COLES
Sports Therapy & Rehab

Stress fractures currently represent 10% of all sports injuries and can strike every runner from the weekend warrior to the elite competitor.
In my own athletic career I suffered three stress fractures (one metatarsal and two tibia fractures). One of my clients, a 33 year old female national record holder (2.27) in the marathon, has suffered 14 stress fractures over an 18 year period, which include 7 rib fractures, 3 tibia, 3 metatarsal and one public arch fracture. Since implementing modifications in her diet, training environment, and correcting foot biomechanics, she has not had an osseous injury in almost two years.
Every sportsperson who has had a stress fracture has come up against the medic who treats the injury with contempt. 'Take two or three months off running and cut back on the training and you'll be OK' is hardly what the runner wants to hear.
Here I will present information on understanding, preventing and managing stress fractures.
Stress fractures are microscopic cracks in the bones that never get a chance to heal and are caused by the build-up of repetitive stress. Imagine bending a coat hanger back and forth. Repeated bending weakens the wire, eventually breaking it. Bones similarly waken by repeated stress and are liable to crack. As with invisible metal fatigue, stress fractures set the stage for a complete break. The symptoms produced by a stress fracture are simple and unmistakable; a quite rapid onset of pain that is well localized, usually to the bones of the lower limbs. The tibia is the most common site, accounting for 55% of stress fractures.
The pain is usually bearable when the athlete is at rest or is walking, but as soon as any running is attempted, the pain becomes quite unbearable and running is impossible.
The diagnosis of a stress fracture is quite simple.
" The injury is usually of quite sudden onset, and there is no incidence of external violence. Warning symptoms are usually mild; runners get little notice until suddenly they are no longer able to run.
" The runner will find that hopping on the injured leg (hop test) is painful.
" The diagnosis may be confirmed if tenderness is felt localized to the bone.
The usual prognosis for stress fracture healing is 5 to 8 weeks rest. Recently I have begun using magnet therapy to expose the fracture to an electrical field to speed up recovery by as much as half the normal healing time.
Few runners accept a two month rest period without visible evidence that the diagnosis is correct, so doctors usually resort to X-rays, which have drawbacks. In quite a high percentage of cases (up to 60%) X-rays will fail to reveal the presence of a stress fracture if they are taken earlier than three weeks after the initial injury. In effect the fracture is so small it cannot be seen. Only when new bone is being formed, which is more dense than the old bone it replaces, does the fracture show as a line on the X-ray.
More stress fractures occur in novice runners or in competitive runners who suddenly increase their training after a rest. An adverse result of a sudden increase in training distance is that it causes accumulated muscular fatigue, which reduces the muscles abilities to absorb shock. When the muscles are tired and unable to absorb shock that function is passed over to the bones, which therefore become more likely to fracture. I advise runners to do 60% or more of their running on grass or trail to decrease impact forces and resulting musculoskeletal breakdown from cyclic overuse on hard surfaces.
The repetitive use of wearing track spikes on a hard track is also a contributing factor as are inadequate shoes for distance running. Muscle imbalances and inflexibility are also an

important consideration. For example in the lower leg there often exists an imbalance between the posterior, calf muscle which is developed and strong, and its opposing muscle, the tibialis anterior (the muscle on the front of the shin), which is often weak. Such imbalances between agonist and antagonist muscles reduce the shock absorbing capabilities of the muscles and place additional forces on the bones. Tight, overly strong muscles should be stretched regularly and weak hypo-mobile muscles should be strengthened to keep the kinetic chain in balance.

BIOMECHANICS

Three principal genetic factors are associated with stress fractures:

" The high-arched foot which fails to absorb shock adequately and is associated with fractures of the femur and metatarsals.

" The pronating low-arched foot which causes abnormal bio-mechanical function, part of which is a shearing motion in the tarsal bones, the tibia and fibula, predisposing those bones to fracture.

" Leg length inequalities. A physiotherapist who specializes in sports injuries can evaluate the lower extremity from a biomechanical perspective and customize orthotics accordingly, which, if required, will not only prevent musculo-skeletal injuries but improve running efficiency.

Running shoes lose their shock absorbing properties and break down with constant use. I recommend a shoe change every 500 miles and the old shoes should be discarded as running shoes because the shock absorbing qualities and heel counter breakdown in old shoes can magnify any biomechanical abnormality.

Menstrual abnormalities from exercise or other causes are a significant risk factor for stress fractures in runners because estrogen deprivation can lead to osteoporosis. Low bond density is a recognized risk factor for stress fractures in men and women. Athletes with eating disorders are more likely to develop stress fractures. Stress fractures are much more common among subjects who have a low dietary calcium intake. These subjects' dietary calcium intake is often too low to maintain bone mineral content.

Initial treatment for most stress fractures involves eliminating the activities that cause pain. Pain free weight-bearing is allowed. Patients who have pain with weight bearing should use crutches (not normal except sometimes with pubic/femoral stress fractures).

Flexibility and strength training for the distal lower extremity can begin during initial treatment to reduce muscle fatigue. Cross-training is essential for maintaining cardiovascular fitness. Deepwater running, swimming, biking and upper body weights are good aerobic alternatives. Have a sports injury specialist do a biomechanical analysis and have customized orthotics made if recommended.

Underlying metabolic disorders and contributing nutritional problems should be treated. Estrogen replacement therapy reduces bone loss in post-menopausal women. Oral contraceptives have been shown to positively affect bone density in young women and are the most convenient and accepted estrogen replacement regimen available to this age group. To promote bone healing 1000 to 1500 mg of calcium supplement should be taken daily in addition to an increase in dairy produce (unless lactose intolerant). Prevention of stress fractures is the best policy so take heed of the above wisdom and your bones should not let you down.