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Medial Ankle Ligament Injuries in Athletes

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Ankle sprains with injuries of the lateral or medial ligament complex have a high incidence in daily life and sports. Therefore, an appropriate concept for clinical examination, diagnosis, and surgical treatment is mandatory. Although clinical presentation and treatment modalities are well described for the lateral ligaments, little is known about the medial ankle and its ligament injuries. The purpose of this article is to provide an update of clinical examination, diagnosis, and treatment for these complex ligament injuries and report the primary results of our treatment concept.

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Introduction

Ankle sprains are among the most common injuries in daily life, especially in sports. Acute ligament injuries of the ankle joint account for as many as 15%-25% of the injuries treated in medical practice[1] and 10%-30% of all injuries in sports,[2-4] thus playing an important socioeconomic role. In a systematic large-scale review, Fong et al[2] showed that ankle injury and ankle sprain incidences were highest in team sports and court games, such as rugby, soccer, volleyball, handball, and basketball.

The ankle joint and the surrounding ligaments, which are involved in stabilizing the hindfoot and in guiding passive joint motion, represent a complex structure. One of these ligaments is the deltoid ligament that spreads in a fan-shaped manner over the medial part of the ankle joint and is an important structure with regard to stability against valgus and rotatory forces. It consists of 6 distinct components: 4 superficial and 2 deep ligaments. The superficial ligaments (tibiospring ligament [TSL], tibionavicular ligament [TNL], superficial posterior tibiotalar ligament [STTL], and tibiocalcaneal ligament [TCL]) cross the ankle and the subtalar joint, while the deep components (deep posterior tibiotalar ligament [PTTL] and anterior tibiotalar ligament [ATTL]) only cross the ankle joint.[5] Because of the broad insertion of the superficial deltoid ligament on the spring ligament, this complex also plays an important role in the stabilizing function of the medial ligaments. The superficial layers of the deltoid ligament particularly limit the talar abduction, while the deep layers limit the external rotation.[6] Both deep and superficial layers are equally effective in limiting pronation of the talus.

In ankle sprains, the deltoid ligament is injured more often than generally believed.[7] Deltoid ligament injuries can also occur as concomitant injuries accompanying lateral or bimalleolar fractures. They mostly occur in a pronation-eversion mechanism at the level of the ankle joint, with a higher risk in patients with a pre-existing, increased pronation deformity of the foot, such as valgus-flat foot deformities.[8] In an arthroscopic assessment of 288 acute ankle fractures, the medial ligaments were injured more frequently than clinically expected (39.6%).[9] A further mechanism of deltoid ligament injuries is the supination-external rotation injury, in which stage IV also includes the tears of the deltoid ligaments due to the excessive lateral rotation of the talus. In addition, this lateral rotation can result in tears of the tibiofibular and interosseous ligaments at the syndesmosis.

The purpose of this article is to provide an update of clinical examination, diagnosis, and treatment for these complex medial ligament injuries and report the primary results of our treatment concept.

Clinical Findings and Diagnosis

Patients with an acute injury of the medial ligaments usually give a history of an eversion-pronation trauma and pain in the anteromedial part of the ankle joint. Generally, a hematoma and tenderness along the deltoid ligament are present. Furthermore, loading of the ankle joint is critical and associated with a feeling of instability.

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Figure 1 Anterior drawer test. To assess the medial ankle instability, the examiner grasps the calcaneus and the hindfoot with one hand, while stabilizing the distal tibia with the other hand. In a slight plantarflexed position, the hindfoot can be translated anteriorly in the case of ligament insufficiency. (Color version of figure is available online.)

In cases where medial ankle instability has become a chronic problem, making an accurate diagnosis may be more demanding. Again, paying attention to a patient's history and the physical examination of the affected foot are the most important steps. These patients usually report a medial or anteromedial "giving way", especially while walking down a hill or stairs. A hallmark in getting the diagnosis is the palpation pain at the medial gutter of the ankle joint.[7] Not only do the injured ligaments themselves, but the synovitis of the medial part of the ankle joint are also responsible for this anteromedial pain. The laxity of the medial ankle can be detected manually by the examiner performing a varus-valgus stress test and the anterior drawer test (Fig. 1). While standing on both feet, the laxity of the medial ankle can be seen in a more pronounced hindfoot valgus and pronation of the affected foot when compared with the contralateral unaffected foot. This deformity typically disappears when the patient is asked to stand on tiptoe (Fig. 2).

In the case of secondary posterior tibial muscle dysfunction, tenderness along this tendon can be found. Furthermore, a loss of supination strength may be present, and thus the valgus deformity typically does not disappear when patients are asked to go on tiptoe. Other common concomitant injuries are listed in Table 1.

A further important clinical method is gait analysis, which allows detection of a pre-existing valgus-flat foot deformity in the contralateral foot. This is known to be a risk factor for pronation-eversion trauma.

Figure 2 In the upper left image, the patient shows an increased hindfoot valgus and forefoot pronation. When standing on tiptoe, these findings disappear because of the strength of the intact posterior tibial muscle. If the patient is asked to activate the left anterior tibial muscle, the valgus-pronation deformity also disappears (lower right image).