Stress Fractures

Stress fractures are classified as an injury of an overuse of bone,\(^1\) resulting from excessive repetitive stress and typically are multifactorial.\(^1,\)\(^2\) A stress fracture, which may be nascent or complete, exceeds the bone's intrinsic ability to repair itself.\(^1\) Bone, like muscle, is an adaptable tissue capable of repair, regeneration, and remodeling in response to environmental signals. Bones are exposed to both stress and strain, along with weight-bearing exercise.\(^1\) Stress fractures most commonly occur in the lower limbs as a result of the ground-reaction forces (GRFs) that must be dissipated during running, walking, marching, or jumping. Muscle fatigue can reduce the shock-absorbing capacity of the muscular system, resulting in greater transmission of GRFs to the associated parts of the skeleton.\(^1\) However, stress fractures of the vertebral arch, upper limbs, ribs, and even the scapula are not uncommon.\(^1\) The tibia has surpassed the metatarsals to become the most common location for the development of stress fracture.\(^3\) Stress fractures are among the 5 most common injuries suffered by runners and have been reported to account for up to half of the injuries sustained by military recruits.\(^4\)

Diagnosis in most cases is based on clinical evaluation.\(^2\) Plain radiographs may show characteristic changes 2 to 4 weeks from onset of symptoms. Increasingly, magnetic
resonance imaging is recognized as the study of choice in the evaluation of stress injury of the bone. Early on, the pain of a stress fracture is typically mild and occurs toward the end of the provoking activity. Subsequently, the pain may worsen and become prominent earlier, which may limit participation in sports and other activities. Despite the fact that rest may provide temporary relief of symptoms in the early stages of the injury, as the stress injury progresses, the pain may persist even after the finish of an activity. A good example of this pain is night pain, which is a frequent complaint.

Creating an environment conducive to healing the stress injury, by interrupting the cycle of repetitive overload is quite essential. The conventional treatment options for a stress fracture begin with rest and cessation of triggering activity. For healing most stress fractures, the period of relative rest may be expected to last from 4-12 weeks. Most stress fractures at low-risk sites can be managed in the primary care setting with conservative measures. From a primary care perspective, orthopedic or sports medicine consultation is considered for stress fractures at high-risk sites. Under supervision and direction of a physical therapist, rehabilitation of the individual with a stress fracture should begin. Included in the patient’s plan of care, should be both a program for muscle strengthening and generalized conditioning. These programs should be monitored carefully to avoid training errors, such as too much, too soon. A patient’s plan of care should not increase by any more than 10% from one week to the next. Strong, well-conditioned muscles help to dissipate GRFs that otherwise would be transmitted to bones and joints along the kinetic chain. Therefore, exercise participation and the integration of physical activity within the daily routine seems to be a preventive strategy to lessen injuries.
References


