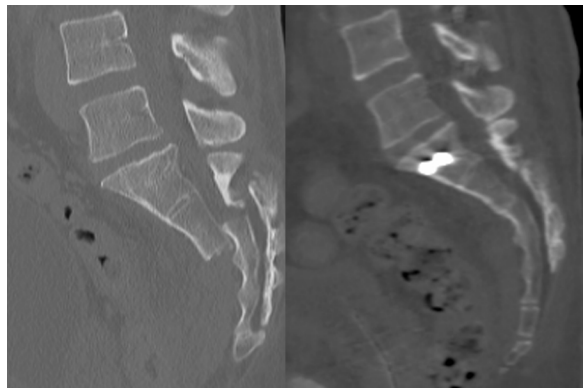


Percutaneous Lumbopelvic Fixation for Sacral Fractures with Spinopelvic Dissociation*Stephen Quinnan, MD¹; Seth Williams, MD²;*¹*University of Miami, Jackson Memorial Hospital, Miami, Florida, USA;*²*University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin, USA*

Background/Purpose: Sacral fractures with spinopelvic dissociation patterns are highly unstable injuries. Reestablishing the anatomic relationship of the pelvis to the axial spine and achieving mechanical stability, while preserving neurologic function, are the main treatment goals. Lumbopelvic fixation is typically performed through a single posterior extensile midline incision from L4 to the pelvis. Surgery can be lengthy with major blood loss, and associated with wound complications. In an effort to minimize the morbidity of surgery while achieving stable fixation, we developed a percutaneous lumbopelvic fixation technique. The purpose of this study is to determine the outcomes and complications of percutaneous lumbopelvic fixation in the treatment of highly unstable sacral fractures with spinopelvic dissociation patterns.

Methods: Between March 2008 and August 2014, 15 consecutive patients with bilateral vertical sacral fractures and a transverse fracture (U or H-type pattern) resulting in spinopelvic dissociation were treated with percutaneous lumbopelvic fixation using lumbar L4 and L5 pedicle screws connected to iliac screws with rods. No open surgeries for this injury pattern were performed during this time. Surgery was performed through separate paired parasagittal incisions under fluoroscopic guidance. Data were collected prospectively including blood loss, fluoroscopy time, screw accuracy, wound complications, neurologic status including bowel and bladder function, instrumentation failure, fracture healing, and patient functional status using established outcomes questionnaires.

Results: Clinical follow-up in 13 patients who had surgery more than 1 year prior to this report averaged 709 days and radiographic follow-up averaged 520 days. Across all 15 patients surgical duration averaged 2 hours 21 minutes and blood loss averaged 192 mL, and there was 1 deep wound infection. Postoperative CT scans included 94 screws and showed an intraosseous screw accuracy rate of 98%, with 2 screws revealed to have minor cortical breaches that were inconsequential. Fracture reductions were attempted in 5 patients and achieved in 3, including anatomic reduction of a completely displaced and shortened fracture (traumatic spondyloptosis) as shown in Figure 1. Patients stood on average 8 days after surgery. All fractures healed. One patient had not regained normal bladder function when he was lost to follow-up at 135 days, but he also had a severe lumbar spine injury. One patient developed postoperative weakness in bilateral tibialis anterior muscle groups that could not be explained on CT or MRI.



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.

This most likely represented a stretch neurapraxia, and there was full neurologic recovery. No other patients developed neurogenic bladder dysfunction as a result of their injury. There were no instances of screw loosening or instrumentation failure. At the time of this report, instrumentation was electively removed in 5 patients without complication. The Short Form Health Survey SF-12v2 average Physical Component Summary score was 43 with a range of 26-51 (population average is 50) and the Mental Component Summary score was 54 with a range of 46-62 (population average is 50). The average Oswestry Disability Index score was 17% with a range of 0%-44% (0%-20% indicates minimal disability, 20%-40% indicates moderate disability, and 40%-60% indicates severe disability).

Conclusion: Sacral fractures with spinopelvic dissociation patterns are severe injuries. This is the first reported series of patients treated with a percutaneous technique. Percutaneous lumbopelvic instrumentation can be performed safely with limited blood loss and within a reasonable surgical duration, theoretically minimizing the physiological burden of surgery in these severely injured patients. Patients can be mobilized immediately without restriction. The known problem of wound complications with these types of injuries, however, is not fully solved. Fracture manipulation can be performed as evidenced by anatomic reduction in a case of traumatic spondyloptosis, but further technique refinement is necessary in order to reliably and safely reduce these fractures. Percutaneous lumbopelvic fixation is a safe and effective option for stabilization of highly unstable sacral fracture patterns with associated spinopelvic dissociation.