

Asymmetric Sacral Dysmorphism: Prevalence and Impact on Surgical Planning

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Purpose: Proper iliosacral screw placement requires an understanding of sacral morphology and recognition of sacral dysmorphism. Although the characteristics of sacral dysmorphism have been well-described, the presence and relevance of asymmetric dysmorphic features have not been previously characterized. This study aims to determine the prevalence and surgical relevance of asymmetric sacral dysmorphism.

Methods: A retrospective review was conducted of patients presenting to an academic Level I trauma center between January 2023 and July 2024. Inclusion criteria were patients between age 18 and 85 years with a surgical pelvic ring injury and a thin-cut pelvis CT (≤ 2.0 mm) with 3D reformats. Sacral dysmorphism was defined by the inability to place a transiliac-transsacral screw in the upper sacral segment. Asymmetry was assessed by evaluating side-to-side differences in neuroforaminal height, upper sacral segment pathway obliquity, and anterior-posterior pathway width.

Results: Of 228 patients evaluated, 118 (51.7%) demonstrated sacral dysmorphism. Among patients with dysmorphism, 35 (29.6%) exhibited at least one feature of asymmetry. The asymmetric group included 19 females and 16 males, with an average age of 42.1 years (range: 16–91 years). Asymmetric features included differences in neuroforaminal height, upper sacral segment pathway obliquity, and pathway width (see figure).

Conclusion: Nearly 30% of patients with sacral dysmorphism demonstrate asymmetric features, which can impact surgical planning. Recognition of asymmetric sacral dysmorphism is important for proper execution of posterior pelvic fixation.

