five years.

Riew KD, Park JB, Cho YS, Gilula L, Patel A, Lenke LG and Bridwekk KH. Nerve Root Blocks in the Treatment of Lumbar Radicular Pain. A Minimum Five-Year Follow-Up. J. Bone Joint Surg. Am. 88:1722-1725, 2006.

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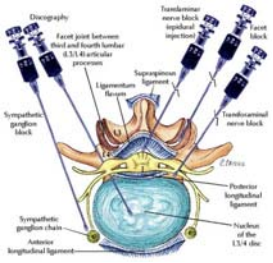
Interventions



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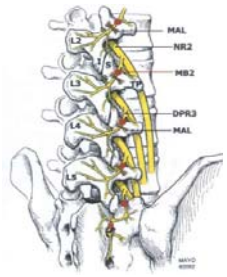
Medial Branch Blocks



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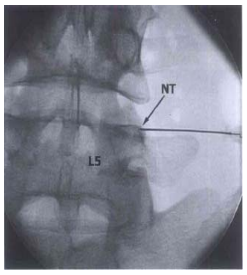
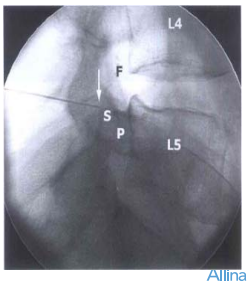
Medial Branch Block





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Radiofrequency Ablation (RFA)

- Electrical current produced by a radio wave used to heat up a small area to selectively injure A-beta and C-fibers.
- Set-up similar to medial branch block.
- Lesion settings: 80 degrees C for 60-90 seconds.
- Pain returns when axons regenerate.
- Relief considered short-term if <6 months, long term if >6 months.
- Pain relief may last 1-2 years.

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Radiofrequency Ablation (RF)

- 31 patients, prospective, double blinded, placebo controlled study of RF neurotomy for chronic lumbar facet pain
- Facet pain was diagnosed with single medial branch blocks
- @ 1-4 wks: 67% had relief
- 3 months: 60%
- 6 months: 47%
- 12 months: 47%

Van Kleef M, Barendse GAM, Kessels A et al. Randomized trial of radiofrequency lumbar facet denervation for chronic low back pain. Spine 1999; 24:1937-1942.

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Sacroiliac Joint Injection

- History: Pain usually associated with trauma (fall, MVA), DJD or spinal fusion but may be idiopathic.
- PE: Pain over SI joint, 3/5 positive provocation maneuvers (distraction, thigh thrust, compression, FABER, Gaenslen's) give 91% sensitivity and 78% specificity indicating indicate the SI joint as a pain generator.
- Radiology: Not very useful unless there is sclerosis or partial fusion.
- Diagnosis/ Treatment : Fluoroscopically guided injection of SI joint using contrast, bupivacaine, and steroid.

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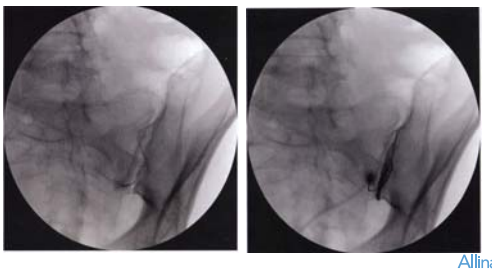
Sacroiliac Joint Injection



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Intradiscal Biacuplasty

- Relatively new procedure.
- Minimally invasive treatment of lumbar discogenic pain.
- Creates a large cooled bipolar RF lesion to ablate nocioceptors in the posterior annulus.

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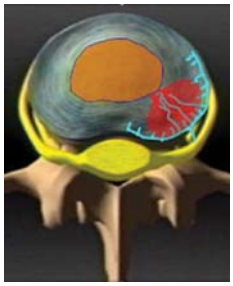
Intradiscal Biacuplasty



- Discs cause pain by
  1. Mechanical or chemical irritation of adjacent neural structures
  2. Internal derangement of the disc causing the disc itself to become a pain generator
- Internal disc disruption with sinuvertebral nerve in turquoise and inflamed fissures in red.

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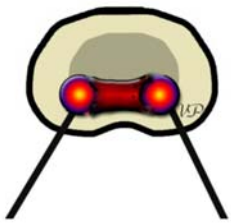
Intradiscal Biacuplasty



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Intradiscal Biacuplasty

- 63 subjects: IDB+CMM (n=29) and CMM-alone (n=34).
- 42% of IDB+CMM subjects reported ≥50% relief of symptoms at 6 months.
- No statistical differences in secondary outcomes of ODI, SF36-PF, EQ-5D, VAS, BDI and opioid consumption but directional trends suggest a greater tendency toward improvement in treatment group.
- At 12 months 41% of IDB+CMM subjects reported ≥50% relief of symptoms.
- 50% and 64% reported clinically significant improvement in SF36-PF and ODI, respectively.

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Kyphoplasty

- Used to treat vertebral body compression fractures due to osteoporosis and trauma.
- Involves the insertion of a bone balloon into the vertebral body using biplanar fluoroscopic image guidance.
- Balloon is then inflated causing the trabecular bone to compact.
- Results in a suitable cavity to re-expand the vertebral body.
- PMMA is then injected.

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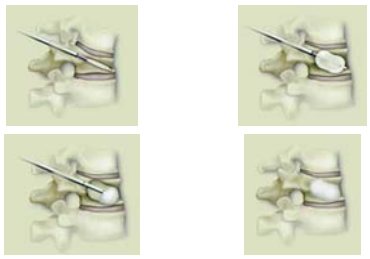
Kyphoplasty



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Kyphoplasty

- A total of 155 elderly patients with symptomatic VCFs were enrolled in a prospective, multicenter treatment study of balloon kyphoplasty at 19 geographically diverse US centers.
- Outcomes included back pain severity, bedrest, and limited activities because of back pain, back disability score, and SF-36 Medical Outcomes Survey, at 7 days (visual analog scale only), and 1, 3, 12, and 24 months after treatment.
- Statistically significant ($P < 0.001$) improvements occurred in all pain, functional, and mental health outcomes at the first follow-up after treatment and were maintained for 24 months.
- 82% showed at least 10% vertebral body height restoration.
- Average midline vertebral body height restored was 32%.

Garfin, SR, et al. Balloon kyphoplasty for symptomatic vertebral body compression fractures results in rapid, significant, and sustained improvements in back pain, function, and quality of life for elderly patients. Spine. 2006 Sep 1;31(19):2213-20.

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Kyphoplasty

The role of bone cement augmentation in the treatment of chronic symptomatic osteoporotic compression fracture.

Author information

Abstract

OBJECTIVE: Bone cement augmentation procedures such as percutaneous vertebroplasty and balloon kyphoplasty have been shown to be effective treatment for acute or subacute osteoporotic vertebral compression fractures. The purpose of this study was to determine the efficacy of bone cement augmentation procedures for long standing osteoporotic vertebral compression fracture with late vertebral collapse and persistent back pain.

METHODS: Among 270 single level osteoporotic vertebral compression fractures that were treated by vertebral augmentation procedures at our institute, 18 consecutive patients were included in this study. Study inclusion was limited to initially, minimal compression fractures, but showing a poor prognosis due to late vertebral collapse, intra-vertebral vacuum clefts and continuous back pain despite conservative treatment for more than one year. The subjects included three men and 15 women. The mean age was 70.7 with a range from 64 to 85 years of age. After postural reduction for two days, bone cement augmentation procedures following intraoperative pressure reduction were performed. Imaging and clinical findings, including the level of the vertebra involved, vertebral height restoration, injected cement volume, local kyphosis, clinical outcome and complications were analyzed.

RESULTS: The mean follow-up period after bone cement augmentation procedures was 14.3 months (range 12-27 months). The mean injected cement volume was 4.1 mL (range 2.4-5.9 mL). The unipedicular approach was possible in 15 patients. The mean pain score (visual analogue scale) prior to surgery was 7.1, which decreased to 3.1 at 7 days after the procedure. The pain relief was maintained at the final follow up. The kyphotic angle improved significantly from 21.2 ± 4.9° before surgery to 10.4 ± 3.9° after surgery. The fraction of vertebral height increased from 30% to 60% after bone cement augmentation, and the restored vertebral height was maintained at the final follow up. There were no serious complications related to cement leakage.

CONCLUSION: In the management of even long-standing osteoporotic vertebral compression fracture for over one year, bone cement augmentation procedures following postural reduction were considered safe and effective treatment in cases of non-healing evidence.

KEYWORDS: Bone cement; Compression fracture; Long standing; Osteoporosis

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Spinal Cord Stimulators

- A technique utilizing implanted epidural leads to generate an electrical field over the spinal cord.
- Previously known as “dorsal column stimulators.”
- The leads are connected to an implanted battery powered pulse generator (IPG).
- The field changes pain signal transmission in the spinal cord.

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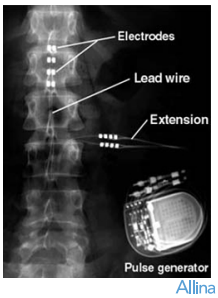
Spinal Cord Stimulators

- Leads are inserted through a needle (percutaneous leads) or by a neurosurgical procedure (laminotomy leads)
- Involves a trial testing period before a full implantation. Both are outpatient procedures.



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Spinal Cord Stimulators

- Not fully understood.
- "Gate theory" is limited/oversimplified.
- Altered neurochemistry at dorsal horn suppresses activity of wide dynamic range interneurons.

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Spinal Cord Stimulators

74 studies of 3300 patients

- Efficacy and safety of SCS in patients with chronic leg and back pain (CLBP) and FBSS and examined prognostic factors.

Major results:

- 62% achieved at least 50% pain relief.
- 53% needed no analgesics post-SCS.
- 40% returned to work.
- 70% were satisfied with SCS.

- **Conclusion:** SCS relieved pain or improved quality of life of patients with CLBP/FBSS better than other therapies. No major adverse events were reported

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Summary

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	Evidence rating	References	Comments
Low back pain should be classified as nonspecific low back pain, low back pain with potential radicular symptoms, or secondary low back pain associated with a specific spinal cause.	C	6	Clinical practice guidelines
Do not order imaging studies unless there is concern for infection, fracture, or cauda equina syndrome, or unless required before invasive interventions.	A	4, 11-14	Meta-analysis of RCTs
NSAIDs, opioids, and topiramate (Topamax) are more effective than placebo in the short-term treatment of nonspecific chronic low back pain.	A	18-23	Meta-analysis of RCTs for opioids and NSAIDs RCTs for topiramate
Acetaminophen, antidepressants (except duloxetine [Cymbalta]), skeletal muscle relaxants, lidocaine patches, and transcutaneous electrical nerve stimulation are not more effective than placebo in the treatment of chronic low back pain.	B	20, 24-28	RCTs and meta-analysis Acetaminophen is extrapolation from RCTs for acute low back pain
Epidural steroid injections are not more effective than placebo for long-term relief of chronic back pain from various causes.	B	37, 39-42	Cochrane review, meta-analysis, and RCTs
Spinal manipulation therapy results in small improvements in pain and function in chronic low back pain for up to six months.	B	50	Cochrane review Minimal improvement in pain/function at six months

NSAIDs = nonsteroidal anti-inflammatory drugs; RCTs = randomized controlled trials.

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to http://www.aafp.org/afpsort.

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Summary

BEST PRACTICES IN MUSCULOSKELETAL CARE: RECOMMENDATIONS FROM THE CHOOSING WISELY CAMPAIGN

Recommendation	*Sponsoring organization*
Do not order an electromyogram for low back pain unless there is leg pain or sciatica.	American Academy of Physical Medicine and Rehabilitation
Do not order an imaging study for back pain without performing a thorough physical examination.	American Academy of Physical Medicine and Rehabilitation

Source: For more information on the Choosing Wisely Campaign, see http://www.choosingwisely.org. For supporting citations and to search Choosing Wisely recommendations relevant to primary care, see http://www.aafp.org/afp/recommendations/search.htm.

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Case Review #1

- 64yo Female, BMI 52, presents with worsening 4 year history of LBP.
  - Numbness/tingling BLE with walking (limited to 1 block), improves with rest
  - L knee pain and R hip pain with activities
  - LE edema
  - Difficulty with weight management despite numerous attempts
  - Physical Exam- reflexes 2+ BLE, sensation intact to LT, normal muscle bulk and tone, strength 5/5, negative SLR, R greater troch TTP, antalgic gait

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Case #1

- MRI Lumbar Spine- L3/4, L4/5 severe central stenosis secondary to disc protrusion and facet hypertrophy. Noted severe L and moderate R foraminal stenosis at L4/5
- Treatment Plan-
  - Self Care/Nonpharm- PT lumbar/core strength/stability, CV self program
  - Medications- NSAIDs, gabapentin trial
  - Interventions- L ESIs x3, R greater troch, L knee
  - Surgical- referral for neurogenic claudication symptoms

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Case Review #2

- 65yo M with previous L3/4 interbody fusion in 2000 presents with 4 months LBP and left posterolateral n/t/pain
  - Pain worse with flex/bend and sitting, improves with walking
  - Improved with prednisone pack, now worse again
- Physical Exam
  - Reflexes 2+ BLE, sensation intact to LT, normal muscle bulk and tone, strength 5/5, antalgic gait, positive SLR on Left

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Case Review #2

- MRI Lumbar Spine- L3/4 fusion in good position. L4/5 moderate foraminal stenosis and far lateral recess stenosis 2/2 disc protrusion. L5/S1 left disc protrusion with moderate-severe foraminal stenosis with likely L5 nerve root compression.
- Treatment Plan-
  - Self Care/Nonpharm- PT lumbar/core extension based program- MedX
  - Medications- NSAIDs
  - Interventions- Lumbar L paramedian L4/5 ESI
  - Surgical- hold on referral as no further radicular complaints with PT and intervention

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Case Review #3

- 59yo Female with PMH fibromyalgia, multiple sclerosis (relapse-remit), anxiety, depression presents with 20 year history LBP
  - Dull/achy, constant LBP, worse with activity, improves with rest
  - Previous narcotics/benzos- now successfully weaned with pain program
  - Currently on low dose baclofen, PRN NSAIDs, Cymbalta
  - Very limited function with goals to improve
  - Physical Exam- reflexes 2+ BLE, sensation intact to LT, normal muscle bulk and tone, strength 5/5 with giveway, TTP globally including hyperesthesia over lumbar paraspinals

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Case Review #3

- MRI Lumbar Spine (from 2 years prior)- mild disc height loss, mild facet arthropathy, mild disc bulge scattered throughout lumbar spine without significant central or foraminal stenosis.
- Treatment Plan-
  - Self Care/Nonpharm- 1) Walking Program, 2) Pool Therapy, 3) Land therapy- strength/stability and modalities, including chiropractic
  - Medications- PRN NSAIDs, PRN baclofen QHS, Cymbalta
  - Interventions- previous L ESIs ineffective
  - Surgical- axial/mechanical MSK dysfunction- nonsurgical candidate

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Questions?

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