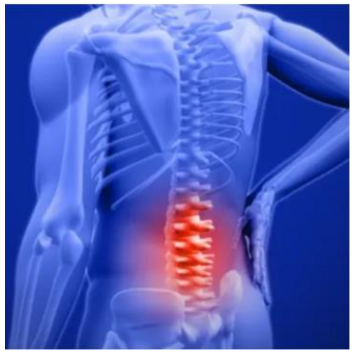

Diagnostic Methods in Low Back Pain

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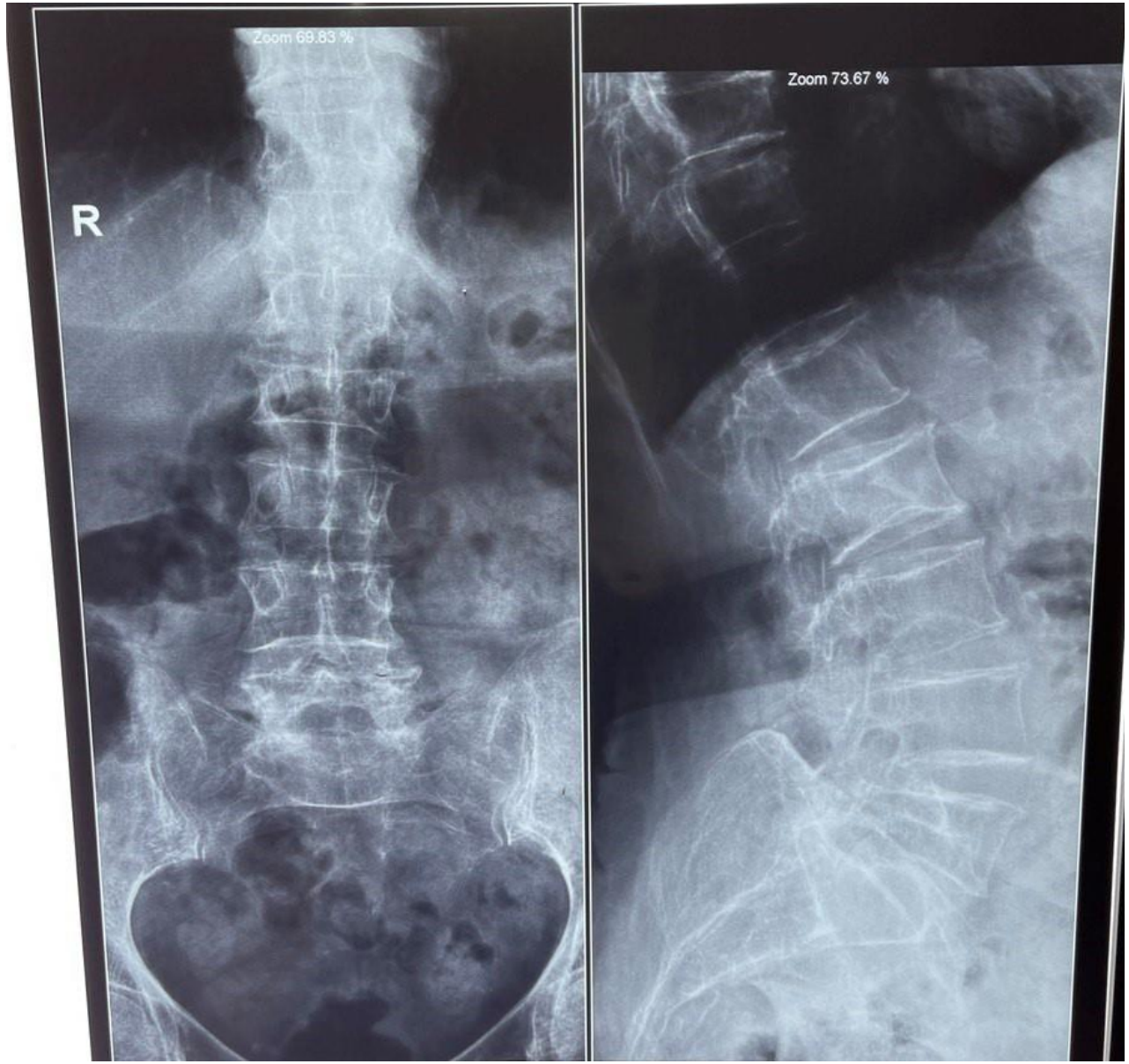
Physical Medicine and Rehabilitation Research Center

An interesting case

- A 78 Y/O female with subacute LBP and mild radiation to right lower limb , in his first visit she had a Electrodiagnostic test and caudal injection, after 3 days pain reduction , his pain turned over and gradually exaggerated in 2 weeks in low back area.
- In another visit the patient had a X ray

- Diagnosis was osteoarthritis and she received some medication .
- In my visit , she couldn't sit and stand without support, and had tenderness in vertebra without any other positive sign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Pain generators of the lumbar Spine

- Intervertebral disks
- Facet joints
- Spinal ligaments
- Vertebral body

Nonlumbar Spine Causes of “Radicular” Leg Symptoms

- **Joint disorders** …. sacroiliac joint, hip Joint
- **Soft tissue disorders** ….Piriformis syndrome , tightness, Greater trochanteric pain syndrome , Iliotibial band syndrome
- **Vascular disorders**

The best method for start

- Good History
- Good Physical examination

"Red Flags": Most Common Indications From History and Examination for Pathologic Findings Needing Special Attention and Sometimes Immediate Action (Including Imaging)

- Children<18 years with considerable pain or new onset in those> 55 years old
- History of violent trauma
- Nonmechanical nature of pain (i.e., constant pain not affected by movement, pain at night)
- History of cancer
- Systemic steroid use
- Drug abuse
- Human immunodeficiency virus infection or other patients who are immunocompromised
- Unintentional weight loss

Red Flags

- Systemically ill, particularly signs of infection such as fever or night sweats
- Persisting severe restriction of motion or intense pain with minimal motion
- Structural deformity
- Difficulty with micturition
- Loss of anal sphincter tone or fecal incontinence, saddle anesthesia
- Progressive motor weakness or gait disturbance
- Marked morning stiffness
- Peripheral joint involvement
- Iritis, skin rashes, colitis, urethral discharge, or other symptoms of rheumatologic disease
- Inflammatory disorder such as ankylosing spondylitis is suspected
- Family history of rheumatologic disease or structural abnormality

Physical examination

- Observation
- Palpation
- Range of motion
- Neurologic examination
- Orthopedic special tests

Observation

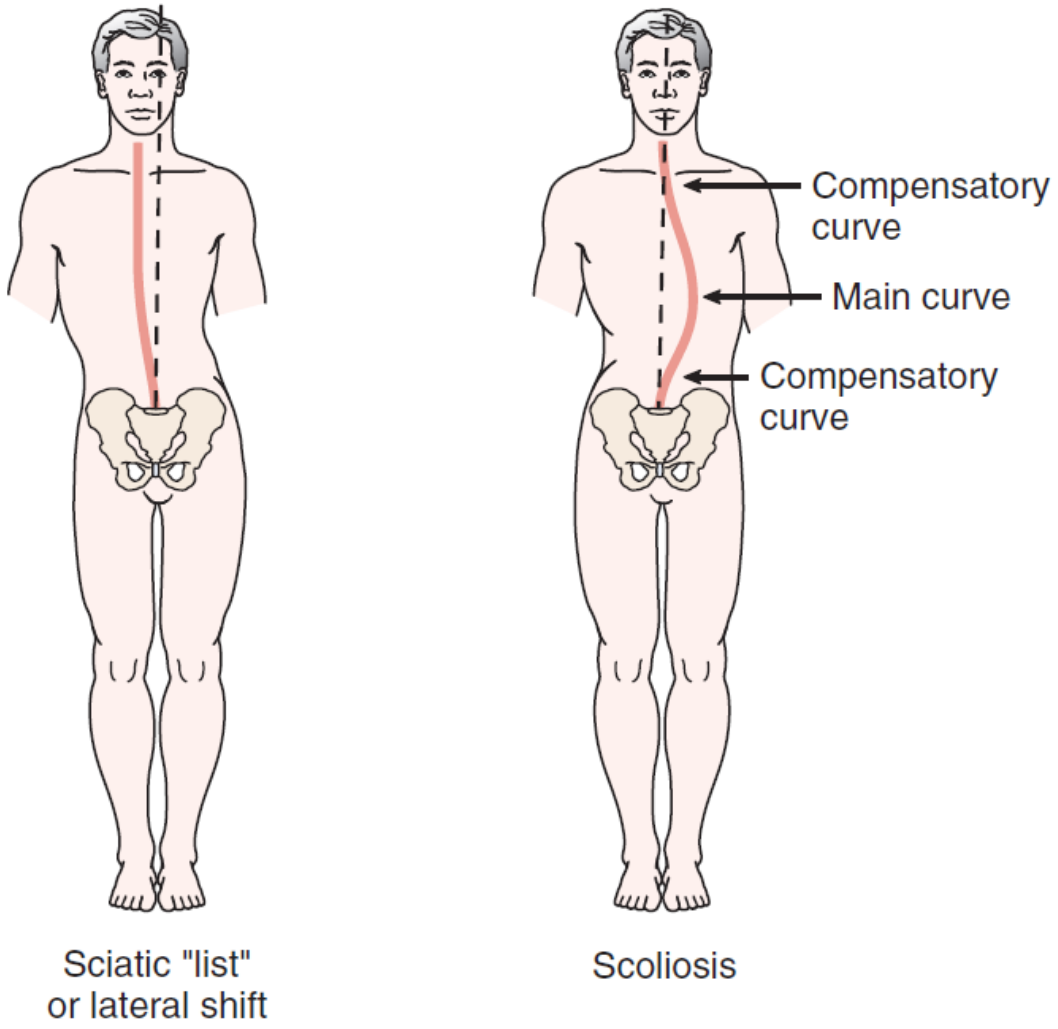
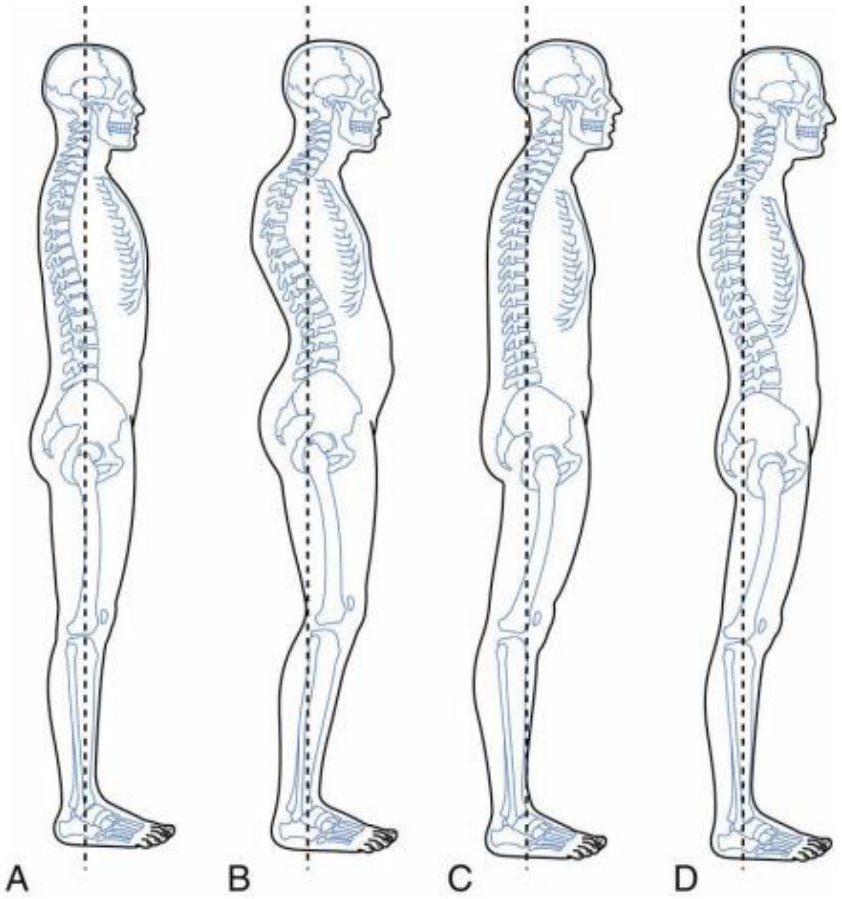


Figure 9-19 Lateral shift or list.

Postural alignment



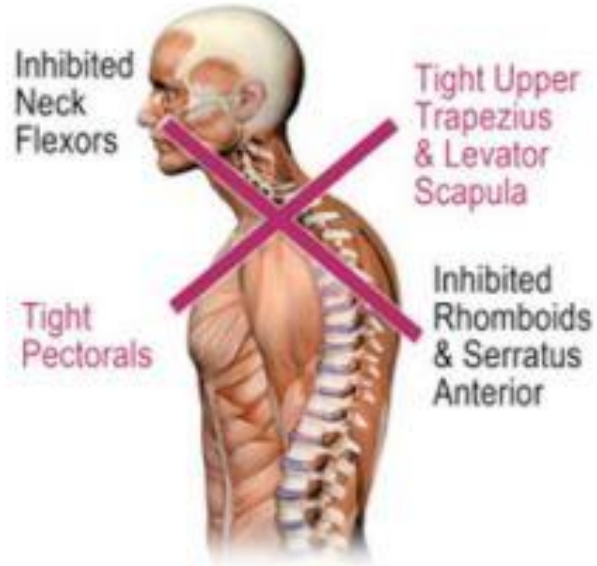
- Four types of postural alignment.
- (A) Ideal alignment
- (B) Kyphosis-lordosis posture…ant pelvic tilt
- (C) Flat back posture…post pelvic tilt

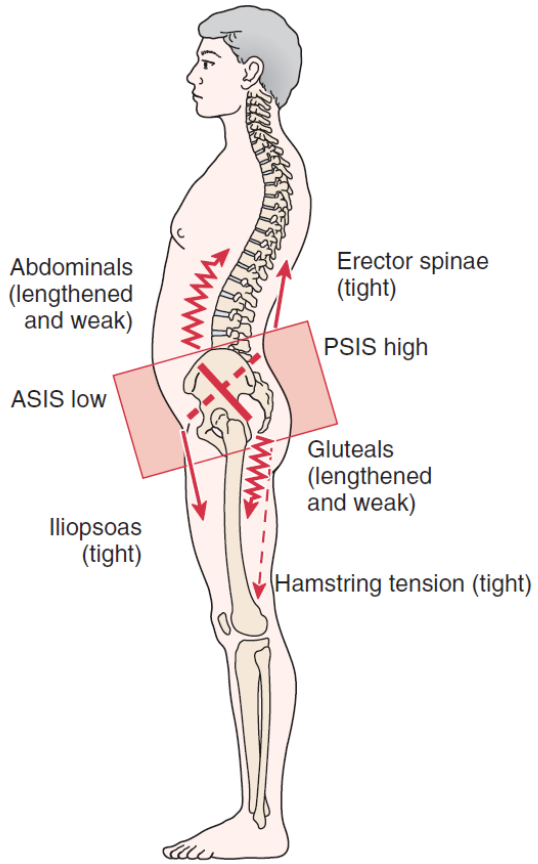
(D) Sway-back posture…post displacement of upper trunk and ant displacement of the pelvis

Layer syndrome

- Layer syndrome

Upper crossed syndrome + pelvic crossed syndrome





Palpation

- ROM
- Trigger point
- Muscle spasm
- Muscle atrophy

Neurological examination

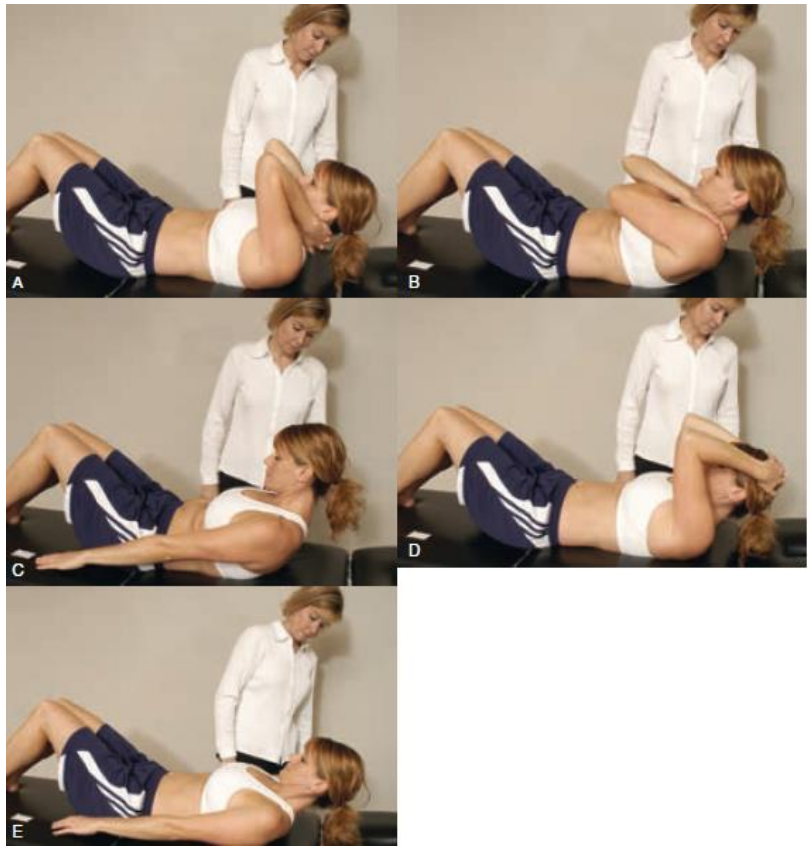
- Provocation tests
- MMT
- DTR
- Sense
- PR
- Balance

Orthopedic Special tests

- Dynamic abdominal Endurance test

Orthopedic Special tests

- Isometric abdominal test



Normal (5) = Hands behind neck, until scapulae clear table (20 to 30 second hold)

• Good (4) = Arms crossed over chest, until scapulae clear table (15 to 20 second hold)

• Fair (3) = Arms straight, until scapulae clear table (10 to 15 second hold)

• Poor (2) = Arms extended, toward knees, until top of scapulae lift from table (1 to 10 second hold)

• Trace (1) = Unable to raise more than head off table

Orthopedic Special tests

- Dynamic extensor endurance test

Orthopedic Special tests

- Isometric extensor test

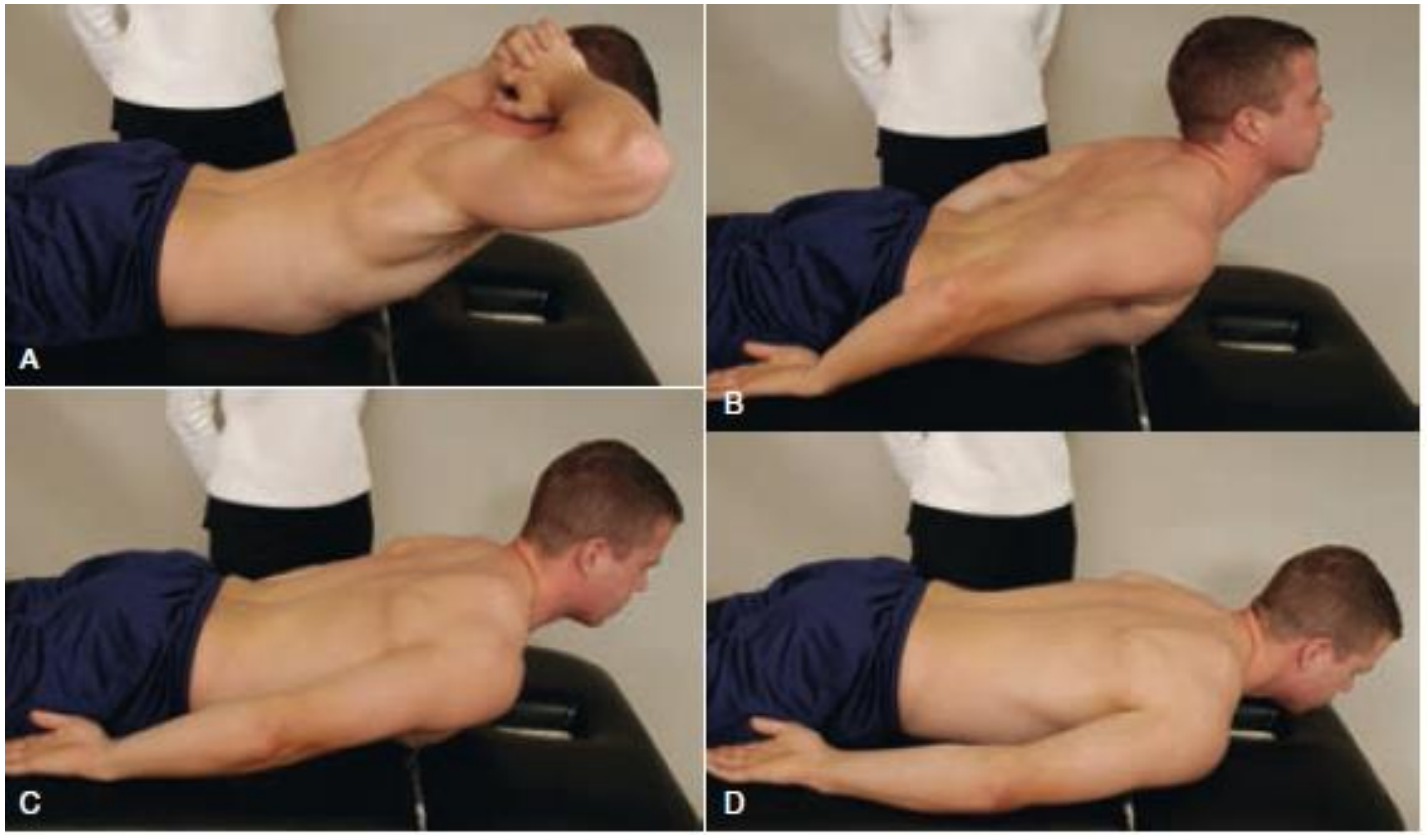


Figure 9-41 **Isometric extensor test. A,** Hands behind head, lift head, chest, and ribs off bed. **B,** Hands at side, lift head, chest, and ribs off bed. **C,** Hands at side, lift sternum off bed. **D,** Hands at side, lift head off bed.

Orthopedic Special tests

- Double straight leg lowering test

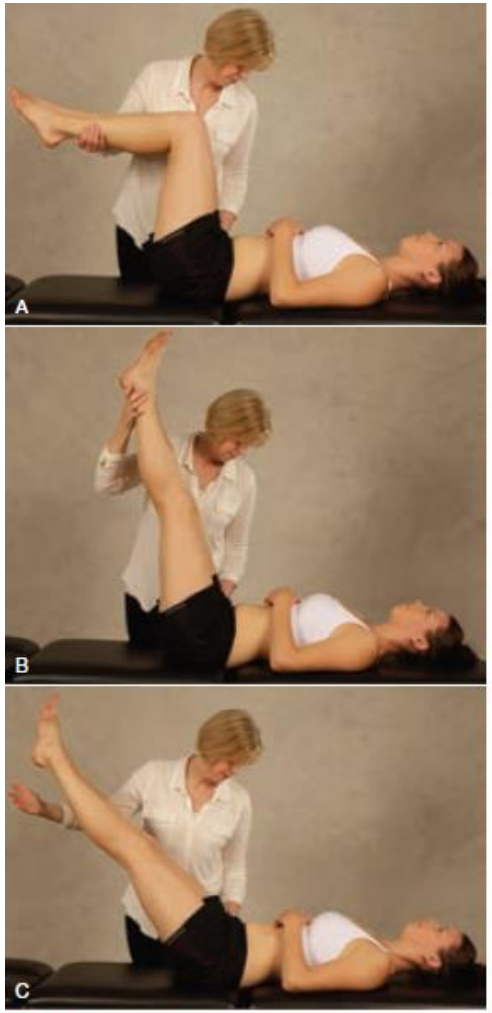


Figure 9-42 **Double straight leg lowering test. A,** Flexing hips to 90°. **B,** Start position with knees straight. **C,** Example of leg lowering. Note how the examiner is watching for anterior pelvic rotation which would indicate an inability to hold a neutral pelvis.

Normal (5) = Able to reach 0° to 15° from table before pelvis tilts

- Good (4) = Able to reach 16° to 45° from table before pelvis tilts
- Fair (3) = Able to reach 46° to 75° from table before pelvis tilts
- Poor (2) = Able to reach 75° to 90° from table before pelvis tilts
- Trace (1) = Unable to hold pelvis in neutral at all

Orthopedic Special tests

- Internal /external abdominal oblique test

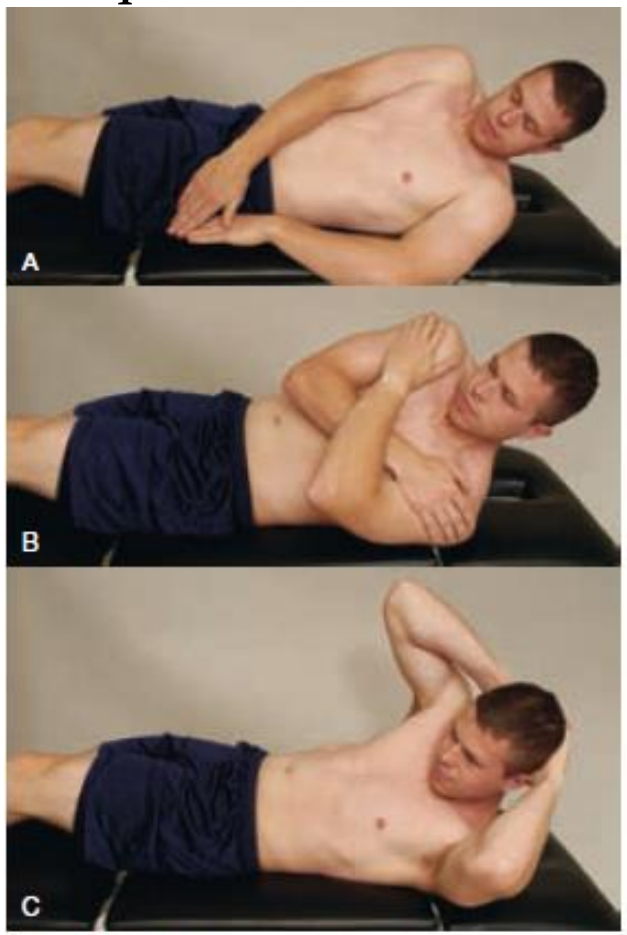


Figure 9-43 Internal/external abdominal oblique test. A, Test position with hands at side. B, Test position with hands on shoulders. C, Test position with hands behind head.

- Normal (5) = Flexes and rotates the lumbar spine fully with hands behind head (20 to 30 second hold)
- Good (4) = Flexes and rotates the lumbar spine fully with hands across chest (15 to 20 second hold)
- Fair (3) = Flexes and rotates the lumbar spine fully with arms reaching forward (10 to 15 second hold)
- Poor (2) = Unable to fl ex and rotate fully
- Trace (1) = Only slight contraction of the muscle with no movement
- (0) = No contraction of the muscle

Orthopedic Special tests

- Prone instability test

Figure 9-76 **Prone segmental instability test. A,** Toes on floor. **B,** Feet lifted off floor.

Orthopedic Special tests

- Ober test

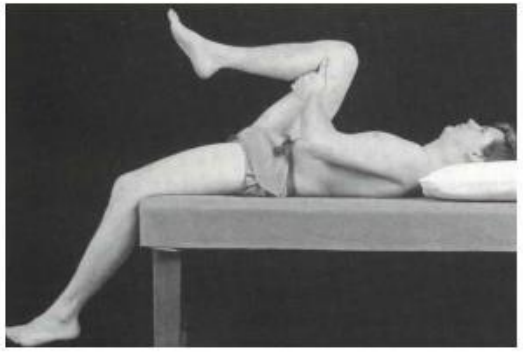
Orthopedic Special tests

- Ely test

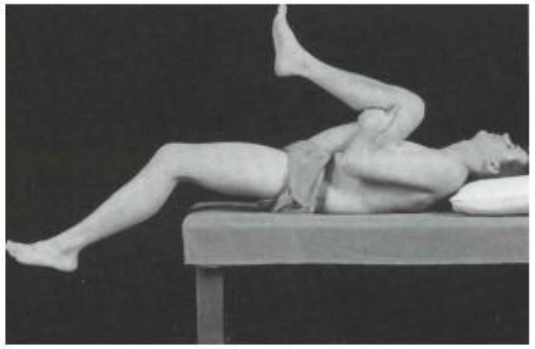
Orthopedic Special tests

Hip flexor shortening

Thomas Test



- Normal length of hip flexors
- With low back flat
- Posterior thigh touches table
- Knee flexes approximately 80°
- The pelvis is in 10 ° posterior tilt

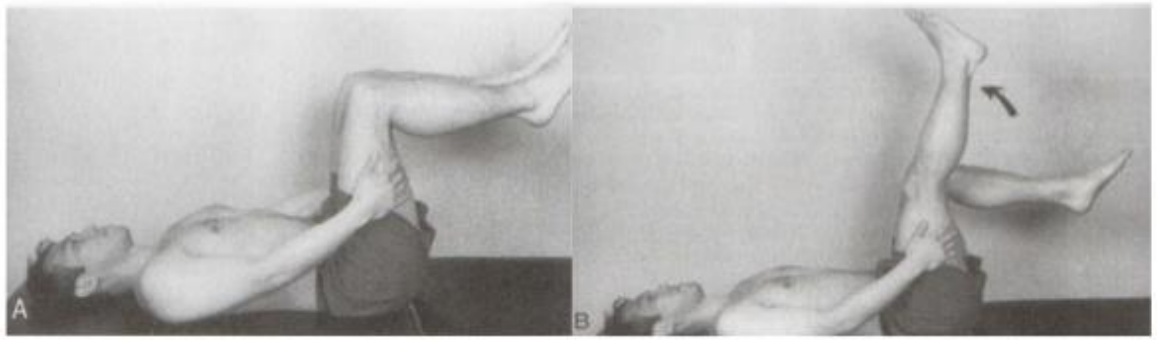


- Abnormal length of hip flexors
- With low back flat
- Posterior thigh does not touch table
- Knee flexes < 80°

Orthopedic Special tests

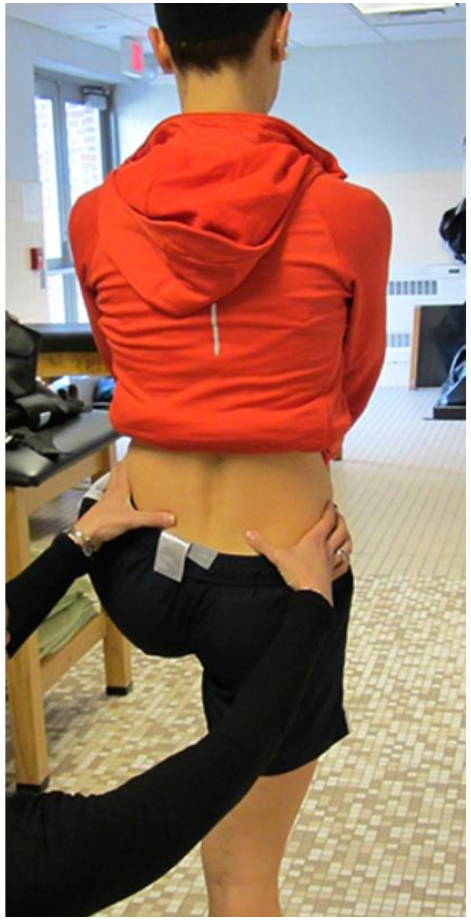
Hamstring shortening

1) 90-90 Straight Leg Raising Test



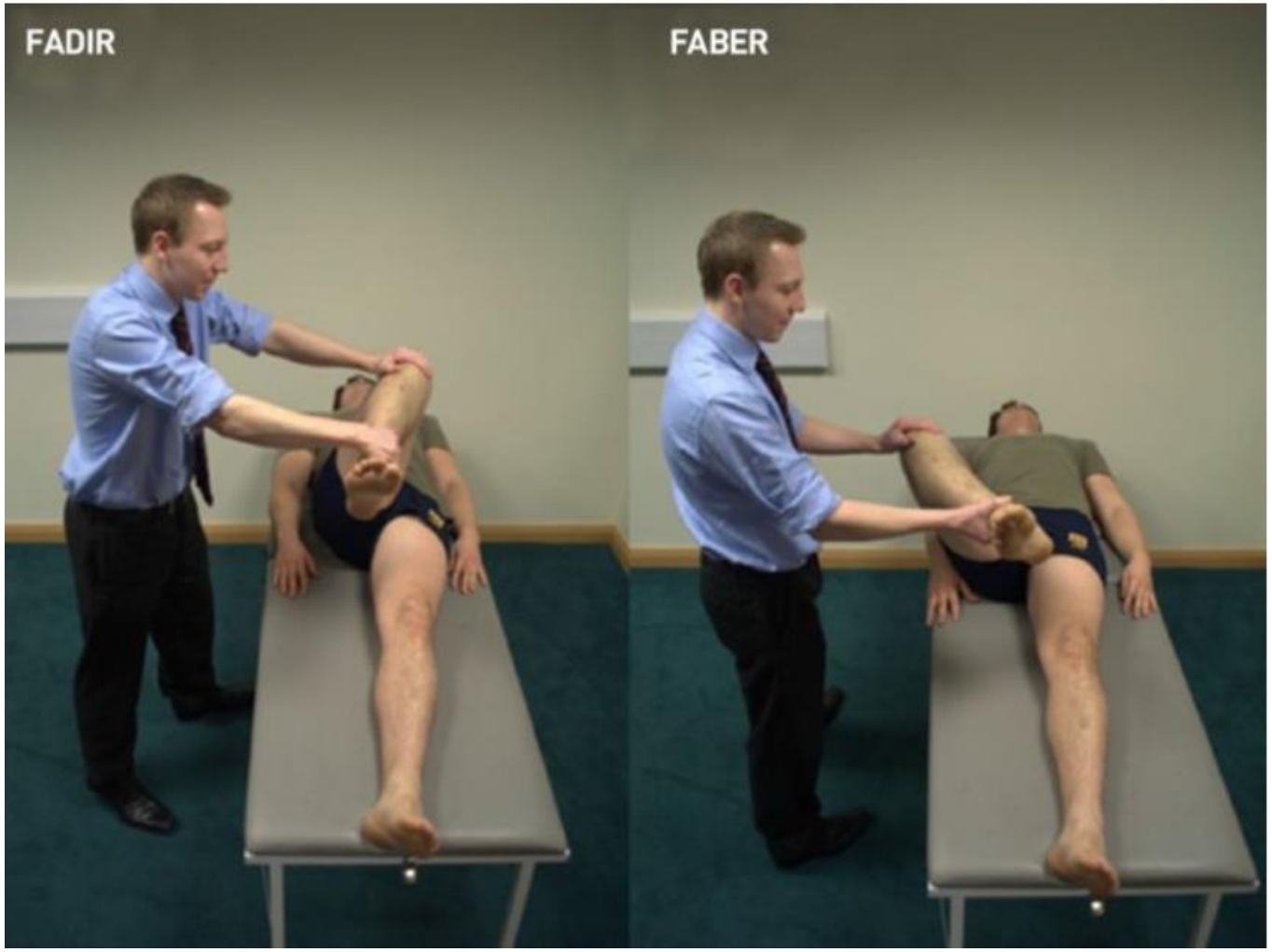
- **Normal flexibility in the hamstrings : knee extensior should be within 20˚ of full extension**
- **Positive : if the hamstrings are tight, the end feel will be muscle stretch**

Orthopedic Special tests



- Gillet test
- Normally with hip bending the sacrum moves posteriorly ,with no movement or anterior movement the test is positive

Orthopedic Special tests



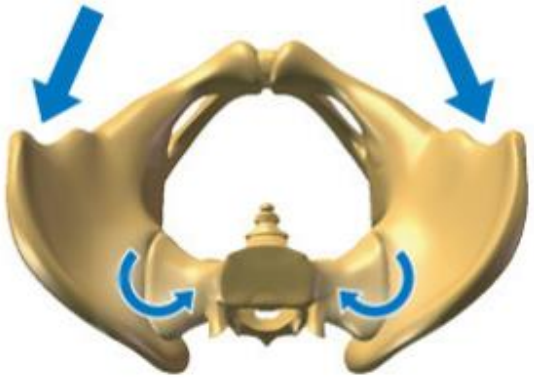
- SIJ and Hip

Orthopedic Special tests

- Gaenslens` test

Orthopedic Special tests

- Distraction

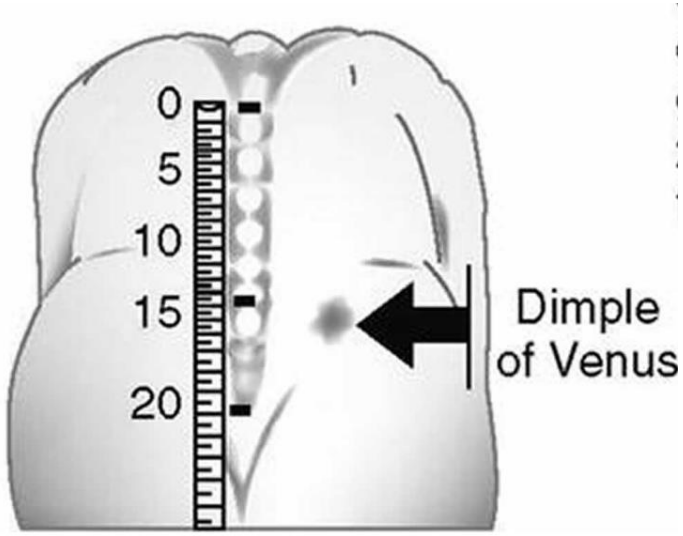


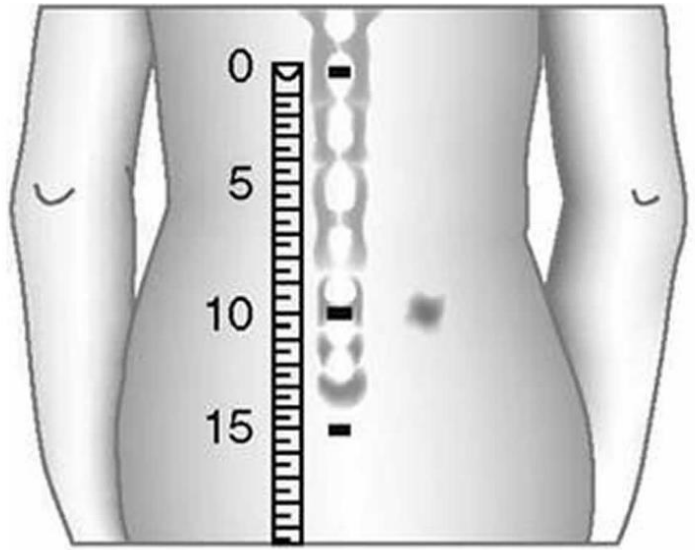
Orthopedic Special tests

- Compression

Orthopedic Special tests

- Schober test





Imaging studies

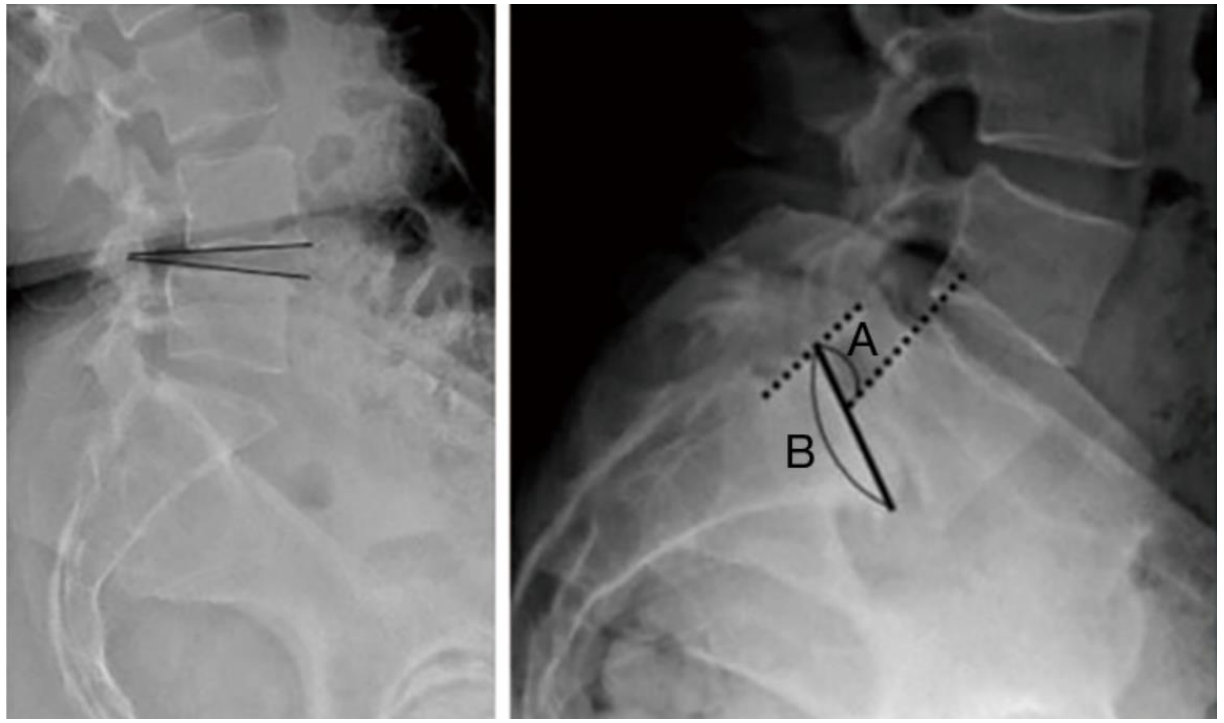
Plain X ray

- In trauma
- Bony lesion
- Scoliosis
- Segmental anomalies
- Hip Pelvis SIJ

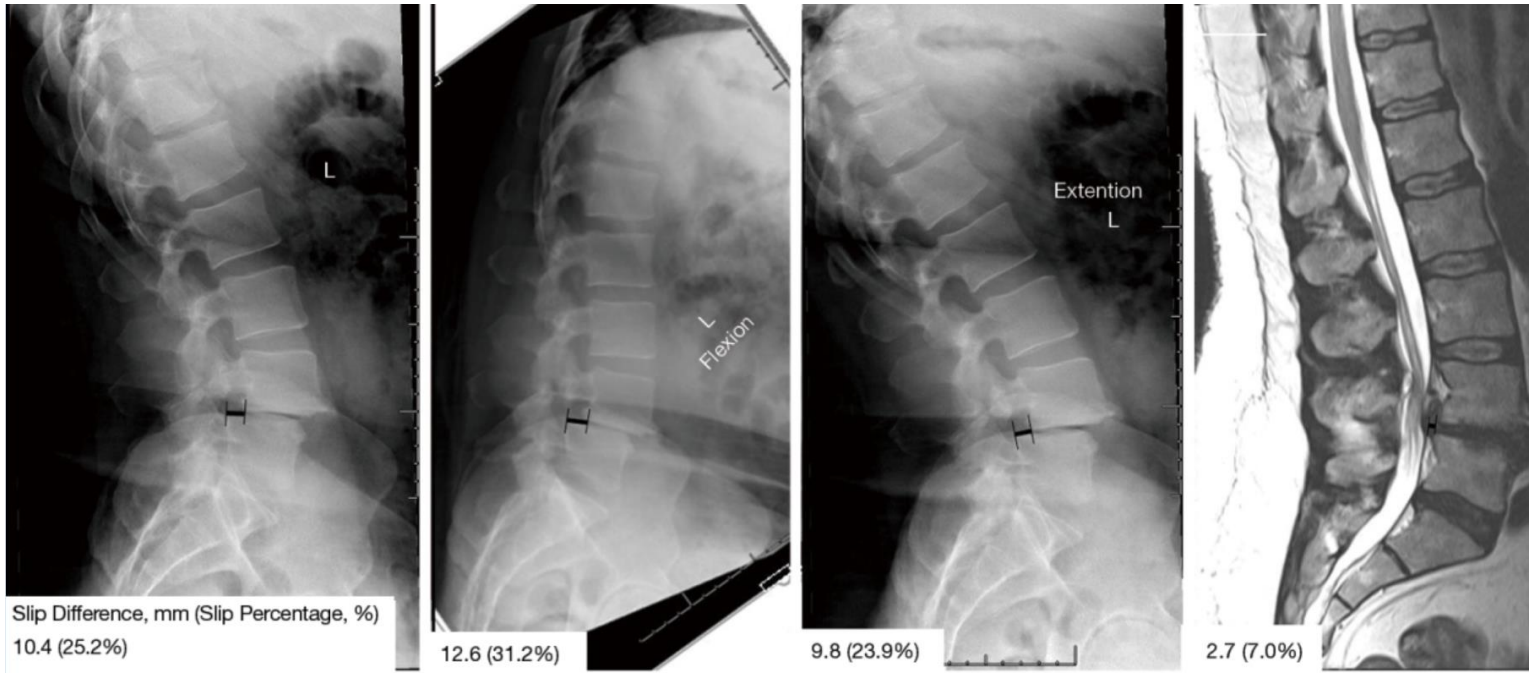
Low sensitivity , low specificity

X -Ray

- Standing flexion and extension
- the most commonly accepted radiologic sign for ventral instability is a sagittal SP difference of ≥8% or a translation ≥3 mm

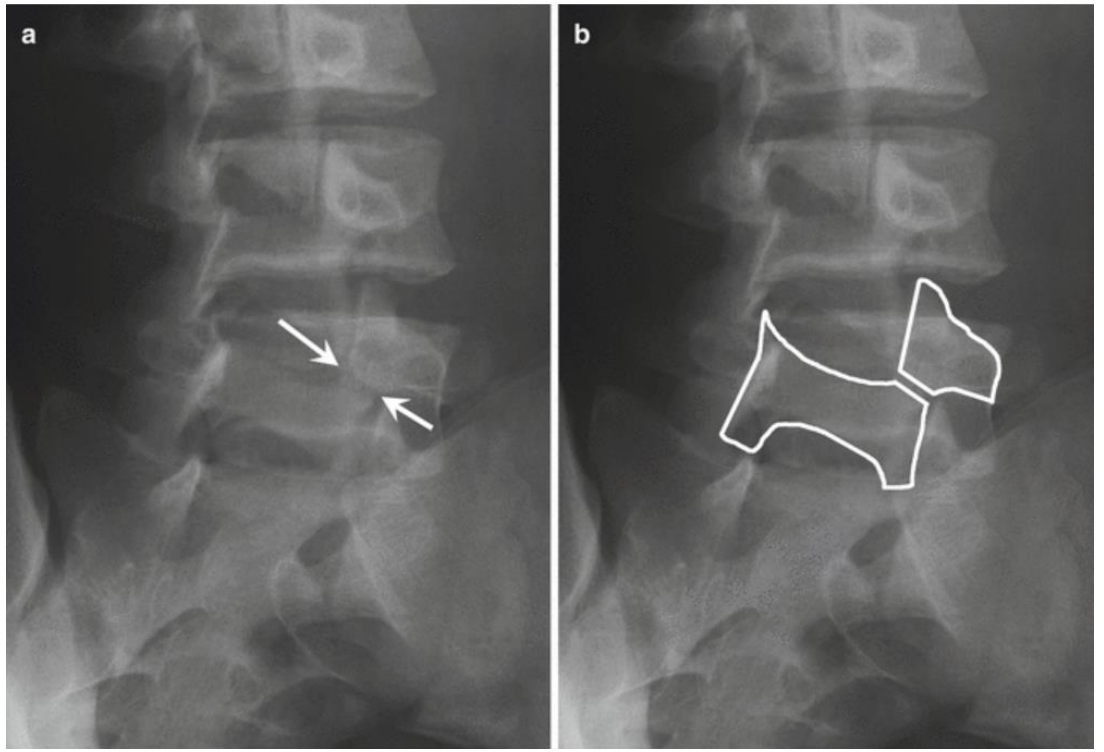


- **Flexion-extension standing radiographs underestimate instability in patients with single-level lumbar spondylolisthesis: comparing flexion-supine imaging may be more appropriate**
- Nathan J. Lee, et al .march 2021
- Comparing standing lateral and flexion X-rays with supine MRIs provides higher sensitivity to assess instability than standard flexion-extension radiographs



X -Ray

- Scottie dog
- Oblique view



MRI

- IVDs, the spinal canal, and the vertebrae and perivertebral structures,disk herniations, lumbar spinal stenosis, fractures, tumors, infection, and other forms of pathology
- gadolinium contrast enhancement ……increased vascularity….. tumor or infection or to determine scar tissue (vascular) versus recurrent disk herniation (avascular) in postsurgical patients
- The downside of MRI is that, although a very sensitive test, it is not very specific in determining a definite source of pain
- <60y ….. 20% had a disk herniation, >60y 36% disk herniation and 21% spinal stenosis OR in normal 36% had normal MRI
- Except extrusion

Computed Tomography

- bony lesions
- postsurgical patient with excessive hardware
- patients with implants (aneurysm clips or pacemakers) CT can be accompanied by myelography

Scintigraphy

- a fairly sensitive but not specific….occult fractures, bony metastases, and infections
- To increase anatomic specificity, single photon emission computed tomography (SPECT) bone scanning ….MRI with facet hypertrophy
- zygapophyseal joint injections
- the identification of a painful pars lesion in adolescent athletes

Electromyography

- to provide information as to which anatomic lesions found in imaging studies are truly physiologically significant
- distinction between radiculopathy, peripheral mononeuropathy, peripheral polyneuropathy, and other lower motor neuron processes
- It is important to remember, and to educate referring physicians, that electromyography has limited specificity for radiculopathy and that its sensitivity also decreases with time
- It also does not assess for the presence or absence of radicular pain or isolated nerve root sensory dysfunction.

Laboratory studies

- Inflammatory disease…..AS, Infection

- Neoplastic …MM with serum and urine protein electrophoresis

Thanks for your attention