Thoracolumbar Spine Radiology

Standard Views
- Lateral
- Anteroposterior

Other Views
- Oblique Views

Lateral View

Adequacy
- Thoracic spine
  - The film should ideally visualise the entire thoracic spine
  - The film must visualise the area of the injury
- Lumbar Spine
  - All five lumbar vertebrae
  - Thoracolumbar junction [TLJ]
  - Lumbosacral junction [LSJ]

Bones
- Alignment
  - **Anterior Longitudinal Line**
    - This should form a smooth curve only changing direction at the TLJ & LSJ
  - **Posterior Longitudinal Line**
    - This should form a smooth curve only changing direction at the TLJ & LSJ
  - **Facet Joint Line**
    - This should form a smooth curve only changing direction at the TLJ & LSJ
- Margins
  - The upper thoracic spine is obscured by the overlying ribs, scapulae & soft tissues
  - Check the height and shape of each vertebra
  - The height of the anterior and posterior aspects of the vertebrae should differ by less than 2mm [rectangular shape] except between T11 & L1
  - Loss of more than 50% in height indicates a serious injury
  - Loss of anterior & posterior height relative to adjacent vertebrae indicates an axial compression injury
- Density
  - Look for disruption of the internal trabecular pattern
  - Increased density indicates a compression fracture

Cartilage & Joints
- Intervertebral Discs
  - Similar anterior & posterior height
  - Height increases progressively down the spine [except L5/S1 which is narrower than L4/L5]
  - Hyperflexion injuries cause anterior disc space narrowing
  - Hyperextension injuries cause anterior disc space widening
  - Axial compression narrows the disc space
- **Facet Joints**
  - Disruption only occurs with severe trauma

**Soft Tissues**
- Disruption of the soft tissue shadows may indicate an underlying bony or ligamentous injury

**Anteroposterior View**

**Adequacy**
- Thoracic spine
  - The film should ideally visualise the entire thoracic spine
  - The film must visualise the area of the injury
- Lumbar Spine
  - All five lumbar vertebrae [L5 & upper sacrum are superimposed]
  - Thoracolumbar junction [TLJ]
  - Lumbosacral junction [LSJ]

**Bones**
- Alignment
  - The spinous process should lie in the midline in vertical alignment
  - The superior & inferior surfaces should be in alignment
  - There should be a progressive increase in the interpedicular distance down the spine; widening suggests a compression fracture
- Margins
  - Check for cortical disruption
  - Check for the transverse processes for fractures [may indicate underlying visceral injury]
- Density
  - Check for disruption of the internal trabecular pattern
  - Increased density suggests a compression fracture

**Cartilage & Joints**
- Loss of the intervertebral joint space

**Soft Tissues**
- Soft tissue signs associated with an upper thoracic vertebral fracture may mimic a ruptured thoracic aneurysm:
  - Left apical capping
  - Paravertebral haematoma
  - Mediastinal widening
Examples of Thoracolumbar Spine Injuries

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Injury</th>
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</thead>
<tbody>
<tr>
<td>Hyperflexion</td>
<td>Anterior wedge fracture</td>
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<tr>
<td>Fall from a height; landing on the heels</td>
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<tr>
<td>Blows across the upper back and shoulders</td>
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<tr>
<td>Hyperflexion &amp; Rotation</td>
<td>Lateral wedge fracture</td>
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<tr>
<td>Fall from a height; landing on the heels</td>
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<tr>
<td>Hyperextension</td>
<td>Avulsion fracture of the anterior superior corner of the vertebral body</td>
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<tr>
<td>Shearing</td>
<td>Chance fracture [a horizontal fracture through the body, pedicle &amp; posterior structures]</td>
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<td>RTA with the patient constrained by a lap belt</td>
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<tr>
<td>Axial Compression</td>
<td>Burst fractures</td>
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<tr>
<td>Heavy object landing on the shoulders</td>
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Notes
- Anterior wedge fractures are the commonest injury and may be stable or unstable
- All other injuries should be considered to be unstable until assessed by a specialist and appropriate precautions should be taken to immobilise the spine

Features of an unstable anterior wedge fracture
- The following suggest damage to the posterior ligament complex:
  - Marked wedging
    - > 20 degrees
    - Anterior height < 50% posterior height
  - Avulsion fractures of an adjacent spinous process
  - Wide separation of adjacent spinous processes
- Loss of posterior height when compared with adjacent vertebrae [suggests a burst fracture; fragments of which may encroach the spinal canal]
- Fractures extending to involve:
  - Facet joints
  - Pedicles
- Vertebral shift
  - Unilateral facet joint dislocation & posterior ligament complex rupture [forward shift of less than one-third of the width of a vertebral body]
  - Bilateral facet joint dislocation & posterior ligament complex rupture [forward shift of more than one-third of the width of a vertebral body]