

The Risk Factors of Neurologic Deficit After Fixation of Zone 2 Sacral Fractures

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Purpose: Zone 2 sacral fractures account for 34% of sacral fractures with reported neurologic deficit in 28% of the patients. The purpose of this study was to examine the risk factors for neurologic injury in zone 2 sacral fractures.

Methods: A retrospective review of consecutive patients admitted to a Level I trauma center with zone 2 sacral fractures requiring surgery from September 2010 to September 2014 was performed. Patients were excluded if no neurologic exam was available after surgery. Fractures were classified according to Denis and presence / absence of comminution through the neural foramen was noted. Fixation schema was recorded (sacral screws, anterior open reduction and internal fixation, or posterior tension plate). Any change in postoperative neurologic examination was documented as well as examination at last clinic encounter.

Results: 92 patients met inclusion criteria, with zone 2 fractures and neurologic exam. 85 patients (92.3%) were intact neurologically in their last follow-up examination. Of the 7 patients with postoperative neurologic deficit, 3 had a neurologic deficit prior to surgery and 4 had no documented neurologic examination prior to surgery. Of the entire cohort, at final follow-up, only one patient had nonunion that required revision. Focusing on fracture pattern, 56 fractures (60.8%) were simple fractures and 36 fractures (39.2%) were comminuted fractures. All 7 patients with neurologic deficit had comminuted fractures. The association between neurologic deficit in zone 2 sacral fracture and fracture comminution was found to be statistically significant ($P = 0.002$).

Conclusion: The use of partially threaded screws for zone 2 sacral fractures does not cause neurologic injury, suggesting that compression through the fracture does not cause iatrogenic nerve damage. The low rate of sacral nonunion can be attributed to compression induced by the partially threaded compression screws. Zone 2 fracture comminution is a risk factor for neurologic damage.