



Duplication of the gemellus superior and misplacement of gemelli-obturator internus complex

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Abstract

Bilateral duplication of the gemellus superior and misplacement of the duplicated gemellus superior, obturator internus and gemellus inferior muscles of a 67-year-old Caucasian male cadaver were noted during a routine dissection. Inferior to the piriformis muscle the gemellus superior was properly located. The gemellus superior did not run along the length of the obturator internus tendon as normally depicted. The duplicated gemellus superior, obturator internus and inferior gemellus were found directly on the superior surface of the quadratus femoris. These muscles demonstrated a common origin and insertion. No other variation was noted in the gluteal region. Awareness of the duplicated gemellus superior, obturator internus and gemellus inferior misplacement can be linked to clinical muscle weakness of lateral hip rotation and abduction of the femur. This anatomical variation can benefit surgeons, physical therapists, and radiologists to competently assist patients.

© *Int J Anat Var (IJAV)*. 2013; 6: 182–183.**Key words** [superior gemellus] [obturator internus] [inferior gemellus]

Introduction

Normally, the gemelli muscles are distinguished as attaching along the tendon of the obturator internus (OI) and collectively inserting onto the greater trochanter of the femur [1]. The usual origin of the gemellus superior (GS) lies on the external aspect of the ischial spine with the gemellus inferior (GI) originating from the superior surface of the ischial tuberosity [1, 2]. The OI is commonly noted originating from the medial aspect of the obturator membrane and surrounding bone [1, 2]. Lateral rotation of the hip joint and abduction of the femur are the primary actions of the gemelli and OI muscles. The OI also composes the anterolateral wall of the pelvic cavity and lateral wall of the ischio-anal fossa [1].

Prior publications have demonstrated variation of GS and GI muscles by identifying a doubled appearance or absence [2]. Fusion has also been noted between the GS with the piriformis or gluteus minimus and the GI with the quadratus femoris [3]. Minimal variations of the OI have been found, which include complete absence or division into two parts [3]. This paper describes the bilateral presence of the GS doubled with the superior GS in the correct location and the duplicated inferior GS in an improper location. The duplicated GS muscle along with the OI and GI were found lying on the superior surface

of the quadratus femoris. This report describes previously unreported variations, which include bilateral improper origins and insertions of the GS, OI, and GI.

Case Report

In the routine university dissection course of the gluteal region, during 2012, the GS was found duplicated in a 67-year-old male cadaver (Figure 1). The duplicated GS was noted to be misplaced as well as the OI and GI. The standard placement of the GS is inferior to the piriformis, and runs along the superior margin of the OI [2]. The GS examined in this cadaver was located inferior to the piriformis, properly originating from the ischial spine, and inserted onto the greater trochanter along with the tendon of the piriformis. This GS was not associated with the margin of the OI and did not insert with the tendon of the OI. Variation of the GS did not interrupt the sciatic nerve pathway through the greater sciatic foramen below the piriformis. There was no modification of the placement of the piriformis, obturator externus, or quadratus femoris.

The duplicated GS, OI and GI were found lying on the superior surface of the quadratus femoris. The unusual placement of the gemelli-obturator internus complex obstructed the view of the quadratus femoris. All three muscles (duplicated GS,

OI, GI) shared the same origin on the anterior aspect of the ischial tuberosity and insertion on the quadrate tubercle, which is normally associated with the proper location of the quadratus femoris. In standard cases, the OI originates from the obturator membrane and surrounding bone with its insertion on the medial aspect of the greater trochanter [1]. The GI normally originates from the upper aspect of the ischial tuberosity and inserts along with the tendon of the obturator internus on the greater trochanter [1].

Discussion

Bilateral duplication and complete absence have been the most commonly reported variations seen within GS [1, 2]. Previous reports have indicated that duplication of the GS can increase the pressure exerted on the sciatic nerve and result in piriformis syndrome [4–6]. The presence of the extra GS could potentially cause additional sciatic nerve aggravation through external hip rotation. Recognizing the possible duplication of the GS can aid medical professionals in

evaluating problems of the gluteal region [6]. A study done on muscles that may contribute to retrotrochanteric gluteal and thigh pain found that the gemelli-obturator internus complex could play a role [7]. Pain distributed along the posterior thigh is usually correlated with entrapment of the nerves in close approximation to the gemelli, obturator internus, and quadratus femoris. Nerve entrapment has been known to result in inguinal pain, arterial and/or venous obstruction and alteration of proprioception [7].

Overall, this paper describes an uncommon anatomical variation of the duplicated GS, OI and GI appearing on the superior surface of the quadratus femoris. Being aware of the misplacement of these muscles can provide surgeons, physical therapists and radiologists with information that may lead to the better treatment or proper diagnosis of a patient with related gluteal pain.

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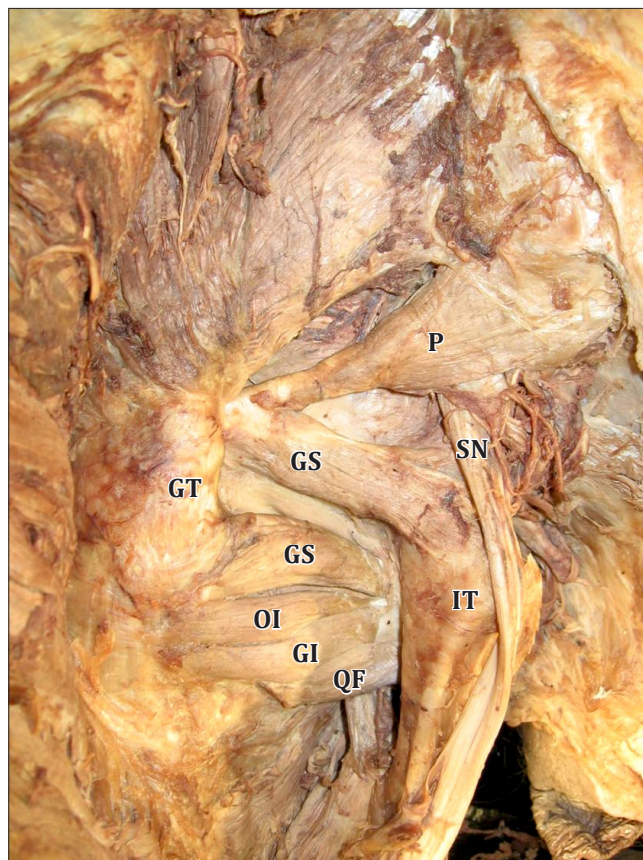


Figure 1. View of left gluteal region. *Gemellus superior (GS)* is visible originating from the ischial spine and inserting onto the greater trochanter (GT) with the *piriformis (P)* via a common tendon. Duplicated *gemellus superior (GSD)*, and *obturator internus (OI)* and *gemellus inferior (GI)* can be seen originating from the anterior ischial tuberosity and inserting onto the quadrate tubercle. (QF: quadratus femoris; SN: sciatic nerve; IT: ischial tuberosity)