

A case report of variant insertion of plantaris muscle and its morphological and clinical implications

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Abstract

Plantaris is a small muscle of posterior compartment of the leg. Plantaris is considered as one of the vestigial muscles of the body with least functional significance and immense clinical importance. There are very few reports in the literature about the plantaris muscle such as duplicated bellies, tendons and abnormal attachment. Here we present a very rare case of absence of plantaris tendon. The muscle origin was normal but the muscle belly ended in the form of fascia which was used with the soleus muscle, the tendon of plantaris found to be absent. Absence of the plantaris tendon will not cause any functional deficits.

Keywords: plantaris muscle, tendon graft, ligament reconstruction, tendon transfer.

1 Introduction

Plantaris is a small muscle in the superficial group of posterior compartment of the lower leg. It takes origin from the lower part of the lateral supracondylar line and oblique popliteal ligament, hence the muscle belly is found deep to the lateral head of the gastrocnemius muscle. Its slender tendon passes between the gastrocnemius and soleus muscles and inserts to the calcaneus medial to the insertion of calcaneal tendon or occasionally it fuses with the calcaneal tendon. The plantaris muscle found to be double or absent in approximately 10% of population. Rarely its tendon may fuse with the flexor retinaculum or with the fascia of the leg (STANDRING, 2005). In past, the reported cases of plantaris include, the presence of two heads with common tendon (SHARADKUMAR, SHAGUPHTA and RAKHI, 2012), additional tendinous origin and associated entrapment of surrounding structures (NAYAK, KRISHNAMURTHY, PRBHU et al., 2009), unilateral double plantaris (KWINTER, LAGREW, KRETZER et al., 2010) and bicipital origin of plantaris muscle (UPASNA and ASHWANI KUMAR, 2011). The insertion of plantaris shows frequent variations than its origin (BERGMAN, ADEL and RYOSUKE, 2002). The present case describes the absence of plantaris tendon.

2 Case Report

During regular cadaveric dissection for first year medical students, the lower limb of a 60-year-old male cadaver showed a variation in the morphology of plantaris muscle. The specimen was further dissected to trace the attachments of the plantaris muscle. The muscle originated from the lateral supracondylar line of the femur. The muscle belly was 2 cm in length and 0.5 cm in width. The muscle passed downwards and medially superficial the popliteal vessels and tibial nerve, under the lateral head of gastrocnemius. The muscle belly ended in the form of a thin fascia through which it fused with the soleus muscle, near its origin (Figure 1).

Hence the tendon of plantaris found to be absent, though there was a small muscle belly. The present variation was observed unilateral in the right leg.

3 Discussion

The plantaris is considered as vestigial muscle in humans however it has abundant clinical importance. The knowledge of plantaris variations is essential for the diagnosis of muscle tear, tennis leg and interpretation of MRI scans (SHARADKUMAR, SHAGUPHTA and RAKHI, 2012). Plantaris tendon is an excellent source for the tendon graft (SIMPSON, HERTZOG and BARJA, 1991). The mode of insertion of plantaris tendon frequently varies and it may take one of the following; a) soft tissue between the gastrocnemius and soleus muscles b) medial border of the calcaneal tendon c) dorsal surface of the calcaneal tendon at its insertion d) bursa between the calcaneal tendon and the calcaneus e) fibrofatty tissue of the calcaneal tendon f) plantar aponeurosis (DASELER and ANSON, 1943; LE DOUBLE, 1897; HENLE, 1871). The present case report varies from the previous reports in that; the tendon of plantaris muscle is absent and muscle ended in the form of a fascia. Plantaris muscle is found to be absent in 8.2% male limbs and 5.8% female limbs (DASELER and ANSON, 1943). Bilateral absence is common than the unilateral absence, however unilateral absence is found to be frequent on the left side (KWINTER, LAGREW, KRETZER et al., 2010). However there are no reports available on the absence of plantaris tendon. As the plantaris is a small vestigial muscle, absence of the muscle or its tendon does not show functional deficits in the individuals. Plantaris tendon grafts are successfully used to reconstruct the anterior talofibular and calcaneofibular ligaments (PAGENSTERT, VALDERRABANO and HINTERMANN, 2005). Its tendon graft also frequently used to replace the flexor tendons of the hand and to repair the atrioventricular valves (SHUHAIBER and SHUHAIBER,

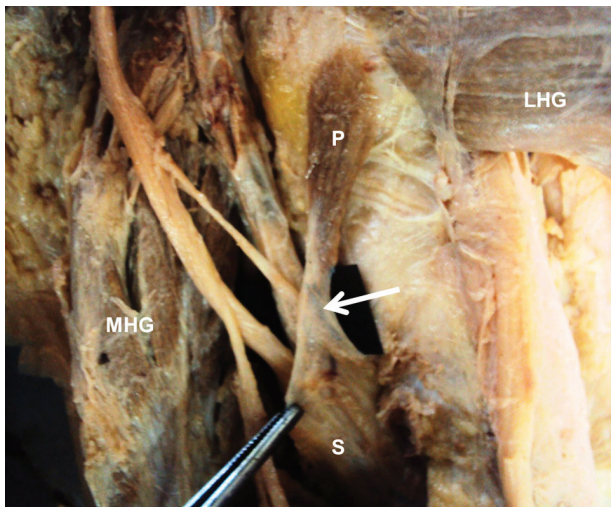


Figure 1. Showing the plantaris muscle, after the reflection of gastrocnemius muscle. Note the fascia attached to the soleus.

2003). Although plantaris tendon is a choice of graft, but it may not possible in all the individuals as the tendon may be absent in few individuals, similar to the present case. Clinically the tennis leg is often associated with the rupture of plantaris muscle, and the rupture is common at its insertion on the calcaneus or at the musculotendinous junction (HAMILTON, KLOSTERMEIER, LIM et al., 1997). On the other hand, this variation may be advantageous in subjects with this variation, as they can escape such avulsion.

To conclude plantaris tendon absence is a unique variation, and the knowledge of this variation is essential for physiotherapists, sports medicine specialists, orthopaedic surgeons and anthropologists.

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