

## Low Complication Rates Associated with Open Anterior Approach to the Posterior Pelvic Ring

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**Background/Purpose:** Pelvic ring injuries often result from high-energy trauma, and many require operative stabilization. Fixation of the posterior pelvic ring is vital in restoring normal pelvic stability. While percutaneous techniques for posterior pelvic ring stabilization are safe and effective, anatomic reduction cannot always be attained. Theoretical concerns of the open anterior approach to the posterior pelvic ring include blood loss, wound complications, iatrogenic nerve injury, prolonged operative time, and lack of familiarity to surgeons without training in orthopaedic trauma. The purpose of this study was to investigate the perioperative complications associated with the open anterior approach to the posterior pelvic ring and to assess the effectiveness of this technique for obtaining reduction.

**Methods:** Over a 10-year period at a Level I trauma center, we identified all adult patients who underwent open reduction of a posterior pelvic ring fracture or dislocation via the lateral window of the ilioinguinal approach. We excluded patients who required the full ilioinguinal exposure. Charts were reviewed to record demographics, fracture classification, associated injuries, perioperative hematocrit, blood loss, operative time, and complications including wound complications, iatrogenic nerve injury, oblique abdominal muscle hernia, flank pain, DVT (deep vein thrombosis), and PE (pulmonary embolism). Reduction of the fracture/dislocation was assessed with postoperative pelvic CT. Reduction was considered anatomic if there was <2 mm of fracture displacement or if the sacroiliac (SI) joint was reduced to within 2 mm of the uninjured side.

**Results:** We identified 48 patients who underwent 50 open anterior approaches to the posterior pelvic ring (two bilateral). Average age was 36.9 years. Fracture patterns according to the OTA and Young-Burgess classification systems are displayed in Tables 1 and 2, respectively. Additional orthopaedic procedures were performed under the same anesthetic setting in 32 cases. For the 18 patients who underwent an isolated lateral window approach, average blood loss was 520.5 mL, and average operative time was 176 minutes (Table 3). Of the 42 patients with injuries involving the SI joint, postoperative CT scan was performed in 35 (Fig. 1), and reduction was anatomic in 28 cases (80%). Average residual displacement in the remaining seven cases was 5.1 mm (Table 4). There were 8 complications for an overall complication rate of 16%. Two cases of wound complications were managed with local wound care, and three nerve injuries recovered spontaneously. Three patients had flank pain. There were no cases of oblique muscle hernia, DVT, or PE.

**Conclusion:** The open anterior approach to the posterior pelvic ring is effective for obtain-

ing reduction in a variety of injury patterns and is associated with a very low complication rate. When anatomic reduction of fractures or dislocations of the posterior pelvic ring is not possible using percutaneous means, surgeons should not hesitate to perform an open reduction prior to performing posterior pelvic ring fixation.

Table 1. OTA Fracture Classification

OTA (N=50)	
61-A2	16 %
61-B1	4 %
61-B2	30 %
61-B3	18 %
61-C1	14 %
61-C2	16 %
61-C3	2 %

Table 2. Young-Burgess Classification

Young-Burgess (N=50)	
LC-2	34 %
LC-3	8 %
APC-2	10 %
APC-3	16 %
VS	12 %
CM	4 %
Iliac Wing	16 %

LC = lateral compression, APC = anterior-posterior compression, VS = vertical shear, CM = combined mechanism.

Table 3. Perioperative Characteristics

PERIOPERATIVE CHARACTERISTICS (N=18)		
	Avg.	Range
Pre-Op Hct (%)	29.4	21 – 38
Post-Op Hct (%)	29.3	21 – 35
Change in Hct	-0.1	
EBL (ml)	521	200 – 1000
Op Time (hh:mm)	2:56	1:29 – 7:58

EBL = estimated blood loss

Table 4. Quality of Reduction

QUALITY OF REDUCTION (N=42)	
True Pelvic Ring Injuries (N=42)	N
No CT Scan	7 (16.7%)
CT Scan Performed	35 (83.3%)
<ul style="list-style-type: none"> <li>• Anatomic</li> <li>• Displacement &gt; 2mm*</li> <li>• *Avg Displacement: 5.1mm (range 3-7mm)</li> </ul>	28 (80%) 7 (20%)

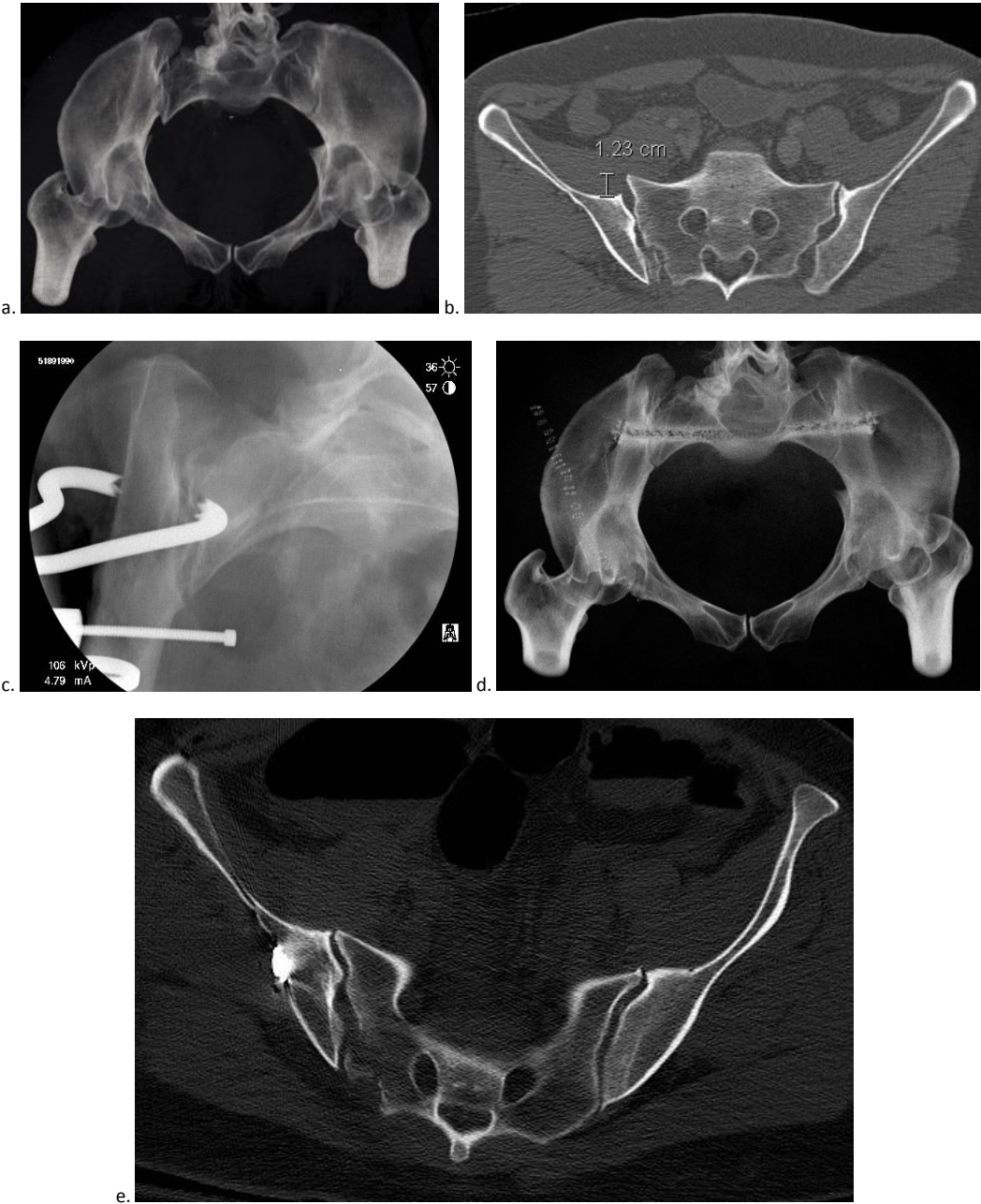
Table 5. Complications

COMPLICATIONS (N=50)	
	Total
<b>Wound Complication</b>	2 (4%)
<ul style="list-style-type: none"> <li>• Drainage</li> <li>• Dehiscence</li> </ul>	1 (2%) 1 (2%)
<b>Nerve Injury</b>	3 (6%)
<ul style="list-style-type: none"> <li>• LFCN</li> <li>• L5 Nerve Root</li> </ul>	2 (4%) 1 (2%)
<b>Flank Pain</b>	3 (6%)
<b>Failure of Oblique Muscle Repair</b>	0 (0%)
<b>DVT</b>	0 (0%)
<b>PE</b>	0 (0%)
<b>Total Complications</b>	8 (16%)

LFCN = lateral femoral cutaneous nerve, DVT = deep vein thrombosis, PE = pulmonary embolism

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.

Figure 1. Pre-operative volume-rendered inlet view (a) showing a complete right sacroiliac (SI) joint dislocation. Pre-operative CT (b) demonstrates 1.2cm of posterior displacement at the right SI joint. Intra-operative fluoroscopic image showing open reduction and clamping of the Right SI joint (c), after which percutaneous iliosacral fixation was performed. Anatomic reduction of the posterior pelvic ring, as judged on post-operative inlet view (d) and CT-scan (e), was achieved.



POSTER ABSTRACTS