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## Posterior tibial nerve lesions in ankle arthroscopy

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**Abstract** Ankle arthroscopy provides a minimally invasive approach to the diagnosis and treatment of certain ankle disorders. Neurological complications resulting from ankle arthroscopy have been well documented in orthopaedic and podiatric literature. Owing to the superficial location of the ankle joint and the abundance of overlying periarticular neurovascular structures, complications reported in ankle arthroscopy are greater than those reported for other joints. In particular, all reported neurovascular injuries following ankle arthroscopy have been the direct result of distractor pin or portal placement. The standard posteromedial portal has recognized risks because of the proximity of the posterior neurovascular structures. There can be considerable variability in the course of these portals and their proximity to the neurovascular structures. We found one report of intra-articular damage to the posterior tibial nerve as a result of ankle arthroscopy in the English-language literature and we report this paper as a second case described in the literature.

**Keywords** Tibial posterior · Ankle arthroscopy · Nerve complication

### Introduction

A standard method of arthroscopic examination of the ankle was published by Takagi in 1939. In 1972, Watanabe reported on 28 ankle arthroscopies including a detailed discussion of anteromedial, anterolateral and posterior arthroscopic approaches to the ankle [1].

Ankle arthroscopy provides a minimally invasive approach to the diagnosis and treatment of certain ankle disorders with good and excellent results in 90% of cases [2]. Neurological complications resulting from ankle arthroscopy have been well documented in orthopaedic and podiatric literature [1, 3]. Major and minor complication rates of 4.8 and 3.7%, respectively, in the knee have been reported. In the ankle, the overall complication rate is 9.8% (0.7–17% in series) [1, 3–6].

All reported neurovascular injuries following ankle arthroscopy have been the direct result of distractor pin or portal placement [1, 7].

External anatomic landmarks should be delineated before placing the portals [1].

The conventional posterolateral portal passes between the Achilles tendon and the sural nerve, approximately 1.2 cm above the tip of the fibula. The sural nerve and the small saphenous vein branches must be avoided with this approach. The standard posteromedial portal has recognized risks because of the proximity of the posterior neurovascular structures [8, 9]. The posteromedial portal passes between the Achilles tendon and the posterior tibial neurovascular bundle. There can be considerable variability in the course of these portals and their proximity to the neurovascular structures [8].

We found one report of intra-articular damage to the posterior tibial nerve as a result of ankle arthroscopy in the English-language literature [10].

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## Case report

The patient was a 48-year-old man who complained of posterior ankle pain since the summer of 2003. He received physiotherapy and analgesics. He was operated with posterior ankle arthroscopy after being diagnosed as having posterior impingement. He complained of a dysesthetic sensation in the posterior tibial region after surgery. Some weeks later he described a selected pain at the site of the posterio medial portal. He had a Tinnel sign. The electromyography study revealed a lesion in the posterior tibial nerve. In January of 2005 was carried out a liberation of the posterior tibial nerve. At surgery we observed the impingement of the posterior tibial nerve by fibrosis secondary to the posterio medial portal (Fig. 1) we searched the posterior tibial nerve (Fig. 2). The nerve was found with a central lesion secondary to fibrosis around it (Fig. 3). We resected all soft tissue fibrosis with nerve preservation (Fig. 4).



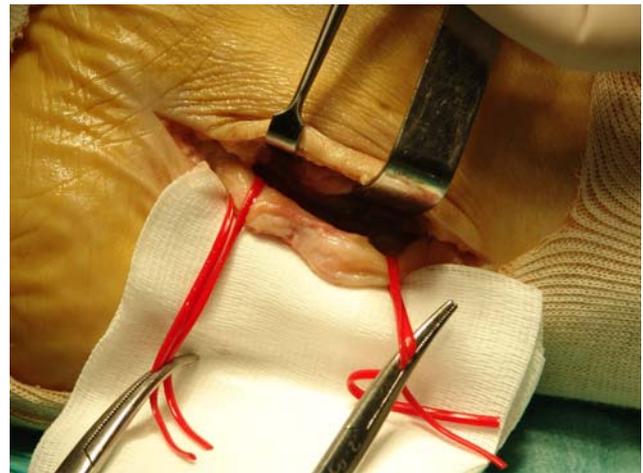
**Fig. 1** View of posterio medial portal with a Tinnel sign



**Fig. 2** Localization of posterior tibial nerve



**Fig. 3** Posterior tibial nerve with “impingement” in the site of posterio medial portal



**Fig. 4** Liberation of posterior tibial nerve

The patient had no more pain after this surgery. The dysesthesias disappeared and he was able to walk without any external support. A follow-up of 18 months shows excellent results.

## Discussion

Ferkel reported in a series of 612 ankle arthroscopies, a complication rate of 9%. The most common complication was neurologic injury (49% of complications) [1, 3, 7], but the majority are resolved in less than 6 months [1]. The use of pin distractors or portal placements are the causes of these lesions [3]. Each review of neurological complications underscores the importance of appreciating the cutaneous ankle anatomy and the technical points in the creation of portals and placement of an ankle distractor, if used [7, 10].

Careful planning and placement of all portals is necessary to prevent neurovascular injury.

Incising only the skin when placing portals and then using a mosquito clamp for blunt dissection down to the joint capsule will decrease injuries to nerves, veins, tendons and other structures [1].

Multiple attempts at portal placement may damage the soft tissues and lead to increased extravasation.

Repeated passage of instruments through the portals without the use of a protective cannula can result in increased soft tissue damage and an increased risk of subcutaneous nerve and vessel injury [1].

Neurovascular structures can be injured via incorrect portal placement, pin placement, prolonged or inappropriate distraction, or the use of a tourniquet [9].

Temporary paresthesias are the most common complications, but permanent paresthesias or paresis is possible.

The uses of the posteromedial portal are described and explained as a relatively safe, effective and reproducible portal [7, 11].

The structures at greater risk of damage are the nervous structures (calcaneal and posterior tibial nerves) and posterior tibial artery [11]. A posteromedial portal located 1 cm above the height of the tip of the lateral malleolus is on average 2.9 cm more distant from the nervous structures than a portal performed 1 cm more proximally [11].

Sitler reported a cadaveric study, which suggests that, during posterior ankle arthroscopy with the limb in the prone supination, the posteromedial and posterolateral portals could be used with a relatively small risk to the neurovascular structures, if the technique for portal placement is followed cautiously [12].

The introduction of the instruments in a horizontal plane compared with the longitudinal axis of the foot allows the surgeon to maintain the distance from the neurovascular bundle (>13 mm on average) during penetration of the instruments themselves [11]. Van Dijk reported a technical solution to minimize the risk of neurovascular lesion. With the arthroscope shaft in place through the posterolateral portal, the trick is to angle the instruments (mosquito clamp, shaver) introduced through the posteromedial

incision at 90° to the arthroscope shaft [7]. The initial perpendicular direction to introduce the cannulae and posterior positioning parallel to first cannulae made this portal safe.

We have only found one case report of a tibial posterior nerve lesion as a result of an ankle arthroscopy [10]. We present this case report as a second case reported in English language literature.

The case presents a posteromedial portal over the tibial posterior nerve. The distance between the tibial nerve and the location of this portal was very short. Perhaps the technical note of Van Dijk was made this portal safe [10]. This surgery requires most carefully in the portal position to prevent nerve lesions.

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