

Modified Triangular Osteosynthesis Technique Utilizing S1 Pedicle Screws for Spinopelvic Dissociation U- and H-Type Sacral Fractures with Kyphotic Deformity

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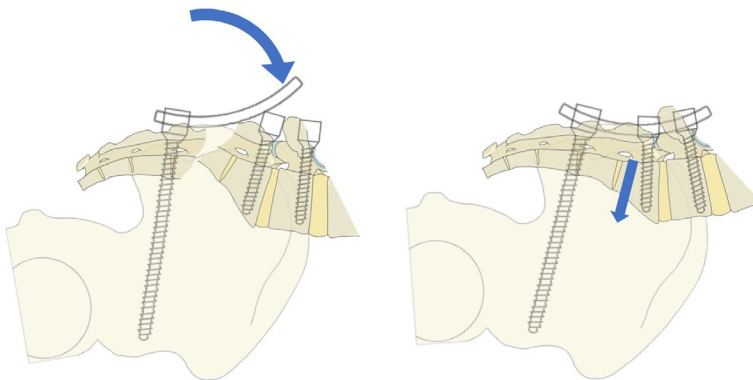
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Purpose: Our objective was to describe a novel modified triangular osteosynthesis (TOS) construct and reduction technique for spinopelvic dissociation (SPD) U-/H-type sacral fractures and to report radiographic and clinical outcomes.

Methods: A retrospective chart review of SPD cases from 2014 to 2018 was performed. All patients had preoperative and postoperative CT scans. Imaging outcomes included fracture union, sacral kyphosis, and analysis of multiplanar fracture reduction using sacral CT reconstructions. Clinical outcomes were recorded. The L5 and S1 pedicles are instrumented with pedicle screws and iliac bolts are placed. By remaining low in the posterior ilium to the anterior inferior iliac spine osseous fixation pathway (OFP), the S1 pathway for iliosacral/transsacral screws remains unobstructed. The titanium rods are contoured into hyperlordosis to facilitate fracture reduction and restoration of lumbosacral lordosis. Bilateral S1 screws allow direct fracture manipulation and reduction and act as the critical hinge for movement of the upper sacral segment relative to the ilium to correct both translation and kyphosis (Fig. 1). Reduction of the kyphotic deformity restores the central portion of the S1 OFP for iliosacral/transsacral screw placement.

Results: 20 patients, average age 37.6 years (range, 20-71), with SPD injuries were identified and all underwent TOS fixation with S1 pedicle screws. Average follow-up was 1 year, and all fractures went on to radiographic union at an average of 55.5 days (range, 25-113). Axial, sagittal, and coronal plane fracture displacement improved on average from 17.2 mm to 4.7 mm ($P<0.01$), 12.4 mm to 3.2 mm ($P<0.01$), and 10.3 mm to 2.5 mm ($P<0.01$), respectively. Kyphotic displacement improved from 24.7° to 14.3° ($P<0.01$). The average neurologic Gibbons score improved significantly from 2.7 preoperative to 1.7 postoperative ($P<0.01$).

Conclusion: The use of S1 pedicle screws in TOS for reduction and fixation of SPD injuries is safe and effective. Reductions were on average near anatomic and improved clinical outcomes were noted.



See the meeting app for complete listing of authors' disclosure information. Schedule and presenters subject to change.

TECHNICAL TRICKS AND TIPS