

Anterior Tarsal Tunnel Syndrome: Case Report

Anterior Tarsal Tünel Sendromu

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ABSTRACT Anterior tarsal tunnel syndrome (ATTS) occurs by the compression on the deep branch of the peroneal nerve. Although the compressions of posterior tibial nerve are diagnosed easily, ATTS may be difficult to realize. A 32-year-old male patient with numbness at first and second fingers of right foot was admitted to outpatient clinic. The right extensor digitorum brevis (EDB) muscle was atrophic electrophysiologically, compound muscle action potential (CMAP) of the peroneal nerve couldn't be obtained by recording at the right EDB muscle. Conduction speed and amplitude of right peroneal nerve recorded at tibialis anterior (TA) muscle were normal as well as the other nerve conductions of right and left lower extremities. The entrapment of the deep branch of peroneal nerve has been defined. We aimed to draw attention to this rare entrapment neuropathy by sharing a patient with weakness of foot and numbness in the first and second fingers of the foot.

Key Words: Tarsal tunnel syndrome; peroneal nerve; tibial nerve; electromyography

ÖZET Anterior tarsal tünel sendromu (ATTS), peroneal sinirin derin dalının sıkışmasına bağlı olarak meydana gelmektedir. Posterior tibial sinir kompresyonlarının tanılarının daha kolay konulmasına karşın ATTS fark edilmesi daha zor olabilir. 32 yaşında, erkek hasta, sağ ayak 1. ve 2. parmaklarında uyuşma şikayeti üzerine kliniğimize başvurdu. Sağ ekstansör digitorum brevis (EDB) kası atrofik görünümdeydi. Elektrofizyolojik çalışmalarda sağ EDB kası kayıtlı peroneal sinir birleşik kas aksiyon potansiyeli amplitüdü elde edilemedi. Sağ peroneal sinirin tibialis anterior (TA) kasından kayıtlı ileti ve amplitüdü normal, sağ alt ekstremitte ve sol alt ekstremitenin diğer sinir iletimleri normaldi. Peroneal sinirin derin dalında tuzaklanma olduğu düşünüldü. Ayakta kuvvetsizlik ve ayak parmaklarında uyuşma yakınması olan ve yapılan tetkiklerde anterior tarsal tünel sendromu saptanan vakayı paylaşarak, nadir görülen bu tuzak nöropatiye dikkat çekmek istedik.

Anahtar Kelimeler: Tarsal tünel sendromu; peroneal sinir; tibial sinir; elektromiyografi

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Anterior tarsal tunnel syndrome (ATTS) occurs by the compression on the deep branch of the peroneal nerve which is located under the extensor retinaculum at the front part of the ankle. The reason is usually chronic compressions and traumas of the ankle. Although the compressions of the posterior tibial nerve are diagnosed easily, ATTS may be difficult to realize.^{1,2}

Peroneal nerve passes through the fibrous tunnel between peroneus longus muscle and fibula. Beyond this tunnel, the nerve is divided into deep and superficial branches. The deep branch goes down within extensor dig-

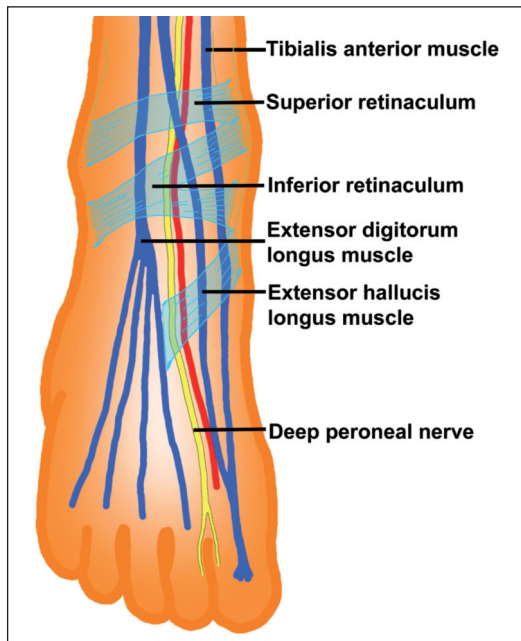


FIGURE 1: The anatomy of deep peroneal nerve.

itorum longus and peroneal muscles. At ankle level, it continues at a region called anterior tarsal tunnel, the base of which are fascias of talus and navicular bone (Figure 1).³ At this level, ATTS, caused by compressions of the deep branch of the peroneal nerve, may occur due to traumas, fractures, talonavicular osteophytes, contusions of the back of foot and pseudocysts.⁴⁻⁶ At the inferior extensor retinaculum, the deep peroneal nerve separates into two distal branches: lateral branch innervates EDB muscle and medial branch takes the senses of dorsal 1st and 2nd fingers.¹

We aimed to draw attention to this rare entrapment neuropathy by sharing a patient with weakness of foot and numbness in the first and second fingers of the foot.

CASE REPORT

32-year-old male patient with numbness at the first and second fingers of right foot which started 4 months ago and pain at right foot, was admitted to outpatient clinic. The patient described a weakness while lifting his foot. His complaints were increasing while standing. The pain, sometimes could wake him up. He had difficulty while lifting his foot from the ankle.

On neurological examination, the right extensor digitorum brevis (EDB) muscle was atrophic and the patient described hypoesthesia at dorsal region of right 1st and 2nd fingers. The extensions of the 2-5 fingers were 4/5 in strength. The lumbosacral magnetic resonance images (MRI) were normal.

Electrophysiologically, compound muscle action potential (CMAP) of the peroneal nerve recorded at the right EDB muscle could not be obtained. Velocity and amplitude of the right peroneal nerve, recorded at tibialis anterior (TA) muscle, were normal as well as the other nerve conductions of right and left lower extremities. No motor unit potential and pathological spontaneous activity were detected at right EDB muscle by needle EMG. The needle EMG findings of right TA, gastrocnemius and tibialis posterior (TP) muscles were normal. With these findings, the entrapment of the deep branch of peroneal nerve was defined. On MRI, bone edema at calcaneus and effusion at flexor hallucis longus muscle were detected (Figures 2A-2B). The patient was given physical therapy and rest.

DISCUSSION

Kopell and Thompson identified ATTS for the first time in 1960s.⁴ Because of its asymptomatic condition, the etiology of this entrapment neuropathy is not discovered easily, retrospectively.⁵

In addition to reported various etiologies such as those stated above, in some population like our case, Akyuz et al reported that kneeling and prone posture of prayer was an important reason of chronic trauma at ankle.¹ It was reported that sit position was a risk factor for ATTS. Traditionally, some women want to sit in legs crossed position while they are sitting during the meals and other daily activities. This crossed position of legs may cause ATTS.⁷ Also, Cetinkal et al. reported that fibro-osseous structure occurred after a missed talus fracture could cause ATTS.⁸ Moreover, Gani et al. reported such a case with the thrombosed dorsalis pedis artery.⁹

Patients may describe hyperesthesia and/or paresthesia between the first and second finger and



FIGURE 2A: Sagittal STIR MRI demonstrates marrow edema in the posterior calcaneus.

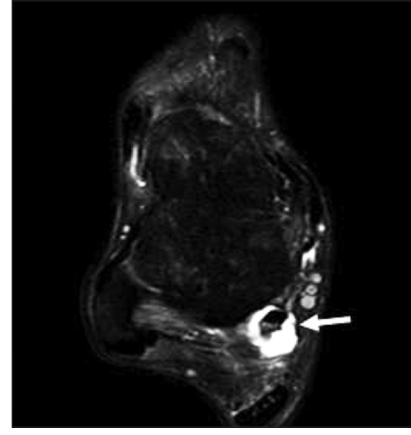


FIGURE 2B: Axial Fat Sat T2 image shows focal effusion in the flexor hallucis longus tendon sheath.

pain at the back of foot.¹⁰ The pain is usually aggravated by movements and also sleeping time at night. The deterioration of motor branch causes weakness in EDB muscle and it causes weakness in extension of foot fingers. The extensor digitorum longus and the extensor hallucis longus muscles help EDB in extension of foot fingers. Therefore, the motor symptoms are generally mild. But, in some serious cases such as ours, it was reported that atrophy of EDB muscle has been found.³

Electrophysiologically, ATTS reveals delayed distal latency of deep peroneal nerve and denervation potentials in EDB. Lack of denervation potentials in the muscles innervated by L5 spinal nerve such as extensor digitorum longus, extensor hallucis longus and tibialis anterior is important to diagnose the differential diagnosis.¹¹ On the other hand, it is known that most normal cases reveal fibrillation in EDB because of local trauma so it may be neglected.⁸ The symptoms of ATTS with the denervation in EDB are important to diagnose. In

our case, CMAP of the peroneal nerve recorded at the right EDB muscle and motor unit potential and pathological spontaneous activity at right EDB muscle could not be obtained due to the atrophy of EDB.

In the treatment, firstly the patient must refrain from movements that may lead to nerve compressions. Anti-inflammatory analgesic drugs may be given if necessary. If symptoms persist despite this approach, surgical treatment may be considered. Decompression surgery is provided by cutting the inferior extensor retinaculum.¹² Our patient's symptoms were decreased after resting and physical therapy, so surgery was not considered.

The ATTS is a rare case and its diagnosis can be made with an exhaustive clinical and neurological examination and electrophysiological tests. ATTS should be kept in mind when evaluating patients with numbness, weakness or pain of leg. The underlying etiology is important for treatment's choice.

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