Single level lumbar spine fractures in young patients

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Causes

- Accidents
  - motor vehicle/Sports/industrial/agricultural

- Fall from height person vs object on person

- Gunshot wounds
Goals

- Preserve neurologic function
- Restore/maintain spinal stability
- Both non-surgical and surgical treatment options
Classification - Poor reliability and validity

- **Multiple injury patterns + subtypes**
  - difficult in clinical setting

- **Holdsworth, 1953 (2-column theory)**
  - anterior = VB, disc, ALL, PLL
  - posterior = neural arch, Post lig. complex

- **Ao kappa coefficient (kc) 0.475**

- **Denis**
  - fair to good inter-observer reliability
  - kc 0.606
Prognostic information

good to excellent reliability and validity $kc = 0.724$

Patel and Vaccaro J Am Acad Orthop Surg *Feb 2010*;18: 63-71
Thoracolumbar Injury Classification and Severity Score

**Injury morphology**
- Compression — 1
- Burst +1
- Rotation/translation — 3
- Distraction — 4

**Neurologic status**
- Intact — 0
- Nerve root — 2
- Spinal cord, conus medullaris Incomplete 3
- Complete 2
- Cauda equina — 3

**Posterior ligamentous complex integrity**
- Intact — 0
- Suspected/Indeterminate — 2
- Disrupted — 3

**Nonsurgical<4  Nonsurgical or surgical4  Surgical>4**
TLICS 6=Open reduction+post spinal fusion
TLICS 7 = Combined ant + post decompression and fusion
TLICS 2= Thoraco-lumbar orthosis and ambulated within 24 hours of injury
Non-surgical Tx

- Retrospective review of outcome
- Neurologically intact patients
- Three column lumbar spine burst fractures treated non-op

Shen et al Feb’99 Spine: 15 - Volume 24 - Issue 4 - pp 412-415
Results - Follow up averaged 4.1 years

- 38 patients. Median age 37yrs
  - Denis A-16, Denis B-21, and Denis C-1

- All remained neurologically intact

- Residual Pain - 78%

- Return to work at the same level - 76%

- Kyphosis Pre vs Post-brace 20° vs 24°

- Complications
  - transient urinary retention
Non-operative treatment

Compression # + Stable Burst #
- TLSO or Jewitt extension bracing
- Frequent radiographic follow-up
- Deformities can progress

Advantages
- avoid surgical complications and muscle injury
  $2^0$ to surgery

Disadvantages: post-traumatic kyphosis
Surgery Indications

- TCIS > 4

- Unstable # + neurological deficit
  - Stabilise # + restore neurology for incomplete
  - Nursing care and rehab for complete
Surgical options

- **Posterior fixation**
  - Short Segment +/- fusion
  - Long Segment
  - Relies on intact ALL

- **Decompression**
  - Indirect (distraction and ligamentotaxis)
  - Direct

- **Ant cage +/- plate fixation**

- **Laminectomy alone** - Contraindicated - post-op kyphosis
Posterior Short-Segment Fixation with or without Fusion for Thoracolumbar Burst Fractures

- 5 to 7-Year Prospective Randomized Study

- **No significant difference** in radiographic or clinical outcomes

- operative time and blood loss were significantly less in the non-fusion group

- Illiac donor-site pain

Gunshot Wounds

- Non-op tx-standard
- Steroids not useful
- 10-14 days IV antibiotics for colonic perforations
- No role for debridement
INTRA-CANAL BULLET

- “3-column” injury
- Fractures usually stable
- Decompression
  - better motor recovery than non-op
Complications- All surgical!

- Iatrogenic neurologic deficits - 1%
- Postoperative epidural hematoma
- Damaged vascular or visceral structures
- Infection
- Dural tears
- Pseudarthrosis and hardware failure