

Posterior Tibialis Tendonitis in Dancers

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Abstract

Dance is a fascinating artistic activity, although highly demanding as regards physical and technical skills. It forces dancers in major loads which lead to musculoskeletal problems, with ankle injuries being undoubtedly amongst the most common dance injuries.

Posterior Tibialis Tendonitis although not common, it may be a debilitating pathology affecting female classical ballet dancers, especially when anatomical foot abnormalities are present.

Clinicians dealing with dance injuries should be aware of this existing, although rare pathological entity, due to the fact that it may prove to have harmful influence on a dancer's career.

In this review an analysis of the basic aspects of pathogenesis, diagnosis and treatment of this specific clinical entity is conducted, with special focus on dancers.

Keywords: Posterior tibialis; Tendonitis; Dance injury; Ballet

Introduction

Dance is an enchanting activity that requires tremendous and optimized physical and technical skills. It forces dancers in major loads which lead to musculoskeletal injuries, with ankle injuries being undoubtedly amongst the most common dance injuries [1-3].

In a series of studies the incidence of dance related ankle injuries vary between 4,7% an 54% with soft tissue lesions representing a great proportion of these ailments [1].

Although Flexor Hallucis Longus Tendonitis (FHL) is a well recognized pathology affecting the female classical ballet dancers, Posterior Tibial Tendinopathy (PPT) is frequently an underestimated and misdiagnosed dance injury [4].

PPT in dancers, which is originally the result of overuse infestations that lead to PTT tenosynovitis, may restrict their artistic performance with a harmful influence on their career.

In this review an analysis of basic aspects of pathogenesis, diagnosis and treatment of this clinical entity is conducted with special focus on dancers.

Anatomy-Biomechanics

The Posterior Tibialis (PT) is the deepest muscle in the posterior compartment of the leg. It takes origin on the interosseous membrane and the posterior surfaces of the tibia and fibula. PT attaches primary on the tuberosity of the navicular while other attachments of this muscle are located to cuneiform, and cuboid bones as well as the bases of the second, third, and fourth metatarsals [4,5].

Normally, this muscle participates in inversion and secondary in plantarflexion and supports the medial arch height during stance phase as the main dynamic stabilizer [1,6,7].

During normal gait, PT locks the calcaneus to the cuboid and the talus to the navicular, converting the foot into a rigid lever [8].

Pathogenesis-Aetiology

There are several intrinsic and extrinsic factors play a major role for the occurrence of this pathology. Extrinsic factors which are considered

to contributing to the development of PTT, are the amount and the intensity of training practice and training on inappropriate solid surface as well as theatre temperature [4,9]. Other causes of injury appear to be poor training, unbeknown choreography or dance style and technical errors [9].

As predisposing factors, overpronation of the foot, flat-foot instability of the subtalar joint in a cavus valgus foot and accessory navicular, are implicated [6].

The overpronation which takes place when dancers force turn-out from their feet, sets increased strain on the posterior tibialis muscle. Another causing factor proposed by Bracilovic is the appearance of a "winged" foot that presupposes an excessive plantar flexion, abductions, and eversion of the foot which consequently stretches the posterior tibialis tendon [4].

Epidemiology

Foot and ankle are the most common sites of dance related injuries with the peroneal and flexor hallucis longus (FHL) tendonitis representing the majority of soft tissues injury patterns in this region [10].

Cavovarus anatomy of dancing performers provides an inherent protection and PPT is less commonly encountered in them than the other than the other standard professional athletes [11]. Nevertheless, PTT oftentimes appears as compensation for an unstable dancer's ankle [12].

Nilsson et al. [3] estimates PTT incidence as high as 1% in male

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and 3.8% in female Swedish classical ballet dancers. In another recent study including Irish female dancers Noon et al. report that this overuse injury is equal to 4.6% [13].

Diagnosis

Diagnosis is established primary on history and a meticulous clinical examination. The onset of pain is gradual and the recall of previous injury is not usual. In some cases a twisting episode of the foot may be present. Athletes of classical ballet may report increased time spent in dancing activities associated often with jump combinations [4].

Patients with PPT present with pain which exacerbates with weight bearing and with inversion and plantar flexion against resistance. Swelling posterior to the medial malleolus and tenderness along the tendon are also frequently revealed on clinical examination [14,15].

Diagnostic imaging modalities

Diagnosis is mainly clinical and modern radiographic examinations have been primary used to exclude other causes of ankle pain with similar clinical presentation or to detect concomitant ailments [15-17].

Plain radiography is the initial imaging study as depicts foot alignment and bone abnormalities including soft tissue calcifying or osteoarthropathy [15,17]. Nevertheless has a poor diagnostic value for the detection of soft tissue lesions.

Sonography (US) can be a useful imaging tool for the early detection of abnormalities caused by posterior tibial tendinopathy [18]. In a study comparing, US and Magnetic Resonance Imaging (MRI) of the PPT ultrasounds were found only slightly less sensitive than MR imaging for the depiction of for PTT pathology [19].

MRI is considered the gold standard for assessing soft tissue injuries such as PPT with the .major advantage of detection of marrow oedema typically seen underneath the course of the posterior tibialis tendon [8,17]. However the high cost associated with this diagnostic intervention and the limited availability should be considered as drawbacks [17].

Differential diagnosis

PTP tendonitis must be must be differentiated from other possible causes of medial pain in dancers, predominately flexor hallucis longus (FHL) tenosynovitis and posterior impingement [20]. Other pathologies such as medial ligament ankle sprain, Flexor Digitorum Longus injury, navicular stress fracture and tarsal tunnel syndrome must be excluded [15].

Treatment

Treatment is primarily conservative. The initial management of PTT tenosynovitis includes tendon rest, ice application and different physical therapy modalities such as local ultrasound [21,22].

Nonsteroidal anti-inflammatory drugs and acetaminophen can provide only short-term pain relief for patients with tendinopathies but do not affect long-term outcomes [15].

Immobilization in a short walking boot or cast for two to three weeks and airlifting braces for 3 to 6 months may be beneficial [4,15,22]. Custom shoe inserts such as a medial heel wedge in the boot can decrease the load applicable to the tendon owing to overpronation [11].

For refractory cases surgical treatment is necessary. In rare cases where non operative therapeutic modalities fail surgical exploration, tendon debridement and longitudinal split tears repair should be

considered in patients with true stage I disease at least 3 months after conservative treatment [21]. Posterior tibial tendoscopic synovectomy appears to be a minimally invasive and effective surgical procedure in patients with stage I posterior tibial tendon dysfunction (PTTD) [22]. It is worth mentioned that stage I (PTTD) is the clinical entity defined by Johnson and Strom as tenosynovitis or tendinitis characterized by normal tendon length, absence of hindfoot deformity, and clinically based diagnosis [14].

Conclusion

Posterior Tibialis Tendonitis although uncommon still is a potential debilitating pathology affecting dancers especially in the presence of anatomical foot abnormalities.

Diagnosis is mainly clinical and is based on detailed history and meticulous examination whilst modern radiology is particularly helpful in the differential diagnosis.

Treatment is generally conservative and most of cases heal uneventfully. For the few cases where this therapeutic approach is failed, surgical intervention is considered.

Prevention is the cornerstone for all dance related overuse injuries [23], as it contributes in avoidance of potentially career-hazardous lesions. Prevention strategies include good training on dance techniques, careful warming up exercises before vigorous movements, frequent rest and appropriate environmental and dancing floor conditions [9,24].

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