

# Gluteus medius accessorius and gluteus quartus scansorius in one specimen: case report of two rare variations

**Stefan Orthaber, Andreas Pritsch, Annina Julia Laura Zach, Georg C. Feigl\***

*Division of Macroscopic and Clinical Anatomy, Gottfried Schatz Research Center for Cell Signaling, Metabolism and Aging, Medical University of Graz, A-8010 Graz, Austria*

## SUMMARY

The gluteal muscles have all the same embryological origin and therefore show typical variations. The gluteus medius has its origin on the external surface of the ilium and inserts at the major greater trochanter. It lies between the gluteus maximus and minimus. Variations included in this case are the gluteus medius accessorius and the gluteus quartus or scansorius. Various sources of literature have described these two muscles on anthropoids and in man, but never with the two very rare variations appearing in one specimen, as we have found in this right lower limb of a 53-year-old woman. The gluteus medius originates from the iliac crest between the gluteus medius and the gluteus minimus and inserts onto the greater trochanter. The gluteus quartus arises from the anterior portion of the gluteus minimus and the fascia lata and inserts into the tip of the greater trochanter. As a clinical consequence, the occurrence of these muscles might lead to instability in the hip joint on the contralateral side, and these anatomical variations are also important to be known during different approaches of total hip replacement surgery.

**Key words:** Gluteus medius – Gluteus medius accessories – Gluteus quartus – Musculus invertor

femoris – Gluteus minimus – Gluteus scansorius – Accessory gluteus medius muscle

## INTRODUCTION

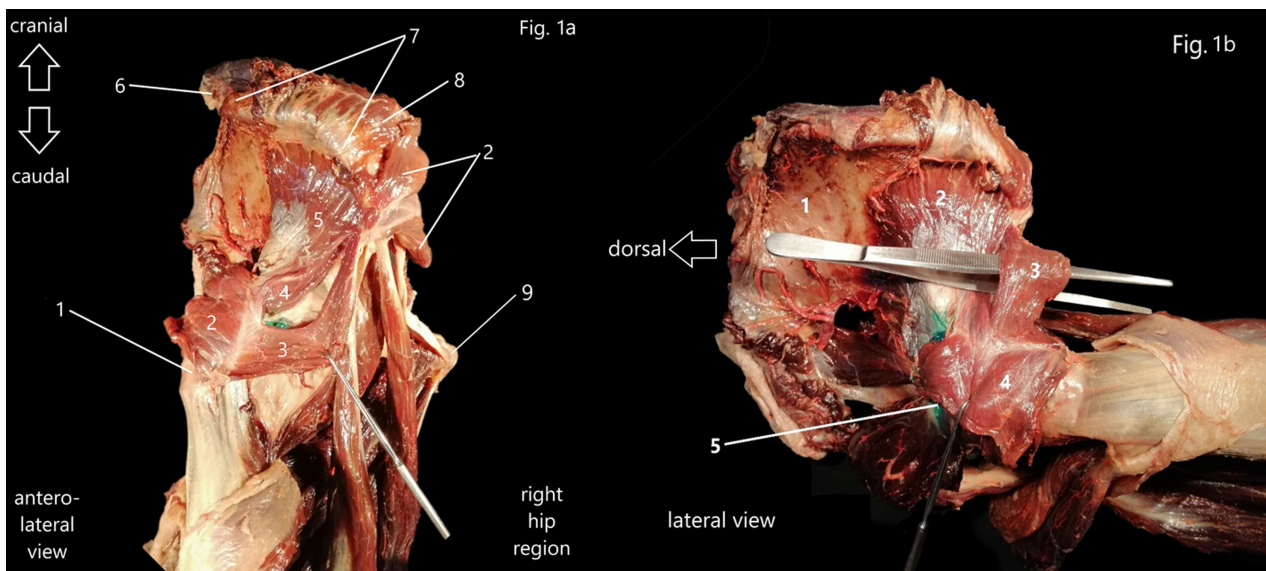
The gluteus medius originates from the gluteal surface of the ilium, between the anterior and posterior gluteal line and inserts onto the outer side of the greater trochanter. It lies between the gluteus maximus and gluteus minimus. Its main function is to stabilize the hip in a frontal plane, so that during activities like walking, the hip (on the side of the support leg) does not collapse towards the side of the free leg. This function correlates to the muscles' ability to abduct in the hip joint. The anterior fibres can rotate the femur inward. (Anderhuber et al., 2012). The trochanteric bursae of gluteus medius are usually located between the gluteus medius and minimus and the greater trochanter major (Platzer, 2009).

The gluteal muscles themselves have been described with many variations, besides varying size and form, and especially with many different names: The gluteus quartus "Haughton", which is seen as "an independent muscle" (Bergman et al., 2019) formed by the fibres that arise anteriorly of the gluteus minimus, which correspond to the musculus invertor femoris OWEN, found in apes like the orangutan (Bergman et al., 2019; Henle, 1871). It is also called musculus scansorius

**Corresponding author:** Georg C. Feigl. Division of Macroscopic and Clinical Anatomy, Gottfried Schatz Research Center for Cell Signaling, Metabolism and Aging, Medical University of Graz, Harrachgasse 24, A-8010 Graz, Austria. Phone: +43/316/ 385-71100; Fax: +43/316/385-79100.

E-mail: georg.feigl@medunigraz.at

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**Fig 1a.** Gluteus medius accessories and quartus scansorius in an anterolateral view. Between 3 and 4 the trochanteric bursa can be seen injected with green latex. 1 = greater trochanter; 2 = gluteus medius; 3 = gluteus medius accessorius; 4 = gluteus quartus scansorius; 5 = gluteus minimus; 6 = posterior superior iliac spine; 7 = iliac crest; 8 = gluteus medius; 9 = symphysis.

**Fig 1b.** Gluteus medius separated from surrounding structures by a tweezer, 45° of flexion in the hip joint. 1 = gluteal surface of ilium; 2 = gluteus medius and superior gluteal artery; 3 = gluteus medius accessorius; 4 = gluteus medius; 5 = trochanteric bursa of gluteus medius, gluteus medius accessories and gluteus quartus (scansorius).

TRAILL, or “le petit fessier antérieure,” by some sources like Le Double and Testut (Le Double, 1897; Testut, 1884). The gluteus medius accessorius, on the other hand, is described as “arising from the iliac crest under tensor fasciae latae and gluteus medius and inserting on the greater trochanter” (Bergman et al., 2019).

## CASE REPORT

During standard dissection at our department throughout a gross anatomy course for medical students we spotted two rare variations in one specimen. There were a gluteus medius accessorius and gluteus quartus [scansorius] muscle present in this specimen of a 53-year-old woman’s right lower limb. After the separation of the gluteus maximus and gluteus medius orthogonally to their fibers, the tractus iliotibialis was retracted laterally together with the tensor of fascia lata (Figs. 1a and 1b). Because of connective tissue and fat in between these two muscles, they could easily be identified as independent muscles, and it was easy to separate them with blunt dissection. The gluteus medius is seen in Figs. 1a and 1b retracted anteriorly and downwards, arising from the anterior part of the iliac crest and inserting on the top of the major trochanter with a conjoined tendon of the gluteus medius, gluteus medius accessorius and partly gluteus quartus. The latter one is presented by number 4 in Fig. 1a and has a fusiform aspect in this specimen, with a distinct muscle mass, clearly separated from the gluteus minimus (number 5 in Fig. 1a). Both muscles are supplied by a branch of

the superior gluteal artery and the superior gluteal nerve (Fig. 1a).

The bursa was injected with green latex (Figs. 1a and 1b) to study its extension. In this case, the trochanteric bursa of gluteus medius reaches the ventral and caudal edge of gluteus medius accessorius (Fig. 1a) covering the reflected head of rectus femoris. Therefore, the trochanteric bursa of gluteus medius is extending further ventrally than it is described in cases without gluteus medius accessorius.

## Comments

These two variations, or some might even say extensions, of the gluteus medius and minimus have been described in detail in many books at the end of the 19th century. In addition to the basic information about these muscles as mentioned in the introduction, the anthropologic view described by the old anatomists like Henle (1871), Le Double (1897) and Testut (1884) is very intriguing in certain points.

Le Double (1897) states that the “petit fessier antérieure,” as he calls the gluteus quartus (scansorius), had been discovered by Thomas Stewart Traill in the chimpanzee and has been described by Bischoff in the orangutan and by Hepburn in the four anthropoids, but being developed best in the two apes mentioned above. In the official paper published by Traill (1821), he states: “The action of this muscle, which appears to be peculiar to this animal, is to draw the thigh up toward the body; and it seems especially to be intended to assist in climbing. On this account we

propose to name it the scandens, or Musculus scansorius;...”.

Henle (1871) elaborates further in saying that the maximum contraction of the muscle brings the trochanter into the median plane, so that the sole of the foot would be rotated outward.

Documentations on the gluteus medius are scarcer. Bergman (2019) simply describes it as “arising from the iliac crest under tensor fasciae latae and gluteus medius and inserting onto the greater trochanter, partly with medius and partly independently”. Variations in size and sometimes tendinous slips are described in Le Double’s (1897) and Testut’s (1884) works.

Le Double (1897) also describes an “accessoire de petit fessier”, a gluteus minimus accessorius so to say, which he found below the gluteus minimus and near its anterior border.

As stated in the case report, both muscles are supplied by the superior gluteal vessels and nerves. This relation makes embryological sense, as the superior gluteal nerve and its related artery are also supplying the gluteus medius, gluteus minimus and tensor of fascia lata (Anderhuber et al., 2012), and was also seen in a case described by Jazuta (1931).

Because the older anatomists seldom provided adequate statistics or, in cases of the anthropoids, only had one specimen available for dissection, it was difficult to acquire enough case numbers. Jazuta (1932) states in his work about the gluteus quartus that in 100 human specimens, equating to 200 lower limbs, he only found the muscle twice. That equals 2% of all specimens he dissected and 1% of all limbs in total. All the above variations have been described as existing on their own, but were never described as existing together in one specimen.

Statistical records on the frequency of the gluteus medius accessorius in man were not retrievable; only certain numbers exist in the works of comparative anatomists who have studied this muscle in different animals, like the chimpanzee and in koalas but not in man.

As a clinical consequence, the occurrence of these muscles might lead to instability in the hip joint on the contralateral side, as there is an imbalance in muscle mass and therefore a difference in force distribution to both hip joints, especially during walking. Also, these anatomical variations are important to be known during different approaches of total hip replacement surgery, as the gluteus medius accessorius is right in the way of the lateral approach, and, in a more modern anterolateral approach, the gluteus quartus scansorius would impose right in front and laterally to the hip joints capsule.

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