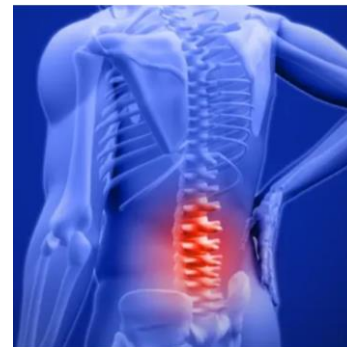




Diagnostic Methods in Low Back Pain

Bina Eftekharsadat ,MD.

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





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

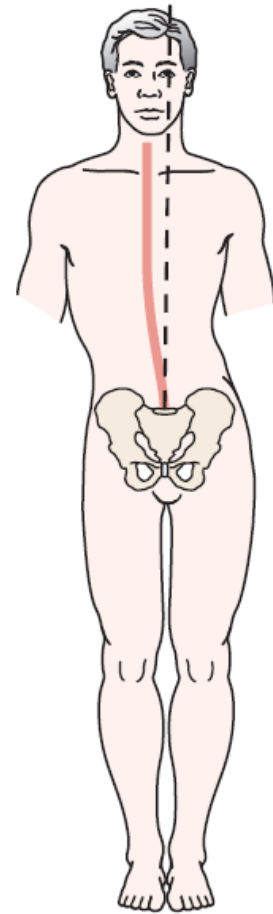
Red Flags

- 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

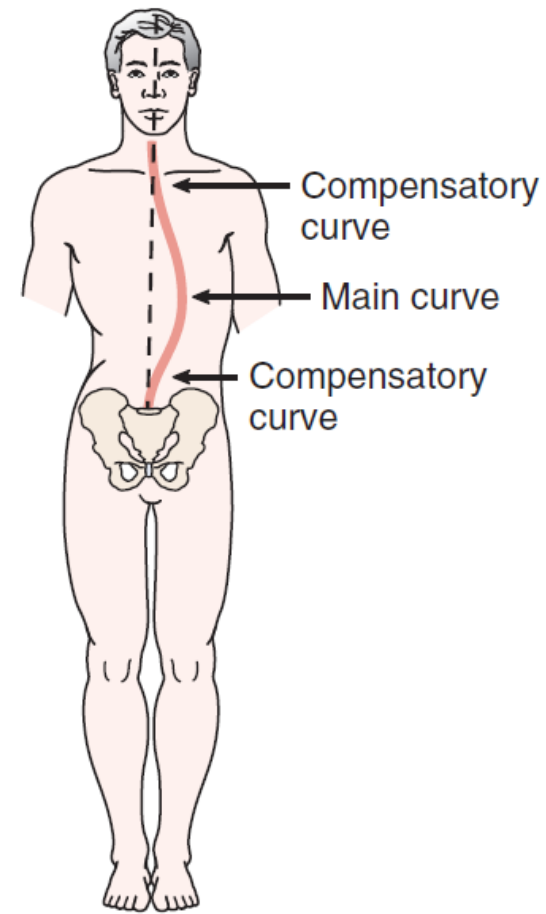
Physical examination

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

Observation



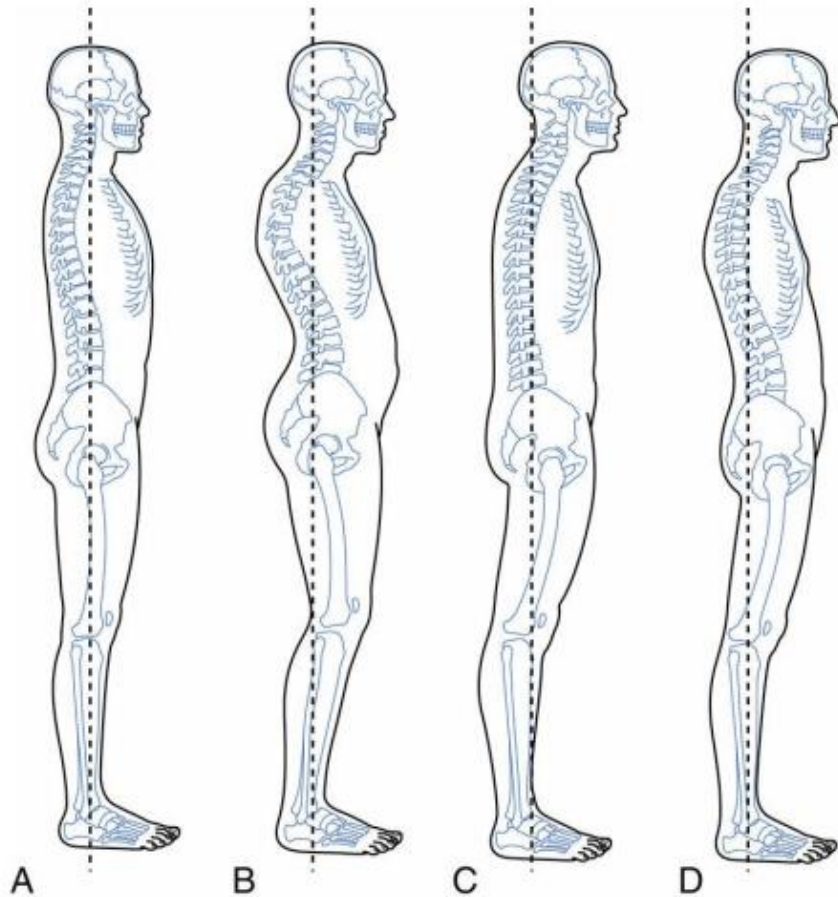
Sciatic "list"
or lateral shift



Scoliosis

Figure 9-19 Lateral shift or list.

Postural alignment

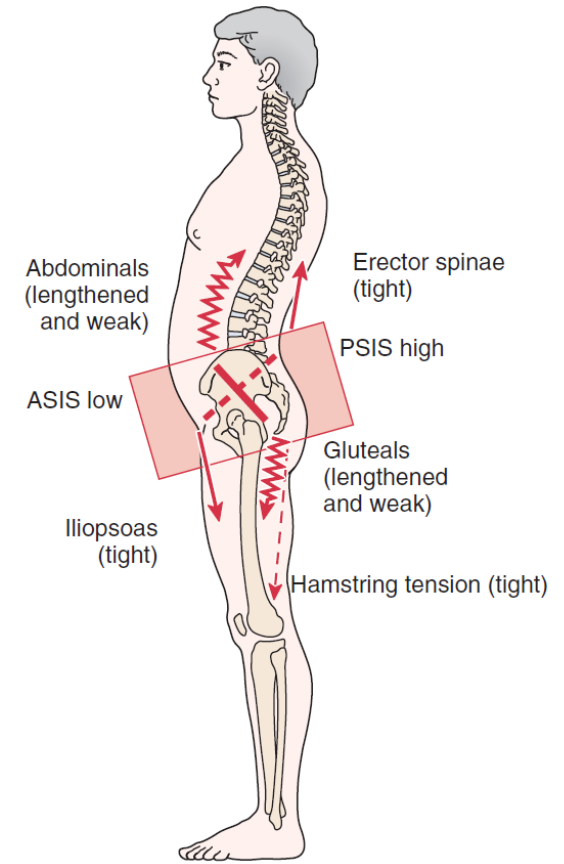
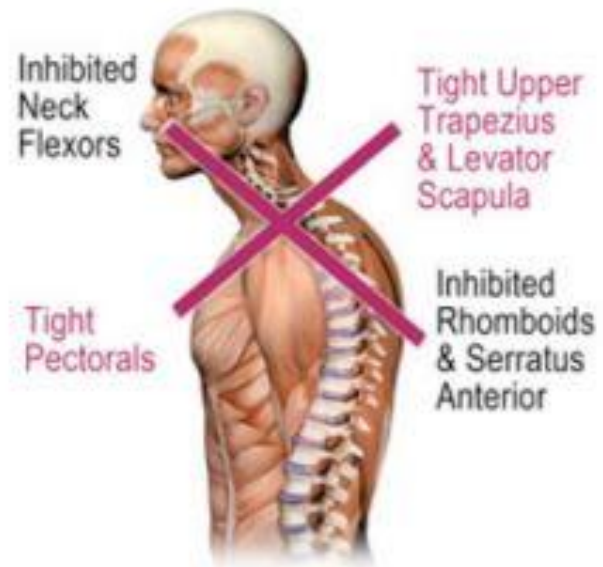


- Four types of postural alignment.
- (A) Ideal alignment
- (B) Kyphosis-lordosis posture...ant pelvic tilt
- (C) Flat back posture...post pelvic tilt
- (D) Sway-back posture...post displacement of upper trunk and ant displacement of the pelvis

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

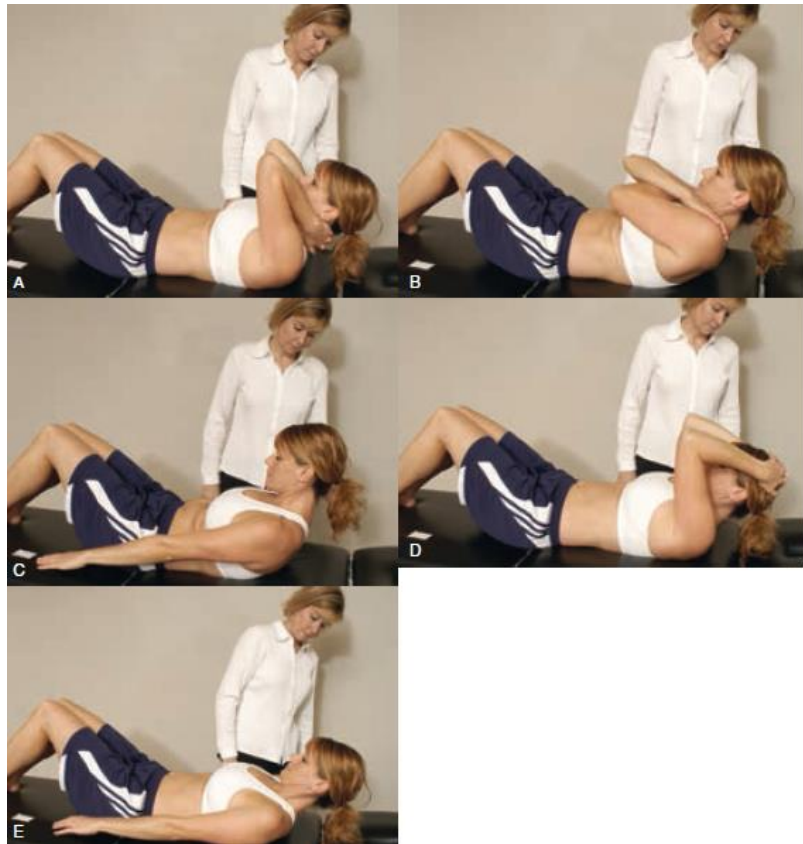
Orthopedic Special tests

- 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

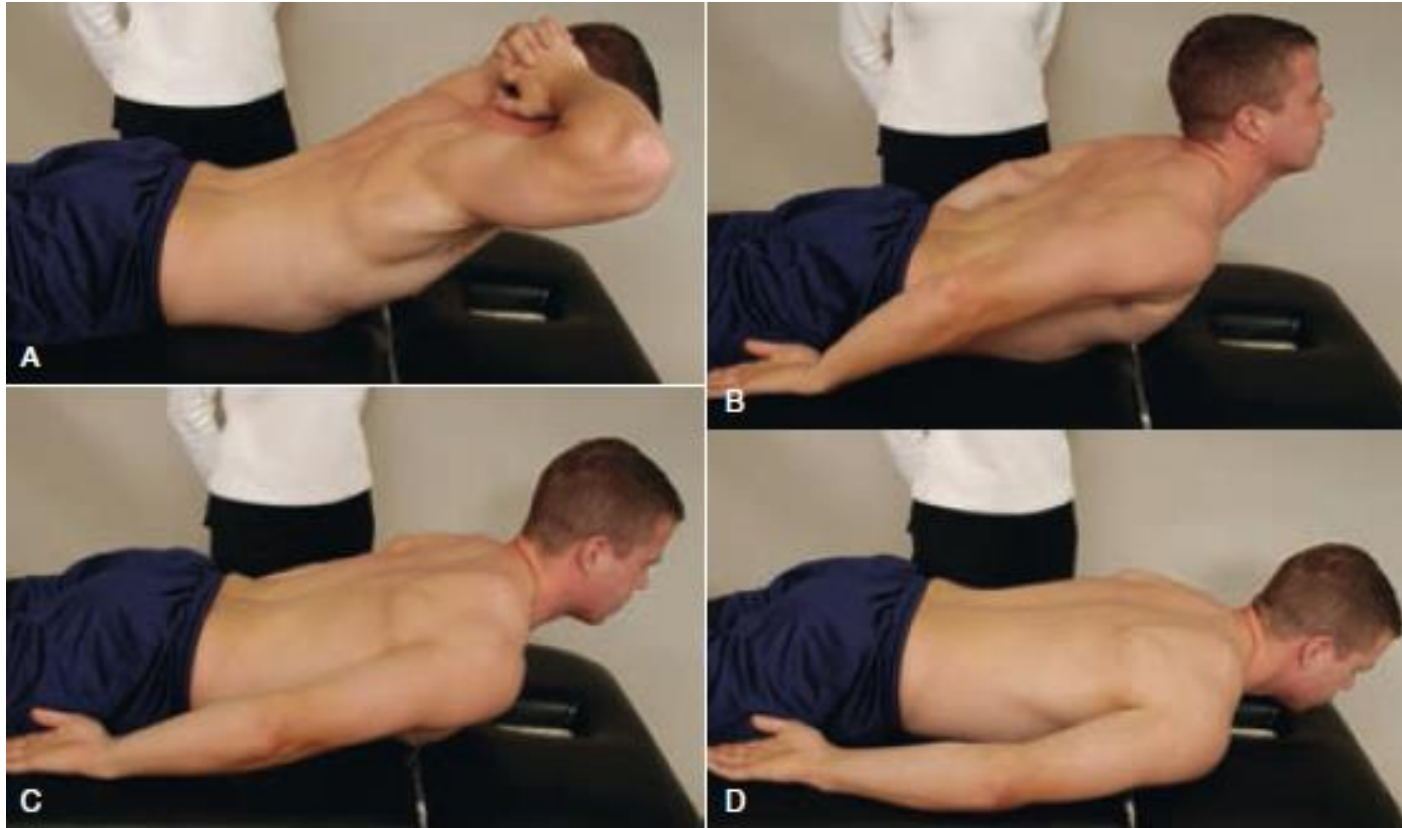


Figure 9-41 Isometric extensor test. A, Hands behind head, lift head, chest, and ribs off bed. B, Hands at side, lift head, chest, and ribs off bed. C, Hands at side, lift sternum off bed. D, Hands at side, lift head off bed.

Orthopedic Special tests

- Double straight leg lowering test

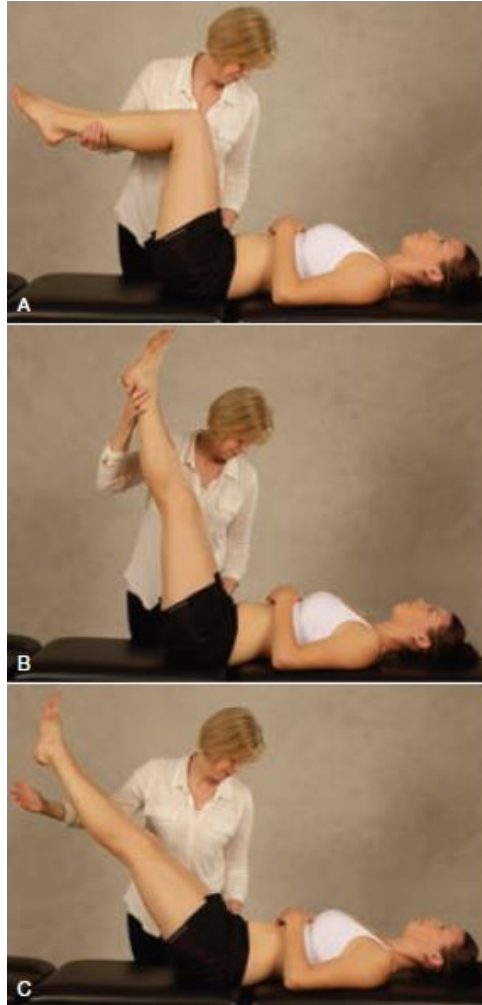


Figure 9-42 Double straight leg lowering test. A, Flexing hips to 90°. B, Start position with knees straight. C, Example of leg lowering. Note how the examiner is watching for anterior pelvic rotation which would indicate an inability to hold a neutral pelvis.

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

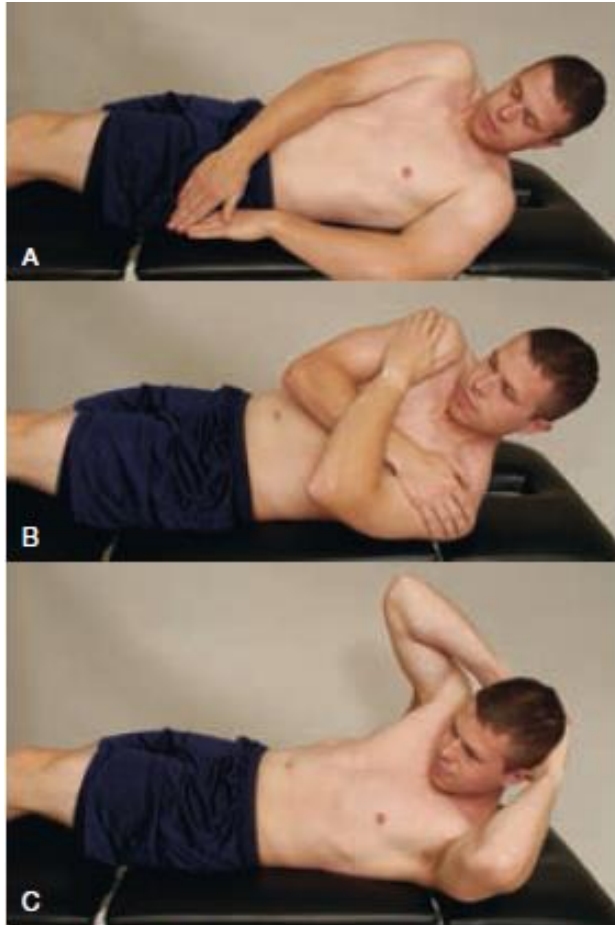


Figure 9-43 Internal/external abdominal oblique test. A, Test position with hands at side. B, Test position with hands on shoulders. C, Test position with hands behind head.

- 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 flex 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



장경안대의 오버테스트

Orthopedic Special tests

- Ely test



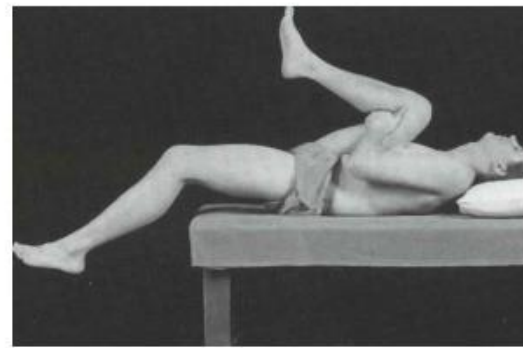
Orthopedic Special tests

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

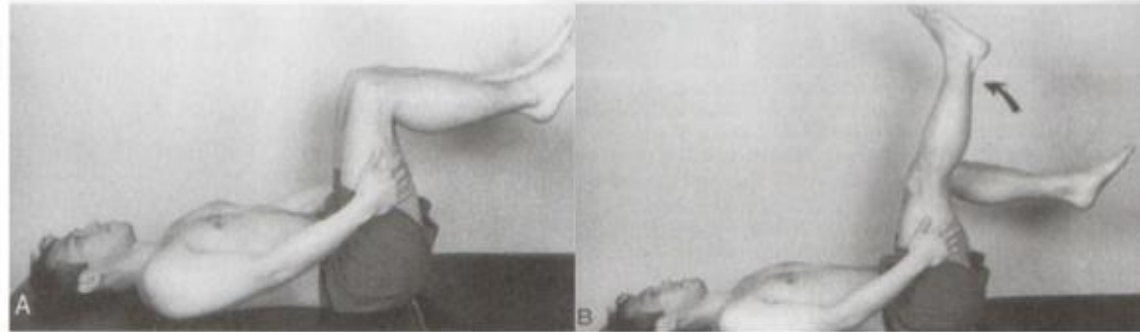


- Abnormal length of hip flexors
- With low back flat
- Posterior thigh does not touch table
- Knee flexes $< 80^{\circ}$

Orthopedic Special tests

Hamstring shortening

1) 90-90 Straight Leg Raising Test



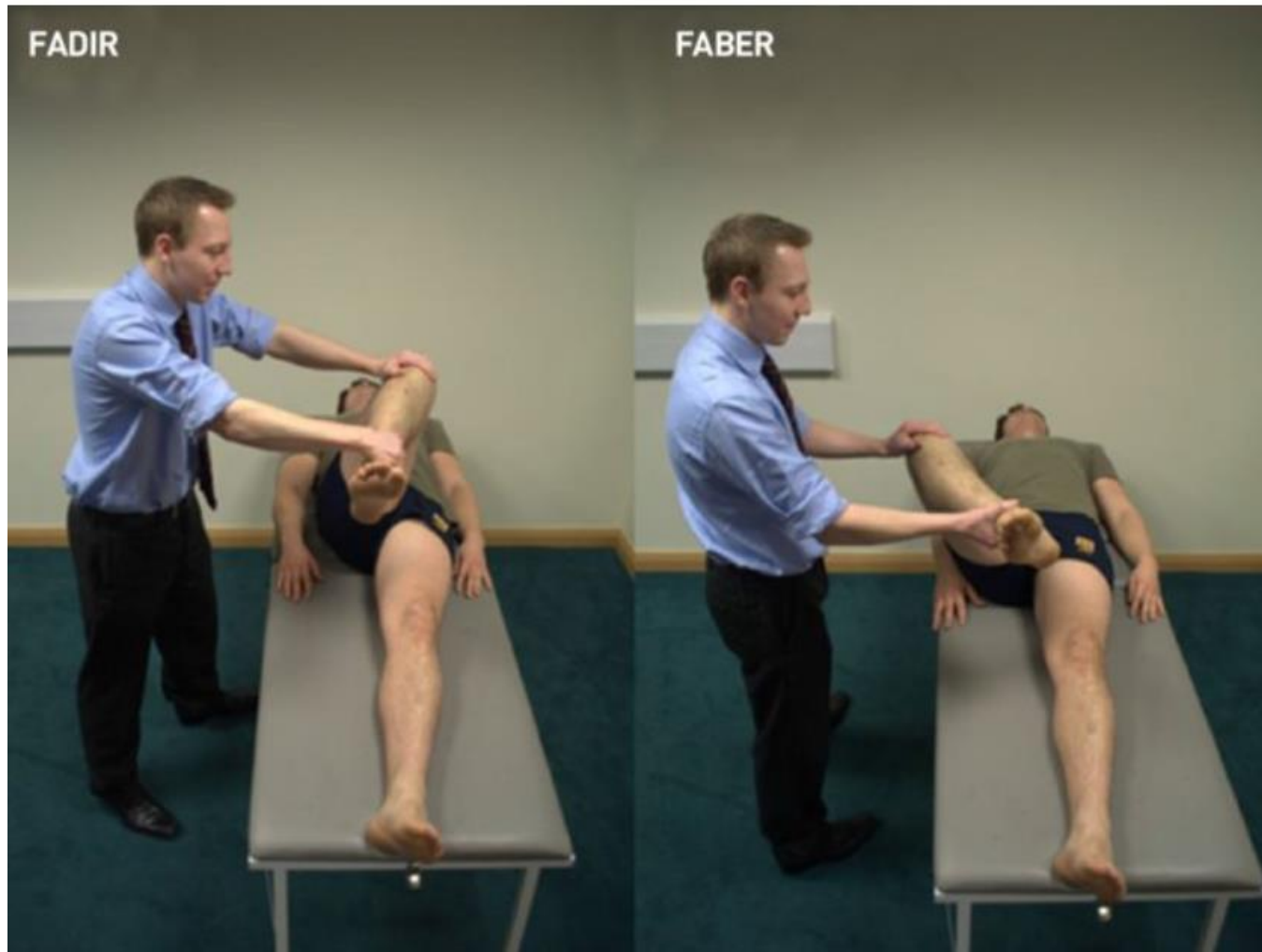
- Normal flexibility in the hamstrings : knee extensor should be within 20° of full extension
- Positive : if the hamstrings are tight, the end feel will be muscle stretch

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

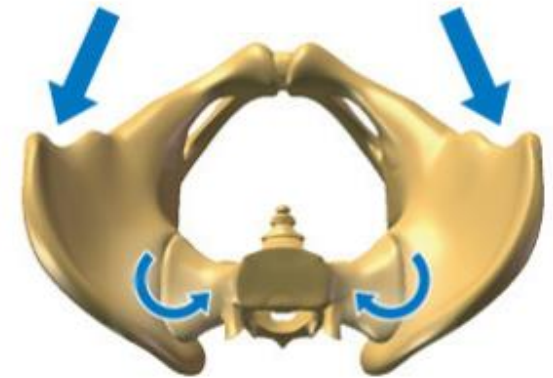
Orthopedic Special tests

- Gaenslens` test



Orthopedic Special tests

- Distraction



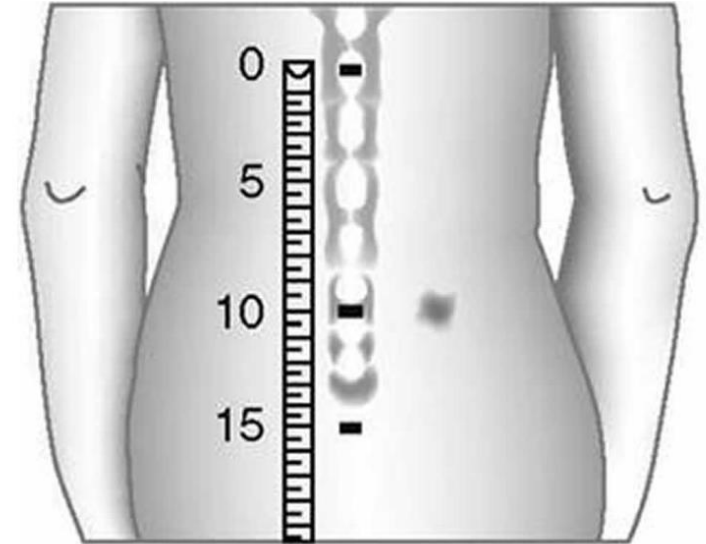
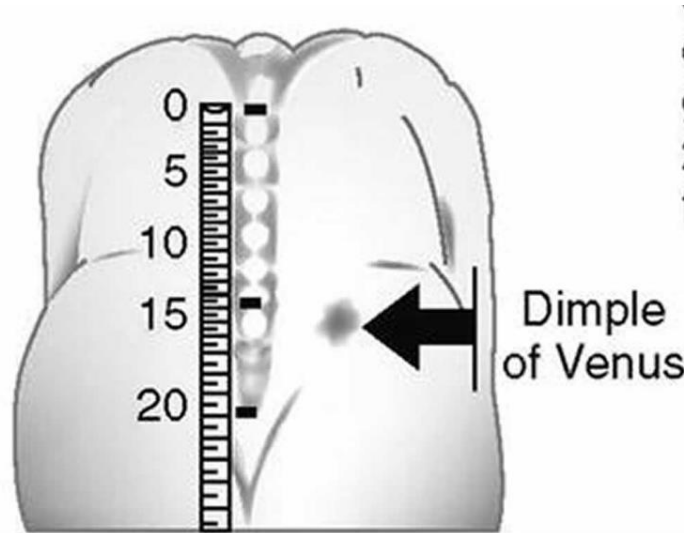
Orthopedic Special tests

- Compression



Orthopedic Special tests

- Schober test



Imaging studies

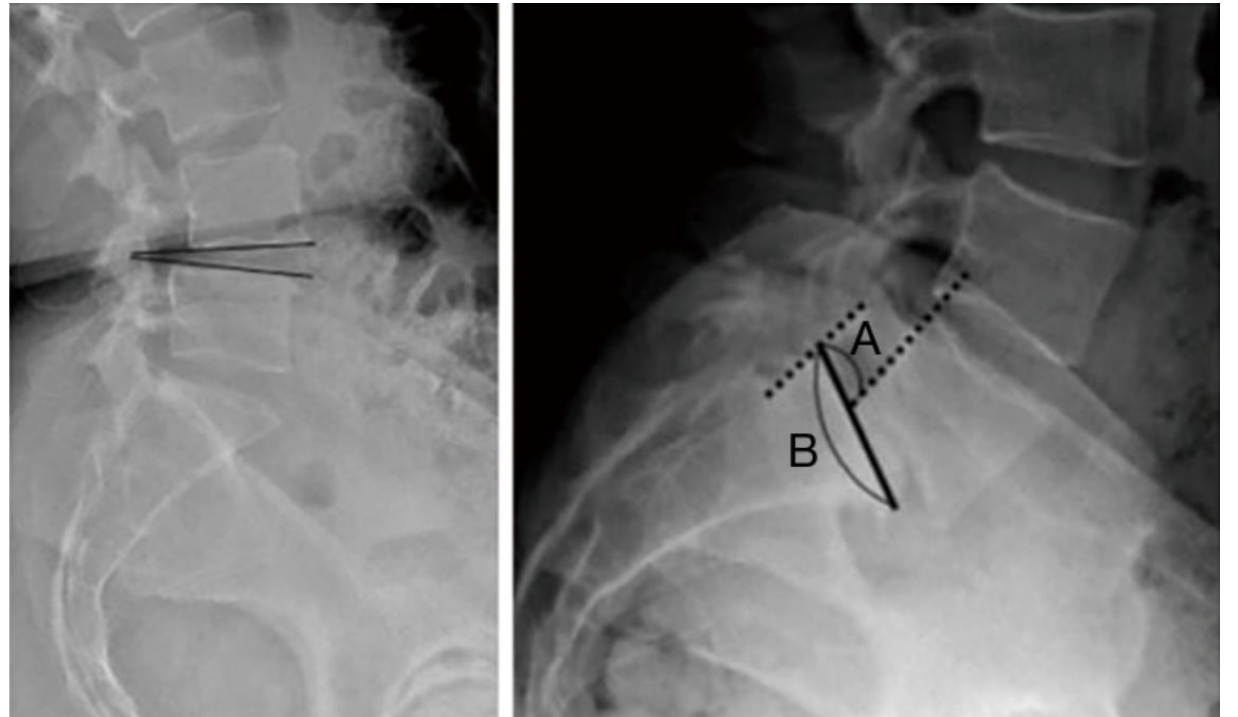
Plain X ray

- 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 $\geq 8^\circ$ or a translation ≥ 3 mm

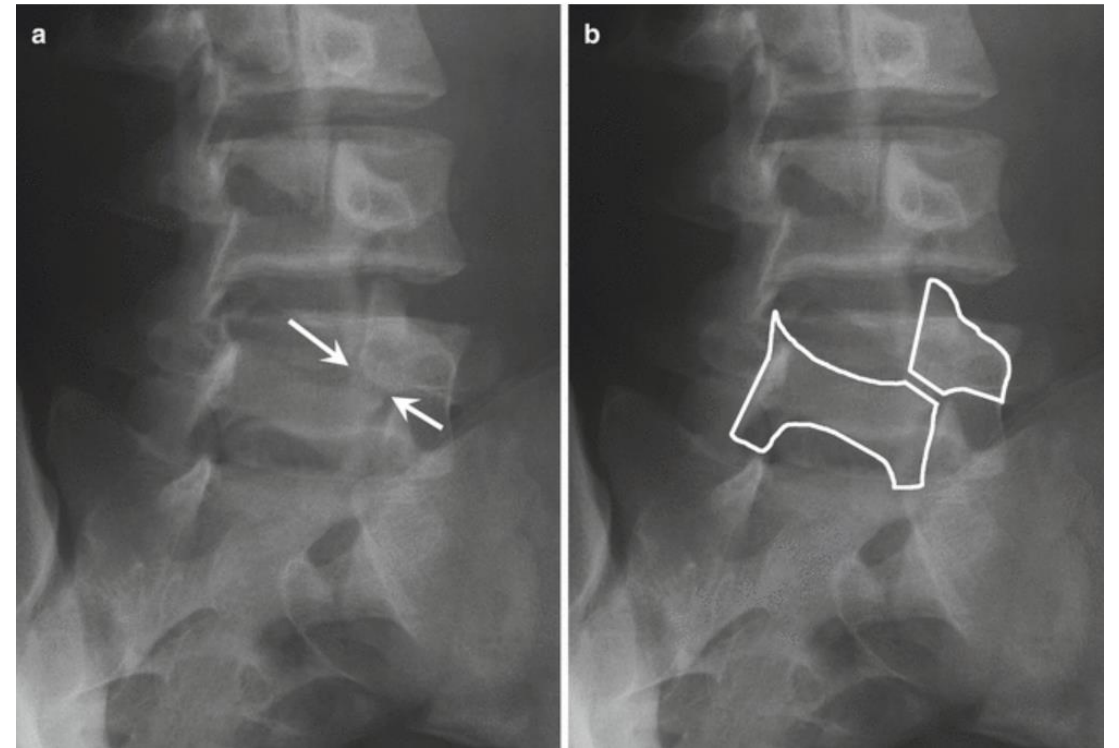


- **Flexion-extension standing radiographs underestimate instability in patients with single-level lumbar spondylolisthesis: comparing flexion-supine imaging may be more appropriate**
- Nathan J. Lee, et al .march 2021
- Comparing standing lateral and flexion X-rays with supine MRIs provides higher sensitivity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

