Acute Forefoot and Midfoot Injuries

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KEYWORDS

- Runner's toe • First metatarsal phalangeal joint dislocation
- Compartment syndrome • Jones fracture • Midfoot sprains
- Lisfranc fracture/dislocation

KEY POINTS

- Compartment syndrome and Lisfranc fractures require a high index of suspicion, because they both require further testing for accurate diagnosis.
- Fifth metatarsal base fractures must be examined closely, because treatment ranges from protected weight-bearing to surgical intervention.
- Radiographs of the first metatarsophalangeal joint dislocation must be evaluated closely to determine extent of damage.

SUBUNGUAL HEMATOMA

Subungual hematomas, commonly referred to as "runner's toe," are common injuries in runners. They are collections of blood under the nail plate. They cause intense pain and throbbing as pressure increases under the toenail. Runner's toe is caused by direct trauma to the nail, such as a crush injury (eg, dropping a heavy object on the nail) or, more commonly in running, microtrauma from rubbing on the end of a shoe. Shoe trauma can result from wearing a shoe that is too short or from normal swelling that occurs during high-mileage running. Another cause can be downhill running, wherein the foot slides forward in the shoe. Treatment ranges from none to surgical avulsion, depending on pain, and treatment of possible infection that can develop.

DIGITAL FRACTURES

Digital fractures are almost always a result of direct trauma. They are rarely debilitating but may require treatment and moderation of activity. Radiographs are required to determine treatment course. Treatment consists of rest, splinting to keep the toe in proper alignment, wearing of a stiff-soled shoe, "buddy splinting" if appropriate, and possible surgery to correct displacement with internal fixation. The formulation

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of an alternative training schedule for athletes training for an event is important to prevent frustration and noncompliance.

METATARSAL FRACTURES

Metatarsal fractures represent 5% to 6% of fractures encountered in primary care.[1,2] These fractures range from requiring little treatment to requiring surgical intervention, depending on the location and displacement. Metatarsal fractures generally arise from direct trauma or twisting injuries.

Distal central metatarsal fractures (ie, neck fractures) are stable fractures and can be treated conservatively with a stiff-soled shoe or a walking fracture boot as long as there is less than 10° of sagittal plane deformity or greater than 4 mm translation. In those instances, percutaneous fixation should be considered with non–weight-bearing (NWB) casting.

First metatarsal fractures are more serious because of the weight-bearing (WB) forces they experience. If no displacement is present, limited WB in a fracture walking boot is acceptable treatment. If any displacement is present, surgery is indicated followed by NWB casting.

Fifth metatarsal fractures are the most common metatarsal fracture. Spiral oblique fractures (ie, Dancer's fractures) result from missteps and falls from the demi pointe position. The fracture is usually displaced and mildly comminuted. These fractures usually heal in a short leg cast for 6 to 8 weeks NWB. If it is significantly displaced, open reduction internal fixation (ORIF) may be required. Proximal fractures at the base of the fifth metatarsal are more difficult to treat. Fractures of the proximal fifth metatarsal are common and usually can be divided into 1 of 3 patterns:

- Avulsion fractures of the base of the metatarsal
- Fractures at the junction of the metaphysis and diaphysis (Jones fractures)
- Pure diaphysis fractures

Most of these fractures heal with nonoperative management and do not require surgery. Fractures of the metaphyseal diaphysis junction have a higher rate of nonunion and occasionally do require surgery. Jones fractures treated operatively have been shown to have excellent union rates.[3] Blood supply plays a crucial role in the healing ability of these fractures. As described by Smith and colleagues,[4] perfusion comes from metaphyseal arteries at the base of the fifth metatarsal. A nutrient artery enters at the proximal diaphysis and tracks proximally across the so-called "watershed area" at the metaphysis-diaphysis junction. This area creates a region at high risk for avascularity and poor healing with disruption of the blood supply. The Torg classification of fifth metatarsal base fractures (**Fig. 1**)[5] is as follows:

- Type 1: tuberosity fracture of the lateral aspect of the tuberosity extending proximally into the metatarsocuboid joint.
- Type 2: Jones fracture beginning laterally in the distal part of the tuberosity and extending obliquely and proximally into the medial cortex at the junction of the metaphysis and diaphysis.
- Type 3: fracture distal to the fourth and fifth metatarsal base articulation in the diaphyseal part of the bone.

Torg type I fractures can be treated in a removable fracture boot partial WB to full WB for 6 to 8 weeks. Torg types 2 and 3 fractures have been reported to have higher rates of nonunion treated nonoperatively than when treated surgically. The literature