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Case report

The anterior recurrent peroneal nerve entrapment syndrome: A patellar tendinopathy differential diagnosis case report

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ABSTRACT

Patellar tendinopathy which is a cause of pain in the inferior patellar region is a relatively common pathology among sports enthusiasts. This paper describes a new pain syndrome identified from clinical observations which is a differential diagnosis to patellar tendinopathy. The pattern is specific and recognizable among many individuals, and it should be considered as its own entity. The new syndrome is discussed in terms of the pain experienced, the diagnostic criteria, treatment and the rationale to explain it. As it is a differential diagnosis to patellar tendinopathy, many sports enthusiasts might benefit from this diagnosis. If identified correctly, treatment might be directed to the correct structures and with the appropriate modalities, ensuring the patients a fast return to their past occupations without pain and without unwarranted treatments.

1. Introduction

The syndrome under discussion is derived mainly from clinical observations. The author has noticed this clinical presentation many times over the years but despite a search of the medical literature, nothing similar was found. Since the overall presentation pattern is specific and recognizable among many individuals, the author proposes that it should be considered as its own entity. The goal of this article is to acquaint the reader to this pain syndrome as a specific differential diagnosis apart from patellar tendinopathy, the latter being a common condition in sports. Its prevalence may reach 50% in sports involving jumping and landing (Ramos et al., 2009).

2. Case presentation

A 28 year old male carpenter came for consultation about a patellar tendon pain. He was not referred by a physician. The pain, while not severe enough to prohibit work, sports, or daily activities, was very annoying to the patient as it began without any trauma a year ago and he felt it every step when walking upstairs. In this specific case, no other pain was felt. Tenderness was located on the lateral border of the proximal patellar tendon. Upon examination, increased peroneus muscles tone was noted as well as peroneal nerve neurodynamic restriction (Butler, 2005) and a dorsal cuboid subluxation as described by Mooney and Maffey-Ward (1994). The lower quadrant scan was otherwise normal.

Initial treatment consisted of a plantar cuboid manipulation. No hypomobility or hypermobility was felt after the manipulation. The neurodynamics were now symmetrical on both legs. But there was still a slightly increased tone in the peroneus muscles. Therefore, the patient was taught to stretch the peroneus muscles. Immediately after the treatment, the patient did not experience any pain on stairs. A telephone conversation with the patient 3 months later revealed that he had remained pain free thereafter.

When there is pain typically associated with a provisional diagnosis of patellar tendinopathy, immediate and maintained improvement after the manipulation makes a narrower, more definitive, diagnosis of patellar tendinopathy less likely. In contrast, anterior recurrent peroneal nerve entrapment syndrome as presented in this case is more likely.

3. Typical patient presentation

When referred by a physician, the patient usually presents with a diagnosis of patellar tendinitis, tendinosis, or tendinopathy. The pain is usually a burning sensation located over the lateral patellar tendon, sometimes radiating into the peroneus muscles. The symptoms are usually intermittent and aggravated by physical activities, mainly running and sometimes walking upstairs or downstairs. Stretching in plantar flexion with inversion may also

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exacerbate the symptoms. The patient may have tried other treatment regimens, including non-steroidal anti-inflammatory drugs, eccentric strengthening exercises, ultrasound therapy and transverse friction massage but they mention only a temporary improvement of a limited extent. Finally, there is no reported sensation loss or paresthesia.

The pain associated with this syndrome is always reproducible precisely on the lateral border of the proximal insertion of the patellar tendon by palpation. This appears to be the most salient feature. By contrast, in the case of patellar tendinopathy, the pain is not specifically triggered by palpation at the lateral aspect of the tendon. While some pain may be reproduced by palpation elsewhere around this specific area on occasion, the most tender spot is always precisely the lateral border of the proximal insertion of the patellar tendon, whereupon the clinician will note a consistent increased muscular tone in the lateral compartment of the leg. Usually there is altered neurodynamics (Butler, 2000) of the peroneal nerve. There is no sensation or motor loss, osteotendinous reflexes are normal, ligamentous and meniscus tests are also normal, resisted eversion and plantar flexion overpressure are sometimes painful, and finally, the accessory movement findings will reveal one of the following: superior tibiofibular subluxation or inferior tibiofibular subluxation or cuboid subluxation with no preferred direction of subluxation. Overall, the inferior tibiofibular joint seems to be less frequently affected. This is a triad syndrome, consisting of an exact painful spot, peroneus muscular hypertonicity, and some degree of varied subluxation.

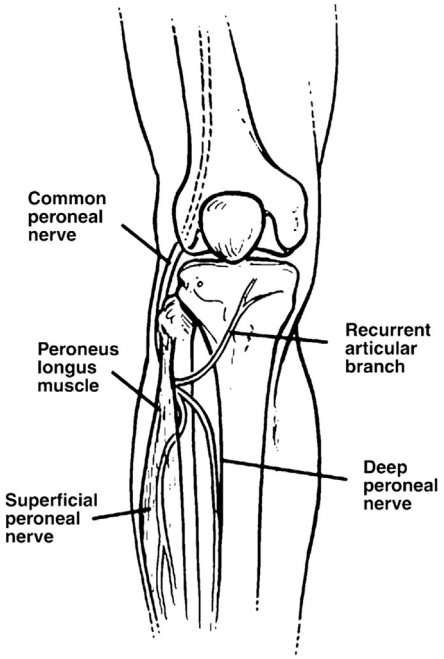

Fig. 1. Drawing shows the common peroneal nerve and its branches at the knee. The common peroneal nerve wraps around the fibular neck and under the peroneus longus muscle to trifurcate into the recurrent articular branch to the knee capsule, the superficial peroneal nerve, and the deep peroneal nerve. Image reproduced with permission from Donovan et al. (2010).

4. Anatomy

The sciatic nerve splits into the common peroneal nerve and the tibial nerve at the popliteal fossa or slightly above. After this division, the common peroneal nerve lies between the tendon of the biceps femoris and lateral head of the gastrocnemius muscle, where it might be occasionally compressed by a fabella (Boon and Dib, 2009), an accessory sesamoid bone near the attachment of the lateral gastrocnemius found in 8.5% of individuals (Zipple et al., 2003). The common peroneal nerve then winds around the neck of the fibula, entering the lateral compartment of the leg by piercing the posterior intermuscular septum of the leg (Aigner et al., 2004) and then entering the fibular tunnel between the two heads of the peroneus longus (Dellon et al., 2002; El Gharbawy et al., 2009), more precisely a superficial portion attaching to the head of the fibula, and a deep portion which is attached to the proximal to middle third of the fibula (Aigner et al., 2004). This location is usually perceived to be the main culprit for common peroneal nerve entrapments. The fibular tunnel is also where the common peroneal nerve usually divides (Gray et al., 1977; Donovan et al., 2010) and where the anterior recurrent branch nerve takes origin and travels with the anterior tibial recurrent artery up to the front of the knee (Gray et al., 1977) (Fig. 1).

5. Rationale

The rationale behind proposing this syndrome relates to the increased tone in the peroneus muscles. Any orthopedic articular subluxation capable of increasing muscular tone in the peroneus muscles might be causal for this syndrome. The suspected underlying pain mechanism is entrapment of the anterior recurrent branch of the peroneal nerve in the fibular tunnel secondary to the increased peroneus muscles tone. It is relatively easy to imagine a superior tibiofibular or inferior tibiofibular subluxation increasing the tone of the peroneus muscles, possibly via muscle guarding. But if the cuboid bone subluxation increasing the peroneus muscle's tone might be more abstract for some, it is related to the pulley role of the cuboid bone in relation to the peroneus longus muscle since the peroneus longus tendon runs through the peroneal groove on the plantar aspect of the cuboid (Roney, 2010). The increased muscle tone is shortening the muscle, which cause some compressive force in the fibular tunnel, as it removes some slack. Moreover, muscle fibers can swell up to 20 times their resting size (Fronek et al., 1987), thus possibly contributing to reduction of space available in the tunnel.

The presence of subluxation is based on the assessment of accessory joint glides and passive physiological tests described by Maitland (Hengeveld and Banks, 2005) and Kaltenborn et al. (2002). The cuboid bone assessment was described more specifically by Mooney and Maffey-Ward (1994) and Patterson (2006). Sijbrandij (1978) described the passive play of the proximal tibiofibular joint. Although not frequently evaluated, proximal tibiofibular joint subluxation is not a rare pathology (Semonian et al., 1995) and the diagnosis is easily missed (Gillham and Villar, 1989). Finally, Beazell et al. (2009) described the passive testing of the inferior tibiofibular joint.

In this paper subluxation is used to describe a joint which seems malpositioned and very stiff in the opposite direction, but not necessarily out of range, secondary to neurophysiological and/or mechanical constraints. Some therapists prefer to use gentle mobilization or neurophysiological techniques instead of manipulations and this seems to have similar results (Lederman, 2010).

Stretching the peroneus muscles probably also increases the pressure over the anterior recurrent branch of the peroneal nerve. The peroneal nerves are also themself stretched by the same movement, increasing the tethering in the fibular tunnel area. Repetitive exercises involving inversion, stretches the common peroneal nerve against the fibrous arch of the fibular tunnel and is thought to be a cause for common peroneal nerve entrapment syndrome (McCrory et al., 2002). The reason why resisted eversion is painful is probably also because it momentarily increases the tone of the peroneus muscles, also compressing the nerves in the fibular tunnel. The author has not witnessed similar cases with