

TIBIALIS POSTERIOR TENDON RUPTURES

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A condition which has received attention in recent literature is the so called spontaneous pes valgus deformity or unilateral flatfoot. It is associated with rupture of the tibialis posterior tendon either traumatically or as a result of degeneration. This presentation will discuss the causes of the particular condition along with the various misleading concepts which have been reported.

The patient affected by a tibialis posterior rupture/synovitis frequently presents with a complaint of medial arch or ankle pain which may be associated with swelling and a localized area of warmth. The symptoms may have been present for a variable period and are usually aggravated by walking, although this is typically more easily tolerated than standing. Depending upon the duration of the symptoms the patient may relate a progressive increase in the development of a flat foot deformity. Some will describe a distinct incident of "giving way" in the medial ankle. Once tendon rupture has occurred, inflammatory symptoms may be absent and pain may be the only complaint.

Clinical Findings

Clinical evaluation will reveal the presence of pes valgo planus deformity. Prior to actual rupture a bulge may be visible along the medial arch and distal retromalleolar area. This represents the path of the enlarged tendon or the associated inflammation. The soft tissue bulge which represents tenosynovitis of the tibialis posterior tendon may not be evident once rupture has occurred. The severity of the deformity and the clinical appearance will vary depending upon the primary deformities involved and the modes of compensation available to the patient.

Physical examination may reveal the presence of tenderness, edema, and warmth from the insertion of the tendon proximally to the retromalleolar area. Once tendon rupture has occurred there may be a palpable defect in the area. The patient will have difficulty adducting the forefoot, especially against resistance. The tibialis posterior muscle may be tested by placing the foot in an adducted position and having the patient resist an abductory force (Fig. 1). The adducted foot in the normal patient is almost impossible to overpower. However, in patients with a ruptured tibialis posterior tendon, the

foot will be abducted with relative ease. Gait studies will demonstrate a marked planovalgus foot with severe abductus. The foot is apopulsive and lacks resupination in gait.

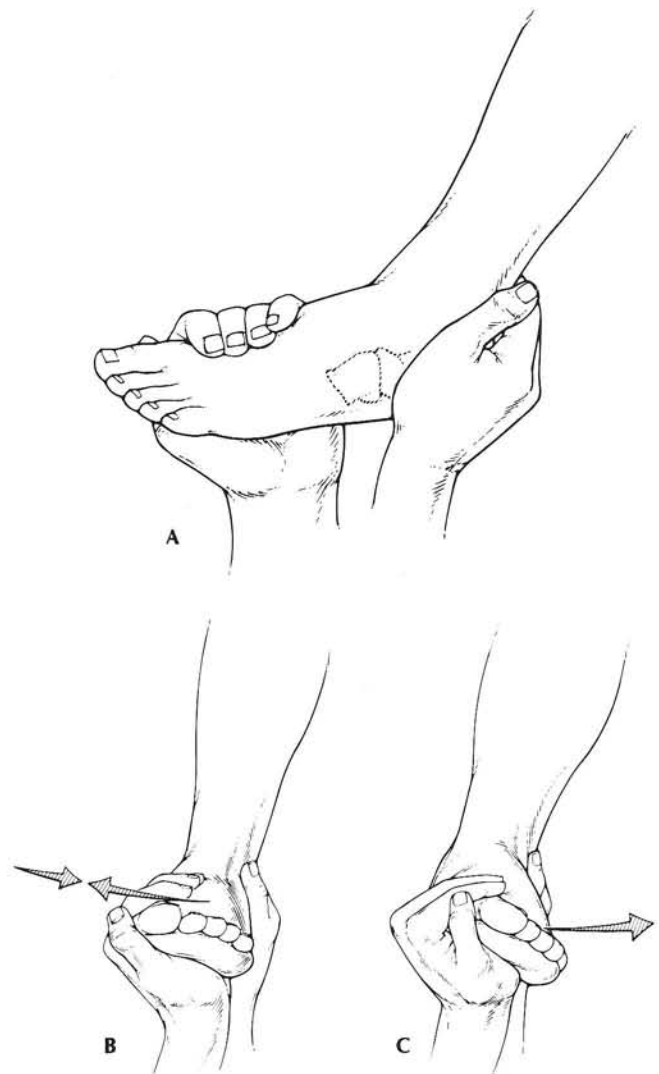


Fig. 1. Method for testing the tibialis posterior muscle. (A) The examiner must stabilize the proximal foot by placing the heel of one hand at the calcaneocuboid joint. The foot is then placed in an adducted and slightly plantarflexed position. The patient is then asked to resist abduction of the forefoot. (B) Normally the patient should maintain this position with ease. (C) If the tibialis posterior tendon is ruptured the forefoot may be abducted easily despite patient resistance.

Etiology

The etiology of a tibialis posterior tendon rupture may be either traumatic or degenerative in nature. Our attention will be focused on those who have degenerative changes. Various mechanisms are described to account for the degenerative changes which have been seen. Stenosing tenosynovitis at the ankle level has been postulated by Trevino and associates (1). Stenosis leads to inflammatory changes which interfere with tendon function creating a process which feeds upon itself until rupture occurs. Jahss noted no evidence of stenosis in his surgical cases and felt that the changes were purely degenerative in nature. The tibialis posterior tendon was said to be stressed as it acts to support the longitudinal arch (2). Mueller astutely noted that the musculature is not required to support the arch except in a pathologic situation. Therefore, he concluded that pes valgus "... could predispose a patient to the development of tibialis posterior tenosynovitis and subsequent rupture"(3).

We wholeheartedly concur with Mueller as it is in the pronated foot that the muscles attempt to stabilize an otherwise hypermobile structure. This additional stress placed upon the tibialis posterior is the initial pathology which will lead to degeneration and rupture. This should alert the clinician to search for the primary pronatory force which serves as the cause of tendonitis/rupture.

Discussion

There are several aspects of tibialis posterior tendon ruptures which merit discussion. Many authors credit this condition as a cause of unilateral flatfoot. Our own experience shows that such patients have significantly pronated feet on the contralateral foot as well. Jahss noted that some of his patients demonstrated "mild physiologic bilateral pes planus" (2). Funk and associates stated that similar symptoms developed in the contralateral foot in two patients within two years after undergoing surgical repair (4). Mueller describes several patients as having significant bilateral pathologic pes valgo planus (3). Otherwise, most authors fail to mention the appearance of the unaffected foot, although photographs seem to indicate a high degree of pes valgus deformity (4-6).

The presence of bilateral pes plano valgus is supported by closely examining the findings of other authors. Henceroth and Deyerle describe osseous changes within the midfoot that were seen in association with tibialis

posterior rupture (5). Funk and associates state that in 7 of 19 patients dorsal degeneration was seen at either the naviculocuneiform joint or the cuneiform-first metatarsal joint in conjunction with talocalcaneal collapse (4). These changes are well known to be adaptive changes within the foot secondary to ankle equinus or other conditions producing severe pronation. Additionally, one will encounter a variety of other bilateral forefoot pathologies including hammertoes and hallux abductovalgus. Such deformities are not encountered with "benign" pes planus.

Another misconception is that the condition is "spontaneous" (1, 2, 5). This is despite the fact that the patients presented in the literature were said to have experienced previous episodes of pain in the medial arch area prior to rupture or else possessed a neuropathic foot. The symptoms leading to tendonous rupture are characteristic and real. The term spontaneous implies that no previous pathology is present, and, is therefore, not appropriate.

Also of interest, Jahss describes these patients as being sedentary (2). The pathologic forces which lead to tibialis posterior rupture also cause significant symptoms in and of themselves. Perhaps this sedentary lifestyle is not selected, but imposed by the degree of symptoms experienced by the patient. Under normal circumstances patients do not choose to be sedentary. Careful questioning of our patients has consistently revealed that pain or severe aching had been present for years before actual rupture and that the patient had attempted to limit activities to relieve pain.

Finally, one should be aware that tibialis posterior tenosynovitis/rupture does not occur as an isolated phenomena, but as a consequence of severe pronation. The clinician must search for the cause of the primary deforming force which in most instances will either be a severe ankle equinus or a severe forefoot varus or supinatus.

Treatment

Conservative treatment has met with varying degrees of success. One of the measures which is contraindicated in this condition is the use of local steroid injection prior to rupture of the tendon. This renders the tendon much more susceptible to future rupture. Otherwise orthoses, immobilization, and non steroidal anti-inflammatory drugs may be employed. For any treatment regimen to be successful the primary deforming force must be recognized and accommodated. The patient with severe equinus may not possess the type of foot which may be converted to a normal functioning unit. The use of a rigid

orthotic device may actually exacerbate the problem if the equinus is not neutralized. Molded shoes have been successful in cases where surgical therapy was not possible, but only when the shoe is constructed with a raised heel to accommodate equinus. Even then the results are not ideal. Generally speaking institution of conservative therapy will only delay the inevitable breakdown of the foot, or at best the patient will maintain a rather propulsive part.

While not all patients are not surgical candidates, those who are may be provided a less symptomatic foot which will permit increased activity levels postoperatively. Surgical therapy in more recent years has included the reconstruction of a functional tibialis posterior through the use of various tendon grafting techniques. The most popular has been the transfer of the flexor digitorum longus and the flexor hallucis longus to the remainder of the tibialis posterior tendon.

Symptomatic relief has been reported following simple release of the flexor retinaculum (7, 8). This is said to decompress the stricture which may lead to the tendon rupture. Our experience has shown that stenosis if present is a secondary phenomena, and decompression will only serve as a temporary solution. Furthermore, such release is inappropriate once rupture has occurred.

Osseous procedures such as arthrodesis have been mentioned in only a few instances. Mann and Specht noted that residual pain persisted in the medial arch of patients who had tendon reconstruction. They questioned whether or not osseous procedures might provide additional improvement (9). Johnson suggests that subtalar arthrodesis may be required when the deformity is severe, supporting tissues are stretched, or signs of degenerative arthritis are present. He states that subtalar arthrodesis alone is adequate since the subtalar joint is the center of deformity (6).

We feel that triple arthrodesis is the procedure of choice when fusion is to be performed. The foot deformity seen with tibialis posterior ruptures typically involves all three planes and many times most notably affects the midtarsal joint. This is reasonable as the midtarsal joint is primarily stabilized by the tibialis posterior. Loss of this muscular function will result in a marked abduction deformity centered at this joint. One must remember that when a subtalar arthrodesis is performed that the heel must be placed in slight valgus. This will leave the midtarsal joint inherently more flexible. The severe forefoot varus which may accompany this condition cannot be suitably addressed by subtalar arthrodesis alone.

When should a triple arthrodesis be performed? Primary repair of the tendon is indicated when acutely lacerated. Grafting techniques may prove satisfactory in cases where the patient is young or where there is a lack of osseous or soft tissue adaptation and when the primary deforming force can be readily managed. The majority of patients with a tibialis posterior tendon rupture have a number of factors which tend to favor triple arthrodesis. Usually the patients are middle aged, and as such have marked soft tissue and osseous adaptation due to long standing pathologic pes valgo planus. This is not a benign or physiologic pes valgus.

While some patients may possess asymptomatic flat-foot deformities, the majority of those affected by tibialis posterior tendon ruptures have symptomatic deformity. This may not be expressed verbally, but evidenced by their sedentary lifestyle. Many people accept tired, aching, even painful feet as a normal occurrence. Friends are usually not impressed or sympathetic to those who complain of symptomatic feet. Therefore, the only alternative is for the patient to assume a lifestyle which does not exacerbate their symptoms. Tendon reconstruction, may avert an acutely symptomatic foot to a chronically symptomatic foot in such instances. Those who routinely perform tendon reconstruction freely admit that no osseous correction is obtained by tendon repair. Triple arthrodesis will allow one to correct deformities in all three planes, and provide a more functional and less symptomatic part. This will in turn improve the patient's overall quality of life assuming that the primary deforming influence is recognized and addressed as well.

Conclusion

Tibialis posterior tenosynovitis/ruptures will manifest with the remaining muscles attempting to stabilize a hypermobile foot. Bilateral pes valgo planus will be evident in those patients who do not have a tendon which has been traumatically lacerated. Diagnosis is made by the characteristic history given by the patient as well as manual muscle testing. Determination of the primary deforming influence is essential for the successful outcome of any treatment regimen, be it conservative or surgical.

References

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