

**Case report****A CLINICO-ANATOMICAL REPORT OF AN ACCESSORY MUSCLE FASCICLE EMANATING FROM SARTORIUS MUSCLE****Vandana Mehta, Ashwini Kumar, Jyoti Arora, R.K.Suri, Gayatri Rath***Department of Anatomy, Vardhaman Mahavir Medical College & Safdarjung Hospital, New Delhi, India***RESUMEN**

Los fascículos musculares accesorios se observan raras veces en relación al músculo sartorio (MS) de la extremidad inferior. La descripción del caso existente informa una presencia poco común de un fascículo muscular accesorio visto pasar del MS al músculo vasto medial (VM) encontrado unilateralmente en la cara anterior del muslo derecho de un cadáver masculino indio adulto. La anomalía fue observada por accidente mientras se mostraba la cara extensora del muslo a los estudiantes de pregrado. Deseamos llamar la atención sobre los diversos aspectos de los usos clínicos de tal músculo supernumerario. Los ecografistas deben ser conscientes de la posible presencia de fascículos musculares accesorios mientras investigan esta región antes de la anestesia o de la exploración de esta área. Este músculo accesorio poco común se debe citar en los textos clínicos para advertir a los cirujanos reconstructivos y a los radiólogos.

**Palabras claves:** *accesorio; sartorio; fascículo; muslo; vasto medial.*

**ABSTRACT**

Accessory muscle fascicles are rarely observed in relation to the sartorius muscle (SM) of the lower extremity. The existing case description reports a rare presence of an accessory muscle fascicle seen to pass from the SM to the vastus medialis muscle (VM) found unilaterally in the anterior aspect of the right thigh of an adult Indian male cadaver. The anomaly was observed accidentally while demonstrating the extensor aspect of the thigh to the undergraduate students. We wish to bring attention to the various aspects of clinical usages of such a supernumerary muscle. Ultrasonologists should be aware of the possible presence of accessory

muscle fascicles while investigating this region prior to anesthesia or exploration of this area. This unusual accessory muscle should be cited in clinical texts for cautioning the reconstructive surgeons and the radiologists.

**Key words:** *accessory; sartorius; fascicle; thigh; vastus medialis.*

**INTRODUCTION**

The vastus medialis (VM) muscle has a broad origin from the intertrochanteric line, medial lip of linea aspera, and the medial femoral condyle. It gains attachment distally onto the patella. As a part of the quadriceps femoris muscle it plays a key role in the knee extension and has a stabilizing role in medial knee stability. (Sinnatamby, 1999) The sartorius muscle (SM) stems from the anterior superior iliac spine and inserts on the medial surface of the upper tibial shaft. It crosses the VM obliquely and both the muscles contribute to the sub-sartorial canal. The VM may be used as a flap to cover defects in the distal anterior thigh. (Landry et al, 2009).

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Additionally, it may assist the closure of the superior aspect of the knee joint with concurrent reformation of the extensor mechanism of the knee. Moreover, sartorius (SM) flaps have been successfully used for adequate coverage and retrieval of grafts in cases of complicated femoral wounds. (Landry et al, 2009)

The accessory muscle fascicle reported in the current case description may provide a convenient substitute for reconstructions in the lower extremity.

### CASE REPORT

An unusual orientation of the SM was observed unilaterally on the right thigh of an adult Indian cadaver while demonstrating the lower extremity to the medical students. The SM originated as usual from the anterior superior iliac spine (ASIS) and was observed to span inferiorly and medially. However, midway along the femoral shaft a fleshy well developed muscular fascicle separated from the SM, 15.4 cm distal to the ASIS and splayed distally and laterally. Subsequently it merged with the VM muscle. This muscle fascicle was given off from the lateral border of the SM. (Figure 1) It was strap like and had a flattened appearance. The SM continued towards its insertion into the upper aspect of the medial tibial shaft as usual. The fascicle measured 6.4 cm in length and 0.5 cm in width. The width of SM at its origin was 1.6 cm whereas it was observed to widen after giving off the muscle fascicle measuring 3.1 cm there. Thereafter it measured 2.5 cm in width. The other muscles of the anterior femoral region were normal and displayed no anomalous attachments or any supernumerary fascicles.

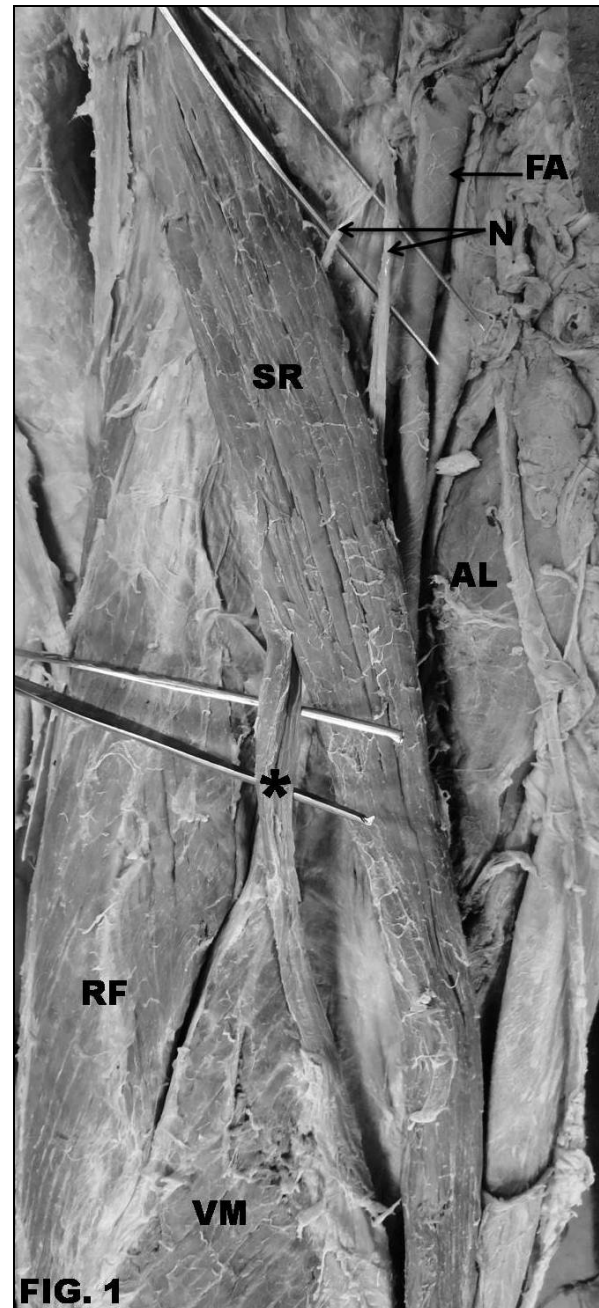
The innervation of the SM was unexceptional being derived from the femoral nerve and the blood supply from the profunda femoris artery. The superior branch of the femoral nerve entered SM on its deep surface close to the medial border, 7.8 cm distal to the ASIS. (Figure 2)

The adjoining muscles and neuro-vascular structures displayed normal topographical relations and revealed no digression from the usual anatomy.

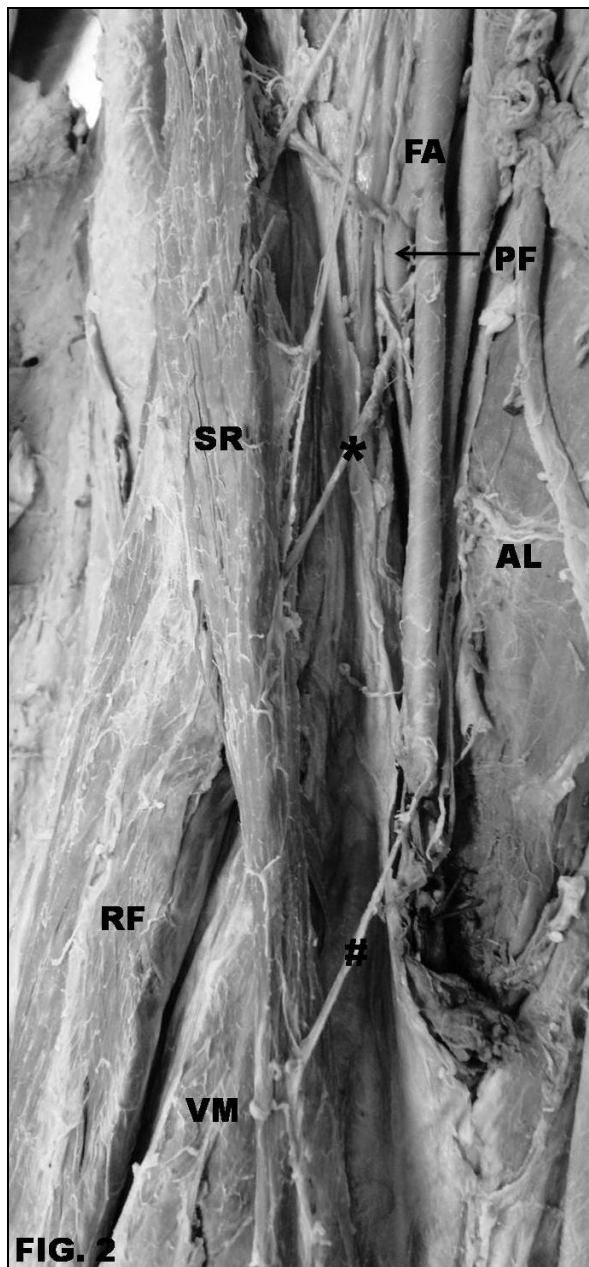
### DISCUSSION

Extensive pelvic and groin resections are an integral part of cancer surgeries. Subsequent upon such massive resections the surgeons are faced with the cumbersome task of adequate

wound closures and reconstructions. The lower limb muscles especially the rectus femoris, sartorius and gracilis may be employed for this purpose. Furthermore, a sturdy coverage of these defects is paramount to avoid the exposure of the femoral vessels which may have damaging results. (Ahmad et al, 2004).



**FIG. 1** Photograph of a dissected specimen of the right thigh to show: FA- femoral artery; SR- Sartorius; VM- vastus medialis; N- femoral nerve ;AL- adductor longus; RF- rectus femoris ;\*- accessory fascicle from the Sartorius to vastus medialis



**FIG. 2** Photograph of a dissected specimen of the right thigh to show the nerve supply: FA- femoral artery; SR- Sartorius; VM- vastus medialis; PF- profunda femoris; AL- adductor longus; RF- rectus femoris; \*- branch from femoral nerve supplying SR; #- branch from femoral nerve supplying accessory fascicle

The femoral vessels are at an exposure after radical inguinal lymphadenectomy because of their topographical position. Therefore, an interesting application of the SM is its medial transfer in the form of a flap to shield the vital femoral vasculature after radical inguinal lymphadenectomy done in cases of carcinoma or surgical debridement of infected femoral vascular grafts. (Won et al, 1996)

Additionally, SM flap may be applied to protect the vital femoral vasculature after surgical interventions in the inguinal region. The convenient position and nearly constant relations of the muscle to neuro vascular bundle makes it suitable for coverage of the unprotected vessels. (Oeckl and Hohenberger, 2011)

Another interesting study reported the usage of pedicled groin flap for defect closure of the hand, in which case recognition of the lateral border of the sartorius muscle, incision of its fascia and inclusion of the fascia was mandatory to preserve the vessels in the vicinity (Jokuszies et al, 2010)

The femoral triangle serves as an important landmark while performing inguino-femoral lymphadenectomy which provides both diagnostic and therapeutic advantages in various carcinomas. (Master et al, 2009) The presence of this accessory fascicle would alter the topography of the SM alone and in conjunction to the adjacent structures. Therefore, an apposite awareness of the possible muscular variations in relation to SM has an important bearing when planning any intervention in this vital region.

Total hip arthroplasty is the preferred alternative for femoral neck fractures in geriatric age group as it is known to provide satisfactory results. The plane between the tensor fasciae latae and the sartorius muscles is utilized for this procedure. (Ossendorf et al, 2010)

It has been observed in the past that the infra-patellar branch of the saphenous nerve can be detected by ultrasonography. The relation of SM again plays a significant role as the course of this nerve is explained in relation to it. An precise account of it course may present with notable clinical outcomes. (Lecoroller al, 2011)

Owing to the consistent neurovascular anatomy, the SM is also considered appropriate for local transposition and free muscle transfer for facial reanimation. (Buckland et al, 2009) However, in the present case study we have observed an unusual morphology in relation to the SM which should serve as a caution for the reconstructive surgeons or alternatively may be utilized for the same instead of the main SM.

In a previous study, thirty sartorius muscles and the circumferential skin of the thigh were harvested from adult cadavers and anatomic considerations such as number, location, diameter, and length, were recorded. They also used CT angiography to calculate the length of muscle perfused by a single pedicle. The authors concluded that it was possible to utilize SM as a local transposition and free flap (Mojallal et al, 2011).

An investigation into individual anterior hip muscle size could prove useful for measuring the asymmetry and keep a check on the

effectiveness of the treatment in patients with hip pathologies. Therefore, real time ultrasound imaging was employed for measuring the cross sectional area of the SM along with other muscles of the region (Mendis et al, 2010). The presence of the accessory muscle fascicle would modify the cross sectional area of the SM.

An ultrasound-guided saphenous nerve block was attempted by injecting the local anesthetic into the compartment formed by SM and femoral artery (Saranteas et al, 2011). In another similar study the same ultrasound guided approach for saphenous nerve blockade utilized the close proximity of the nerve to the saphenous branch of descending genicular artery as a practical alternative (Horn et al, 2009). The authors opine that since there is an accessory fascicle in relation to SM, there could be confusion in delineating this region for appropriate anesthetic blockage.

In either case, the ultrasonologist should be aware of the possibility of such supernumerary fascicles in relation to the SM for adequate anesthetic effect.

There is a debate on the presence of separate fascia for the SM, since its presence would exclude SM from the radiotherapy volume. The presence of this accessory muscular slip between the SM and VM, could affect the dose of radiotherapy to be given in cases of soft tissue sarcoma of the anterior thigh (Burnet et al, 2004). To conclude, we speculate the usage of this rare accessory fascicle for reconstructions and also hope to acquaint the radiologists and surgeons about its entity.

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