

EVALUATION OF BACK PAIN AND ROLE OF NON-OPERATIVE INTERVENTIONS: UPDATES

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Clinical Summary

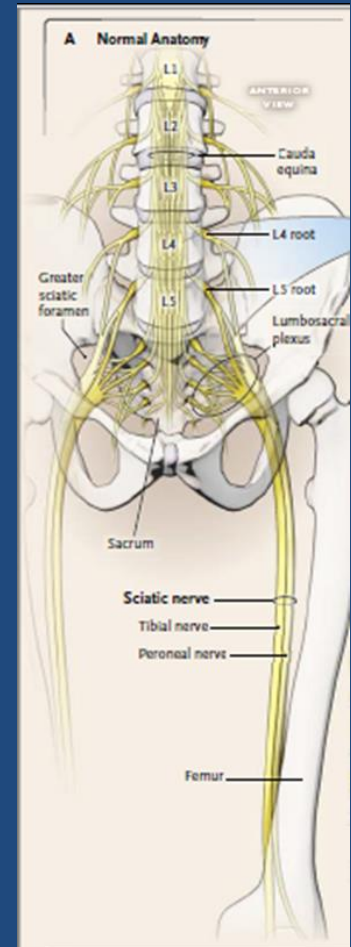
- Objectives:
 - Back pain work up in a cost effective way
 - Which tests to order and when to order them
 - Differential diagnosis
 - Role of different interventions

Outline

- *Sciatica and differential diagnosis*
- Ankylosing spondylitis and axial spondyloarthritis
- Lumbar canal stenosis

SCIATIC NERVE

- The largest nerve in the body
- Most common areas of involvement are L4–L5 and L5–S1 levels
- 40% of Sciatica occurs at the 4th and 5th decade of life



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Symptoms and Examination Findings

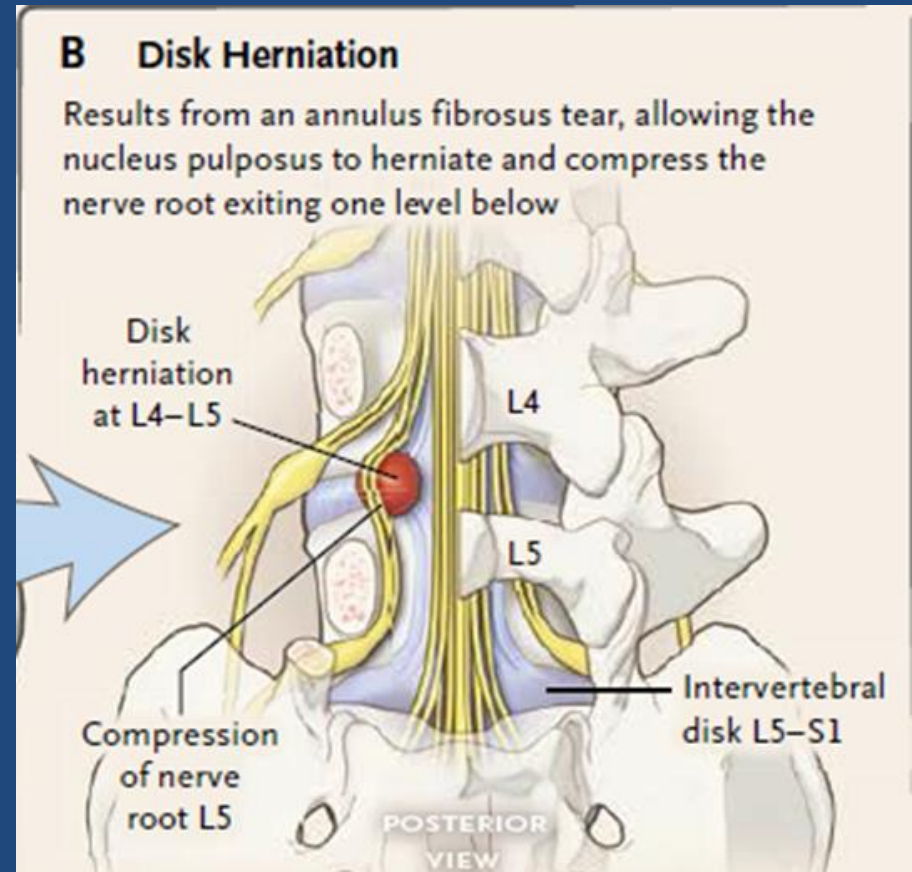
Depends on the dermatome involved:

- **L4**: difficulty in squatting and rising
 - knee jerk diminished
- **L5**: difficulty walking on heels
- **S1**: difficulty walking on toes.
 - ankle jerk diminished



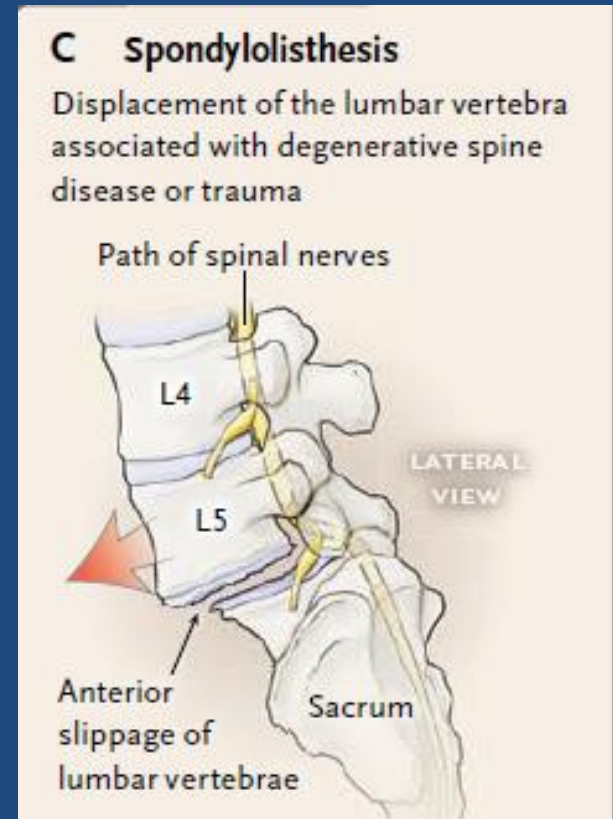
SCIATICA/DISC HERNIATION

- Pain that radiates from the buttock downward along the course of the sciatic nerve
- Neuroradiology studies affirm that **85%** of cases of sciatica are associated with a disk disorder



SPONDYLOLISTHESIS

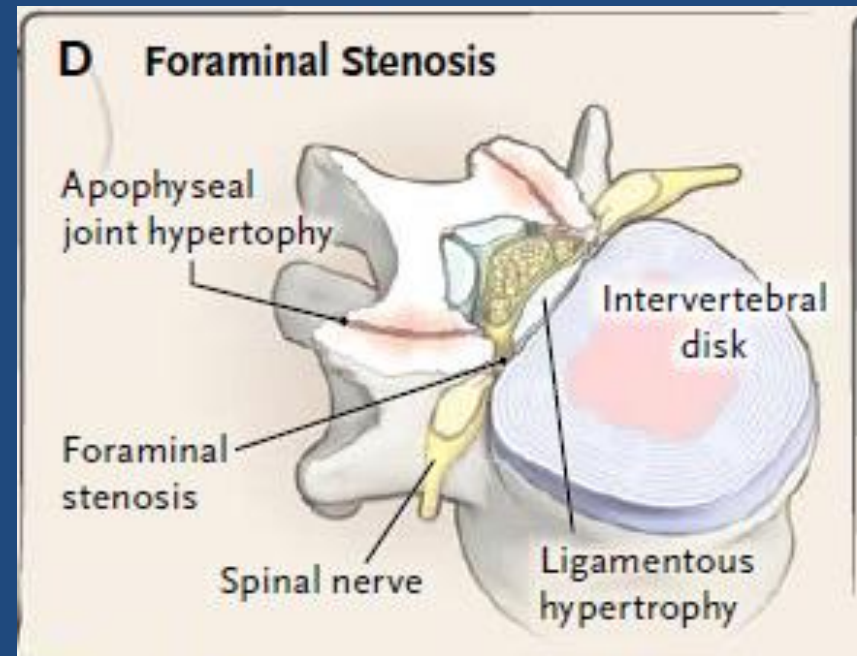
- Often associated with spondylolysis
- Most common at L5-S1 junction
- Causes low back pain later in the day
- Often associated with fracture of pars interarticularis



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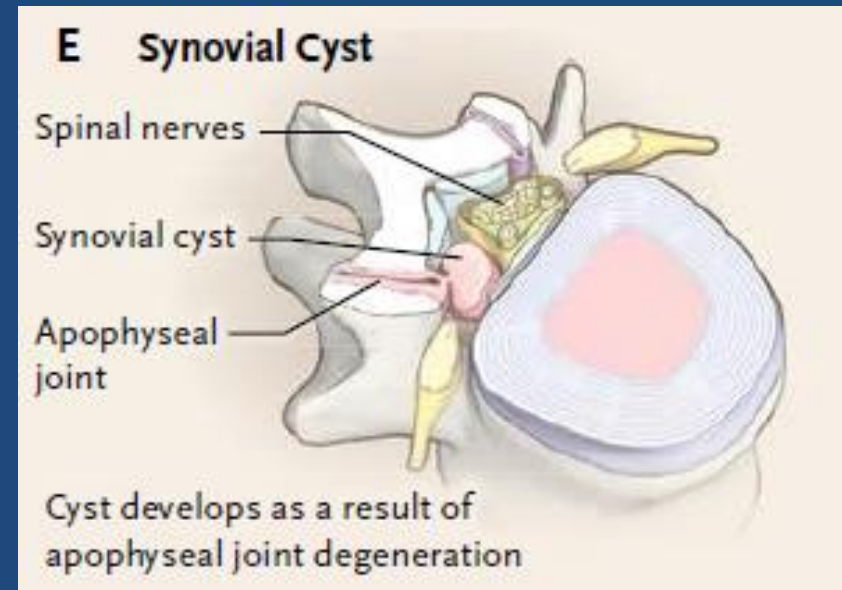
FORAMINAL STENOSIS

- Associated with paracentral disc prolapse
- Involves the spinal nerve below the vertebral level
- Seen in association with age related spinal hypertrophic and degenerative changes



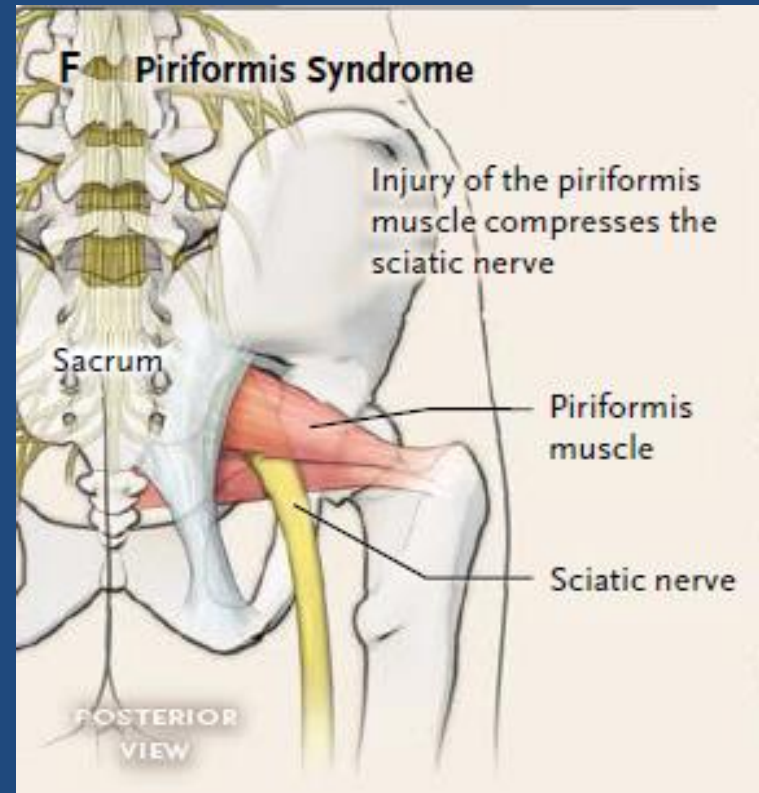
SYNOVIAL CYST

- Presents similar to sciatica symptoms, but is usually **more chronic and progressive**
- Involves the exiting nerve root
- Diagnosed by MRI spine



PIRIFORMIS SYNDROME

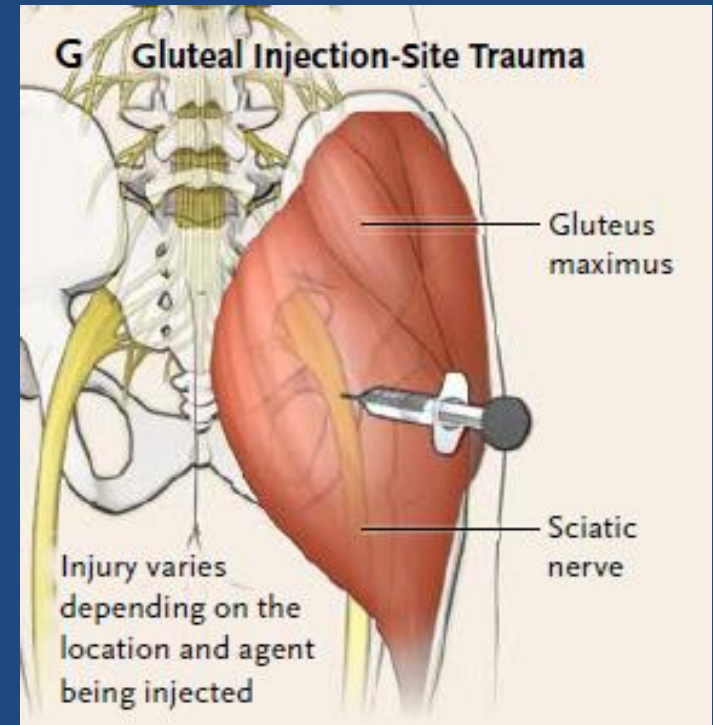
- **Compression of the sciatic nerve** underlying the piriformis muscle
- Focal mid-buttock pain, tenderness over the sciatic notch
- Aggravation of pain after sitting
- Provocation with external rotation of the hip
- Treatment of the piriformis syndrome involves stretching and physical therapy to enhance mobility



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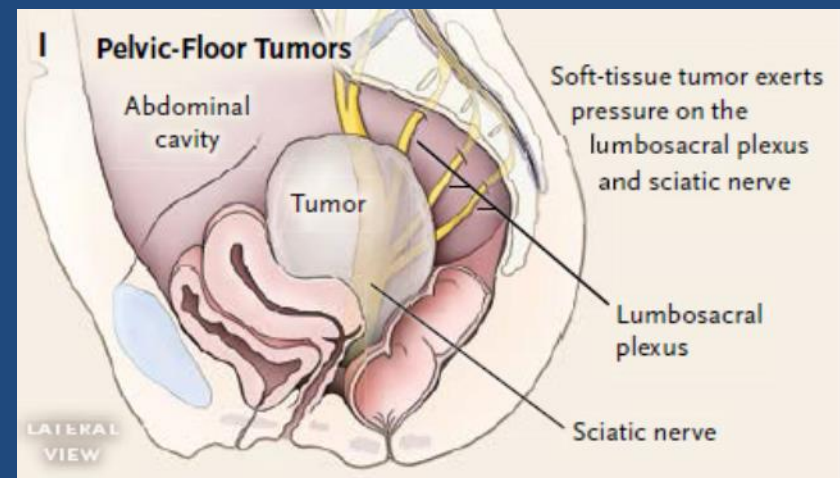
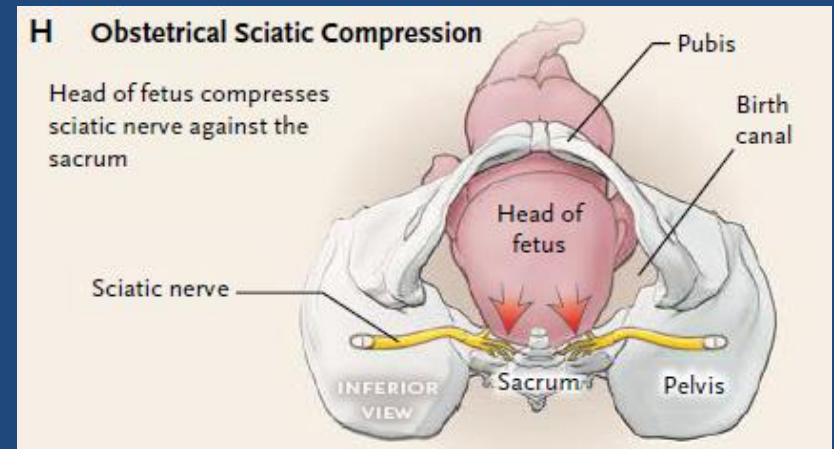
INJECTION SITE TRAUMA

- Possible to injure the sciatic nerve by deep injection in gluteal muscle
- Uncommon



GYNECOLOGIC AND PERIPARTUM CAUSES OF SCIATICA LIKE SYMPTOMS

- Caused by
 - Nerve compression between the fetal head and the pelvic brim
 - Large ovarian cysts and uterine enlargement
 - Endometriosis: endometrial tissue deposits on the proximal nerve
- Pain can be recurrent, cyclic
- Occurs after prolonged time in the lithotomy position



OTHER CAUSES OF SCIATICA LIKE SYMPTOMS

- **Zoster Sine Herpete**
 - Few days before the eruption of shingles
 - Often involves lumbar or upper sacral dermatome

- **Traumatic Injury of the Sciatic Nerve**
 - Fractures of the pelvis
 - Proximal hamstring or nerve injury
 - Muscle hematomas or tendinous injuries
 - Posterior hip dislocation
 - Femoral fracture

IMAGING

- Imaging is not necessary in a typical case
- Radiographs may show
 - Reduction in the height of intervertebral space
 - Spondylolisthesis
 - Osteomyelitis
 - Tumor infiltration
- Imaging should be considered **only** if intervention is planned
- MRI helps diagnose
 - Location of disk rupture
 - Lateral recess stenosis
 - Synovial cysts
 - Facet joint problems

ELECTROPHYSIOLOGICAL TESTING

- Test if diagnosis is questionable
- Radiculopathy confirmed by testing yields better surgical outcome
- Sampling four or five relevant muscles including the paraspinal regions is considered adequate
- Role of EMG in sciatica has not been established

CONSERVATIVE TREATMENT

- Sciatica resolves without treatment in the majority of cases
- Initial treatment is pain control by medication and physical therapy
- Many guidelines recommend restrictions on the use of opioids
- Indicated interventions
 - temporarily reduce pain
 - increase participation in exercises

PHYSICAL THERAPY

Motor-control exercises that focus on:

- control of the transversus abdominis
- multifidus muscles (deep back muscles)
- strengthening of other core muscles
- stretching and exercise, improving posture
- slowly increasing mobilization

NONPHARMACOLOGICAL TREATMENTS

- **Spinal manipulation** for sciatica is widely used
- Spinal manipulation provides short-term benefits when added to an exercise program
- Lumbar traction showed no benefits
- Transcutaneous electrical nerve stimulation is unclear

EPIDURAL INJECTIONS

- Short-term decrease in leg pain but no decrease in the need for subsequent surgery

SURGICAL TREATMENT OF SCIATICA CAUSED BY LUMBAR DISC DISEASE

- 33% improve in 2 weeks without treatment
- 75% improve in 3 months
- Trials favor surgery when comparing surgical to conservative treatment of sciatica due to lumbar disk disease
- Results in earlier relief of pain
- There were few differences in pain or disability between the two groups 1 year post-surgery

INDICATIONS FOR SURGERY

- Review showed
 - Conflicting evidence of long-term benefit
 - Greater and more rapid pain relief with surgery compared to conservative treatment
- Large disc ruptures that compress the cauda equina with bowel bladder involvement

COST-EFFECTIVENESS

- Prolonged conservative care versus early surgery correlated with a cost savings per quality-adjusted life-year of approximately \$60,000
- 23% of the participants reverted from recovered to not recovered suggesting sciatica can be a chronic with relapsing symptom

SURGICAL TECHNIQUES

- Unilateral procedure preserves tension and alignment between adjacent spinal segments
- Fusion of adjacent spinal segments is generally not necessary
- Overall outcomes of minimally invasive or conventional treatment are similar
- Minimally invasive approaches
 - Earlier and better pain relief
 - Less para-spinal muscle damage
 - Longer operating times and are associated with a higher rate of re-rupture of disc
- Surgery complications
 - Dural tears and CSF leaks
 - Root damage

NORTH AMERICAN SPINE SOCIETY

- Only surgery benefitted all aspects of global effect, pain relief, and a composite of condition-specific outcomes in the short, medium, and long term
- That discectomy provides more effective and more rapid symptom relief than do other treatments for symptoms that warrant surgery
- Less severe symptoms can be managed conservatively
- Patients with psychological distress have poor outcomes after surgery

NORTH AMERICAN SPINE SOCIETY

- Epidural glucocorticoid injection provides short-term pain relief
- Electrodiagnostic studies have limited utility
- Lumbar fusion: insufficient evidence for comment
- There is inadequate evidence to gauge how long one can wait before surgery and still recover from cauda equina compression or motor deficits

BRITISH PAIN SOCIETY

- Any indication of cauda equina compression requires referral for urgent surgery
- MRI is indicated for
 - Severe radicular pain that is disabling or intrusive or that prevents the patient from performing everyday tasks
 - A persistent neurologic deficit that lasts 2 weeks

Outline

- Sciatica and differential diagnosis
- Ankylosing spondylitis and axial spondyloarthritis*
- Lumbar canal stenosis

ANKYLOSING SPONDYLITIS AND AXIAL SPONDYLOARTHRITIS

- Ankylosing spondylitis, an inflammatory disorder, leads to the bony fusion of vertebral joints
- Uncommon but well-established cause of chronic back pain
- Prevalence of axial spondyloarthritis in the United States is 0.9 to 1.4% of the adult population
- Similar to rheumatoid arthritis prevalence
- Prolonged delay in reaching the diagnosis

CLASSIFICATION OF SPONDYLOARTHRITIS

- Axial spondyloarthritis
 - With radiographic sacroiliitis
 - Without radiographic sacroiliitis
 - Sacroiliitis on MRI
 - HLA-B27 positivity plus clinical criteria
- Peripheral spondyloarthritis
 - With psoriasis
 - With inflammatory bowel disease (Crohn's disease or ulcerative colitis)
 - With preceding infection
 - Without psoriasis or inflammatory bowel disease or preceding infection

CHARACTERISTICS OF INFLAMMATORY BACK PAIN

- Age at onset <45 yr
- Duration >3 mo
- Insidious onset
- Morning stiffness >30 min
- Improvement with exercise
- No improvement with rest
- Awakening from pain, especially during second half of night, with improvement on arising
- Alternating buttock pain
- Two or more suspicion for inflammatory back pain
- Four or more features can be considered diagnostic
- The sensitivity of inflammatory back pain for the diagnosis of axial spondyloarthritis is 70 to 80%

MEASURES OF DISEASE ACTIVITY AND OUTCOME

- Ankylosing Spondylitis Disease Activity Score (ASDAS)
- Score is calculated
 - Basis of patient ratings with regard to spinal pain
 - The duration of morning stiffness
 - Overall global assessment
 - Peripheral arthritis
 - Laboratory assessments of either the C-reactive protein level or the erythrocyte sedimentation rate
- (www.asas-group.org/clinical-instruments/asdas_calculator/asdas.html)

RISK FACTORS

- The strongest predictor is the presence of syndesmophytes at baseline
- History of smoking and elevated levels of inflammatory markers at baseline
- Involvement of one or often both hip joints occurs in 24 to 36% of patients
- Hip replacement indicated in 8% of patients

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ASSOCIATED CLINICAL MANIFESTATIONS

- Half of patients with ankylosing spondylitis have arthritis in peripheral joints or peripheral entheses at some point in the disease course
- Acute anterior uveitis has a lifetime prevalence of 30 to 40%
- Psoriasis occurs in more than 10%
- Inflammatory bowel disease is seen in 5 to 10% of patients
- Osteoporosis of the spine and peripheral bones
- Spinal fracture rate is as high as 10%

ROLE OF HLA-B27

- HLA-B27 is found in 74 to 89% of patients with ankylosing spondylitis
- The absolute risk of spondyloarthritis in persons with HLA-B27 positivity is 2 to 10%.
- Higher if a first-degree relative is affected

TREATMENT

- Treatment goals for axial spondyloarthritis include reducing symptoms, improving and maintaining spinal flexibility and normal posture
- Reducing functional limitations, maintaining the ability to work
- NSAIDs, including selective inhibitors of cyclooxygenase 2

TREATMENT

- TNF inhibitors used for symptoms that are not controlled by NSAID
- Five TNF inhibitors — infliximab, etanercept, adalimumab, golimumab, and certolizumab have produced rapid, profound, and sustained improvement in 60% of patients
- Predictors of a good response:
 - Young age, short disease duration, a high baseline level of inflammatory markers, and a low baseline level of functional disability
- Etanercept is less effective in treating anterior uveitis and inflammatory bowel disease

CONTRAINDICATIONS

- Active infection
- High risk of infection
- Advanced heart failure
- Lupus
- Multiple Sclerosis
- Cancer
- Patients should be tested for the presence of latent or active tuberculosis
- Carriers of the hepatitis B virus (HBV) surface antigen should be treated prophylactically

RECENT STUDIES

- Secukinumab, a monoclonal antibody to interleukin-17A shows dramatic efficacy in patients with cases of inadequate responses with TNF-alpha inhibitors
- Ustekinumab, an antibody to the subunit shared by interleukin-12 and interleukin-23, was efficacious

OUTLINE

- Sciatica and differential diagnosis
- Ankylosing Spondylitis and axial spondyloarthritis
- Lumbar canal stenosis*

LUMBAR SPINAL STENOSIS

- The clinical syndrome of neurogenic claudication due to lumbar spinal stenosis is a frequent source of pain in the lower back and extremities, impaired walking
- Most frequent indication for spinal surgery in patients older than 65 years of age

DIAGNOSIS

- The most common symptom associated with lumbar spinal stenosis is neurogenic claudication
- Radiates beyond the spinal area into the buttocks and frequently into the thigh
- It is exacerbated by lumbar extension and improves with lumbar flexion

Pathoanatomical Features of Degenerative Lumbar Spinal Stenosis

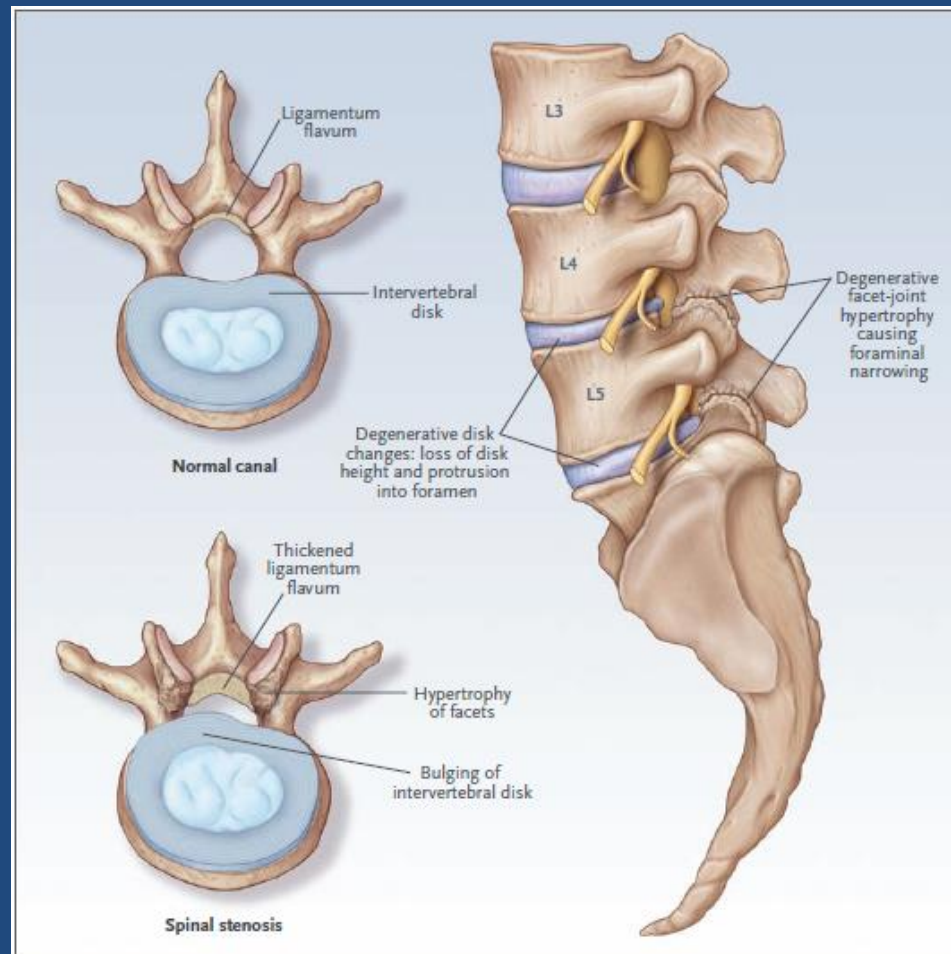


Table 1. Categories of Lumbar Spinal Stenosis.*

| Category | Comments |
|--|---|
| Congenital stenosis (developmental) | Congenitally shortened pedicles; typical age at symptom onset, 20s–40s |
| Idiopathic | |
| Achondroplastic | Frequently seen in achondroplastic dwarves |
| Acquired stenosis | |
| Degenerative | |
| Central canal | Disk degeneration, facet osteoarthritis, ligamentum flavum hypertrophy; typical age at symptom onset, 60s–90s |
| Peripheral canal, lateral recesses | Sciatica-like presentation in patients with lateral recess stenosis |
| Spondylolisthesis | Back pain may predominate |
| Combinations of congenital and degenerative stenosis | |
| Iatrogenic | |
| Postlaminectomy | Stenosis typically at adjacent level but may recur at operated level |
| Postfusion | |
| Spondylolitic | Typical age of symptom onset, teens–20s, associated with spondylolisthesis |
| Post-traumatic | |
| Miscellaneous | |
| Corticosteroid excess (Cushing's syndrome or exogenous source) | Goal of management is to treat underlying condition |
| Paget's disease, acromegaly | |

* The classification is adapted from Arnoldi et al.²

DIFFERENTIAL DIAGNOSIS

- Hip osteoarthritis: groin pain
- Trochanteric bursitis: pain over greater trochanter
- Peripheral neuropathy: associated paresthesia
- Vascular claudication: loss of distal pulse

IMAGING

- (MRI) or computed tomography (CT) may confirm the presence of spinal stenosis
- The sensitivities of CT and MRI for lumbar spinal stenosis exceed 70%
- It is important to recognize that more than 20% of persons older than 60 years of age who have no symptoms or functional limitations may have findings of spinal stenosis on imaging studies
- Electromyography is not routinely warranted

TREATMENT

- Majority of symptomatic patients whose care is managed nonoperatively report no substantial change over the course of 1 year
- Dramatic spontaneous improvement is also uncommon, making watchful waiting an unsatisfactory strategy for patients with intolerable symptoms

NON-OPERATIVE MANAGEMENT

- Exercises performed during lumbar flexion, such as bicycling, are typically better tolerated than walking
- Exercises that strengthen the abdominal musculature may help patients avoid pain
- Pain can typically be managed with acetaminophen and, if this fails, nonsteroidal anti-inflammatory drugs

OPERATIVE MANAGEMENT

- Decompress the central spinal canal and the neural foramina, eliminating pressure on the spinal nerve roots
- Stenosis accompanied by spondylolisthesis: the combination of decompression and fusion is more effective

OPERATIVE MANAGEMENT

- More than 80% of patients have some degree of symptomatic relief after surgery for spinal stenosis
- 7 to 10 years later, at least one third of patients report back pain rec
- Patients with the most severe nerve-root compression preoperatively are the most likely to benefit
- Rates of reoperation are on the order of 10 to 23% over a period of 7 to 10 years
- Inpatient mortality from surgery <1%
- Deep infection risk 1%

TAKE HOME POINTS

- Sciatica
 - Most resolve on their own
 - Surgery indicated for persistent neurological symptoms
- Ankylosing spondylitis and axial spondyloarthritis
 - Best managed by rheumatologist
 - TNF inhibitors indicated for disease activity
- Lumbar canal stenosis
 - Cause of late onset pain
 - Surgery decompression is often indicated

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