

An Additional Head of Biceps Femoris: A Case Report

Swati Sarjero More¹, Vasudha Ravindra Nikam²

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Author's Affiliation: ¹Tutor, ²Professor and Head, Department of Anatomy, D.Y. Patil Medical College, Kolhapur, Maharashtra 416006, India.

Corresponding Author: Vasudha Ravindra Nikam, Professor and Head, Department of Anatomy, D.Y. Patil Medical College, Kolhapur, Maharashtra 416006, India.

E-mail: vasudhamikam@gmail.com

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Abstract

Background: Anatomists and clinicians need to be aware about existence of muscle variation. The biceps femoris is the muscle of thigh having two heads.

Methods and Material: During cadaveric dissection we got the muscle variation. The biceps femoris muscle shows variations in its origin bilaterally. Both right and left limbs were carefully and cleanly dissected.

Results: In the upper portion of muscle, few fibers was diverged & directed medially, downwards and inferiorly, and joined with distal fibers of semitendinosus muscle. The length of these fibers was 8.2 cm on right and 7.6 cm on left side. Hence the muscle fibers diverging from long head of biceps femoris muscle, they look like additional head of biceps femoris.

Conclusions: These fibers merges with semitendinosus, they may give strain in posterior compartment, compress sciatic nerve & strengthen semitendinosus muscle. These fibers may create misconceptions to clinicians and diagnostic experts.

Keyword: Biceps femoris; Variation; Additional head.

Introduction

Muscle variations routinely come across during dissection as well as in clinical practice, so both anatomists and clinicians need to be aware of their existence. The biceps femoris is the muscle of posterior compartment of thigh. It has two

heads; the long head originates from lower and inner impression on the posterior side of ischial tuberosity. This is the common origin with the semitendinosus muscle, and from the lower part of sacrotuberous ligament. The short head arises from linea aspera laterally. Both heads of biceps femoris is joined together and inserted on the head of fibula laterally and small tendinous slip inserted on the lateral condyle of the tibia. The tibial part of sciatic nerve innervates the long head of biceps femoris and common peroneal nerve innervates to the short head.^{1,10}

The long head of biceps femoris is the component of hamstring muscles along with semitendinosus, semimembranosus, and adductor magnus muscle.^{2,3} All the hamstrings crosses the hip joint cranially and knee joint caudally, so the action of these muscles is flexion of knee joint and extension of the hip joint partially. Along with this they also help in internal and external rotation of the hip joint.^{5,6}

Hamstring muscles are involved mainly in locomotion hence forth injuries of the muscles are common in many sports and usual activities life. The anatomical variations of biceps femoris are rare or if present it may affect normal functions like gliding and flexibility. The information about variations of the biceps femoris is required to avoid diagnostic misconceptions of surgeons, physiotherapists and radiologists.¹

The variations mainly arise by genetical inheritance or may be due to developmental



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deformities. Most of these are not harmful and some of these may affect body systems severally.

The common variations of biceps femoris are the short head may be absent, additional heads may arise from the ischial tuberosity, the linea aspera, the medial supracondylar ridge of the femur etc. The insertion may be on iliotibial tract and gastrocnemius.¹⁰

In year 2017–2018, at the time of 1st year MBBS student's regular cadaveric dissection, muscle variation was found. The biceps femoris muscle showed variations in its origin bilaterally. All the structures were preserved like attachments of muscle, its relations and neurovascular supply. Other structures were normal except biceps femoris in the posterior compartment of thigh. Later the biceps femoris muscle was carefully examined. Both the lower limbs were preserved in 10% formalin.

Case Report

The case was found in department of Anatomy, D.Y. Patil Medical College, Kolhapur at the time of regular cadaveric dissection. Out of total 15 cadavers, a 48 years male cadaver showed variation of biceps femoris muscle bilaterally. The long head

of biceps femoris normally originates from ischial tuberosity and is inserted on the head of fibula. We found that some muscle fibers were diverging from long head of biceps femoris and located in between biceps femoris and semitendinosus muscle. A variation was found in the upper region of popliteal fossa (Fig. 1,2). The existence of additional muscle fibers between long head of biceps femoris and semitendinosus is mentioned rarely in our literature. The region was carefully dissected and cleaned without damage to any structure. In this case, the long head of biceps femoris was originated and inserted normally but in the proximal portion of muscle some fibers were diverged their normal course. These abnormal muscle fibers were directed downward, medially and inferiorly. Inferiorly these muscle fibers were merged with the distal fibers of semitendinosus as they coursed medially. On measuring the length of right side muscle fibers was 8.2 cm. (Fig. 1) and of left side was 7.6 cm. (Fig. 2) these muscle fibers look like additional head of biceps femoris. The right and left lower limbs of cadaver showed same variation. After dissecting whole limb no any other variation was found. The biceps femoris was examined carefully and photographed. As these variations are rare we preserved these limbs in 10% formalin.

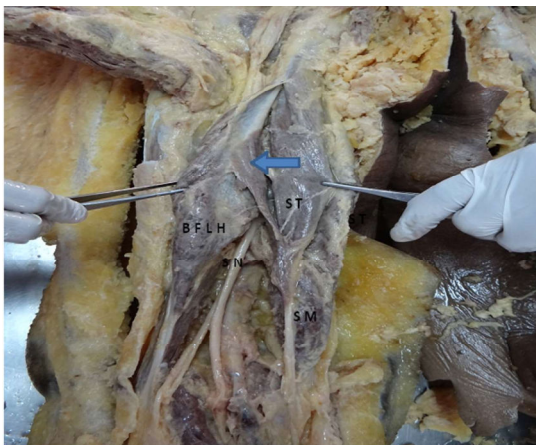


Fig. 1: An additional head of biceps femoris showed by arrow of left lower limb.

SM- Semimembranosus
ST-Semitendinosus
SN- Sciatic Nerve
BFLH- Long head of biceps femoris

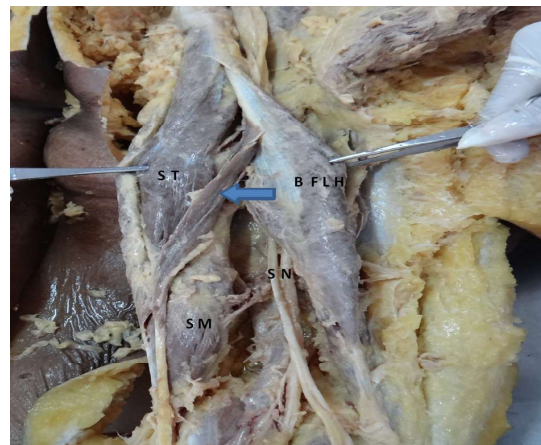


Fig. 2: An additional head of biceps femoris showed by arrow of right lower limb.

SM- Semimembranosus
ST-Semitendinosus
SN- Sciatic Nerve
BFLH- Long head of biceps femoris

Discussion

The structure and function of hamstrings muscle have been studied for long time which provides

full information about anatomy of hamstrings muscles. The biceps femoris is the important component of the hamstrings muscle. Different variations of hamstrings muscle explained

in a review of literature. e.g. an accessory semimembranosus muscle,¹¹ Hypoblastic or absent semimembranosus,¹² Duplicated semimembranosus,¹³ common proximal tendon of three muscles,¹⁴ separate distal short head of biceps brachii insertion and separate proximal long head of biceps brachii.^{3,4}

The abnormal muscle bundle originated from long head of biceps femoris in the right lower limb of adult male cadaver was described by Cetkin M. et al. The origin was normal but some fibers formed another tendon, runs medially in between biceps femoris and semitendinosus. It measures about 86.32×5.47 mm.² The present study is similar to Cetkin M. et al. But we found bilateral presence of anomalous muscle.

This type of variation may affect normal actions of biceps femoris muscle. The slip of muscle attached to semitendinosus, so it may strengthen it. It crosses the sciatic nerve; there may be chance of compression and a mysterious pain in lower limb. In clinical practice this type of muscular variations produces confusion to diagnose.^{7,11}

A muscular anomaly was identified between long head of biceps and semitendinosus muscle by Chakravarti.⁴ It was originated from the long head of biceps and merges with semitendinosus muscle. It was 6.5 cm in length and 3.5 cm in width. He considered that it may be the third head of biceps femoris.

An anomaly in the insertion of the biceps femoris tendon that has never been described in the literature was described by Fritsch and Mhaskar. They found a hypertrophic insertion on the tibia and an atrophic insertion on the fibula, which was successfully managed by otoplasty of the fibular head and by changing the route of biceps femoris surgically.⁵

The anatomy and relations of muscle was described by Renata La Rocca Vieira, by using MRI of the distal biceps femoris. A variation present in this part may be resulted in entrapment neuropathy of common peroneal nerve.⁹

In myogenesis when a muscle precursor enters, to divide the limb buds into dorsal and ventral part. After that both the parts again divides into three compartments and proximal–distal axis. The continuous migration of muscle precursor results in the formation of specific muscle. Anomaly found in present study may be defect in continuous moving of muscle precursor during development.¹⁶

Conclusion

We found a part of muscle fibers originates from long head of biceps and merges with semitendinosus bilaterally. The importance of this finding is it gives strain to the muscles of posterior compartment and compression of sciatic nerve. Hence the muscle fibers were merged with semitendinosus may strengthen it. This muscle strap may create confusion in examination of CT and MRI scans and while performing surgery. Hence to avoid complexity during diagnosis and treatment, it is necessary to cognizant of such variations.¹⁵

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Conflict of Interest: None

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