

Posterior Fixation in APC-2 Pelvic Ring Injuries Decreases the Rates of Anterior Plate Failure and Malunion

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Purpose: Biomechanical studies report that augmenting anterior pelvic ring fixation with posterior fixation significantly increases stability. While clinical studies assess radiographic outcomes following plate fixation of the anterior pelvis, no studies have purely compared the radiographic and clinical outcomes of a partially disrupted hemipelvis (intact posterior sacroiliac ligaments) treated with either anterior plate fixation alone versus anterior fixation with percutaneous posterior iliosacral screw fixation. Our aim was to determine whether anterior fixation alone is adequate to control sagittal and coronal plane rotation and prevent malunion in pelvic ring injuries with anterior sacroiliac widening.

Methods: A retrospective review of all skeletally mature patients with a traumatic pelvic disruption treated from 2004 to 2014 with anterior symphyseal plating with or without a posterior iliosacral screw was completed. Inclusion criteria included type-2 anteroposterior compression (APC-2) pelvic ring injury with CT evidence of symphyseal disruption and isolated anterior widening of one sacroiliac joint. Patients with fractures of the acetabulum, pubic rami, or sacrum were excluded, as were those with bilateral injuries. Patients were then divided into two groups: those that only underwent plating of the symphysis with a 3.5-mm 6-hole plate versus those that also had placement of a percutaneous partially threaded 7.0-mm or 7.3-mm iliosacral screw. Patients were followed for a minimum of 6 months or to failure of fixation. Examined data points included age, anterior symphyseal diastasis as measured on CT, duration of follow-up, time to fixation failure (failure defined as any change in anterior fixation visible on follow-up radiographs), type of fixation failure, and presence of malunion. Malunion was defined as >5 mm of either rotational or translational displacement of the hemipelvis and pubic symphysis in a nonanatomic position. Statistical analysis was completed using Pearson uncorrected chi-square test. $P < 0.05$ was considered statistically significant.

Results: Complete documentation (chart and radiographic) was available on 140 patients. 96 patients underwent combined anterior and posterior fixation, and 44 patients had anterior plate fixation alone. Average age and length of follow-up was 38 years and 7.2 months, respectively. Anterior plate fixation failure occurred in 5 patients (7.3%) in the combined fixation group and in 17 patients (38.6%) in the anterior-only group ($P < 0.0001$). Malunion was identified in one patient (1.0%) in the combined treatment group and in 15 patients (34.1%) in the anterior-only cohort ($P < 0.0001$).

Conclusion: APC-2 pelvic ring injuries treated with anterior plating and supplemental posterior screw fixation have significantly less anterior hardware failure and malunion than those treated with anterior plating alone.