

# Common Runners/Walkers Foot Injuries

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## ABSTRACT

*This is my 35<sup>th</sup> year of running most days a year. That was correct most days a year not a week. Running is my first priority each day. Developing a routine will assist those who want exercise to become a habit. After I awake I drink a glass of water and a cup of coffee then my dog “Jazz” and I hit the streets for a 3-4 mile run. Later in the day, we walk one to two miles after going to the gym to lift weights. I will admit that I am very addicted to running and working out. I enjoy the physical, psychological, and health benefits. This paper will focus on common foot injuries. There are several foot injuries that runners or walkers may suffer. Most of the injuries on that list may result from overuse. Other problems of the foot maybe related to chronic injuries that develop over a period of time. According to Mike Walden, a former teacher of sports injuries, sports massage, and sports science, “the average runner has between 37-56% risks of injury during the course of a year’s training.” (Walden 2005) Plantar fasciitis, metatarsal stress fractures, metatarsalgia, blisters, turf toe, and Morton’s neuroma will be the focus of this paper.*

**Keywords:** foot injuries, causes of runners foot injuries, causes of walkers foot injuries, identification of various foot injuries, symptoms of various running, symptoms of walking foot injuries

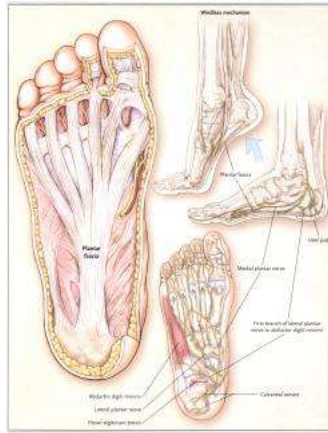
## INTRODUCTION

This paper will focus on common foot injuries. There are several foot injuries that runners or walkers may suffer and most of these injuries may result from overuse. Other problems of the foot maybe related to chronic injuries that develop over a period of time. According to Mike Walden, a former teacher of sports injuries, sports massage, and sports science, “the average runner has between 37-56% risks of injury during the course of a year’s training.” (Walden 2005) Specific injuries discussed will include common foot injuries such as plantar fasciitis, metatarsal stress fractures, metatarsalgia, blisters, turf toe, and Morton’s neuroma.

## PLANTAR FASCIITIS

Pain related to Plantar Fasciitis (Figure1) involves the inferior heel at the origin of the arch ligament. When placing weight on the foot pain symptoms appear. Pain is most common at the attachment of the heel bone. Tenderness and swelling under the heel may be associated with the injury. (Prentice 2005) According to Rachelle Buchbinder, plantar fasciitis is not only the most common cause of pain in the inferior heel, but is responsible for approximately ten percent of all running injuries. In addition, plantar fasciitis accounts for 11 to 15 percent of all adult foot symptoms requiring the care of a professional. (Buchbinder 2004) This injury is near the origin of the plantar fascia at the medial tuberosity of the calcaneus. Plantar fascia (plantar aponeurosis) is a broad flat band of dense connective tissue that runs the entire length of the sole of the foot. The non-elastic band of tissue connects proximally to the medial surface of the calcaneus. The main function of this tissue is to provide support for the foot and protect the longitudinal arch. Plantar fasciitis develops as a result of tension that occurs in the plantar fascia during extension of the toes and depression of the longitudinal arch during weight bearing activities. The development of plantar fasciitis is baffling. There may be several factors that play a role in the development of the condition. Some of these factors include obesity, excessive pronation of the foot, heel spurs, prolonged periods of standing, reduced ankle dorsiflexion, and high arches. The individual may experience the most pain in the morning or with increased physical activity over a period of time. The pain may subside as the foot warms up, but may

worsen during the day due to extended periods of walking. Since plantar fasciitis is frequent among runners, the assumption is that it results from repetitive microtrauma. (Prentice 2006)



**Figure1 Plantar Fasciitis (Buchbinder 2004)**

## **STRESS FRACTURES**

Metatarsal stress fractures (Figure 2) are common foot injuries that occur most frequently in running and jumping sports. Overuse is the primary cause of stress fractures. According to Prentice and Arnheim, this injury commonly occurs because of structural deformities in the foot, changes in training surfaces, training errors, or wearing inappropriate shoes. (Prentice and Arheim 2005) Additional causes may include a sudden change in training patterns, running hills, running on hard surfaces, or increasing the amount of mileage the athlete runs. As stated by Prentice, the most common type of metatarsal stress fracture involves an injury to the shaft of the second metatarsal. The March Fracture is another name for Stress fractures (as in soldiers marching). Athletes that suffer from conditions such as flat foot, structural foot vargus, hallux valgus, or a short first metatarsal may be at an increased risk for this type of injury. Another frequently seen stress fracture affects the fifth metatarsal and takes place at the intersection of the peroneus brevis tendon. The athlete typically complains of tenderness along the bone in the midfoot. (Prentice 2006)



**Figure 2 Stress Fracture (Prentice and Arheim 2005)**

## BLISTERS

Blisters (Figure 3) are common among runners. The shearing forces or repetitive friction that acts on the skin forms blisters. Soft skin accompanied by the shearing stress to the skin may produce a blister. When this happens, fluid accumulates below or within the outer skin layer known as the epidermis. The fluid may be clear or bloody hence the name blood blister. (Prentice and Arnheim 2005) A superficial blister contains clear fluid compared to the disrupted deep tissue of a blood blister causing the rupture of blood vessels. Blisters may cause runners a significant amount of pain if not treated properly. There are many preventative measures an athlete may undertake when treating blisters. By applying a skin lubricant to the area of the skin where the repetitive friction occurs, wearing correctly fitting shoes, and making sure there are no wrinkles or folds in the socks may prevent the development of blisters. In case of a friction area or hot spot, an athlete may place a material known as second skin or a piece of moleskin on the hot spot, which reduces the amount of friction in the covered area. The following methods have proven to be effective in the prevention and treatment of blisters. The individual may apply ice to the hot spots as a preventive measure. As a blister forms, the athlete may complain of feeling a hot spot, or a sharp burning sensation in the area. The pain that is accompanied by a blister is due to the accumulation of fluid and the pressure exerted on the nerve endings near the skin. The application of ice may reduce the buildup of fluid, reduce the size of the hot spot, and relieve pain. (Prentice 2006)



Figure 3 Blisters (Green & Murray 2007)

## METATARSALGIA

An athlete who suffers from metatarsalgia (Figure 4) complains of having pain at the distal portion of the mid-foot directly over the balls of their feet. (Orthopedic Institute 2006) Some of the primary causes of metatarsalgia include the limited extensibility of the gastrocnemius and soleus muscles, a fallen metatarsal arch, or cavus deformity. These injuries develop after the skin has been pinched against the inelastic callus; causing the athlete to experience pain when placing weight on the forefoot. (Prentice 2006) An additional symptoms include pain that occurs during palpation or when running and jumping. (Orthopedic Institute 2006) The most common site of this injury takes place beneath the head of the second and third metatarsals. A heavy callus may form in the area as a result of the condition. The athlete experiences pain due to the flattening of the transverse arch causing the depression of the heads of the second, third, and fourth metatarsal bones. The symptoms associated with this condition increase with the mechanism of hyperextension. (Prentice 2006)

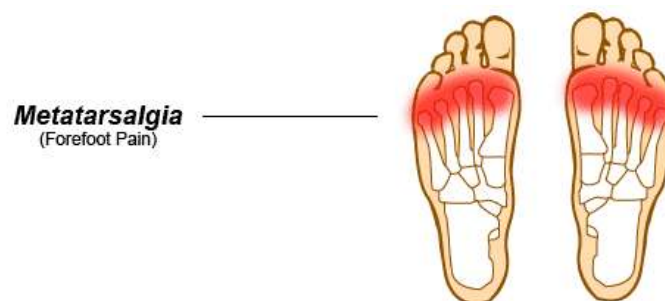


Figure 4 Metatarsalgia (Orthopedic Institute 2006)

### **MORTON'S NEUROMA**

According to Prentice, Morton's Neuroma (Figure 5) usually takes place between the heads of the third and fourth metatarsal and is the most frequent nerve problem of the lower extremity. The above location is where the nerve is the thickest; therefore, it receives branches from both the medial and lateral plantar nerves. (Prentice 2006) A neuroma is a mass that occurs in relation to the nerve sheath of the common plantar nerve at the point at which it separates into the two digital branches of the adjacent toes. The characteristics of this injury includes the inability of the great toe to dorsiflex, severe pain starting from the distal metatarsal head that spreads to the tips of the toes, and a burning numbness between or in the toes. (Prentice and Arnheim 2005) In addition to the above symptoms, the collapse of the transverse arch may irritate the injury by stretching the transverse metatarsal ligaments and compressing the common digital nerve or vessels. (Prentice 2006)



**Figure 5 Morton's Neuroma (Hughes, etc. 2007)**

### **TURF TOE**

Turf toe (Figure 6) is a hyperextension injury, which results in a sprain to the metatarsophalangeal joint of the great toe commonly known as the "big toe". This type of injury may result from repetitive overuse or by a specific trauma to the foot. (Prentice 2006) The most common mechanism that causes turf toe is the application of a downward force. Turf toe accounts for more than eighty percent of toe injuries. Turf toe causes the great toe to become dorsiflexed beyond biomechanical limits; resulting in a tear of the capsule. An athlete with turf toe may experience a significant amount of pain and swelling around the injured joint. (Prentice 2006) As stated by the staff at the Orthopedic Institute, the pain occurs at the metatarsophalangeal joint where the big toe attaches to the foot. The magnitude of pain increases when the athlete pushes off on the injured foot. Pain may occur when the foot is moved in extension, or when running or jumping. (Orthopedic Institute 2006)



**Figure 6 Turf Toe (Sports Injuries 2007)**

## CONCLUSION

The common foot injuries discussed above included plantar fasciitis, metatarsal stress fractures, metatarsalgia, blisters, turf toe, and Morton's neuroma. As Mike Walden, a former teacher of sports injuries, sports massage, and sports science, stated "the average runner has between 37-56% risks of injury during the course of a year's training." (Walden 2005) This means that one-third to one-half of those of us who are serious runners or walkers will suffer from some sort of foot injury. Some of these injuries may develop into chronic injuries that may lead to medical care. Cross training and rest may prevent the acquisition of chronic injuries and the need for medical attention. An excellent substitute for running may be swimming or bike riding. Both of these modes of training may relieve stress on the feet and maintain high levels of personal fitness.

## AUTHOR INFORMATION

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**Matt Ihlers & Calin Haar** are outstanding students enrolled at Dakota State University. Their goal is to someday work as a physical therapist or athletic training.

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