

# International Journal of Experimental Pharmacology

www.ijepjournal.com

## A CLINICAL STUDY OF A GASTROCNEMIUS VARIANT HEAD

## Radhakrishnan P<sup>1</sup>\* and Jaikumar S<sup>2</sup>

<sup>1</sup>Department of Anatomy, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry – 605502. <sup>2</sup>Department of Pharmacology, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry – 605502.

## ABSTRACT

The area on the popliteal surface of the femur behind the medial condyle and behind the adductor tubercle. The lateral head is linked to the lower section of the supracondylar line and the lateral surface of the lateral condyle. The inferolateral and inferomedial boundaries of the popliteal fossa are formed when the two heads meet at the inferior boundary of the popliteal fossa. The tendinous attachments spread to cover the posterior surface of each head with an aponeurotic sis, from which muscle fibers emerge on the anterior surface. Muscle fibers begin to enter into the broad aponeurosis as the muscle descends, which contracts and receives the soleus tendon on its deep surface to create the Calcaneal or Achilles tendon. The tibial nerve supplies the gastrocnemius muscle. The gastrocnemius muscle was found to be particularly massive. Along with the lateral and medial heads of the gastrocnemius, an accessory head was seen on the lateral side, forming the inferolateral and inferomedial boundaries of the popliteal fossa. As illustrated in the accessory head originated from the lateral femoral condyle and the adjacent region of the lateral supracondylar line. After reviewing the literature and comparing the current case, we have determined that this is a case of the third/accessory head of the gastrocnemius muscle, which originates from the popliteal surface of the femur and attaches distally to the junction of the medial and lateral heads of the gastrocnemius. It's likely that this variant muscle compresses the tibial nerve and popliteal arteries, and that being aware of this could avoid radiologists and surgeons from misinterpreting it as a pathological structure.

Keywords: Variant Head of Gastrocnemius, Pathological, Lateral Supracondylar Line.

#### INTRODUCTION

The area on the popliteal surface of the femur behind the medial condyle and behind the adductor tubercle [1]. The lateral head is linked to the lower section of the supracondylar line and the lateral surface of the lateral condyle. The inferolateral and inferomedial boundaries of the popliteal fossa are formed when the two heads meet at the inferior boundary of the popliteal fossa [2]. The tendinous attachments spread to cover the posterior surface of each head with an aponeurotic sis, from which muscle fibers emerge on the anterior surface. Muscle fibers begin to enter into the broad aponeurosis as the muscle descends, which contracts and receives the soleus tendon on its deep surface to create the Calcaneal or Achilles tendon [3].

Corresponding Author

**Dr. P. Radhakrishnan,** Email id: jaipharma2007@gmail.com The tibial nerve supplies the gastrocnemius muscle. It has its own Sural artery for blood supply [4, 5]. These arteries are popliteal artery branches. Plantar flexion is aided by this muscle. Extra muscles or muscle slips in the extremities are quite prevalent [6, 7]. Some of them may constrict movement or compress nerves and arteries, while others may increase muscular activity. A tiny percentage of them, however, may go undiscovered [8, 9]. Plastic surgeons need to know about these different muscles when performing various reconstructive procedures, and doctors need to know about them when managing pain [10-12].

#### **Case Presentation:**

The gastrocnemius muscle was found to be particularly massive. Along with the lateral and medial heads of the gastrocnemius, an accessory head was seen on the lateral side, forming the inferolateral and inferomedial boundaries of the popliteal fossa. As illustrated in the accessory head originated from the lateral femoral condyle and the adjacent region of the lateral supracondylar line. The lateral femoral condyle was the source of the lateral head. From the medial femoral condyle and the medial supracondylar line, the medial head had a single head. Between the auxiliary head and the medial head, the tibial nerve was implanted. Near their origin, all of the muscle's heads stayed separate and merged to produce the tendocalcaneus in the lower half of the leg. The bipennate arrangement of fleshy fibers in this auxiliary head was another remarkable discovery. All of them, the heads were innervated by tibial nerve branches and supplied by popliteal arteries. The plantaris arose from the lateral condyle of the femur and was positioned between the gastrocnemius and the soleus, dividing the two muscles . The tendon of the plantaris joined the tendon of the trend.

#### **Discussion:**

The Gastrocnemius is a calf muscle that generally develops from the femur's condyles in two heads. The lateral head is attached to the lateral surface of the lateral condyle and the matching supracondylar line, while the medial bigger head is linked to the medial condyle. Some fibers of both heads come from the genicular capsule's subjacent area. Normally, the tendinous attachments extend to form an aponeurosis that covers the posterior surface of each head. The fleshy muscle fibers emerge from the aponeurosis's anterior surface. The medial head's fleshy muscle fibers are shorter than those of the lateral head. The muscle fibers insert into a large aponeurosis below, and the muscular masses of the two heads stay distinct until that point. The aponeurosis narrows throughout time and is linked on its deep surface by the soleus tendon to produce the tendocalcaneus. The branches of the tibial nerve and the popliteal artery supply the gastrocnemius. Additional heads and other muscle variants are quite uncommon. The gastrocnemius muscle is a muscle on the fibular side of the leg, according to phylogeny. It originates in the calcaneum blastomere and migrates upwards to the inferior femoral epiphysis. The long head of the biceps femoris muscle,

Linea aspera, lateral femoral epicondyle, knee joint capsule, or leg fascia may all contribute to the third head. It may split and arise from multiple regions, or it may divide at its terminus to link both gastrocnemius heads. Tensor fasciasuralis / Ischioaponeuroticus is an uncommon variation in which an atypical muscle leaves the belly of the semitendinosus and ends in the tendon that links the fascia of the leg. Tensor Fascia Suralis developed a thin tendon distally merging with the intratendinous fibers of the medial and lateral heads of the gastrocnemius muscle. It characterized the third head (Caput tertium) as a variant of the gastrocnemius muscle, also known as Gastrocnemius tertius, as detected in CT scans. Gupta and Bhagwat discovered that muscle variations are prevalent and visible during normal cadaver dissection. Many, if not all, of the variances are completely harmless; others are caused by abnormalities in embryologic developmental time or the persistence of an embryologic disease. Some of these changes may put sections of the muscular, circulatory, neurological, skeletal, and/or organ systems at jeopardy. As a result, it is suggested that the plantaris muscle is a derivation of the gastrocnemius muscle's lateral head's deeper section. The co-existence of the bilateral gastrocnemius tertius and auxiliary Soleus muscles in the same cadaver was described in their paper. They've gone into great detail on how these mutations could cause problems for structures in the popliteal fossa. Entrapment syndromes are most typically associated with the third head of the gastrocnemius muscle contacting the medial head of the muscle.

### **Conclusion:**

After reviewing the literature and comparing the current case, we have determined that this is a case of the third/accessory head of the gastrocnemius muscle, which originates from the popliteal surface of the femur and attaches distally to the junction of the medial and lateral heads of the gastrocnemius. It's likely that this variant muscle compresses the tibial nerve and popliteal arteries, and that being aware of this could avoid radiologists and surgeons from misinterpreting it as a pathological structure.

### REFERENCES

- Wang, M., Zhang, S., Wu, X., Jin, X., & Zhang, J. (2012). Popliteal vascular entrapment syndrome caused by variant lateral head of the gastrocnemius muscle leading to pulmonary artery embolism. *Clinical Anatomy*. <u>https://doi.org/10.1002/ca.22039</u>
- Bhagath Kumar Potu, S. R. S. (2013). Popliteal Vessels Entrapment by a Variant Accessory Belly of Medial Head of Gastrocnemius. *Anatomy & Physiology*. https://doi.org/10.4172/2161-0940.1000116
- Wang, M., Zhang, S., Wu, X., Jin, X., & Zhang, J. (2012). Popliteal vascular entrapment syndrome caused by variant lateral head of the gastrocnemius muscle leading to pulmonary artery embolism. *Clinical Anatomy*. https://doi.org/10.1002/ca.22039
- 4. Gamagami, R. A., Plecha, E. J., Bundens, W. P., & Hye, R. J. (1995). An unusual variant of popliteal artery entrapment. *Annals of Vascular Surgery*. https://doi.org/10.1007/BF02143861

- 5. Koplas, M. C., Grooff, P., Piraino, D., & Recht, M. (2009). Third head of the gastrocnemius: An MR imaging study based on 1,039 consecutive knee examinations. *Skeletal Radiology*. https://doi.org/10.1007/s00256-008-0606-5
- 6. Paval, J., Vollala, V. R., & Nayak, S. (2005). Sciatic nerve entrapment in the popliteal fossa: A case report. *Neuroanatomy*.
- di Marzo, L., Cavallaro, A., Sciacca, V., Mingoli, A., & Tamburelli, A. (1991). Surgical treatment of popliteal artery entrapment syndrome: A ten-year experience. *European Journal of Vascular Surgery*. https://doi.org/10.1016/S0950-821X(05)80928-4
- Mercuri, E., Bushby, K., Ricci, E., Birchall, D., Pane, M., Kinali, M., Allsop, J., Nigro, V., Sáenz, A., Nascimbeni, A., Fulizio, L., Angelini, C., & Muntoni, F. (2005). Muscle MRI findings in patients with limb girdle muscular dystrophy with calpain 3 deficiency (LGMD2A) and early contractures. *Neuromuscular Disorders*. https://doi.org/10.1016/j.nmd.2004.10.008
- 9. 8.Koplas, M. C., Grooff, P., Piraino, D., & Recht, M. (2009). Third head of the gastrocnemius: An MR imaging study based on 1,039 consecutive knee examinations. *Skeletal Radiology*. <u>https://doi.org/10.1007/s00256-008-0606-5</u>
- di Marzo, L., Cavallaro, A., Sciacca, V., Mingoli, A., & Tamburelli, A. (1991). Surgical treatment of popliteal artery entrapment syndrome: A ten-year experience. *European Journal of Vascular Surgery*. https://doi.org/10.1016/S0950-821X(05)80928-4
- Yamazaki, T., Maruoka, S., Takahashi, S., Saito, H., Takase, K., Nakamura, M., & Sakamoto, K. (1995). MR findings of avulsive cortical irregularity of the distal femur. *Skeletal Radiology: A Journal of Radiology, Pathology and Orthopedics*. https://doi.org/10.1007/BF02425946
- 12. Rochier, A. L., & Sumpio, B. E. (2009). Variant of Popliteal Entrapment Syndrome Involving the Lateral Head of the Gastrocnemius Muscle: A Case Report. *Annals of Vascular Surgery*. https://doi.org/10.1016/j.avsg.2009.02.003