

## Unilateral Sacral Fractures Demonstrate Slow Recovery of PROMs Irrespective of Treatment

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**Purpose:** There is relatively little information about the recovery curve for patients who sustain unilateral sacral fractures. We sought to prospectively evaluate the patient-reported outcome measures (PROMs) and recovery curve of patients with unilateral sacral fractures. The secondary purpose was to compare operative with nonoperative treatment for those with minimal displacement in whom both operative and nonoperative management have been proposed.

**Methods:** A consortium of 16 Level-I trauma centers prospectively enrolled adult (18-80 years) patients with unilateral sacral fractures into an observational study. Exclusion criteria were APC (anterior posterior compression) injury, symphyseal dislocation, zone 3 sacral fracture, inability to complete 2-year follow-up, incarceration, displaced acetabulum fracture, or inability to ambulate prior to injury. Treatment was decided by the treating surgeon. Radiographic assessments were made using a standard measurement technique that included translational and rotational displacements as well as description of the bony injuries on AP, inlet, and outlet films and CT scans (preoperative only). Patient-reported outcome was the Short Musculoskeletal Function Assessment (SMFA) at baseline (preinjury surrogate) and at 3, 6, 12, and 24 months (mo). Fractures with  $\leq 5$  mm of translational displacement of the sacrum in all views were considered minimally displaced (MD) and all others were considered displaced (D).

**Results:** 333 patients (45% male, 55% female) aged 40 years (range, 18-80) with unilateral sacral fractures agreed to be studied. The average ISS was 15. 2-year follow-up was available on 123 patients (64 MD, 59 D). For the population as a whole, the highest SFMA dysfunction scores were seen at 3 mo (MD = 28, D = 27). At 1 and 2 years the results were MD = 20 and 17, and D = 13 and 12. Patient-reported scores showed the greatest improvement over the first 6 mo and then improved on average  $<4$  additional points over the next 18 mo. For patients with MD fractures, the SFMA and pain scores at 1 and 2 years for those treated operatively versus nonoperatively were 24.1 versus 18.7 ( $P = 0.88$ ) and 17.2 versus 16.7 ( $P = 0.98$ ). Regardless of displacement or whether surgery was performed, outcomes were similar at all time points.

**Conclusion:** This prospective observational study demonstrated that patients with unilateral sacral fractures have impairment even at 1 and 2 years after injury. 1-year results compare similarly to those of talar neck and Lisfranc injuries, and 2-year results are similar for surgically treated tibia plateau and distal tibia fractures. Patients showed the greatest dysfunction at 3 mo with substantial improvement at 6 mo followed by only small improvements after that. In the MD group in which both operative and nonoperative management are supported, there were no differences in the functional outcomes at 3, 6, 12, or 24 mo. Unilateral sacral fractures result in dysfunction for at least 2 years and patients should be counseled appropriately. Surgery did not demonstrate an advantage in minimally displaced fractures; however, surgery for displaced fractures resulted in similar outcomes to undisplaced fractures.

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