



Turf Toe Surgical Methods and Post Management

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Abstract

Turf toe is a relatively rare but serious injury of the 1st metatarsophalangeal joint (MTP). This injury most commonly occurs in the athlete due to initial hyperdorsiflexion of his MTP joint. Turf toes can cause significant morbidity and loss of playing time in elite athletes.

Keywords: Turf toe; metatarsophalangeal (MTP); plantar plate; sesamoids

Introduction

A lawn toe is an injury to the hallux-metatarsal-phalangeal joint complex. Most commonly, this is due to excessive dorsiflexion moments of the proximal phalanx at the metatarsal heads, leading to tension impairment of plantar capsule structures. This often involves plantar plate, flexor hallucis brevis tendon, and sesamoid injuries. The term turf toe was first coined by Bowers in 1976 when West reported 27 injuries after he installed first-generation synthetic turf at the University of Virginia. At the time, the authors concluded that the injury was caused by a combination of a hard playing surface and relatively flexible shoes [1]. Soon after, Coker and colleagues reported having the same injury at the University of Arkansas after implementing a similar artificial turf. The authors reported an average of six turf toe injuries per season. Ankle injuries were more than eight times more common, but they missed more seasons than ankle sprains [2]. In Clanton's series, which evaluated Rice University players from 1971 to his 1985, he estimated that he had 4.5 lawn toes per season, with the average player missing about a week. It is taken. The authors also concluded that the condition may be due to overly flexible shoes on hard playing surfaces [3]. Rodeo was the first to report injuries in American professional football. A survey he conducted of eight active football players found that 45% suffered from what appeared to be turf toe injuries. His 83% of players believe the injury occurred on artificial turf [4]. These early studies helped define turf toe injury mechanisms and stimulated debate about risk factors for flexible footwear on unforgiving playing surfaces. The incidence of lawn toe injuries among college and professional soccer players has been shown to be lower than previously reported. At the 2006 National Football League Combine, 11% of his athletes reported toe injuries, with running back and Linebacker being the most commonly affected positions [5-7].

Anatomy

The anatomy of the first metatarsophalangeal (MTP) consists of a complex relationship between bony, capsular, and musculo-tendon elements. The first MTP joint supports nearly 50% of your body weight during normal walking, up to 2-3 times your body weight during motor activity, and up to 8 times your body weight during sprints and jumps [8, 9]. The head of the first metatarsal and the phalanx join to form the condylar joint, which has inherently less stability and can be classified as a flat, rounded, or angular joint. The medial and lateral sesamoids lie within the tendon of the flexor hallucis brevis (FHB) tendon plantar to the head of the first metatarsal. 10% of the population has his bipartite sesamoids, 25% of these are bilateral and the medial sesamoids are more commonly his bipartite. The medial sesamoid is larger, more distal, and carries more weight. Sesamoids work to increase the first row plantar flexor force by increasing the moment arm of the endogenous flexor

muscle at the plantar side of the metatarsal head and distributing the force across the metatarsal head [10]. The sesamoid bones are stabilized by a network of capsular structures that include metatarsal-sesamoid, phalange-sesamoid, and interseamal ligaments. The plantar plate is a rigid soft-tissue complex that arises as a thin continuation of the periosteum at the distal metaphysis of the 1st metatarsal plantar and is inserted as a strong fibrocartilage attachment to the proximal phalanx. Attachments to the plantar plate include the collateral ligaments, the transverse metatarsal ligaments, the plantar fascia, the abductor and adductor muscles, and the flexor hallucis brevis tendon. Johnston found the plantar plate to be about 2 cm long, 1 cm wide and 2-5 mm thick [11].

Mechanism of Injury

The most common mechanism of injury is that the foot is plantarflexed and the ankle is pinned to the ground in a pointed position. Axial loads on the ankle, typically caused by another player dropping onto the ankle, force the MTP into hyperextension and put the capsular ligamentous structures of the plantar joint into tension. This can also be combined with hallux valgus or varus elements that damage other stabilizing collateral structures.

Clinical Assessment

Patients often present with early MTP joint pain and often have significant memories of the injury. However, given the vague presentation of forefoot pain during strenuous activity and the rarity of the injury, an index of high suspicion should be maintained for diagnosis. Swelling and bruising are common. The pain can be exacerbated by weight bearing, especially during the heel lift phase. Other test signs may include lateral limb loading to relieve the injured area, decreased range of motion, and positive Lachman. Patients may also have valgus or varus instability if the injury compromises the medial or lateral stabilizing structures, respectively.

Classification

A classification system has been modified over several years but

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was initially proposed by Clanton and Ford [12].

Grade 1: Complex ligamentous sprain. Weakness of plantar structures with focal swelling and minimal ecchymosis. This represents a microtear of the ligament. The first her MTP joint is still functional and able to resist dorsiflexion. Treatment is symptomatic and return to sport is his one week scheduled within.

Grade 2: Partial tear of the ligament. Injuries include partial tearing of plantar structures with moderate swelling and limitation of movement.

Grade 3: Complete ligament tear. The injury consists of complete destruction of the plantar structure with weakness and instability of hallux flexion. This can occur with a dorsal dislocation. Damage associated with the articular surface of the MTP joint can also occur when the proximal phalange impinges or shears the articular surface of the metatarsal head. Surgery is often indicated in this group, especially in athletes. Recovery may take him up to six months.

Grade I injuries are characterized by plantar capsule stretching with minimal symptoms. Grade II injuries include partial lacerations and are often accompanied by moderate pain and swelling. Grade III injuries involve complete rupture of the plantar capsule with considerable tenderness and swelling. Grade III injuries most often result in a positive dorsal drawer test. They may also have injuries related to MTP joint structures [13].

Imaging

Non-surgical treatments are commonly considered for Type I and Type II grass toe injuries. Non-surgical treatments are commonly considered for Type I and Type II grass toe injuries. Initial treatment begins with standard techniques to reduce inflammation, such as rest, ice, and elevation. Depending on the level of discomfort, stiff-soled shoes, hiking boots, or toe casts can be used to reduce the torsional load across the MTP joint. To avoid the risk of constrictive ischemia, taping in the immediate area is not recommended due to acute swelling. Once the swelling subsides, conservative treatment for grade I and II injuries is taping the big toe in slight plantarflexion to attach the partially torn fibers and limit further cushioning. Range of motion can begin with passive plantarflexion in the first week. Experts recommend starting with low-impact activity, where the toes are protected from passive dorsiflexion, and gradually increasing activity to full push-out as long as the pain does not increase. You can expect to miss at least two weeks for a Grade I injury and up to three months for a Grade II injury before a full return to sport can be expected. When athletes return to competition, we recommend incorporating a carbon fiber plate or Morton extension into their shoes. Depending on the level of discomfort, stiff-soled shoes, hiking boots, or toe casts can be used to reduce the torsional load across the MTP joint. To avoid the risk of constrictive ischemia, taping in the immediate area is not recommended due to acute swelling. Once the swelling subsides, conservative treatment for grade I and II injuries is taping the big toe in slight plantarflexion to attach the partially torn fibers and limit further cushioning. Range of motion can begin with passive plantarflexion in the first week. Experts recommend starting with low-impact activity, where the toes are protected from passive dorsiflexion, and gradually increasing activity to full push-out as long as the pain does not increase. You can expect to miss at least two weeks for a Grade I injury and up to three months for a Grade II injury before a full return to sport can be expected [14]. When athletes return to competition, we recommend incorporating a carbon fiber plate or Morton extension into their shoes.

Treatment

There are several well-established indications for operative treatment of a turf toe injury. These may include large capsular avulsions, diastasis of a bipartite sesamoid, sesamoid fractures, retracted sesamoids, traumatic hallux valgus, vertical instability, loose bodies, chondral injury, and failure of conservative treatment.

Surgical procedures are generally performed by one of two approaches. An "L"-shaped medial longitudinal incision, which usually curves the plantar laterally at the 1st MTP joint, allows retraction of the flap and access to the plantar plate [15]. A medial longitudinal incision with a separate second lateral plantar incision can also be considered. In general, when the plantar capsule is repairable, the authors primarily repair the tissue with multiple simple sutures passing through the proximal and distal tissue stumps. These are tied to the big toe with a slight dorsiflexion. In weakened tissue, advancing the plantar capsule through the proximal phalange bone tunnel is the preferred technique. Use a small dorsal incision overlying the MTP joint to facilitate suture passage. Given the small working space, suture placement can be aided by a suture passing device [16]. Four sutures (eight strands) distal to the sesamoid are placed in a proximal tissue stump in a mattress-like manner. Four holes are drilled at the base of the proximal phalanx distal to the articular surface. The suture link is then passed through the bone tunnel and tied over the bridge of the bone with the toes slightly plantar flexed. The senior author (JF Doty) placed the patient in a splint regularly for her first two weeks, after which the patient was changed to a stiff-soled boot or shoe, allowing heel loading for up to six weeks postoperatively. Passive plantar flexion begins at the 2-week postoperative visit while the surgical incision heals [17]. After 6 weeks, the patient can be placed in well-cushioned athletic shoes with graphite calf plates or carbon fiber calf inserts to support the hallux as gait progresses. Return to sport conditioning begins at 3 months with a goal of full sport return at 6 months. Some evidence suggests that athletes should be informed that it may take up to 12 months before they can return to competitive sport.

Outcomes

Given the rarity of surgical treatment of these injuries, outcome data are generally limited to small case series [18]. Waldrop reported on 15 of his notable athletes who underwent grade III turf toe surgical repair. At a mean of 28 months after surgery, her VAS pain scores at rest and during activity were less than. The average return to play was his 16.5 weeks, with all athletes participating using custom-made insoles and one patient requiring repeat surgery for persistent pain. In 2002, Anderson reported on his 19 turf-toed high-performance athletes, of whom he had nine surgeries. Seventeen of the 19 returned to full physical activity without complications [19]. Drakos presents 3 of her cases, 2 of which were treated surgically over her 4 years. Each player was able to play football at a high level again after about six months. Clanton reported her 20 cases with a median follow-up of 5 years and found that nearly half of the patients had some degree of persistent pain and stiffness in the big toe [20]. In summary, rehabilitation and return to play for a serious grass toe injury can take 6-12 months, and most athletes can eventually return to high levels of athletic activity. Patients should be educated that long-term stiffness and occasional pain in the toes are not uncommon in chronic problems following significant injury to the turf toe.

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