

## Sartorius Bifurcatus - A Case Report

Case Report

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### Abstract

The sartorius muscle usually arises from the anterior superior iliac spine, crosses the thigh to the medial side and inserts into the proximal part of medial surface of the tibia. An unusual variation of unilateral sartorius muscle was noted in an adult South Indian cadaver during the routine dissection of the lower extremity. The accessory muscle had similar origin from anterior superior iliac spine but descended downward along the lateral side of the main sartorius muscle to get inserted into the medial patellar retinaculum. This mode of insertion gives more stability to the patella by pulling the patella medially by reinforcing the medial patellar retinaculum and thereby preventing the lateral displacement of patella along with the vastus medialis. The branches of femoral artery and the femoral nerve supplied the muscle. The knowledge of variations of sartorius is of paramount importance to utilize it as a graft in reconstructive surgeries.

**Keywords:** Medial Patellar Retinaculum; Accessory Muscle; Graft; Reconstructive Surgery.

### Introduction

The sartorius muscle is the most superficial extensor muscle of the thigh and is the longest muscle of the lower limb. It crosses the hip as well as the knee joint. It arises from the anterior superior iliac spine, crosses the thigh obliquely to the medial side and inserts into the proximal part of medial surface of the tibia in the pes anserinus. Variations of sartorius reported in the literature are exceptionally rare [1]. Here we report an accessory muscle having conjoint origin with the sartorius muscle and the developmental significance is discussed.

### Case Report

During the routine dissection for the undergraduate students, a unilateral occurrence of an accessory sartorius muscle was noticed on the left thigh of an adult male South Indian cadaver, lying lateral to the sartorius muscle. This accessory muscle had a conjoint muscular origin from the anterior superior iliac spine. The muscle belly was quadrilateral in shape, with the length of 16cm and breadth of 3cm. It ended as a long aponeurosis of

length 32cm and breadth of 3.3cm at the beginning and 1cm at the end of aponeurosis (figure 1a). The accessory muscle descended downward along the lateral side of the sartorius muscle, but superficial to the rectus femoris to get inserted into the medial patellar retinaculum (figure 1b) while the main sartorius inserted in the pes anserinus. It was supplied by the anterior division of the femoral nerve and the branches of femoral vessels. There were no variations in the right side of the cadaver.

### Discussion

The sartorius muscle is a slender strap muscle in the anterior compartment of the thigh. It forms the lateral boundary of femoral triangle and roof of the adductor canal. Reports on variation of sartorius are rare in the anatomical literature. Of the variations, sartorius with two heads is a rare occurrence [1]. Kumar et al., Sesi et al., and Singh and Trivedi, have reported an accessory sartorius muscle which originated from inguinal ligament [1-3]. Garbelotti et al., reported a sartorius with double origin where the accessory head originated from iliopectineal eminence [4]. Quain has described that the sartorius muscle receives fibres from the outer end of Poupart's ligament. There can be a separate head which

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**Figure 1a. Anterior aspect of left thigh.**

Figure 1a. Showing the accessory sartorius muscle (black arrowhead) and the main sartorius muscle (blue arrowhead) arising from the anterior superior iliac spine (a- anterior superior iliac spine, b- knee region).

**Figure 1b. Medial aspect of left thigh.**

Figure 1b showing the insertion of the accessory sartorius muscle to the medial patellar retinaculum (black arrow).

arises from the notch of the ilium with a supplementary slip of origin from the iliopectineal line, and one from the pubis close to the symphysis [5]. But in this case, a rare occurrence of an accessory sartorius muscle having conjoint origin with the main sartorius muscle from anterior iliac superior iliac spine was observed. The origin was muscular in nature whereas Kumar et al., have reported the accessory sartorius muscle of tendinous origin. Macalister has reported that the sartorius muscle may be partially divided distally or may even be completely divided longitudinally into two parts and the accessory portion being inserted into the fascia lata, the femur above or near the medial condyle, the patellar ligament, the tendon of semitendinosus, or the tendon of its twin [5, 6]. A tendinous intersection has been seen in rare cases [5]. In this case, the accessory muscle ran along the direction but superficial to the rectus femoris, in that way it mimicked as if rectus femoris present superficially. The distal half of muscle had no muscle fibers but was rather a fibrous band that merged with the medial patellar retinaculum of the knee. This type of insertion has not been reported previously and it gives more stability to the patella by pulling the patella medially by reinforcing the medial patellar retinaculum and thereby preventing the lateral displacement of patella along with the vastus medialis. There may be changes in hip and knee joint movements in the presence of accessory sartorius muscle. As the activity of the muscle increases at the end of swing phase immediately preceding heel strike and substantially involved in and contributes to the climbing, this variation may influence the gait cycle [2]. Previous studies have named the distal splitting of the sartorius as sartorius bicaudatus and sartorius with two heads as biceps sartorius. Considering the mode of insertion of this accessory muscle, the present case could be called as 'sartorius bifurcatus' [1, 3, 7].

During development, migratory muscle precursors that have migrated diffusely and invaded the limb mesenchyme aggregate and

differentiate into dorsal and ventral pre-muscular masses. With the growth of the limb buds, both dorsal and ventral pre-muscular masses split up eventually to form individual, an anatomically distinct muscles which are well demarcated by connective tissues. Hence, any sort of incomplete cleavage of muscle mass into two different muscles or excessive splitting of the muscular mass may contribute to the development of such kind of variations [8, 9]. In 2011, Kedzia et al. divided the variations into four groups in their study on fetuses. The first of these is the presence of accessory tendons proximal to the muscle, the second is the total duplication of the muscle, the third is the double-headed distal part of the muscle, and the fourth is the presence of discontinuous muscle. [10]. The present variation could be either the total duplication of muscle as per the classification of Kedzia or an atrophied remnant of a pelvic bundle usually found in lower mammals [3, 10]. Therefore, this rare variation may have evolutionary implication of the lower limb muscles in adapting to human development [11].

Additionally, in this case, the accessory muscle is lying lateral to the sartorius muscle. This will not hinder the procedures like femoral catheterization or inguinal lymphadenectomy. But it can be utilized to perform pedicled flaps for various plastic and reconstructive surgeries.

In conclusion, in this report, we described a rare variation of sartorius which has not been described earlier to our best of knowledge. This would immensely help the plastic and reconstructive surgeons for using it as a muscle flap for soft-tissue reconstruction in the lower limb.

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science so that anatomical research could be performed. Results from such research can potentially increase mankind's overall knowledge that can then improve patient care. Therefore, these donors and their families deserve our highest gratitude.

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