



Operative tx of Pelvic Fx w/ Notes w/ [Dr. Chip Routt](#)

Historical Background

- 1970's- pelvic ring disruptions tx w/ skeletal traction + pelvic slings
- Anterior based Ex-fixes
- Plate fixation
- Recent - percutaneous screw fixation, internal fixators

Pelvic fixation principles

- Posterior injury is regarded as more critical
- If the posterior ring is completely unstable. Anterior fixation can't maintain posterior reduction.
- If VS type w/ displacement, anterior fixation should be done too to supplement

Anterior ring ORIF

- APC injuries
- Consider open contaminated laparotomy incision/bladder rupture, women + childbearing age
- Consider women and childbearing age
- Ex fix vs internal fixation-
 - Internal fix - better at controlling and resting vertical displacement
- Closed reduction techniques
 - IR and taping the lower extremities
 - Sheet around GT
- Surgical approach
 - Pfannensteil incision
 - Formal stoppa if more lateral exposure needed
 - Ligate corona mortis - (external iliac + obturator vessels)
- Open reduction:
 - Farabeuf clamps/weber clamps
- Implant:
 - Two hole plates- higher rate of failure and pelvic malunion
 - Small fragment symphyseal plate - 2 or 3 fixation points on either side

- 3.5 or 4.5mm contoured pelvic recon plate

Posterior ring ORIF

- Open reduction SI needed? Prone?
- Posterior approach
 - Midline incision- elevate paraspinal muscles subperiosteally from sacrum to + PIIS and PSIS
- Anterior approach
 - Incision 1-2cm posterior to ASIS towards iliac crest. (The prox portion of smith Peterson iliofemoral approach or lateral window of ilioinguinal approach)-
 - TFL and gluteus interval
 - Bone wax/ thrombin soaked laps- helps control bleeding

Pelvic fixation pathways

- Corticated bony cylinders of different dimensions and orientations that accommodate intraosseous implants

Anterior Ring

Superior ramus

- Arched structure- single point on concavity of the arch that is the cortical limit for any drill or screw
- Cranial anterior screw- could be extraosseous but appear contained
- Safest region for insertion- cranial-posterior zone
 - External iliac vessels- superiorly
 - Acetabulum inferiorly
 - Bladder+corona mortis- inward
- Imaging
 - Onlet + obturator oblique outlet
 - Inlet: retrograde screw insertion is at pubic tubercle zone (depends on screw length/aim)
 - COOO- superior pubic ramus cranial cortical edge and acetabular dome have the maximum distance between them
 - COOO- starting point for an antegrade screw on this view is 1 cm to 2 cm cranial to the acetabulum on the gluteus medius pillar
- B/l ramus fracture- anterograde + retrograde screw on oppising sides- improves efficiency
- Implants: 4.5-mm cortical (lag fashion) or 6.5/7.3-mm cannulated. +/- washer if osteopenic

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Inferior ramus

- OFP - from the symphysis pubis to the ischial tuberosity.
 - Thicker medially
 - Medially directed implants more easily kept intraosseous
 - Full pathway length less frequently accessible
- Imaging: hyper-inlet, +10-20 deg inlet

- Anterograde/retrograde
- Transsymphyseal screws through plate- if poor bone quality, fracture comminution, or fracture fixation revision situations

Mid-Pelvis

AllS to posterior ilium

- AllS>posterior ilium above greater sciatic notch
- Borders- inner/outer iliac cortical tables, the acetabulum, the greater sciatic notch, and the sacroiliac joint (SIJ)
- Imaging
 - COOO, obturator oblique inlet, and iliac oblique views
 - Obturator oblique-inlet view is used to guide the implant
- Used for ex-fix pins
 - Cranial starting point if anticipating prolonged pelvic ex fix
- Percutaneous, open antegrade or retrograde screws can inserted for: crescent/ iliac wing fractures

Iliac crest

- Anterior iliac crest OFP- ASIS to midcrest
- Posterior iliac crest OFP (narrow)- remaining posterior crest
- Imaging
 - OOV- defines inner/outer tables
 - IO view- implant length and cranialcaudal trajectory
- Uses: isolated iliac wing/crest fractures
- Implant: 3.5-mm or 4.5-mm cortical screws
- Open technique- avoid LFCN injury

Posterior Ring

Sacroiliac

- Posterolateral ilium- across SIJ- upper sacral vertebral body
- Recognize sacral dysmorphism !
- Imaging:
 - PI, PO, LS
 - Inlet- superimpose upper sacral vertebral bodies
 - Outlet- cranial symphysis superimposed on cranial aspect of second sacral vertebral body
 - Lateral- pelvic deformity reduction: Iliac cortical densities + GS notches aligned

Sacral

- OFP extends transiliac and trans-sacral
- B/l underrotated OOV- confirm screw head is seated + screw length on contralateral ilium
- Uses: bilateral SIJ injuries, select fx dislocations of SIJ
- Implant: 7mm cancellous cannulated screw
 - Accommodates 2 in upper sacral segment
 - In nondysmorphic second sacral segment- smaller safer zone- one 7mm screw

Sources:

Bishop, J. A., & Routt Jr, M. L. C. (2012). Osseous fixation pathways in pelvic and acetabular fracture surgery: osteology, radiology, and clinical applications. *Journal of Trauma and Acute Care Surgery*, 72(6), 1502-1509.

Rockwood and Green's Fractures in Adults- Pelvic Fractures