

## Case 5:

19-year-old girl presents with pain in the sacral region following a lifting episode. She was lifting a tyre and has been having on-going sacral pain. There is no evidence of sciatica.



**Your Diagnosis**

## **Diagnosis      Sacral Insufficiency fracture [SIF]**

Insufficiency fractures represent a special category of stress fractures that occur in bones with reduced mineral content and elastic resistance.

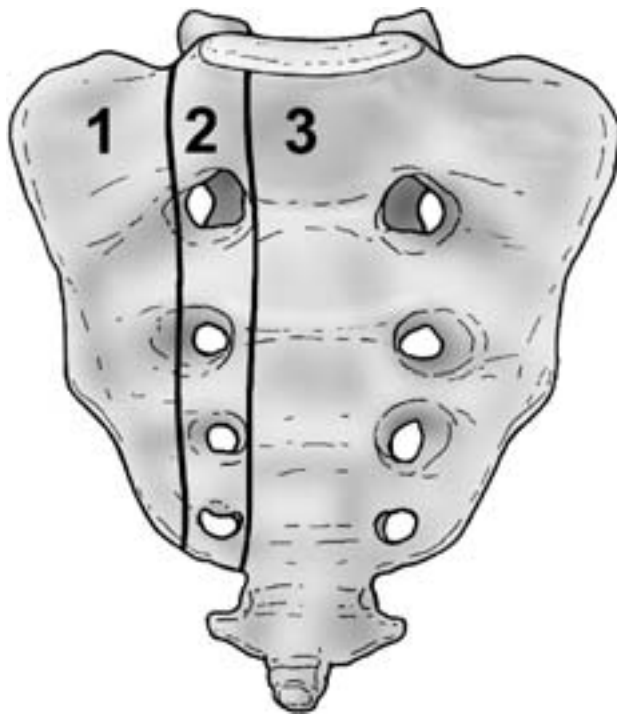
There may be lack of clinical suspicion results in many being undiagnosed.

SIFs are set to become an important clinical entity of both social and economic significance as the Western population ages.

Subtle clinical presentations and signs coupled with radiographic findings that can mimic other unrelated or overlapping conditions, such as sacroiliac joint infection, spinal stenosis and metastatic bone disease

The aim of this review is to increase awareness among clinicians, highlighting SIFs as an important differential diagnosis to be considered when patients present with low back and pelvic pain and subsequently allow prompt management.

With careful assessment it's incidence: women aged over 55 years who presented to hospital with low back pain to be 1.8%. Vast majority fracture occurs in zone I [Dennes]; fractures run vertically, parallel to the sacroiliac (SI) joint,



### **Pathophysiology and risk factors**

The majority of SIFs (over 90%) occur in elderly women. SIFs often arise insidiously, resulting from axial stresses transmitted from the spine to a sacral ala with deficient elastic resistance. It is common for a patient to present without prior history of trauma, detracting clinicians from the diagnosis of fracture.

A history of trauma was often not identified in two thirds of the patients. Several conditions may compromise bone density and strength, predisposing patients to SIFs—postmenopausal osteoporosis being the main cause among them. Corticosteroid-induced osteopenia and radiation therapy are also implicated as common risk factors for SIFs

Secondary osteoporosis, however, is equally an important predisposing risk factor and should alarm the clinicians: hyperparathyroidism, osteomalacia, renal osteodystrophy, Paget's disease, rheumatoid arthritis.

Four types of pregnancy-related primary osteoporosis have been described: idiopathic osteoporosis of pregnancy, transient osteoporosis of the hip, postpregnancy vertebral osteoporosis and lactation-associated osteoporosis.

The predominant presenting symptom is pain, which may be severe

and radiate to the groin, low back, buttocks, and thighs.

### **Lab reports:**

Ca, PO<sub>4</sub> and Alkaline phosphatase

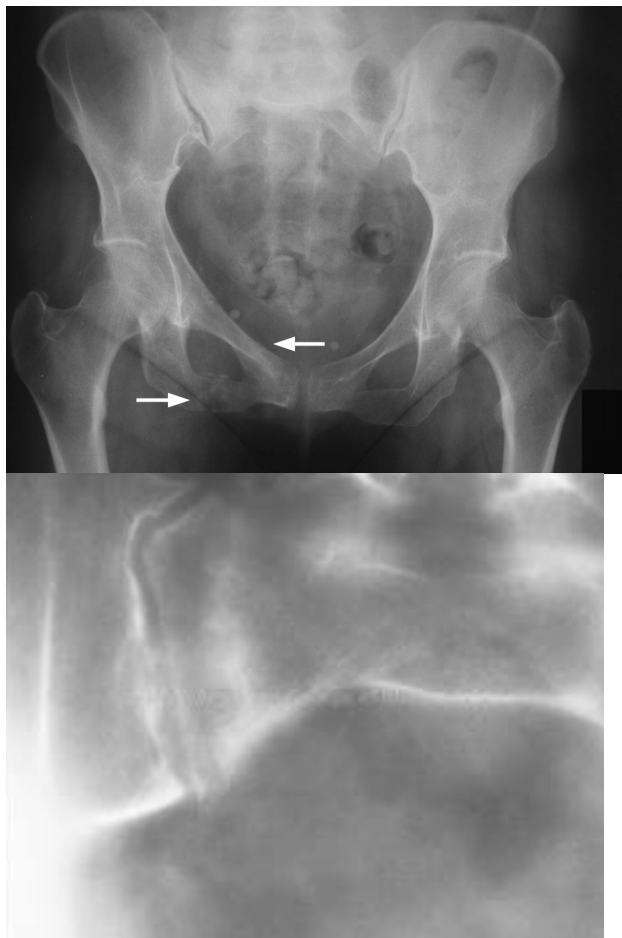
Osteocalcin, a bone matrix protein, is a useful biochemical indicator of high bone turnover.

Markers of bone reabsorption, such as pyridinoline cross links, cross-linked N-telopeptide and C-telopeptide of type I collagen, can be detected in urine and may be of significant help for establishing a diagnosis of osteoporosis.

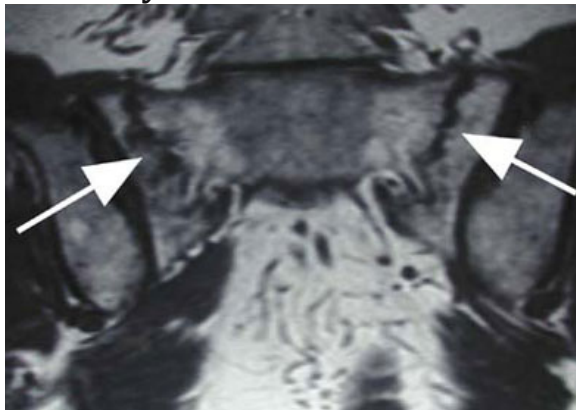
### **Assessment by Endocrinologist**

The most frequently associated stress fracture is that of the ipsilateral, contralateral or both pubic rami. It has been reported that 78% of patients with SIF had concomitant pubic rami. When rami fracture is seen always suspect insufficiency fracture of the sacrum.

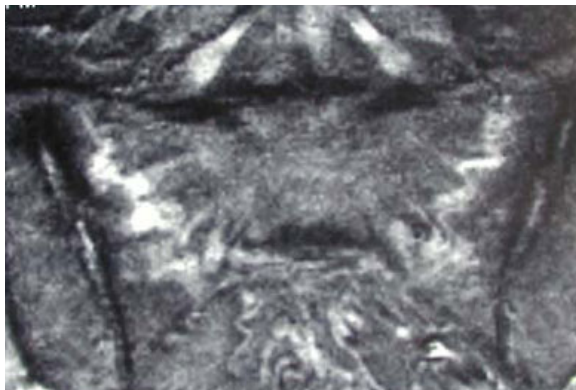
### **X ray Pelvis and tomogram**



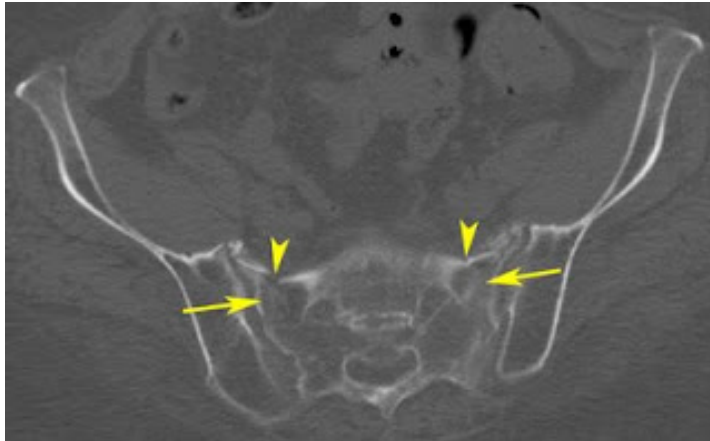
**MRI is by far the most sensitive** screening investigation.



.T1-weighted images demonstrate a low signal intensity while T2-weighted images demonstrate high signal intensity. T2-weighted short tau inversion recovery (STIR) images and T2-weighted images with fat suppression are particularly sensitive to demonstrate a fracture line.



## CT scan



An adjunct to MRI and bone scintigraphy in excluding malignancy or osteomyelitis. Intact bony trabeculation and architecture could effectively provide the diagnosis of exclusion for malignant disease or osteomyelitis

## Bone Scan



Bone scintigraphy with technetium-99 MDP remains a sensitive technique for SIF

A classic "H" pattern and coupled with a corresponding clinical picture, this can be considered diagnostic. Formation of the "H" pattern, however, requires bilateral involvement and a horizontal fracture component to the sacral body that is not always present [40%]

## Bone mineral density

Osteoporosis is the commonest denominator of SIFs and can better be assessed by measuring BMD.[ DEXA scan]

T and Z scores are densitometric values are important.  
WHO has defined osteoporosis as a T score of  $< -2.5$  SD, and a Z score  $< -1.5$  SD

## Treatment

1. Activity modification
2. Walking aids as pain allows
3. anabolic or antiresorptive medication is often prescribed to reduce the risk of further insufficiency

4. NSAID

5. Calcium and vitamin D supplementation

6. Other therapeutic modalities that can provide symptomatic benefit during early rehabilitation include transcutaneous electrical stimulation (TENS), ultrasound and gentle physiotherapy.

7. The principle of vertebroplasty has more recently been attempted for the management of SIF—so called sacroplasty. Polymethylmethacrylate (PMMA) cement is injected into the fracture site under fluoroscopy or CT guidance with the aim of stabilising the fracture.