



Case Report

Duplicated adductor brevis muscle: A case report

Lakshita Sharma^{1*}, Ritika Kaswa¹, Anamika Kumari Yadav¹, Ankita Pareek¹,
Sandeep Madhukar Lahange² 

¹Dept. of Anatomy, National Institute of Ayurveda, Jaipur, Rajasthan, India

²Dept. of Ayurveda Anatomy, National Institute of Ayurveda (Ministry of AYUSH Govt. of India), Jaipur, Rajasthan, India

Abstract

The Adductor Brevis muscle is a prominent component of the medial thigh compartment that helps in stabilizing and adducting the hip. Although the presence of anatomical variations in this muscle is quite frequent and well documented, yet presence of duplicated Adductor brevis is extremely rare. This article presents a case of unilaterally duplicated Adductor Brevis that was witnessed during a routine anatomical dissection in the National Institute of Ayurveda, Jaipur, Rajasthan. The variant consisted of an additional deeper muscular belly with distinct proximal and distal attachments, running parallel to the primary or superficial adductor brevis. Extensive light has been shed on its embryological, surgical as well as clinical aspects. Recognizing such anatomical variations is essential for accurate diagnosis, preventing misidentification during surgical interventions, and understanding possible biomechanical consequences. Further studies are warranted to determine the prevalence and functional impact of this duplication in the general population.

Keywords: Adductor brevis, Variation, Superficial, Duplication, Ontogeny

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1. Introduction

The adductor brevis muscle is a muscle of the medial compartment of the thigh, part of the adductor group, which forms a prominent muscle of the thigh region.¹ This muscle plays a crucial role in hip adduction.² The entire human musculoskeletal system possesses a variety of anatomical variations. One such variation is exhibited by this muscle, although it is typically described as a single muscle, certain anatomical studies have noted its division into separate parts or the presence of an extra slip based on fibres orientation, attachments, along with its innervation. Although the presence of such variations is relatively rare, it might be significant for anatomists, orthopaedic surgeons, and radiologists due to its potential impact on movement, nerve compression, and misinterpretation in imaging studies. This might also disrupt the biomechanics of the lower limb.

1.1. Anatomy

The Adductor Brevis muscle, along with the Adductor Longus, Adductor Magnus, Gracilis, and Pectineus, forms the medial compartment of the thigh.³ This lies superficial to the Obturator Externus and Adductor magnus and lies deep to the Adductor Longus.

1. Origin- Anterior surface of body of pubis, outer surface of inferior ramus of the pubis between the Gracilis and Obturator externus.⁴
2. Insertion – line extending from the lesser trochanter to the upper part of linea aspera, behind the upper part of adductor longus.
3. Innervation- Obturator nerve's (L2-L4) anterior or posterior divisions
4. Actions- Adduction, medial rotation, and flexion of the thigh play a poignant role in lower limb stabilization during gait.

*Corresponding author: Lakshita Sharma
Email: ritikakaswa830@gmail.com

Numerous variations in Adductor Brevis have been reported so far which including an extra slip or division of the muscle into two or more distinctive parts. These are depicted in the form of Case 1 and Case 2.

1. Case 1: It involves the presence of an extra slip, which might be in the form of
 - a. Case 1(a): A fibrous extension that might insert into the structures present in its vicinity, such as the pectineus, iliopsoas muscle.
 - b. Case 1(b): A tendinous slip that might be present in close association with Vastus Medialis or Iliopsoas
 - c. Case 1(c): A distinct muscular belly.
2. Case 2: In case of the presence of distinct parts, its subdivisions are as follows.
 - a. Case 2(a): Medial and Lateral Heads-these heads are named so because of their position.
 - i. Medial Head: one that inserts in the vicinity of pectineus.
 - ii. Lateral Head: one that shows close affinity to the Vastus group of muscles.
 - b. Case 2(b): Superficial and Deep Parts – the muscle might be separated into its superficial and deep parts
 - i. Superficial fibers may lie in close association with fibres of the Adductor Longus may lie anteriorly and is positioned closer to the adductor longus.
 - ii. Deep fibers insert closer to the Adductor Magnus.
 - c. Case 3(c): Tendinous and Muscular Portions
 - i. Some variations show a tendinous portion that extends beyond the usual insertion, forming a distinct band connecting to the Iliopsoas or Vastus Medialis.
 - ii. This could contribute to biomechanical stability, particularly during activities requiring strong hip adduction or internal rotation.

2. Case report

A routine dissection was done in the department of Sharir Rachana, National Institute of Ayurveda, Jaipur. These variations were found while dissecting a 79-year-old formalin-fixed male cadaver of North Indian Origin. The body was donated voluntarily, and the formalin-fixed lower limbs were observed for this study. The variant muscle, Adductor Brevis, possessed **Case 2(b)** type of muscular variation, which involves having a superficial and deeper part unilaterally. Superficial part lies medially to the femoral artery, and Deep Part lies more medially and deeper to the superficial part, as shown in **Figure 1**, while originating from the Anterior surface of the body of pubis, the outer surface of

the inferior ramus of the pubis. Insertion of the superficial part of A.B. at the line extending from the lesser trochanter to the upper part of linea aspera, behind the upper part of adductor longus, and insertion of the deep part of A.B. to the upper and middle part of linea aspera just below the superficial part as shown in **Figure 2**.

The length of the superficial part of A.B. was 19 cm, with 7 cm being its widest part and 4 cm being the narrowest part, and the length of the deep part of A.B. was 12 cm, with 5 cm being the broadest part and 2cm the narrowest one.

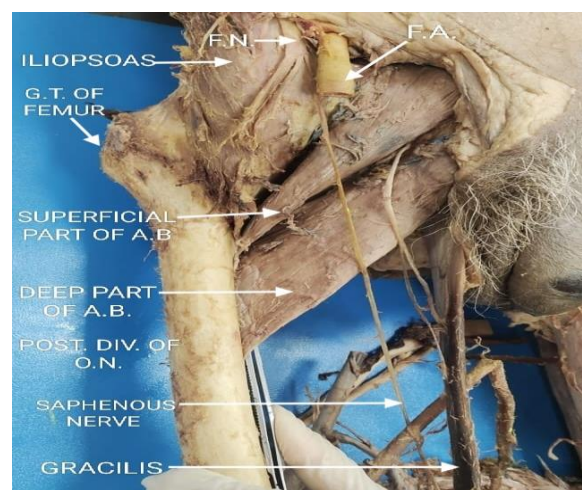


Figure 1: Antero- medial view of thigh: figure depicting Femoral Artery (F.A.), Femoral Nerve (F.N.), Iliopsoas, Greater Trochanter of femur (G.T. of femur), Superficial part of Adductor Brevis (Superficial Part of A.B.), Deep part of Adductor Brevis (Deep Part of A.B), Posterior division of obturator nerve (Post Div of O.N.), Saphenous nerve and Gracilis.

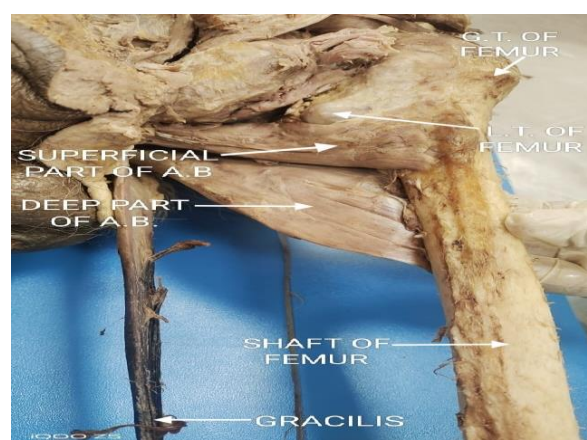


Figure 2: Posterior view of thigh: figure depicting insertion of Adductor Brevis parts: Greater Trochanter of femur (G.T. of femur), Lesser Trochanter of femur (L.T. of femur), Superficial part of Adductor Brevis (Superficial Part of A.B.), Deep part of Adductor Brevis (Deep Part of A.B), Deep part of Adductor Brevis, and Gracilis.

2.1. Clinical relevance

Knowledge of anatomical variations of the Adductor Brevis turns out to be a poignant detail in terms of muscular strains, nerve entrapments, and rehabilitation after any injury.⁵ These additional slips are usually asymptomatic but can occasionally contribute to clinical conditions such as nerve compression, altered biomechanics, or confusion in radiological imaging. These distinct parts of the muscle may exert pressure on the obturator nerve, thus making it more susceptible to compression that might lead to weakness, numbness, and pain in the medial part of the thigh.⁶ This additional part of the muscle might lead to increased strength of that particular group, which is the adductor group in our case. This muscle belly might be used in the surgical treatment of the hip dislocation or subluxation in myelodysplastic patients by transferring the origin of adductor brevis along with other adductors to the ischial tuberosity.^{7,8} This, in turn, will spare other adductors for further adductor function, thus maintaining the strength of the muscle which might have been hampered as a result of transfer.⁹ At times, adductor muscle strain may prove to be incapacitating for the athletes. Sports surgeons may have to resort to adductor release and tenotomy if other rehabilitative procedures fail to cure the patient of pain and debility.¹⁰ The myocutaneous flap of this muscle is also used in scrotal reconstruction, hence an additional muscle belly can be utilized for the same. This knowledge might be relevant in numerous physiotherapeutic modalities as well as surgical interventions targeting the adductor muscles.

3. Discussion

Adductor Brevis tend to possess numerous anatomical variations in terms of the presence of two or more heads, an extra slip, or separate two or more parts, or might be present in close amalgamation with adductor magnus. These variations depend upon the ontogeny of the muscle. The bifurcation of adductor brevis as seen in the present case may be attributed to abnormal splitting of original muscle mass anlagen leading to its partial duplication.

4. Conclusion

Thus, the adductor brevis, with its superficial and deep components, plays a critical role in hip adduction, stability, and controlled movement. Recognizing its layered structure

enhances our understanding of lower limb function and provides insights into clinical applications related to rehabilitation and sports medicine.

5. Abbreviations

Adductor Brevis (A.B.), Greater Trochanter (G.T), Lesser Trochanter (L.T.), Posterior Division of obturator nerve (Post div. of O.N.), Femoral Artery (F.A.), Femoral Nerve (F.N.).

6. Source of Funding

None.

7. Conflict of Interest

None.

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