

ACCESSORY SOLEUS MUSCLE: A RARE TISSUE VARIATION WITH ITS CLINICAL SIGNIFICANCE

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Abstract: Aim of present study is to find out the presence of accessory soleus muscle and its frequency in human lower limbs. Lower limb of thirty cadavers (26 males and 04 females) were dissected. Origin and insertion of soleus muscle was observed and in addition the presence of accessory soleus muscle was seen. Age of all cadavers was in between 30-42 years. Out of thirty cadavers only in one male cadaver of 40 years of age accessory soleus muscle was present. Accessory soleus muscle may give rise to symptoms such as pain with exertion, during running and jumping. The study of these types of variations with its frequencies is important in the planning of operative treatment.

Key words: Achilles tendon, Accessory soleus muscle

INTRODUCTION

Gastrocnemius and soleus (S), collectively known as the triceps surae, constitute a powerful muscular mass whose main function is plantar flexion of the foot, although soleus in particular has an important postural role [1]. The soleus muscle arises primarily by two heads, which are united by a tendinous arch. The fibular head of the soleus arises from the head of the fibula and about third of the shaft; the tibial head arises from the soleal line on the tibia. Muscular fibers of the soleus end in a broad aponeurosis and unite with aponeurosis of the gastrocnemius to form tendo-calcaneus (tendo-Achilles). It is supplied by branches of popliteal artery and its innervation is derived from tibial nerve [2].

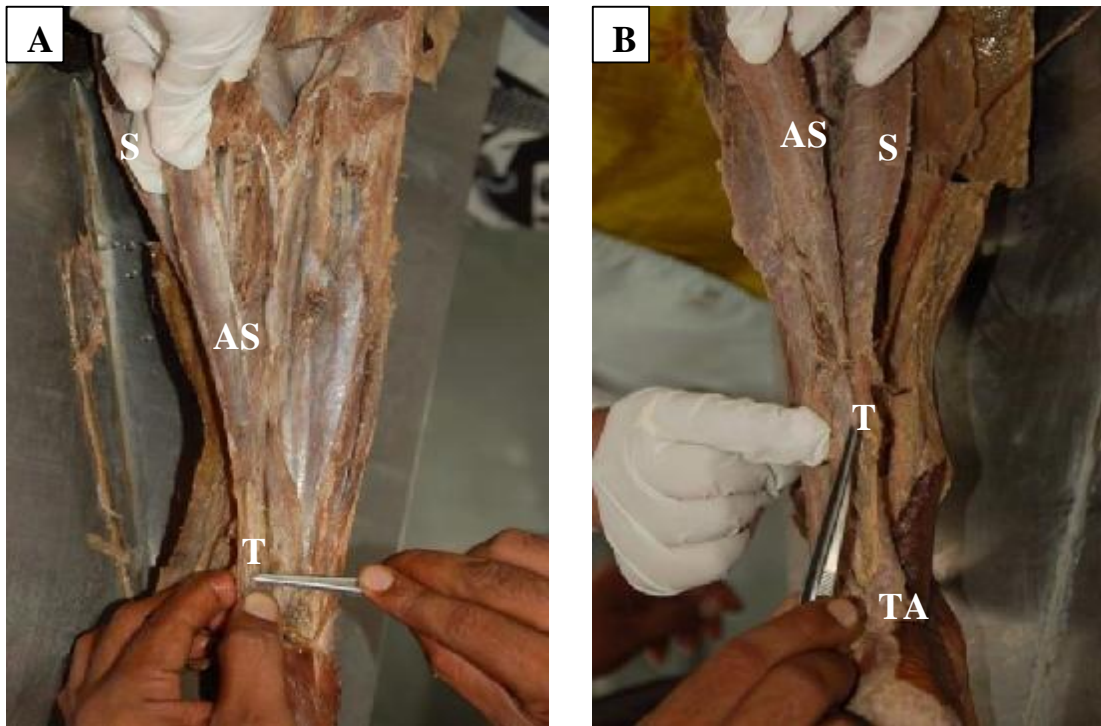
Like all other anatomical variations of the human muscular system, the accessory soleus muscle was well known to early anatomists. It had been described by the end of the 19th century by Luschka (1865), Bankart and Pye-Smith (1869), Testut (1884) and especially Ledouble (1897). But it was not until 1965

that Dunn established a relationship between a painful symptomatology of the posterior aspect of the ankle and a presence of a posterior medial tumefaction, lateral to the Achilles' tendon, initially considered to be a soft-tissue tumor. Surgery was performed in one of the three cases reported and the accessory soleus muscle was discovered as the cause of the symptoms.

The current study demonstrates the presence of bilateral additional musculo-tendinous bellies of soleus muscle only in one cadaver out of 30 cadavers, which were dissected. To the best of our knowledge, the bilateral presence of additional bellies of soleus muscle has been rarely reported.

MATERIALS AND METHODS

The present study was carried out in the dissection hall of JNMC, Sawangi, Wardha (MS). Lower limb of thirty cadavers (26 males and 04 females) were dissected. Origin and insertion of soleus muscle was observed and in addition either accessory soleus



Figs. 1A and B: Dissection of posterior compartment of leg of right and left side showing accessory soleus muscle. S- Soleus muscle, AS-Accessory soleus muscle, T- Tendon of accessory soleus muscle, TA-Tendo- Achilles.

muscle (AS) was present or not was seen. Age of all cadavers was in between 30-42 years. Only in one male cadaver of 40 year of age there was the presence of an additional belly of soleus (accessory soleus) muscle on both limbs. In rest of the 29 cadavers the additional bellies were not present.

RESULTS

In the present study out of 30 cadavers only in one cadaver (0.3%) accessory soleus muscle (AS) was present along with soleus muscle (S). The accessory soleus muscle took origin from inferolateral aspect of soleus muscle, then it tapered distally and finally it was inserted into the tendo-Achilles (TA) as a long tendon (T). The length of the tendon of accessory soleus muscle was 10cm on the right side and 12cm on the left side. The additional musculo-tendinous belly did not display any bony attachments. There was no evidence of separate vascular or nerve supply to the additional bellies. This is shown in figure 1 and 2.

DISCUSSION

The present study displays bilateral anomalous pattern of the soleus muscle in cadavers (0.3%). These accessory muscles could be effectively used for flap repairs in the coverage of soft tissue defects of distal third of the leg owing to poor vascularity of this region. Though accessory fasciculus, supernumerary fascicles and accessory soleus muscle have been described, the above-mentioned additional bellies are distinct in context of their origin, course and insertion.

An accessory fasciculus is sometimes formed on the anterior surface of the soleus. Its fibers take origin from the fascial covering of soleus and run posteromedially to a bipennate-form insertion into a thin lamina that joins with the tendo-Achilles [3]. However, this fasciculus is tightly adhered to the main soleus.

Supernumerary fascicles of muscle have also been described. These are usually reported as thin flat muscles originating from the fibula and soleal line of the tibia or from the deep fascia of the soleus and inserting via a tendon into the calcaneus medial to the tendo-Achilles [4].

The accessory muscle we saw can not be considered as a fasciculus, as it had both muscular and tendinous

components. However, it can be considered as a variant of accessory soleus muscle.

The accessory soleus muscle is a congenital anatomical variation that was first described by Cruvelhier in 1843 [4]. According to Petterson et al. [5], the incidence of the accessory soleus muscle ranges from 0.7 to 5.5%. But, in our study the incidence was 0.3%.

In a previous study done by Singh et al. [6] the length of the tendon of accessory soleus muscle was 7cm. But, in our study the length of the tendon was 10cm on the right side and 12cm on the left side.

Usually, the accessory soleus muscle is asymptomatic and goes unnoticed. However, it can lead to a painful swelling (most common), painless swelling, or association with clubfoot or equines deformity [4]. Painful swelling is thought to be due to an increase in the size of the muscle causing either muscle ischemia [4] or a compressive neuropathy involving the posterior tibial nerve [7].

Our premise in the present study is that awareness of this soleus muscle variant is imperative as one could diagnose its presence preoperatively by MRI scanning. Thus, this could help the reconstructive surgeon to plan the surgery judiciously by using the accessory muscle as a flap for the coverage of the soft tissue defects of leg.

REFERENCES

- [1] Gray H.: Gray's Anatomy. Churchill Livingstone, Spain (2008).
- [2] Hollinshead, W.H.: Anatomy for Surgeons. Harper and Row Publisher Inc., Philadelphia (1982).
- [3] Anson, B.M.: Human Anatomy. McGraw-Hill Co., New York (1966).
- [4] Palaniappan, M., Rajesh, A., Rickett, A. and Kershaw, C.J.: *Pediatric Radiol.*, 29: 610-612 (1999).
- [5] Petterson, H., Giovannetti, M., Gillespy, T., Slone, R. and Springfield, D.: *Eur J Radiol.*, 7: 149-150 (1987).
- [6] Singh, S., Suri, R.K., Mehta, V., Loh, H., Arora, J. and Rath, G. *International Journal of Anatomical Variations*, 2: 20-22 (2009).
- [7] Trosko, J., J. *J Foot Surg.*, 25: 296-300 (1986).