Lower Lumbar Fractures

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Bones and Spine
Lower Lumbar Fractures

- Definition
  - L3-L5
- Incidence
  - 4%
Anatomic Features

- Weight-Bearing Axis
  - T10 – L1
  - L2 is the transition
  - L3 – L5
- Size of Canal
- Cauda equina Vs. conus
- Lumbar Lordosis
Anatomic Features

- Illiolumbar Ligaments
Anatomic Features

- Blood vessels
Anatomic Features

- Shape of lumbar laminae
  - Hook placement
Anatomic Features: Transverse Pedicle Isthmus width

- Increasing width
- L3, L4, L5 all >8mm.

Anatomic Features: Transverse pedicle angles

- Increasing pedicle angles.

Injury Patterns

I. Wedge Compression Fractures.
II. Burst Fractures.
III. Flexion-Distraction Injuries
IV. Shear Injuries
V. Limbus Fractures.
Wedge Compression Fx.

- Sparing of middle column
  - Posterior wall of the body must remain intact
Level of suspicion

- Suspicion for ligamentous disruption with high impact injury.
Burst Fractures

- **Mechanism:**
  - Flexion + Axial loading.

- **Age:**
  - 50% younger than 20 years old.

- **Denis type B**
  - Watch for postsup.
  - Body retropulsion.
Burst Fractures

- Denis Type A
  - Classic burst Fx.
  - Less frequent
Dural tears

- **Burst Fx + Laminar Fx + Neuro. Deficit** = posterior exploration for dural Laceration
  (sensitivity 100% specificity 74%)
- Watch for entrapped neural elements.

Cammisa, Eismont: JBJS 71A, 1989
Flexion-Distraction Injuries

- Associated Injury
  - 50% intra-abdominal
  - 39% other spinal injuries

- Three types
  - Bony (Chance Fx)
  - Ligamentous (facet dislocation)
  - mixed

Bony Chance Fx.
Flexion-Distraction Injuries

- Bilateral Facet Dislocation
- CT shows “empty facet sign”
Flexion-distraction Injury

- Unilateral facet dislocation

- CT- Inf. Facet of L5 anterior to Sup. Facet of S1
Shear Injuries

- Extremely unstable injury of all 3 columns with disruption of ALL.
Shear Injuries

- Watch out for patients with “stiff spine”.
  - DISH
  - AS
Limbus Lumbar Vertebral Fractures

- **Location**
  - Fx between ring apophyses and central cartilage where fusion is incomplete

- **Age**
  - Usually between 18-40

- **Dx.**
  - CT or Myelo-CT

- **Tx.**
  - Surgical excision

Epstein, spine,16(8), 1991
Treatment Options

- **Non-operative:**
  - Bed rest
  - Postural reduction
  - External immobilization by cast or orthosis

- **Operative:**
  1. Posterior reduction, stabilization, fusion.
  2. Post. or transpedicular decomp, stablz., fusion.
  3. Anterior decomp., stablization and fusion.
Nonoperative Treatment

• **Duration of recumbency**
  - Fracture personality (immediate mobilization VS. 3 months bed rest)

• **Type of external immobilization**
  - Poor selection leads to increase in movement at lumbosacral level.
  - Baycast spica most effective in Fx. Below L3.

Fidler, JBJS 65-A, 1983
Indications for Surgery

- **Instability**
  - Severe post. Ligamentous complex disruption
  - Flexion-distraction (ligamentous type)
  - Shear Injuries.
  - Burst with (severe canal/body compromise,laminar Fx)

- **Neurologic Deficit**
  - >50% canal compromise? + neuro. Compromise?

- **Disruption of axial or sagittal spinal alignment**
  - Kyphosis and scoliosis
<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>#pts</th>
<th>Conclusion</th>
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<tr>
<td>1999</td>
<td>Seybold</td>
<td>42</td>
<td>Functional outcome no diff.</td>
</tr>
<tr>
<td>1993</td>
<td>Knight</td>
<td>22</td>
<td>Functional outcome no diff.</td>
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| 1992 | An     | 20   | Avoid long instrument/fusion
-more loss of height/lordosis in non-surg. Group. But no correlation to back pain |
Current Trend

- Neurologically intact with minimal to moderate deformity
  - Nonoperative Treatment

- Neurological deficit or significant deformity
  - Operative Treatment