



PLAIN RADIOGRAPHY

- Initial imaging modality of choice for detection of suspected stress fractures. [1](#)
- Plain film diagnosis of stress fracture depends on the site of injury and the temporal relationship of imaging to the stage of osteoclastic resorption, osteoblastic repair, and/or periosteal new bone formation. [2](#)
- Most stress fractures are oriented transversely to the bone, but occasionally longitudinal stress fractures are encountered. [1](#)
- In cases where plain films demonstrate changes consistent with stress fracture, such as linear cortical radiolucency or localised periosteal reaction, no further imaging is indicated. [3](#)



- Early radiographs are often normal, as plain radiography is insensitive in detection of the early phases of stress remodelling. [1,3,4](#)
- If the plain radiographs are normal or non-diagnostic, the physician may choose to treat the patient for a presumed fracture and repeat the studies within 6 weeks or further investigate with CT/MRI or bone scan. [3](#)
- Advantages: inexpensive and widely available

THREE PHASE BONE SCAN

- Second line study for detection of radiographically occult stress fractures. [5](#)
- High sensitivity (~100%) for stress fractures and can become positive as early as three days after the onset of clinical symptoms. [4-6](#)
- A normal bone scan generally excludes the diagnosis of stress/insufficiency fracture.
- Classical findings include focally intense and fusiform cortical uptake. [1](#)
- Offers physiological information from which both the age of the injury as well as the status of healing of the fracture can be inferred. [7](#)
- Limitations: lacks specificity (false positives can occur in osteoid osteoma, osteomyelitis, or metastatic disease) and supplemental imaging (CT/MRI) may be necessary for conclusive diagnosis or to avoid false positives. [1](#)

MAGNETIC RESONANCE IMAGING

- Comparable sensitivity but superior specificity to that of bone scan for detection of bone abnormalities. [8,9](#)
- Allows depiction of abnormalities several weeks prior to the development of radiographic changes. [7,8](#)
- For detection of hip fracture, can be performed immediately upon patient presentation. [8-10](#)
- Can be used in cases of suspected stress fractures where radiographic +/- bone scan findings are indeterminate. [1,10](#)
- Useful in grading the stage of certain stress fractures and therefore, predicting the time to recovery (superior spatial resolution allows determination of the extent and orientation of the osseous fracture). [7,11,12](#)
- Limitations: expensive and limited availability.

COMPUTED TOMOGRAPHY

- Provides superior depiction of the osseous anatomy of stress fractures. [1,13](#)





- Useful in: [1,13](#)
 1. Delineation of fracture in a "high-risk" location.
 2. Demonstrating the fracture line in a longitudinally directed injury, which is often not imaged well with MRI.
 3. Demonstrating pelvic and sacral fractures in the elderly.
 4. Evaluating healing when the plain radiographs do not adequately demonstrate the fracture.
- Limitations: may not detect soft tissue or medullary lesions.

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FURTHER READING

1. Greenspan A. **Evaluating suspected stress fracture.** Journal of Musculoskeletal Medicine 1999;16:144.

Website

For more information go to www.imagingpathways.health.wa.gov.au

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