Pelvic Ring Injuries: Stability and Reduction Techniques
OTA Residents Comprehensive Fracture Course
Polytrauma, Pelvis and Acetabulum Module

Objectives
- Classification of pelvic ring disruptions
- Surgical indications
- Principles of treatment: open & closed

Classification
- Young-Burgess
  - Based upon mechanism of injury
- Tile
  - Based upon stability of pattern

Young-Burgess
- Anterior-Posterior Compression (APC 1-3)
- Lateral Compression (LC 1-3)
- Vertical Shear (VS)
- Combined Mechanism of Injury (CMI)

APC-1
- Symphysis disrupted (< 2.5cm)
- SI joints not wide
- Floor/ligaments stretched, not torn

APC-2
- Floor ligaments and anterior SI ligaments disrupted
- Posterior SI ligaments intact
- SI joint hinged
  - Not translated
APC-2

Si involvement may be subtle, even on CT

Vertical Shear

APC-3: Complete sacroiliac dissociation

Pelvic Ring Injuries
Vertical shear

Pelvic Ring Injuries

APC-3

LC-1
LC-1

LC-3

LC-2

LC-3

Combined Mechanism Injury

LC-2

VS?

CMI
Tile Classification

- **Type A:** Stable
  - Wing fx
  - APC-1, some LC-1

- **Type B:** Rotationally unstable, vertically stable
  - APC-2, most LC-1, some LC-2

- **Type C:** Rotationally & vertically unstable
  - APC-3, LC-3, VS, some LC-2, "bad" LC-1

Surgical Indications for Pelvic Disruptions

- **Unstable injuries**
  - "Instability" up to interpretation
- **Potential for displacement**
  - >5mm displacement = poor outcome
    - Mullis & Sagi, JOT 2008
  - Some nondisplaced patterns ok for non-op
    - Ex: Low energy LC1

Young-Burgess

- Widely utilized
- Communicates well over phone
- Inter-observer variability
- Doesn’t always correlate with stability
  - LC-1 v. "bad" LC-1

Stress views = good tiebreaker

- IR = Lat Compression
- ER = AP Compression
- Push - Pull

Mullis & Sagi, et al., JOT 2011

Tile

- Good for surgical plan
  - Fix: front, back, front & back
- Doesn’t paint good picture over phone

Is it an APC-1 or an APC-2?

- Neutral
- IR stress
- ER stress
Reduction

• Ounce of ED reduction = lbs of OR reduction
• Sheet
• Skeletal traction (30-40 lbs)
• Indirect OR reduction: traction, traction table, exfix
• If displaced for a few days, open reduction may be necessary

What do you fix?

• Rotationally unstable: Fix the front or the back
• Rotationally & Vertically: Front & Back
• Plenty of exceptions
• No consensus on APC-2s

Open Reduction: Anterior Ring

• Pfannenstiel v. midline split
• Tenaculum v. screw clamp
• Fix w/ plate, occ. Exfix, ?? Ramus screws

Summary

• Young-Burgess: better for describing
• Tile: better for surgical planning
• Important to reduce gross displacement early
• Closed and open approaches to reduction/fixation
• Surgical indications uncertain
  • Fix unstable/displaced fxs

Open Reduction: Posterior Ring

• Supine: Lateral window
• Prone: Posterior approach
• Fix w/ IS screws, rarely plates