Management of Common Sports-related Injuries About the Foot and Ankle

Abstract

Foot and ankle injuries are commonplace in competitive sports. Improvements in injury surveillance programs and injury reporting have enabled physicians to better recognize and manage specific foot and ankle injuries, with a primary goal of efficient and safe return to play. Athletes are becoming stronger, faster, and better conditioned, and higher-energy injuries are becoming increasingly common. Close attention is required during examination to accurately identify such injuries as turf toe, ankle injuries, tarsometatarsal (ie, Lisfranc) injuries, and stress fractures. Early diagnosis and management of these injuries are critical. Ultimately, however, pressure to return to play must not compromise appropriate care and long-term outcomes.

Injuries about the foot and ankle are common among competitive athletes. In recent decades, public health surveillance programs have more accurately quantified the frequency and breadth of foot and ankle injuries in many sports and at various levels of competition. Management of these injuries typically entails aggressive rehabilitation and early return to competitive activity without compromising healing or long-term functional outcomes. These objectives are frequently influenced by the high expectations of teams, coaches, parents, and the athlete.

Incidence and Magnitude of Injury

The ultimate goal of sports medicine is to enable athletes to perform to their maximum capabilities while minimizing the risk of injury. Athletic associations and governing bodies have developed injury data collection and surveillance programs to allow coaches, trainers, clinicians, and athletes to create a safer athletic experience. This has resulted in the implementation of several rules and measures that have been shown to effectively reduce rates of injury.

In 1982, the National Collegiate Athletic Association (NCAA) developed the Injury Surveillance System (ISS), one of the original injury surveillance programs. This system was created with the intent of improving safety by providing data on injury trends in intercollegiate athletics. Through comprehensive data analysis, the ISS is able to highlight the epidemiology of the most common injury descriptions, illustrate notable disparities in injury rates, and influence injury prevention. Data from the ISS have been used to implement rule changes and equipment recommendations, which has resulted in reducing the number of injuries.
Hootman et al\textsuperscript{2} reported 16-year results of the ISS data for 15 sports in all three collegiate divisions (1988-89 through 2003-04). Overall, ankle ligament sprains were reported to be the most common injury during practice and competition, making up 14.9\% of all injuries, with an injury rate of 0.83 per 1,000 athlete-exposures. By comparison, anterior cruciate ligament injuries accounted for 2.6\% of all injuries, with 0.15 injuries per 1,000 athlete-exposures. Concussions made up 5.0\% of all injuries, with 0.28 injuries per 1,000 athlete exposures. Although anterior cruciate ligament injuries and concussions were less common than ankle sprains, they resulted in greater time lost from participation.

At the high school level, 39.7\% of athletic injuries are to the foot and ankle, with sprains being the most common.\textsuperscript{3} A report on the 2004 Olympic Summer Games in Athens, Greece, noted that 22\% of injuries were ankle sprains.\textsuperscript{4} Foot and ankle injuries were second only to knee injuries in the 2002 Olympic Winter Games in Salt Lake City, Utah.\textsuperscript{5} A review of more than 12,000 injuries in 19 sports demonstrated that 25\% of injuries occurred at the ankle or foot.\textsuperscript{6}

### Injury in Collegiate Athletes

Approximately 380,000 student-athletes participate annually in NCAA sports, with countless others involved at the high school level.\textsuperscript{7} Training and medical care of these athletes are changing as we improve our ability to efficiently identify, diagnose, and manage injuries. Table 1 shows the findings of the NCAA ISS review of foot and ankle injuries sustained in game situations in select sports.\textsuperscript{8-16}

<table>
<thead>
<tr>
<th>Sport</th>
<th>Game Injuries Relating to the Ankle (%)</th>
<th>Game Injuries Relating to the Foot (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men’s baseball\textsuperscript{8}</td>
<td>7.4</td>
<td>0</td>
</tr>
<tr>
<td>Women’s softball\textsuperscript{9}</td>
<td>10.3</td>
<td>0</td>
</tr>
<tr>
<td>Men’s basketball\textsuperscript{10}</td>
<td>26.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Women’s basketball\textsuperscript{11}</td>
<td>24.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Men’s football\textsuperscript{12}</td>
<td>15.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Men’s lacrosse\textsuperscript{13}</td>
<td>11.3</td>
<td>0</td>
</tr>
<tr>
<td>Women’s lacrosse\textsuperscript{14}</td>
<td>22.6</td>
<td>1.3</td>
</tr>
<tr>
<td>Men’s soccer\textsuperscript{15}</td>
<td>18.8</td>
<td>4.2</td>
</tr>
<tr>
<td>Women’s soccer\textsuperscript{16}</td>
<td>19.4</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Initial Evaluation

The initial approach to evaluating the athlete with an injury about the foot or ankle involves identifying and localizing the injured bony and soft-tissue structures. This allows a focused physical examination and narrows the differential diagnosis to determine the need for additional testing or radiographic studies.\textsuperscript{21,22} It is important to determine the mechanism of injury because it can offer vital clues regarding the location and severity of the injury as well as alert the caregiver to potential concomitant injuries that may otherwise be overlooked. It also is important to determine whether preventive measures are available and have been ap-
propiately implemented.23

Perhaps the most important issue in the initial evaluation of an athlete is determining when it is safe to return to play. These decisions may differ slightly depending on the injury, the sport, and temporal issues (eg, in-season versus off-season, practice versus competition). The goal of treatment and surgical decision-making is to ensure safe return to play and to reduce the risk of further or recurrent injury.

Injury prevention and prognosis are of particular importance for the competitive athlete because the goal is not simply to return to participation but to perform at a high level while avoiding long-term consequences. Injury prevention strategies and programs are a vital part of education and training in athletes at all levels.2

## Diagnosis and Management of Select Injuries

A comprehensive review of the diagnosis and treatment of all sports-related foot and ankle injuries is beyond the scope of this article. Instead, we review four injuries that can present diagnostic and treatment dilemmas for team physicians and trainers: turf toe, ankle sprains, tarsometatarsal joint (ie, Lisfranc) injuries, and stress fractures. Management of these injuries can be challenging and often requires referral to a subspecialist. Prompt diagnosis can make a dramatic difference in care and outcome.

### Turf Toe

Turf toe is a hyperextension injury to the hallux metatarsophalangeal (MTP) joint. It occurs when an axial load is delivered to the heel with the ankle in plantar flexion and the hallux in dorsiflexion or extension. The hyperextension moment at the MTP joint causes attenuation or tearing of the plantar capsuloligamentous structures, which may lead to joint instability.

Turf toe injury is occurring with increasing frequency at all levels of competition. The injury was first described in 1976 by Bowers and Martin,24 who found an average of 5.4 turf toe injuries per football season in players at the University of West Virginia. Rodeo et al25 attempted to quantify the incidence of turf toe injury by surveying 80 active players in the National Football League (NFL). They found that 45% of players had experienced a significant turf toe injury, with 83% of these occurring on artificial turf.

### Diagnosis

Diagnosis of turf toe injury starts with a heightened index of suspicion in a patient presenting with hallux MTP pain and swelling following an acute incident. In addition to the mechanism of axial load, the patient may report decreased push-off strength and inability to participate in cutting activities. It is important to determine the mechanism of injury because many of these injuries are not solely the result of hyperextension but rather are the result of a degree of valgus stress. Such a force may create a more medially based soft-tissue injury pattern and put the athlete at risk of progressive hallux valgus. The physical examination focuses on evaluating hallux MTP stability and hallux flexion strength.

Comparison radiographs are helpful in evaluating for sesamoid fracture and diastasis of a bipartite sesamoid. Particular attention should be paid to the position of the sesamoids on the AP radiograph. Proximal migration of the sesamoids from the normal position beneath the metatarsal head is suggestive of capsular disruption (Figure 1, A). Plain radiographs can aid in demonstrating a lag in sesamoid tracking; this is evident most clearly on the lateral view (Figure 1, B). Magnetic resonance images can be conclusive in evaluating the integrity of the plantar capsular structures of the hallux MTP joint as well as concomitant injuries to the joint surface (Figure 1, C).

### Management

Management of turf toe injury is dependent on the grade of injury26 (Table 2). Grade I injuries are characterized by attenuation of plantar structures, localized swelling, and minimal ecchymosis. These injuries are managed with taping and early rehabilitation (eg, range-of-motion exercises, gradual strengthening), with return to play as tolerated. Grade II injuries involve partial tear of plantar structures, moderate swelling, and restricted motion as the result of pain. Athletes with such injury frequently require at least 2 weeks before returning to competitive play. Grade II injuries are also managed with rehabilitation and taping. A turf-toe plate or carbon-fiber orthosis that limits hallux MTP extension can be helpful in protecting grade I and II injuries before return to competitive play.

Grade III injuries may involve complete disruption of plantar structures, significant swelling or ecchymosis, hallux flexion weakness, or frank instability of the MTP joint. Management of these injuries can be nonsurgical, with immobilization in plantar flexion to allow the plantar structures to oppose and heal. Recently, however, Anderson27 reported on the surgical outcomes of 19 collegiate and professional athletes with grade III turf toe injury who underwent open repair of the ruptured capsuloligamentous complex. All but two athletes returned to their previous level of participation; this finding validates the use of more aggres-
sive management in grade III turf toe injury.

Our preferred technique for managing complete rupture is direct primary repair of the plantar capsuloligamentous complex through a two-incision approach (ie, medial and plantar). An important aspect of recovery is appropriate player expectations regarding return to play. Following surgical repair, it may take 6 to 12 months before the player can return to full competition without the need for a protective orthosis or taping. The necessity of surgery appears to be sport- and position-dependent.

**Ankle Inversion**

Ankle sprains are the most common injury in competitive athletics. Usually, rotational ankle injuries involve inversion mechanisms with lateral ligament sprain. Athletes often report having “rolled” their ankle while taking an awkward step in running or landing after a jump. A patient who can bear weight and who demonstrates the ability to perform the jumping, running, or cutting techniques necessary to play his or her sport may return to play immediately. If the patient cannot perform the necessary techniques, then further evaluation is needed, including radiographic studies to assess for fracture or dislocation.

**Diagnosis**

Acute swelling or ecchymosis may aid the physician in localizing the injury and assessing its magnitude. A more extensive evaluation may also be indicated when a severe sprain arouses suspicion of a fracture or articular injury and in cases in which symptoms fail to resolve within 4 to 6 weeks. There is a high incidence of peroneal nerve injury with severe sprains, and such injury should be carefully documented. Frequently, the injury consists of neurapraxia that causes sensory change, which tends to resolve without specific intervention. Several subtle injuries mimic a routine lateral ankle sprain, and care should be taken not to miss subtalar dislocation, fracture of the anterior process of the calcaneus or lateral talar process, or avulsion of the base of the fifth metatarsal.

Lateral ankle sprain may be categorized as grade I, II, or III. Grade I sprain involves a stretched lateral ligament. Symptoms include pain and swelling, and the patient is able to walk without crutches. Partial tear of the lateral ligament is classified as grade II injury, which presents with swelling and ecchymosis. The patient is able to walk a few steps unassisted. Grade III injury consists of complete tear, with swelling, ecchymosis, a feeling of instability, and difficulty walking.

**Management**

Regardless of the grade of ankle sprain, most athletes with so-called classic inversion ankle injuries recover with nonsurgical treatment, in-
The most predictable way to avoid recurrence or chronic instability is to include rest, ice, compression, and elevation. Early mobilization and strengthening exercises are helpful, with the use of taping or bracing as an adjunct to provide additional ankle support. Several treatment algorithms have been reported with varying success, including no treatment, functional rehabilitation, casting, and acute ligament reconstruction. In our experience, an aggressive physical rehabilitation program that includes brief immobilization followed by functional rehabilitation allows the athlete to return to play within 6 to 8 weeks without the need for further treatment. If the patient has not improved within that time, then a more thorough evaluation should be performed. This typically includes MRI evaluation. Findings may include an osteochondral lesion of the talus or a peroneal tendon tear that warrants further management. A study of recurrent injuries in high school athletes found that most such injuries involve the ankle (28%).

Eversion
Eversion ankle injury, the so-called high ankle sprain, can result in injury to the tibiofibular syndesmosis. High ankle sprains account for only 1% of ankle sprains, but they are predictive of a longer period of recovery and residual symptoms. These injuries occur most frequently in collision sports. A review of players on one NFL team over a 6-year period found 15 players with syndesmotic ankle sprain. Athletes in the syndesmotic group required substantially more treatment and missed significantly more games and practices than did the 28 players with significant lateral ankle sprain.

Diagnosis
The most common mechanism of injury is direct contact to the lateral leg while the foot is fixed to the ground. The resultant valgus moment on the knee leads to an external rotation or eversion force at the ankle with the foot in dorsiflexion, which places stress on the syndesmotic ligaments. There may be an associated injury to the medial collateral ligament of the knee.

The physical examination elicits tenderness directly over the syndesmosis, with swelling or ecchymosis proximal to the ankle joint. The squeeze test is performed by attempting to compress the fibula to the tibia more proximally on the injured leg. Pain with this maneuver is considered to be a pathognomonic symptom. An external rotation test can be performed. As the athlete stands on the affected limb, the examiner asks him or her to recreate the mechanism of injury by rotating the pelvis away from the affected side (ie, single-limb standing stress test). An attempt at a single-limb calf raise may also be helpful in identifying a clinically significant high ankle sprain. An increase in pain or tenderness or a semblance of instability with any of these maneuvers is considered to be diagnostic.

Imaging studies are helpful in delineating the degree of acute syndesmotic injury (Table 3). MRI may demonstrate edema through the syndesmotic ligament complex or flexor hallucis longus muscle in the region of the posteroinferior tibiofibular ligament. However, MRI may not be helpful in determining definitive management because this static test fails to highlight instability patterns.

To help elicit instability, three radiographic views of the ankle should be obtained; special attention should be paid to the syndesmosis and the medial clear space. Radiographic parameters for tibiofibular overlap are demonstrated in Figure 2. A medial clear space is a measure of the distance between the lateral border of the medial malleolus and the me-

### Table 2

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description/Findings</th>
<th>Treatment</th>
<th>Return to Play</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Attenuation of plantar structures</td>
<td>Individualized based on the symptoms</td>
<td>As tolerated</td>
</tr>
<tr>
<td></td>
<td>Localized swelling</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimal ecchymosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Partial tear of plantar structures</td>
<td>Walking boot, crutches as needed</td>
<td>Taping may be required for ≥2 wk</td>
</tr>
<tr>
<td></td>
<td>Moderate swelling</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restricted motion because of pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Complete disruption of plantar structures</td>
<td>Long-term immobilization in a boot or a cast or surgical reconstruction</td>
<td>10-16 wk, depending on sport and position</td>
</tr>
<tr>
<td></td>
<td>Significant swelling/ecchymosis</td>
<td></td>
<td>Taping or bracing likely needed</td>
</tr>
<tr>
<td></td>
<td>Hallux flexion weakness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frank instability of the hallux metatarsophalangeal joint</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

dial border of the talus. With the ankle in neutral position, the medial clear space should be equal to the superior clear space on the mortise view. Both deviation from the radiographic syndesmotic parameters and widening of the medial clear space are suggestive of syndesmotic injury and ankle instability (Figure 2, B).

Diastasis and instability can be further highlighted on a single-limb standing AP ankle radiograph, which serves as a simple stress maneuver. If doubt persists regarding ankle stability, an external rotation stress radiograph, aided by fluoroscopic imaging, should be obtained as a definitive diagnostic tool. This is performed by manually applying an external rotation and abduction force to the ankle and evaluating the mortise view using the same parameters as those used with standard radiographs. Some biomechanical evidence suggests that lateral views of the ankle are more sensitive than the true mortise view on stress testing. Thus, when the stability of the syndesmosis remains in question, the surgeon should consider obtaining a lateral radiograph under stress testing.

Management

The absence of radiographic widening is indicative of a stable injury, and the patient can be treated nonsurgically. A tall boot is worn until the injury is no longer tender, at which time therapeutic exercise is begun and the patient is allowed gradual return to activity. The athlete should be given appropriate expectations about recovery time because it can take as long as 6 weeks to achieve full recovery. The ability to hop on the affected extremity 15 times is a good indicator for an attempted return to sport.

Widening of the medial clear space or syndesmosis on external rotation or standard plain radiographs indicates instability requiring surgical stabilization. This typically consists of open reduction of the syndesmosis and screw fixation. Recently, there has been increased use of a suture-button device for syndesmotic fixation, with some evidence of more rapid recovery and improved outcome scores. Our preferred method of fixation in the elite athlete includes the use of a small plate incorporating one syndesmotic screw as well as one suture button (Figure

### Table 3

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Radiographic Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sprain without diastasis</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>Latent diastasis</td>
<td>Normal non-weight-bearing film Positive external rotation stress view</td>
</tr>
<tr>
<td>3</td>
<td>Frank diastasis</td>
<td>Edwards and DeLee classification: type I, lateral subluxation without fracture; type II, lateral subluxation with plastic deformation of fibula; type III, posterior subluxation/dislocation of the fibula; type IV, superior subluxation/dislocation of the talus into the mortise</td>
</tr>
</tbody>
</table>


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**Figure 2**

Ankle radiographic parameters. **A**, Normal syndesmotic relationships include a tibiofibular clear space (open arrows) <6 mm in both the AP and mortise views, as well as a tibiofibular overlap (solid arrows) >6 mm or >42% of the width of the fibula on the AP view, or >1 mm on the mortise view. The overlap is measured 1 cm proximal to the plafond. **B**, AP radiograph demonstrating a widened syndesmosis and increased medial clear space. (Panel A reproduced from Stephen D: Ankle and foot injuries, in Kellam JF, Fischer TJ, Tornetta P III, Bosse MJ, Harris MB, eds: Orthopaedic Knowledge Update: Trauma 2. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2000, p 210.)
3). The syndesmotic screw is removed at 10 to 12 weeks, but the suture button is left in place as an adjunctive fixation tool that affords protection while allowing motion between the tibia and fibula. The retained fibular plate protects against stress fracture through the empty screw hole.

**Tarsometatarsal (Lisfranc) Joint Injury**

Injuries to the tarsometatarsal (ie, Lisfranc) joint suffered during athletic activity are much different from those occurring from high-energy trauma. Such injuries most commonly occur as a result of an axial loading mechanism (ie, force to the back of the heel with the forefoot fixed to the ground), which usually creates a purely ligamentous injury pattern. The athletic injuries may have subtle clinical and radiographic findings, and they are easy to miss on initial evaluation; thus, a high index of suspicion is necessary to diagnose and treat these injuries appropriately.

**Diagnosis**

Athletes often describe feeling a “pop” in the foot at the time of injury and midfoot pain that is aggravated by weight bearing. Pain is elicited with compression of the midfoot, swiveling into pronation and supination, or stressing the first ray into dorsal and plantar deviation while stabilizing the second metatarsal head.

Standard weight-bearing radiographs of both feet should be obtained, including a 30° internal oblique view, with the radiograph of the uninjured foot used for comparison. The diagnosis of an unstable Lisfranc injury has historically been based on displacement of >2 mm between the first and second metatarsal bases compared with the contralateral foot (Figure 4). A small avulsion fragment may be seen arising from either the lateral edge of the medial cuneiform or the medial aspect of the second metatarsal base (ie, fleck sign).

Stress radiographs taken with the foot held in a pronated and abducted position are important when a diagnosis of midfoot injury is suspected but the radiographic findings are normal or equivocal. MRI can be used to diagnose subtle and purely ligamentous midfoot injuries in the absence of subluxation or dislocation, but it is not necessary when diastasis is clearly seen on plain or stress radiographs.

**Management**

In the athlete, nonsurgical treatment is indicated for Lisfranc sprain with a nondisplaced, stable midfoot documented on stress radiographs. Surgery is recommended in the presence of unstable ligamentous injuries. Most authors set the threshold for surgical intervention as displacement of ≥2 mm compared with the contralateral foot.

Obtaining and maintaining anatomic reduction, thereby preserving the posture of the midfoot, is the most important objective of surgical...
Stress Fracture

Stress fractures are among the most common overuse injuries and are potentially serious in the athlete. The great majority of such fractures involve the lower extremity, especially the tibia and bones of the foot. Stress fractures are common in athletes who engage in repetitive activities, especially runners. Such fracture may result in complete fracture that may heal slowly and/or incompletely. Stress fractures are often associated with an increase in training intensity, major change in training program, change in shoe wear, and hard running surfaces.

The cause of stress fracture is related to repetitive loads; the highest incidence generally is found in distance runners and dancers. The incidence of tarsal and metatarsal stress fracture is higher in runners with forefoot varus and hindfoot varus. Despite increased awareness of the injury, certain stress fractures about the foot and ankle remain particularly problematic, including those of the navicular, proximal fifth metatarsal, and medial malleolus. These injuries are often misdiagnosed and may occur at a higher frequency than was previously understood. For example, the navicular is at risk for delayed healing because of areas of poor blood supply, and medial malleolar stress fractures have a high incidence of displacement and nonunion. These injuries frequently require surgical stabilization.

Diagnosis

A thorough history and physical examination can aid in diagnosis. The athlete with a stress fracture often describes prodromal activity-related pain associated with varying amounts of swelling. This pain is frequently associated with an abrupt change in the training regimen. Point tenderness often develops at the site of the stress fracture. A one-legged hop test may also elicit pain, as may percussion over the site that is concerning.

Plain radiographs are often negative, and the examiner should have a low threshold for obtaining a more sophisticated imaging study. Bone scan is sensitive but not specific. MRI is the preferred test because it has a very high sensitivity and specificity. Once the fracture is identified, CT is performed to determine whether the fracture is incomplete or complete. We define high-risk stress fractures as follows: fifth metatarsal metaphyseal fracture, medial malleolar stress fracture, navicular stress fracture, and stress fracture of the anterior tibial cortex. These deserve special consideration because they are more likely to result in fracture displacement and/or nonunion.

Management

Most stress fractures can be managed nonsurgically. This initially entails immobilization in a boot or cast along with protected weight bearing until the symptoms have resolved, usually for approximately 6 to 8 weeks. Impact activities are avoided, but low-impact cross-training, such as swimming, biking, and elliptical machines, can be continued to maintain aerobic conditioning. Frequent physical examination is helpful in identifying resolution of symptoms. Orthoses can be used and shoe modifications made to prevent further injury. Nutritional considerations are important because eating deficiencies can contribute to the development of stress fracture. Recent data recommend early surgical management of high-risk stress fractures in the elite athlete because of the risk of high displacement and nonunion; early surgical management is also associated with a quicker return to sports activities (Table 4).

Preventive Measures

In general, care of foot and ankle injuries is improving as physicians and trainers become better educated about these injuries and their management. Athletes are becoming bigger, stronger, and better conditioned, and higher-energy injuries are becoming more common. Fortunately, sporting leagues such as the NCAA,
NFL, and Fédération Internationale de Football Association have been reporting on injuries to their athletes in an attempt to establish risk factors and create preventive measures to keep their athletes on the field. Modifications in shoe wear and playing surface may further help in reducing the number and severity of injuries about the foot and ankle in athletes at all levels.

Shoe wear may have a role in increased rates of injury. Use of lightweight, flexible shoes with less cushioning and midfoot support may place the athlete at risk because these shoes may offer less protection against potentially harmful forces in the foot. Studies on the use of insoles have demonstrated variable results. One study showed a decreased rate of overuse injury with the use of insoles, but another study showed no difference in the rate of injury. It is likely that a combination of factors has led to increased rates of foot and ankle injury in athletes. Optimal shoe-surface interaction would allow for high friction and traction with low risk of torque-related injury. The threshold for torque injury has yet to be determined, and there remains a delicate balance between performance (ie, high traction coefficient) and risk (ie, excessive torque). Today, most competitive athletes seek high performance whenever possible. It is our responsibility as physicians to educate these athletes on the medical risks of seeking performance over safety.

**Summary**

Foot and ankle injuries in competitive sports are prevalent and appear to be increasing in number. Expanded reporting by sports governing bodies on athletic injuries enables us to better recognize and manage specific foot and ankle injuries with a primary goal of efficient and safe return to play. A thorough initial evaluation is the most important part of care for any athlete. Close attention to subtle examination findings may help accurately identify injuries such as turf toe, high ankle sprain, Lisfranc ligament injury, and stress fracture, for which early diagnosis and management are paramount to successful return to play. Investigators continue to seek methods of protection for athletes as their training and abilities continue to progress to new levels. It is important to keep in mind that, ultimately, the athlete is a patient, and appropriate care and long-term outcomes should not be compromised by the pressure to return to play.

**References**

*Evidence-based Medicine: Levels of evidence are described in the table of contents. In this article, references 17, 29, and 35 are level I studies. References 18, 19, 32, 37, 43, 50, and 53-58 are level II studies. References 24, 25, 28, 33, 34, and 46-48 are level III studies. References 2-5, 20, 27, 38, 40-42, 45, and 48 are level IV studies. References 22, 23, 26, 30, 36, 39 and 51 are level V expert opinion.*

Citation numbers printed in **bold type** indicate references published within the past 5 years.

1. Dick R, Agel J, Marshall SW: National...


