



QUESTION | I HAVE HAD A PATIENT WHO HAD AN EVERSION INJURY TO HER ANKLE WHILE DOING TAEKWONDO. ON ASSESSMENT SHE HAD TENDERNESS OVER HER NAVICULAR AND POSTERIOR TIBIAL TENDON. THE TENDON AGGRAVATION SETTLED WITHIN 2-3 WEEKS WITH REST AND PROGRESSIVE STRENGTHENING. HOWEVER, THE TENDERNESS OVER THE NAVICULAR REMAINED. IT ALSO APPEARED TO BE MORE PROMINENT THAN THE OTHER FOOT.. I WAS WONDERING IS IT POSSIBLE TO SUBLUX THE NAVICULAR FROM THE FORCE OF THE POSTERIOR TIBIAL TENDON ON THE NAVICULAR (SIMILAR TO WHAT CAN HAPPEN WITH THE CUBOID)? IF SO, WHAT IS THE TREATMENT FOR SUCH AN INJURY?

ANSWER |

The navicular bone is in the medial longitudinal arch of the foot and sits between the talus and the three cuneiform bones. Its articulation with the talus as well as its structure providing support to the medial column are essential the formation of the arch of the foot.

The medial portion of the navicular slopes posteriorly and forms a prominent tuberosity. A large portion of the posterior tibial tendon attaches to this tuberosity. It is also the attachment of the insertion of the spring (calcaneonavicular) ligament. The posterior tibial tendon is a strong invertor of the hindfoot. Pull of the posterior tibial tendon during walking is greatest during toe-off, thus applying a tension stress to the navicular tuberosity.

Isolated Tarsal bone dislocations are extremely rare. These bones are held strongly in position by the surrounding bones and strong ligamentous attachments. Because the tarsal bones are held strongly in place, a high-energy injury is required to cause their subluxation or dislocation.

A navicular dislocation is an extremely rare injury, and would usually occur during a high-energy injury with the involvement of surrounding joints. A mechanism of injury that can produce a navicular dislocation might be a plantar flexion injury to the foot at the naviculocuneiform joints.

More commonly, injury to the navicular involves a fracture. There are essentially four types of fractures that occur: 1) chip fracture- the most common, occurs from a minor twisting injury resulting in a cortical avulsion at the dorsal capsule. 2) The tuberosity fracture- The medial tuberosity can avulse from a lateral stress to the midfoot resulting in pull on the tuberosity from the tibialis posterior tendon. 3) Navicular body fracture- From a high-energy injury, a fracture of the body can cause shortening of the medial column and usually requires surgery to restore the anatomy. 4) A navicular stress fracture, resulting from overuse and repetitive injury.

Another entity that can cause pain at the navicular after trauma is the accessory navicular bone. An accessory navicular bone is a congenital anomaly that occurs in about 10% of the population. There are three types described, with type II being the most common and the one that can cause pain



Fig 1: Accessory Navicular Bone

A fibro cartilaginous plate separates the tuberosity from the main body of the navicular. Excess tension, shearing, or compression through the region due to an injury can cause the accessory navicular to destabilize and cause pain.

Investigations-- A weight bearing x-ray of the foot is often the first step in investigating for an injury of the tarsal bones. However, injuries can be missed on plain x-rays due to the overlap of bone and joints. If there remains suspicion of an injury after a "normal" x-ray, A CT scan is often helpful to identify any fractures or dislocations. An MRI is usually helpful to identify soft tissue injury or stress fractures.

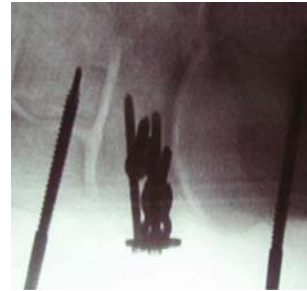
Figure 2



Navicular fracture hard to see on xrays.



CT Scan clearly shows navicular body fracture.



Fixation of fracture with specialised plates and screws.

Treatment is tailored to the diagnosis and the severity of the injury. In a mild injury without presence of a fracture or dislocation, I would initiate a course of rest and temporary immobilisation until symptoms subside. Nondisplaced fractures of the navicular may require casting, or operative management, depending upon their location. Because a nonunion or malunion of the navicular bone can be a devastating disability, I would recommend referral to an orthopaedic surgeon for these injuries.

In summary, and in answer to your question:

- A navicular dislocation is extremely rare, and usually from a high-energy injury.
- More commonly a fracture or destabilization of an accessory navicular can cause pain in the navicular
- CT scan is very helpful to detect fractures or dislocations that may be missed on x-rays. MRI is good for stress fractures.
- Navicular fractures can have devastating consequences, and should be evaluated by an orthopaedic surgeon.

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