

## Secondary Fragility Fractures and Osteoporosis Undertreatment After Sacral Insufficiency Fractures: An Opportunity for Improvement

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**Purpose:** Sacral insufficiency fractures (SIFs) are defined as sacral fractures in the absence of high-energy trauma. SIFs can be sentinel events in the elderly, bringing to light existing osteoporosis and presenting an opportunity for intervention in those untreated or undertreated patients. We sought to study the patterns of SIF treatment across our health system to better understand patient outcomes, frequency of subsequent fragility fracture, and incidence of untreated osteoporosis.

**Methods:** From 2004 to 2020, 295 patients with SIF were identified from a single large tertiary hospital. Demographics, risk factors, injury site, and mechanism were retrospectively reviewed. Radiographic and advanced imaging including a dual-energy x-ray absorptiometry (DEXA) scan was examined. Treatment with bone-directed medications was recorded, as well as any evaluation by an endocrine specialist.

**Results:** Of 295 patients, 83% were female and 94% were Caucasian, with a mean age of 70 years. The median follow-up time was 518 days. 52% had a prior diagnosis of osteoporosis, and 22% took corticosteroids chronically. Bilateral SIFs were seen in 63%; 40% had associated fractures of the pelvic ring. An SIF was the first osteoporotic fracture for 73% of patients (n = 218), and 31% (n = 92) developed a subsequent fragility fracture. The median number of days to subsequent fracture was 427 days. Most patients (60%) did not have a recent DEXA scan within 2 years of injury. 19% of patients were on bone-directed medications at time of injury and 19% received a prescription following SIF; 62% never received bone-directed medications. Patients who were started on bone-directed medications experienced higher rates of clinical union defined as resolution of pain (48% vs 34%, P = 0.014). 17% of patients were seen by endocrine specialist prior to fracture; following fracture, 18% were referred to one. 64% were never seen by an endocrinologist.

**Conclusion:** To our knowledge, this is the most comprehensive compilation of SIF natural history and treatment to date. In our series, SIFs were shown to be a common presenting fragility fracture with one-third developing a subsequent osteoporotic fracture. The majority of patients were not treated with bone-directed medications or referred to endocrinology following their injury. These findings highlight opportunity for improvement in the current treatment of these fractures. This information will be useful in the development of treatment algorithms to initiate early bone health care directed at improving clinical outcomes and mitigating subsequent osteoporotic fractures.