

Case Report

BILATERALLY BIFID ADDUCTOR BREVIS: A CASE REPORT

Upasna ¹, Rajan Kumar Singla ², Arun Sharma ^{*3}, Mannat Singla ⁴.

¹ Associate Professor, Department of Anatomy, Government Medical College, Patiala, Punjab, India.

² Professor & Head, Department of Anatomy, Government Medical College, Patiala, Punjab, India.

^{*3} Junior Resident 3rd Year, Department of Anatomy, Government Medical College, Patiala, Punjab, India.

⁴ 1st Year MBBS Student, Department of Anatomy, Government Medical College, Patiala, Punjab, India.

ABSTRACT

Adductor brevis is an important member of the adductor family occupying the medial compartment of the thigh executing the function of adduction and medial rotation. Deviations from normal anatomy are unusual and rarely reported. A survey of anatomical archives revealed occasional mention of additional bellies of adductor brevis muscle. The present study reports a double belly of adductor brevis (AB) muscle both on right and left side found during a cadaveric dissection for medical students in Government Medical College, Patiala, Punjab. This case report attempts to present the clinical applications of multiple bellies of this important adductor muscle of the thigh. It is feasible to categorize these muscular variations upon specialized radiological procedures such as CT and MRI scans only if the radiologist possesses satisfactory understanding of variant anatomy of this region. It is thereafter inferred that upon recognition these muscles present a fair chance of use in reconstructions.

KEY WORDS: Adductor brevis, Reconstructions, Variations.

Address for Correspondence: Dr. Arun Sharma, Department of Anatomy, Government Medical College, Patiala.147001, Punjab, India. **E-Mail:** arun.gmc@gmail.com

Access this Article online

Quick Response code



DOI: 10.16965/ijar.2016.210

Web site: International Journal of Anatomy and Research
ISSN 2321-4287
www.ijmhr.org/ijar.htm

Received: 20 Apr 2016 Accepted: 12 May 2016
Peer Review: 20 Apr 2016 Published (O): 30 June 2016
Revised: None Published (P): 30 June 2016

INTRODUCTION

Adductor brevis (AB) arises by a narrow attachment from the external aspect of the body and inferior ramus of pubis between the gracilis and obturator externus. It widens in triangular fashion as it descends posterolaterally to insert via an aponeurosis into the femur along a line from the lesser trochanter to the linea aspera and on the upper part of linea immediately behind the insertion of pectineus and upper part of adductor longus [1]. The anterior division of obturator nerve passes

vertically downward on its anterior surface and the posterior division passes down behind it. The upper border of adductor brevis thus lie between the two division of obturator nerve in the same way as the upper border of the adductor longus lie between the femoral and the profunda femoral vessels [2].

From the anatomical position, the main action of the adductor muscle group is to pull the thigh medially, towards or past the median plane. Three adductors (longus, brevis and magnus) are used in all movements in which the thighs are

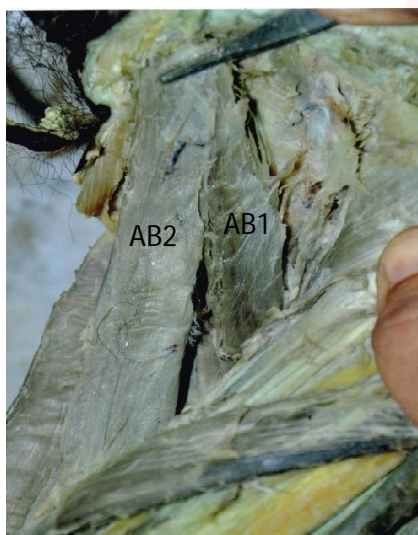
adducted (e.g. pressed together when riding a horse). They are used to stabilise the stance when standing on both feet, to correct lateral sway of the trunk, or when there is side to side shift of the surface on which one is standing (rocking a boat, standing on a balanced board). They are also used in kicking with the medial side of the foot in soccer and in swimming. Finally, they contribute to flexion of the extended thigh and extension of flexed thigh when running or against resistance. The adductors as a group contribute a large muscle mass [3]. Although they are important in many activities, it has been shown that a reduction of as much as 70% of their mass or function will result in only a slight to moderate impairment of hip joint [4].

CASE REPORT

On routine undergraduate dissection, in the department of Anatomy, Govt. Medical College Patiala, we encountered a female cadaver of approximate age 50 where there were two bellies of adductor brevis bilaterally.

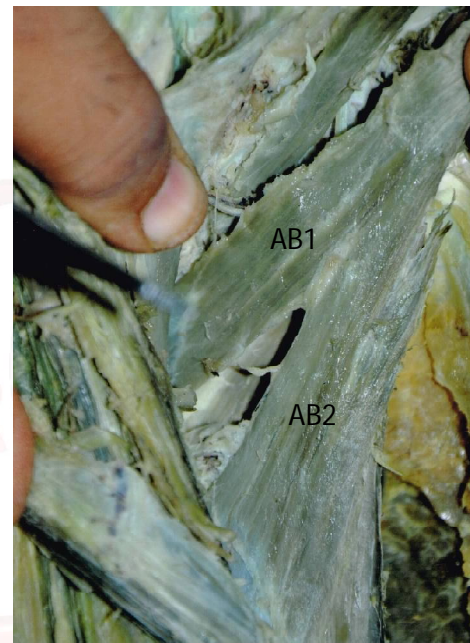
On the left side, the tendon of adductor brevis took origin from the outer surface of body and inferior ramus of pubic bone. After a distance of 5 cm, its belly bifurcated. The upper half was 2 cm wide and continued for another 6 cm. (AB1) The lower belly was 2 cm wide and continued for 9.5 cm. (AB2). The upper belly was inserted along a length of 2.5 cm while the lower was inserted along a length of 2 cm in the upper one third of linea aspera. The distance between two insertions was 3 cm. (Fig. 1)

Fig. 1: Adductor Brevis of Left Side.



On the right side, the tendon of adductor brevis took origin from the outer surface of body and inferior ramus of pubic bone. After a distance of 7 cm, its belly bifurcated. The upper half was 2 cm wide and continued for another 4 cm. (AB1) The lower belly was also 2.3 cm wide and continued for 7 cm. (AB2). The upper belly was inserted along a length of 2 cm while the lower was inserted along a length of 4 cm in the upper one third of linea aspera. The distance between two insertions was 3 cm. (Fig. 2)

Fig. 2: Adductor Brevis of Right Side.



In both the cases, the profunda femoris artery was passing between the two heads of adductor brevis.

DISCUSSION

Adductor brevis is said to have two or three separate parts or may be integrated into adductor magnus [1,5]. Separation may be at the origin or insertion or complete [5]. Ocheltree reported a case in which the adductor brevis divided into two quite separate insertions into the linea aspera but he did not describe it as a separate muscle. Maybe the gap between the two insertions was not large enough to merit the separate name [6].

Singh et al encountered an abnormal adductor brevis in addition to the normal one. It originated from the anterior surface of inferior pubic ramus and was inserted into upper part of linea aspera and adjoining part of the line from the linea aspera to the lesser trochanter. It was

separated from the normal adductor brevis by a gap of 1.5 inches [7]. Thus sporadic cases of bifurcation of adductor brevis are reported off and on. However, none of the studies has given the incidence of bifurcation of adductor brevis nor have any reported a bilateral bifurcation of this muscle. Schaffer believed that division of adductor brevis into two separate fasciculi near the insertion may be even normal [8].

Ontogeny: The musculature of the limb develops from myogenic precursor cells derived from ventral dermomyotomes of somites in response to molecular signals from the nearby tissues. As the long bones form, myoblasts aggregate and form a large muscle mass in each limb bud. In general this muscle mass separates into dorsal and ventral components [9]. Small changes in the extracellular environment of the myoblasts are believed to induce local fusion of some cells and thus create a gap that further divides the muscle mass and that is how these blocks of muscle anlagen undergo spatiotemporal sequence of division and subdivision as the limb lengthens, leading to formation of individual muscles [10]. 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. Bardeen (1966) believed that adductor longus is differentiated from a muscle mass at first not perfectly distinct from that of the adductor brevis. So there is a possibility that adductor longus has not differentiated from a muscle mass of adductor brevis leading to the formation of two heads of adductor brevis [11].

Phylogeny: During evolution, by the process of subdivision, fusion, migration and splitting, the original muscle mass within the limb gives rise to new muscles [12]. In urodeles (amphibians) and reptiles, the number of muscles in the adductor compartment is two viz. Pubotibialis and adductor femoris whereas the number increases to three in mammal's viz. Adductor longus, brevis and magnus [13]. In the different groups of mammals there is considerable variation in the number of individual muscles into which the adductor musculature is divisible, from one to six. In man the chief variations noted have to do with the greater or less fusion of

different muscles into which the group is divided [11].)

CLINICAL IMPLICATIONS: The variant and supernumerary muscles are important not only for anatomists but also for orthopaedic surgeons and radiologists. Functionally, they may add or subtract to the strength of a particular group (adductor in this case).

Myelodysplastic patients with subluxation or dislocation of the hip may be treated surgically by transferring the origin of adductor brevis along with other adductors to the ischial tuberosity. The presence of an additional belly of adductor brevis could possibly be utilized for the same purpose thereby sparing the other adductors for the adduction function which otherwise weakens as a result of transfer [14].

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 [15]. Similarly, adductor minimus has been used as a myocutaneous flap for scrotal reconstruction. An additional belly of adductor brevis as in the present case may also be used for the same.

CONCLUSION

Thus it can be concluded that a variant adductor complex of thigh occurs due to greater or less fusion of different muscles into which the adductor group is divided. Anatomical knowledge of these variations of medial side of thigh with the possible muscular variations is needed for the proper performance of surgeries and reconstructions.

Conflicts of Interests: None

REFERENCES

- [1]. Salmon S. Muscle In: Gray's Anatomy. The Anatomical Basis of Clinical Practice. William PL, Bannister LH, Berry MM, Collins P, Dyson M, Dussek JE, Ferguson MWJ. Edrs. 38th Ed. Edinburg. Churchill Livingstone. 2005; pp 874-5.
- [2]. Sinnatamby CS. Lower limb. In: Last's Anatomy. 12th Ed. Edinburgh: Churchill Livingstone. 1998;p. 121-2.
- [3]. Moore KL, Dalley AF. Clinically Oriented Anatomy. 5th Ed., Philadelphia, Lippincott Williams and Wilkins. 1999;597-8.

- [4]. Merkede G, Stener G. Function after removal of various hip and thigh muscles for extirpation of tumors. *Acta Orthop Scand*.1981;52:373.
- [5]. Hollinshead, W.H. *Buttock, Hip Joint and Thigh*. In: *Anatomy for Surgeons, Vol 3*. 2nd Ed. New York, Harper and Row. 1969; pp 720-1.
- [6]. Ochiltree, A.B. Some muscular anomalies in lower limb. *J Anat Physiol*. 1912;47:31.
- [7]. Singh SP, Singh S, Mathur MM. Abnormal adductor brevis muscle – A case report. *J Anat Soc Ind*. 1971;20(3):157-8.
- [8]. Schaeffer JP. Musculature of the lower limb. In: *Morris" Human Anatomy- Complete Systemic Treatise*. J. C. B. Grant. 10th Ed. Philedelphia, Toronto. The Blakiston Company. 1947; pp 539-40.
- [9]. Moore KL, Persaud TVN. The Muscular System. In: *The Developing Human- Clinically Oriented Embryology*. 7th Ed., Elsevier, Philedelphia, Pennsylvania. Saunders. 2004;pp 402-3.
- [10]. Chopra J, Rani A, Rani A, Manik P. Supernumerary muscle in the adductor compartment of thigh – a case report. *J Anat Soc India*. 2009;58:195-198.
- [11]. Bardeen CR. Development and variation of the nerves and the musculature of the inferior extremity and of the neighbouring regions of the trunk in man. *Am J Anat*.1906;6:259-390.
- [12]. Neal HV, Rand HW. The Muscular System. In: *Comparative Anatomy*. London. Lewis HK and Co. Ltd. 1936;pp 271.
- [13]. Romer AS. Muscular System. In: *The Vertebrate Body*. Philedelphia and London. WB Saunders. Company. 1950;pp 275-81.
- [14]. London JT, Nichols O. Paralytic Dislocation of the Hip in Myelodysplasia. The role of adductor transfer. *J Bone Joint Surg Am*.1975;57(4):501-6.
- [15]. Nicholas SJ, Tyler TF. Adductor muscle strains in sport. *Sports Med*. 2002;32:339–344.

How to cite this article:

Upasna, Rajan Kumar Singla, Arun Sharma, Mannat Singla. BILATERALLY BIFID ADDUCTOR BREVIS: A CASE REPORT. *Int J Anat Res* 2016;4(2):2405-2408. **DOI:** 10.16965/ijar.2016.210