

Low Back Injury in the Industrial Athlete: An Anatomic Approach

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Epidemiology

- * 60-90% lifetime prevalence

Frymoyer 1988, Walker 2000

- * 50% will have recurrent episode

- * Greater than 5% annual incidence

Svensson 1983, Hoy 2010

Work Related Low Back Injury

- * According to Bureau of Labor Statistics 1 million work related back injures per year
- * 20% of all work related injuries are to the low back
- * Number one cause of loss of work days in the United States

Disability

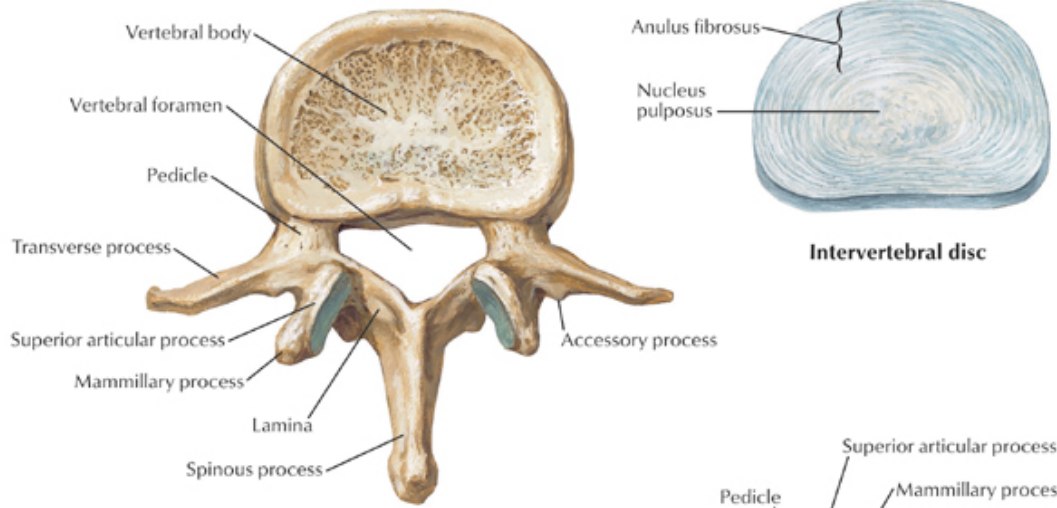
- * #1 cause of disability patients < 45 years old
- * One Third of Work Related disability is due to Low Back Injury

Low Back Injury

- * Low Back Pain is a complaint not a diagnosis
- * The diagnosis of a low back injury should specify the anatomic structure which is the pain generator
- * May be more than one structure injured

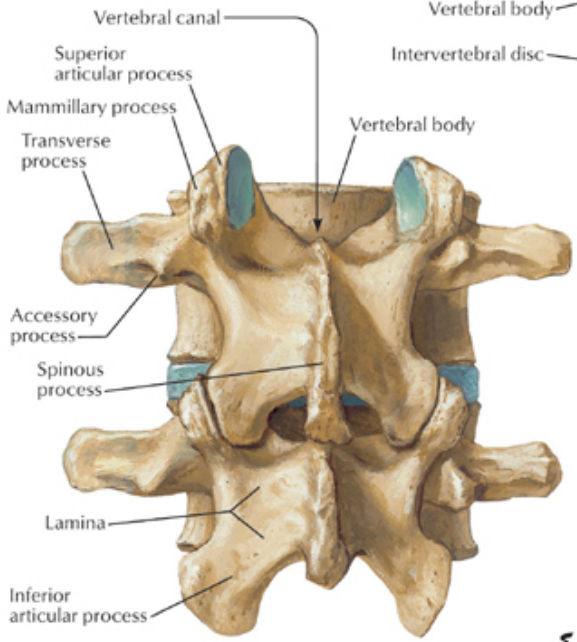
Collaboration

- * Treatment of the Injured Industrial Athlete requires a team approach.
- * Physician for initial diagnosis, pain control, education and work modification
- * Therapist for hands on treatment, education, and feedback to team
- * Nurse Case Manager and Adjustor for facilitation, education and communication.

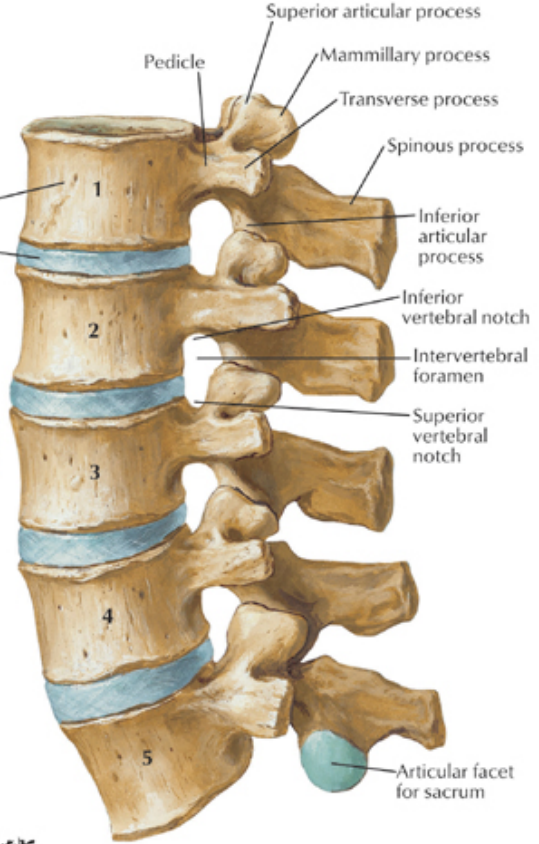


Intervertebral disc

L2 vertebra: superior view



L3 and L4 vertebrae: posterior view



Lumbar vertebrae, assembled: left lateral view

Common Causes of Low Back Pain in the Industrial Athlete

- * Soft Tissues Muscles, Tendons and Ligaments
- * Intervertebral Disc
- * Zygapopophysial Joint
- * Nerve Root
- * Sacroiliac Joint
- * Vertebra body

History

- * Listen to the patient
- * Ask the right questions
 - * When
 - * How
 - * Pain/Numbness/Weakness
 - * Change
 - * Where
 - * Where does the pain radiate
 - * What percentage of the pain is where

Physical Examination

- * Inspect
- * Palpate
- * Joint Range of Motion
 - * What recreates pain
- * Strength
- * Sensation
- * Reflexes
- * Special Tests

Testing

- * Extension of the Physical Examination
- * Imaging
 - * X-Ray
 - * MRI
 - * Bone Scan
- * EMG
- * Diagnostic Injection

Diagnosis

- * The history, physical examination and the testing should agree on the diagnosis
- * Abnormal testing on its own is not enough for a diagnosis
- * The Physical Therapist and the Nurse Case Manager often have information to help with diagnosis

Ligaments

- * Strain/Sprain

- * Injury

 - * Traumatic

 - * Lifting most often

- * Diagnosis

 - * Clinical Suspicion

 - * Physical Examination

 - * Testing

- * Testing

 - * Testing is most often negative

Paravertebral Muscles and Gluteal Muscles

- * Treatment
 - * Physical Therapy and Exercises
 - * Exercises specific for the injured tissue
 - * Heat/Ice/Electricity/Ultrasound
 - * Massage/Myofascial Release/ASTM
- * Pain Control
 - * NSAIDS
 - * Narcotics
 - * Muscle Relaxers

Intervertebral Disc

- * Hydroelastic structure
 - * annulus fibrosus (tough outer)
 - * nucleus pulposus (jelly center)

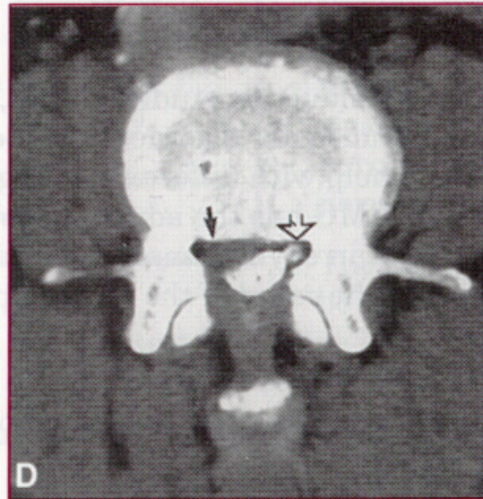
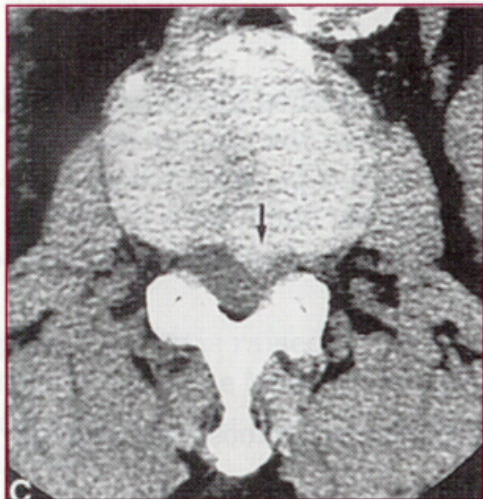


FIGURE 2. A, Normal disc. Note the concave posterior margin of the disc (*arrows*). B, Bulging disc. Image from a CT-myelogram showing the broad-based margin of the bulging disc (*arrows*) pushing on the anterior thecal sac. C, Left posterior disc herniation (*arrow*). D, Right posterior disc herniation. The abnormal soft tissue from the herniated disc is seen in the right lateral recess on this CT-myelogram (*arrow*). Note the normally opacified nerve root sheath on the contralateral side (*open arrow*). E, Herniated discs L4-L5 and L5-S1; the L4-L5 herniation is the larger of the two. There is posterior displacement of the low signal posterior longitudinal ligament (*arrow*). (From Barckhausen RR, Math KR: Lumbar Spine Diseases. In Katz DS, Math KR, Groskin SA (eds): Radiology Secrets. Philadelphia, Hanley & Belfus, 1998, pp 322-335, with permission.)

Intervertebral Disc Injury

- * Injury

- * combination of bending, lifting and twisting

- * Diagnosis

- * Clinical Suspicion
- * Physical Examination
- * Testing

- * Testing

- * MRI Lumbar Spine
- * Looking for Disc Abnormality
- * Not always required

Intervertebral Disc Injury

* Physical Examination

- * Pain increase with Forward Flexion
- * Reduced pain on Extension
- * Minimal Pain to Palpation
- * No significant loss of Strength, Sensation or Reflexes
- * Negative Straight leg raise

Intervertebral Disc Injury

* Treatment

* Pain Control

* Physical Therapy and Exercises

- * Lumbar Extension and Core Stabilization
- * Traction
- * Modalities

* Corticosteroids oral or injection

* Surgery

- * Fusion
- * IDET not commonly used

Intervertebral Disc

* Pearls

- * Pain worse with forward flexion
- * Pain relieved with hyperextension
- * Majority of pain remains in the Low Back

* Bulge

- * Large radius protrusion
- * Rarely pain generator
- * Found with MRI or CT myelogram
- * Look for different pain generator
- * 30 -50% of individuals without back pain will have disc bulges

Mechanical Low Back Pain Injury to Zygapophysial Joint

- * Injury
 - * Hyperextension injury or chronic repetitive use
- * Diagnosis
 - * Clinical Suspicion
 - * Physical Examination
 - * Testing
- * Testing
 - * MRI Lumbar Spine
 - * Lumbar X-rays with Flexion and Extension

Mechanical Low Back Pain Injury to Zygapophysial Joint

* Physical Examination

- * Reproduction of pain with Lumbar Extension
- * Reduced pain with Forward Flexion
- * No significant loss of Strength, Sensation or Reflexes
- * May or may not have tenderness
- * Negative Straight leg raise

Mechanical Low Back Pain Injury to Zygapophysial Joint

* Treatment

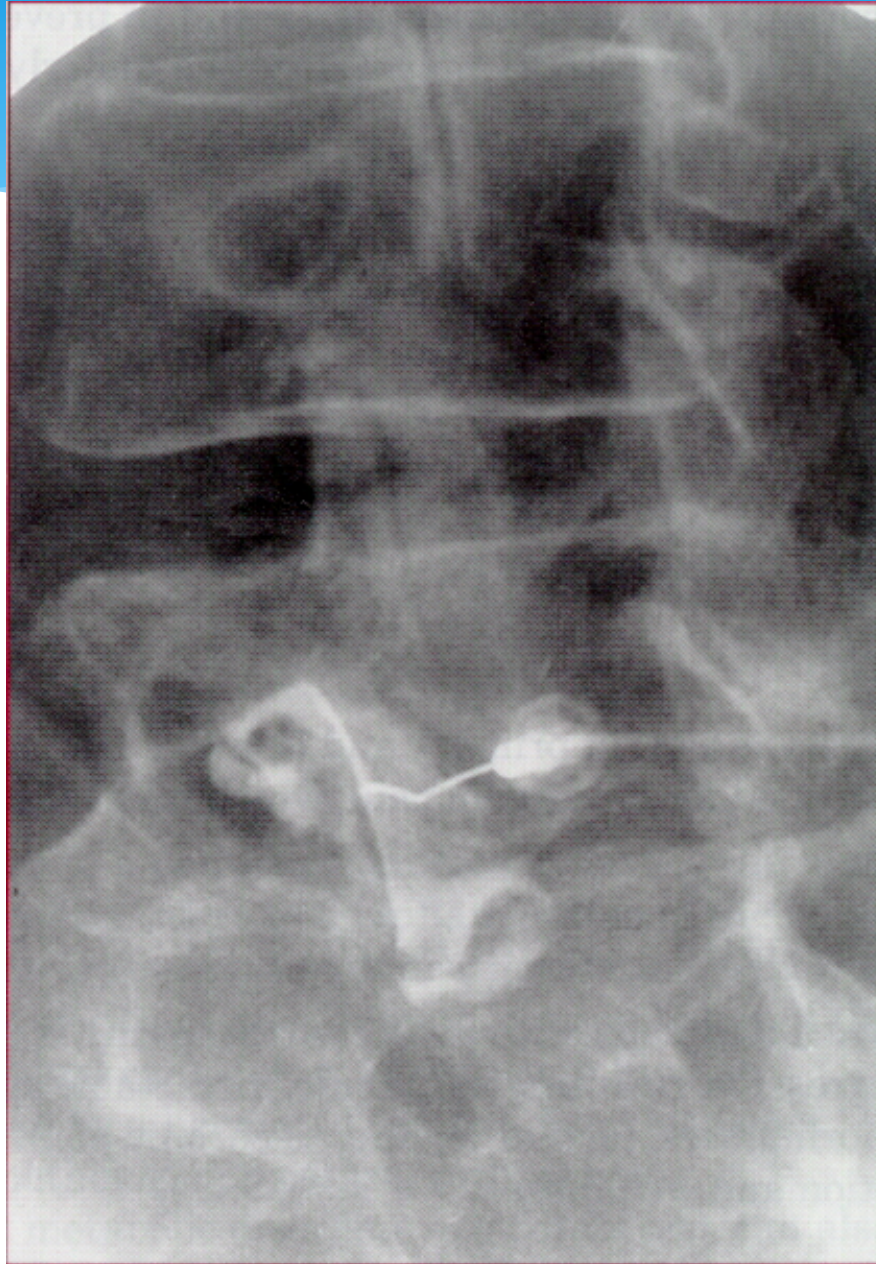
- * Pain Control
- * Physical Therapy and Exercises
 - * Flexion and Core Stabilization
 - * Modalities
 - * Traction
- * Corticosteroids Oral or Zygapophysial Joint injection
- * Surgery not indicated
- * Work Modification

Mechanical Low Back Pain Injury to Zygapophysial Joint

* Pearls

- * Pain worse with Hyperextension
- * Pain improved short term with Forward Flexion
- * Radiation to Buttocks but little to the leg

Z-Joint



Spinal Root Injury Radiculopathy

* Injury

* Nerve Root Impingement

- * Disc displacement
- * Spondylosis
- * Mass

* Chemical Irritation

- * Diabetes or Disc Annular Tear

* Diagnosis

- * Clinical Suspicion
- * Physical Examination
- * Testing

Spinal Root Injury Radiculopathy

* Testing

* MRI of the Lumbar Spine

- * Looking for Impingement

* EMG of the Extremity

- * Looking for Signs of Nerve Cell damage

* CT myelogram rarely required

Spinal Root Injury Radiculopathy

- * Physical Examination
 - * Reproduction of radiating pain depends of the cause of the impingement
 - * Often Gluteal Muscles are tender to Palpation
 - * Straight leg raise may be
 - * May see weakness, reflex and sensory loss in neurologic pattern
 - * Possible Surgical Emergency if Bowel or Bladder dysfunction or significant weakness

Spinal Root Injury Radiculopathy

- * Treatment
 - * Pain Control
 - * Physical Therapy and Exercises
 - * Exercises vary with cause of impingement
 - * Modalities
 - * Traction
 - * Corticosteroids
 - * Oral or Epidural or Selective Nerve Root Injection
 - * Work Modification
 - * Surgery

Spinal Root Injury Radiculopathy

* Causes

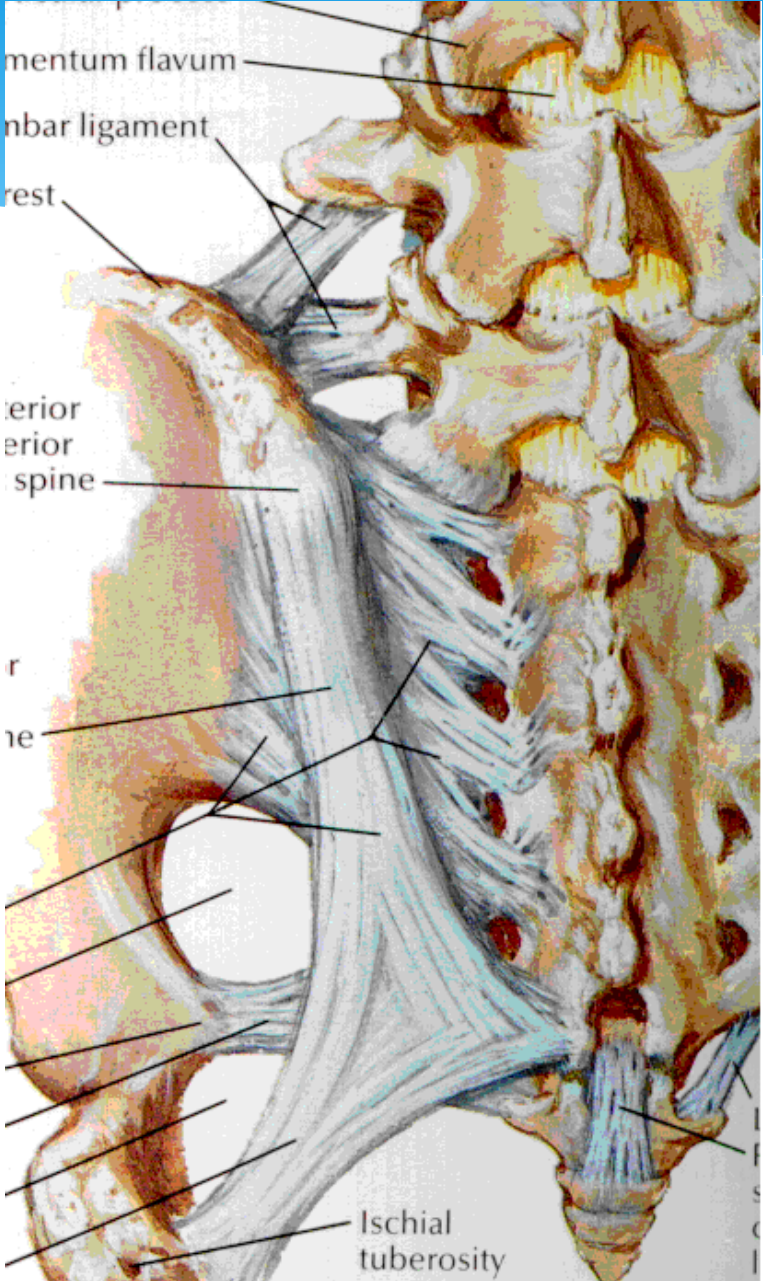
- * Congenital Stenosis
- * Cyst
 - * Dural
 - * Spinal Cord
 - * Z-Joint
- * Infection
- * Intervertebral Disc
- * Tumor
- * Zygapophysial Joint Hypertrophy

Spinal Root Injury Radiculopathy

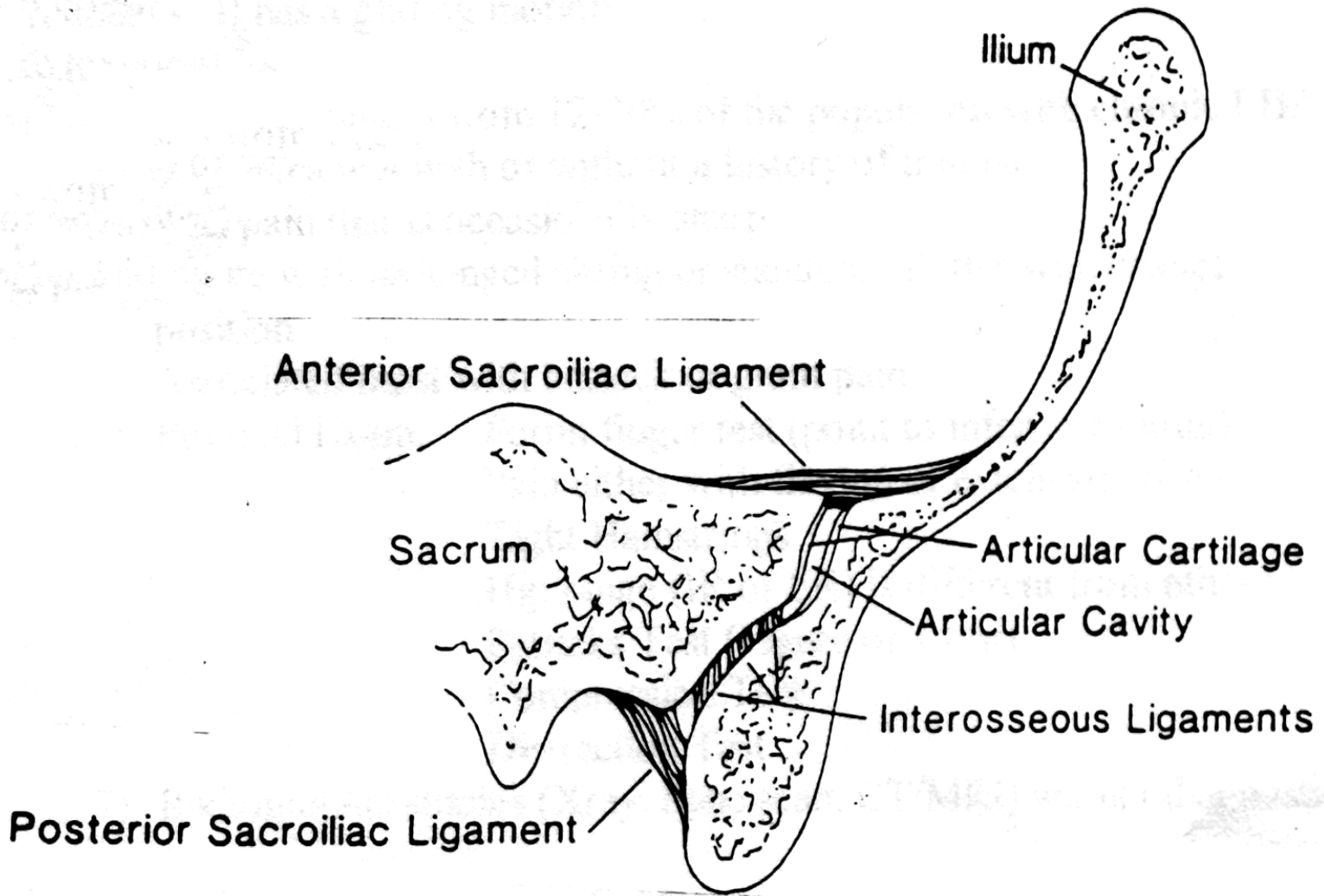
* Pearls

- * Majority of Pain is in the Leg
- * Straight Leg Raise mainly helpful in L5 and S1

SI Joint



SI Joint



Sacroiliac Joint Dysfunction

- * Injury

- * Asymmetric trauma through the pelvis

- * Diagnosis

- * Clinical Suspicion
- * Physical Examination
- * Testing

- * Testing

- * Testing is most often negative

Sacroiliac Joint Dysfunction

* Treatment

* Pain Control

* Physical Therapy and Exercises

- * Exercises vary with cause of impingement
- * Modalities
- * Joint Mobilization
- * Traction

* Corticosteroids

- * Oral or Sacroiliac Joint Injection

* Prolotherapy Injection

* Work Modification

* Surgery

Sacroiliac Joint Dysfunction

* Pearls

- * Pain much greater one side than the other
- * Classically 80% back and 20% leg pain
- * Increased pain with Extension
- * Asymmetric Pelvic Movement on Forward Flexion

Vertebral Compression Fracture

- * Significant axial compression
 - * Falls and Motor Vehicle Accidents
- * Diagnosis
 - * Clinical Suspicion
 - * Physical Examination
 - * Testing
- * Testing
 - * X-Rays often show wedge deformity
 - * Bone Scan or MRI for acuity

Vertebral Compression Fracture

- * Physical Examination
 - * Increased pain with forward flexion
 - * Little pain with extension and palpation
 - * Normal Strength and Reflexes
- * Treatment
 - * Pain control
 - * Forteo injections
 - * Thoracic Extension Brace
 - * Vertebroplasty
 - * Work Modification

Vertebral Compression Fracture

* Pearls

- * Sharp Pain with forward flexion
- * May look similar to disc related pain
- * Often no leg pain

Waddell signs

- * Sign of symptom magnification
 - * Tenderness tests
 - * Simulation tests
 - * Distraction tests
 - * Regional disturbances
 - * Overreaction disturbances

Spinal Cord

- * Traumatic Injury
- * Cyst
- * Impingement by outside mass
- * Neuropathic Process
 - * ALS
 - * Multiple Sclerosis
 - * Ect.

Systemic

- * Rheumatologic
 - * RA
 - * Lupus
 - * Ankylosis Spondylitis
 - * Fibromyalgia

Other

- * Kidney
- * Hip Joint
- * Abdominal Aorta
- * Pelvic
 - * Endomet
 - * Bowel
 - * Bladder
- * Psychogenic
- * Failed Low Back

Conclusions

- * Low Back Injury in the Industrial Athlete
 - * A team approach is most effective in the treatment of an Industrial Athlete with low back injury.
 - * The team must localize the diagnosis.
 - * The team must understand the anatomic tissues of the low back that are most commonly injured in the Industrial Athlete.
 - * The team must treat the patient using specific exercises, modalities, medications, education and when necessary injections.

Questions?