What is it?
The foot is made up of several small bones, including the tarsal navicular bone. This bone is located on inside part of the foot along the arch and helps support the arch of the foot. It can be easily injured from physical activities like running and jumping because of where it is located. Fractures in this bone may happen from injury or overuse. The tarsal navicular bone also has certain areas with decreased blood flow, making it a risk for injury and poor healing. If there is increased stress or inadequate recovery, a fracture can develop. A stress fracture ranges from bone swelling to a full break that develops from repeated pressure on the bone rather than one large force. This usually is seen as slowly increasing pain over time, initially with infrequent pain with activity and progressing to constant pain.

Risk Factors
- Increased frequency, volume or intensity of sport training
- Change in equipment, such as different shoes or training surface
- Poor nutrition
- Low bone density
- Atypical foot structure, such as high arches

Symptoms
- Vague pain to the middle or top of the foot and in the arch of the foot
- Mild swelling or bruising to the foot, though often not seen
- Pain with walking, running or jumping. Frequently, patients will initially have pain only after high-intensity activities like running or jumping. It can progress to pain with low-intensity activities, such as walking and eventually steady pain, even at rest.
- Tenderness when pushing on the navicular bone

Sports Medicine Evaluation & Treatment
Your doctor initially will ask you questions regarding the pain you are feeling, such as where you have pain, how long it has been hurting and what activities make it better or worse. Your doctor will examine your foot to look for bruising or swelling, evaluate the movement of your foot, and determine areas of tenderness. In approximately 80 percent of people with a tarsal navicular fracture, there will be tenderness of the tarsal navicular bone.

Your doctor will likely obtain an x-ray, though these are often normal. Advanced imaging is often needed, such as magnetic resonance imaging (MRI) or computed tomography scans (CT scan). These can help better determine the severity of the injury and what type of treatment is needed. MRI is particularly helpful at seeing early signs of bone injury, even if a full fracture has not occurred.

Treatment of tarsal navicular stress fractures is determined by the severity and location of your injury. Initial treatment for the majority of these fractures is in a cast and non-weight bearing for 6 weeks. For less severe fractures, if pain is resolved at that time, a graded return to activities starting with physical therapy is begun. If the pain is persistent, the period of time in a cast and non-weight bearing is extended. Sometimes even with appropriate treatment, these fractures do not heal because of poor blood supply and surgery is needed. Also, for fractures that heal poorly surgery is often needed.

Injury Prevention
For all stress fractures and general bone health, nutrition and eating enough calories for the demands of sport is very important. Consuming adequate calcium and vitamin D have also been shown to decrease the risk of stress fractures. It is recommended to gradually increase training by no more than 10-15 percent each week to allow for adequate recovery. Proper fitting equipment and shoes, along with appropriate playing surfaces, can also help decrease risk for development of stress fractures.
Return to Play
All tarsal navicular stress fractures are considered high-risk because non-healing stress fractures are common with either conservative or surgical treatments, due to the poor blood supply to the bone. Return to play can take several weeks and even months with either type of treatment. Determined by the degree of injury, return to play after tarsal navicular stress fractures is typically a minimum of 12 weeks, and can be longer. These injuries require a slow and gradual return to sports that is closely monitored by your doctor.

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References
McInnis, KC., Lindsay RN. High-Risk Stress Fractures: Diagnosis and Management. PMR. 2016. S113-S124.