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CASE REPORT

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Accessory head of the semitendinosus muscle: an unusual variation

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Background: *Various studies regarding the morphology of the muscles of the hamstring compartment have exhibited anatomical variations in terms of origin or insertion points. However, variation of the semitendinosus muscle is uncommon. In this case we report an accessory head of the semitendinosus muscle.*

Materials and methods: *During routine dissection for medical teaching purposes, a unilateral morphological variant of the semitendinosus muscle was noted on the left side in an 82-year-old female.*

Results: *The accessory head of the semitendinosus muscle originated lateral to the midpoint of the semitendinosus muscle. Fibres of the accessory head originated from the medial border of the long head of biceps femoris as well as the midpoint of the semitendinosus. The accessory head had a common insertion point with the semitendinosus muscle.*

Conclusions: *This case report adds to the existing body of knowledge about the semitendinosus muscle, which is of anatomical and clinical value. Knowledge of the anatomical variants is essential for anatomists and clinicians and may avoid misinterpretation during diagnostic procedures.* (Folia Morphol 2024; 83, 2: 435–438)

Keywords: semitendinosus, hamstring compartment, variations

INTRODUCTION

The posterior compartment of the thigh consists of several muscles which are referred to as the hamstrings. These muscles are biceps femoris long head, semitendinosus, and semimembranosus, except for the short head of biceps femoris [11, 14]. The hamstring muscles cross the hip joint proximally and knee joint distally becoming the primary flexors of the knee joint as well as extensors of the hip joint. The short head of biceps femoris muscle only crosses the knee joint and is therefore involved in flexion [14].

The semitendinosus muscle forms part of the posterior compartment of the thigh and lies posteromedially. It lies on the posterior surface of the semimembranosus muscle through its length, sharing a common origin with the long head of biceps femoris from an inferomedial aspect on the upper area of the ischial tuberosity. The long head of biceps femoris inserts into the head of the fibula. The semitendinosus belly is fusiform in shape and ends a little below mid-thigh in a long, round tendon. The semitendinosus muscle inserts medial to the tibial tuberosity as part of the pes anserinus, posterior to the attachment of sartorius and distal to that of gracilis [8, 14].

The blood supply to the semitendinosus muscle is by the medial circumflex artery and the inferior gluteal artery, by the tibial attachment it receives

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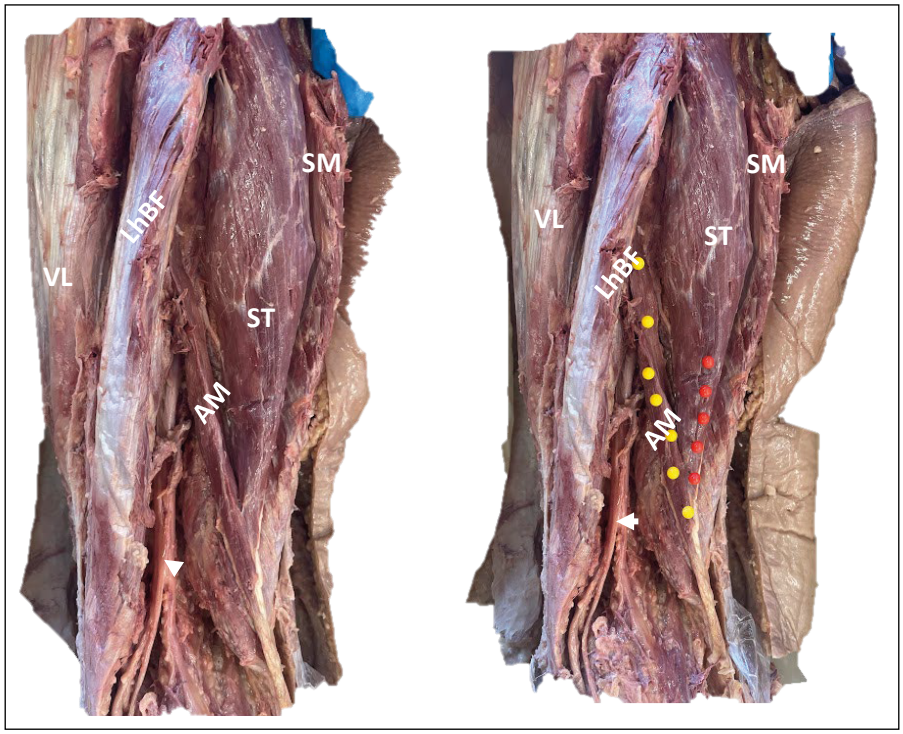

Figure 1. Accessory semitendinosus muscle. LhBF — long head of biceps femoris; SM —semimembranosus muscle; ST — semitendinosus muscle; VL — vastus lateralis muscle; AM — accessory muscle; white arrowhead — sciatic nerve, the red pins — semitendinosus muscle and yellow pins — accessory muscle show the AM splitting form the ST muscle.

blood supply from the inferior medial genicular artery [14]. The posterior thigh region is innervated by the sciatic nerve. It courses obliquely beneath the gluteus maximus muscle toward the midline or the posterior aspect of the leg by descending in the thigh close to the midline. It further divides into the tibial and common peroneal branches at the middle to distal third of the thigh [14].

The embryonic development of the muscular system may result into variations; however, the anatomical variations of the hamstring muscles are rare [5].

Various studies regarding the morphology of the muscles of the posterior compartment of the thigh have shown existence of variations in terms of origin or insertion points [12, 15]. Variation of the semitendinosus muscle is uncommon.

A detailed knowledge of anatomy of the hamstring muscles is vital for understanding the exact state of such muscle injuries and considering the appropriate treatment modality of which may also include conservative or surgical treatment [11]. During surgical procedures, tendons of the semitendinosus and the gracilis muscles can be harvested for anterior cruciate ligament construction, and awareness of variant muscle and tendon morphology is important [10]. Surgical specialists working in this area also need to know a spectrum of pathologies that may be occur. This knowledge is also necessary to avoid misdiagnosis during diagnostic procedures performed by surgeons or when reading angiograms.

Case reports on the accessory muscle fibres were published for the one Turkish female in 1995 [13] and one Turkish male in 2017 [5]. No such reports were published in the South African population.

CASE REPORT

During routine dissection of teaching purposes at the Department of Human Biology, University of Cape Town, South Africa it was noted that an 82-year-old female had a unilateral morphological variant of the semitendinosus muscle on the left posterior thigh. During dissection of the lower limb, the fascia of the hamstring muscles group was removed to reveal the semitendinosus muscle and no other morphological variations were found (Fig. 1). The semitendinosus muscle was isolated from the surrounding structures to expose and observe its origin and insertion. The accessory head of the semitendinosus muscle originated lateral to the midpoint of the semitendinosus muscle and was classified as variant muscle. The fibres

of the accessory muscle originated from the medial border of the long head of biceps femoris as well as the midpoint of the semitendinosus. The semitendinosus muscle and the variant muscle had a common distal tendinous insertion to the medial surface of the tibia posterior to the attachment of sartorius and gracilis muscles. The accessory muscle belly ran over the sciatic nerve along its course.

No obvious signs of surgical interventions were found in the lower limb from the external appearance or dissection. No further variations were noted.

DISCUSSION

Anatomical variations in number of tendons or muscle bellies, place of muscle origin and insertion can be found in several parts of the body [16]. Precise understanding in anatomical variations may improve clinical practice outcomes [2].

The origin of the hamstring muscles play an important role in the occurrence of hamstring strain and injury. The long head of the biceps femoris is the most typical hamstring muscle to strain [9]. A common location of strain is where the long head of the biceps femoris meshes with the semitendinosus muscle to form the single hamstring tendon. Injuries to the hamstring muscles are frequent among sportsmen who engage in sporting activities such as water skiing and hurdle jumping [4]. The musculotendinous junction of the muscle is the area most prone to ruptures and separation injuries [7].

In the present case, the accessory head of the semitendinosus muscle originated lateral to the midpoint of the semitendinosus muscle. Fibres of the accessory head originated from the medial border of the long head of biceps femoris as well as the midpoint of the semitendinosus.

The first report of accessory muscular bundles from the biceps femoris muscle was by Sinav et al. [13] who recoded the two kinds of such accessory muscular bundles in a 20- year-old Turkish female cadaver.

In 2016, at Aichi Medical University, an interesting variation was found the case of a 90-year-old Japanese male cadaver. It was reported the presence of a third head of the biceps femoris. Moreover, 3 muscle tendons were attached to the gluteus maximus [15].

Another variation is reported in 2021 in 59-year--old female cadaver during routine cadaveric dissection. In this case, a variant common origin of the semitendinosus muscle and long head of the biceps femoris muscle was observed originating from the ischial tuberosity. Additionally, a variant muscle was observed between the gluteus maximus and the long head of the biceps femoris muscle [12].

As the long head of biceps femoris is prone to injuries, having this type of anatomical variant pose a risk to and injury of the semitendinosus muscle too when the biceps femoris gets injured [7]. The semitendinosus muscle insertion to the common tendon makes this muscle especially vulnerable for strains during forced eccentric contractions [3]. Myotendinous strains are more frequent than avulsion injuries. It is important to know the difference between the two types of lesions in order to determine treatment since myotendinous strains are treated conservatively and avulsion injuries are treated surgically [4].

Considering the probability and recurrence of hamstrings injuries in sports, attempts to identify the risk factors is crucial for designing exercise-based programs that aim to decrease the frequency of hamstrings injuries and improve rehabilitation methods. Individual anatomic and physiological variations in the hamstrings (e.g., muscle bellies, fibre types, tendon length, aponeurosis width, attachment sites, sex- and age-related differences) must be considered to identify potential risk factors for injury [1].

More studies with a bigger sample size are required to further illustrate the morphological variability of the muscles within the posterior compartment of the thigh.

CONCLUSIONS

Knowledge of the anatomical variants is essential for anatomists, clinicians performing surgeries, sports medicine specialists and rehabilitation clinicians such as physiotherapist and occupational therapists.

Knowledge of anatomic variations of the hamstring muscles provides a greater insight into the potential anatomical factors which may exacerbate hamstrings injuries and potential applications toward a more individualized exercise prescription. A comprehensive review of the anatomy of the semitendinosus muscle variation may be vital for optimising patient care. Anatomical variations, such as the one described in this case report, may increase the risk of hamstring injury or compression of the sciatic nerve. Patients presenting with pain in the posterior thigh may require an evaluation for the variant origin of the hamstring muscles. Knowledge of variations may be beneficial for surgeons, radiologists, and sports

medicine specialists to be aware of in order to determine the most accurate patient treatment plan. This may enable clinicians to contribute accurate and useful information in the treatment of athletes at all levels of injuries.

ARTICLE INFORMATION AND DECLARATIONS

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