



# Variations of the iliacus muscle: report of two cases and review of the literature

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## Abstract

Two cases of intriguing variations of the iliacus muscle were observed during routine student dissections. In the first case, a partial agenesis of the iliacus muscle was found on the left side of a 58-year-old male cadaver. There were missing slips from the anterior and middle parts of the muscle; additionally, some slips of the posterior part of the iliacus started unusually high from the iliolumbar ligament, thus springing over the posterior iliac crest. In the second case, on the right side of a 64-year-old female cadaver, an unusual small muscular slip from the iliacus was identified, that followed an unusual course through the fibers of the femoral nerve. From the extensive literature review provided, it seems that the variations of the iliacus muscle are not common findings. When occur, however, they might be associated with some variations of the corresponding femoral nerve and thus have clinical significance.

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**Key words** (iliacus muscle) (partial agenesis) (laberrant muscle fascicles) (femoral nerve) (clinical significance)

## Introduction

The iliacus muscle in man is a flat triangular muscle occupying the iliac fossa [1]. It arises from the superior two-thirds of this fossa and from the inner lip of the iliac crest. Most of the muscle fibers converged inferiorly to insert to the tendon of the psoas major muscle. Because of the intimate relations in their distal attachments, the two aforementioned muscles are also referred as iliopsoas muscle complex [1–3]. Many interesting and relatively rare variations of the iliacus muscle have been described in the literature [1, 4–16]. Herewith we report two such variations, review the current literature on this topic and also emphasize on their possible clinical significance.

## Case Report

### Case 1

A partial agenesis of the iliacus muscle was found on the left side of a 58-year-old male cadaver. While dissecting the iliac fossa, it was found that the iliacus muscle layer was not complete. Instead, there were some missing slips from the most anterior and also middle parts of the muscle (Figure 1). The missing middle muscle fibers were replaced by thick whitish fibrous slip measuring nearly 7–8 mm. In addition, some slips of the most posterior part of the iliacus started unusually high from the iliolumbar ligament, thus springing over the posterior part of the iliac crest. There were no

variations of the psoas major muscle and the corresponding femoral nerve. The right-sided iliopsoas muscle complex and femoral nerve also showed no variations.

### Case 2

On the right side of a 64-year-old female cadaver an unusual small muscular slip from the iliacus was identified (Figure 2). It originated from the anterior aspect of the middle part of the iliac crest and measured 5 mm in width. Instead going downward together with the usual iliacus fibers, this aberrant slip aimed obliquely medial to pierce through the fibers of the femoral nerve and after that joined the common iliopsoas tendon. The interesting point here was that the femoral nerve itself was relatively compact with only short splitting where the muscle fiber passed through it. The left psoas major and the right-sided iliopsoas muscle complex and femoral nerve showed no variations.

## Discussion

Some notes on the variations of the iliacus muscle can be found in the classic anatomical textbooks [1, 4–7], as well as in many articles published [8–16]. Based on an extensive literature review, we grouped the reported variations of the iliacus muscle as follows (Figure 3A–J): A – partial agenesis (present report); B – complete separation of the iliacus and psoas major [4, 6–8]; C – complete fusion of



**Figure 1.** Photograph of the reported findings in Case 1. (*IM*: iliopsoas muscle; *asterisk*: missing anterior fibers of the iliopsoas; *double asterisk*: missing middle fibers of the iliopsoas; *white arrowheads*: aberrant iliopsoas fibers of high origin; *PMa*: psoas major; *FN*: femoral nerve)

the iliopsoas and psoas major [5, 9, 16]; D – aberrant slips of higher origin (present report) [8]; E – presence of iliopsoas minor (iliocapsularis) [1, 4, 7, 8]; F – splitting of the iliopsoas into a deep and superficial layers [8, 10, 12]; G – presence of two large aberrant superficial slips [9, 15]; H – presence of a single large aberrant slip [13–15]; I – presence of an aberrant slip (accessory iliopsoas) joining accessory psoas major [12]; J – presence of a small muscular slip piercing through the femoral nerve (present report). Under the name “iliopsoas minor” and “iliopsoas minimus” some authors [11, 13] described separate muscular slips of the iliopsoas starting from either the iliolumbar ligament or ala ossis sacri.

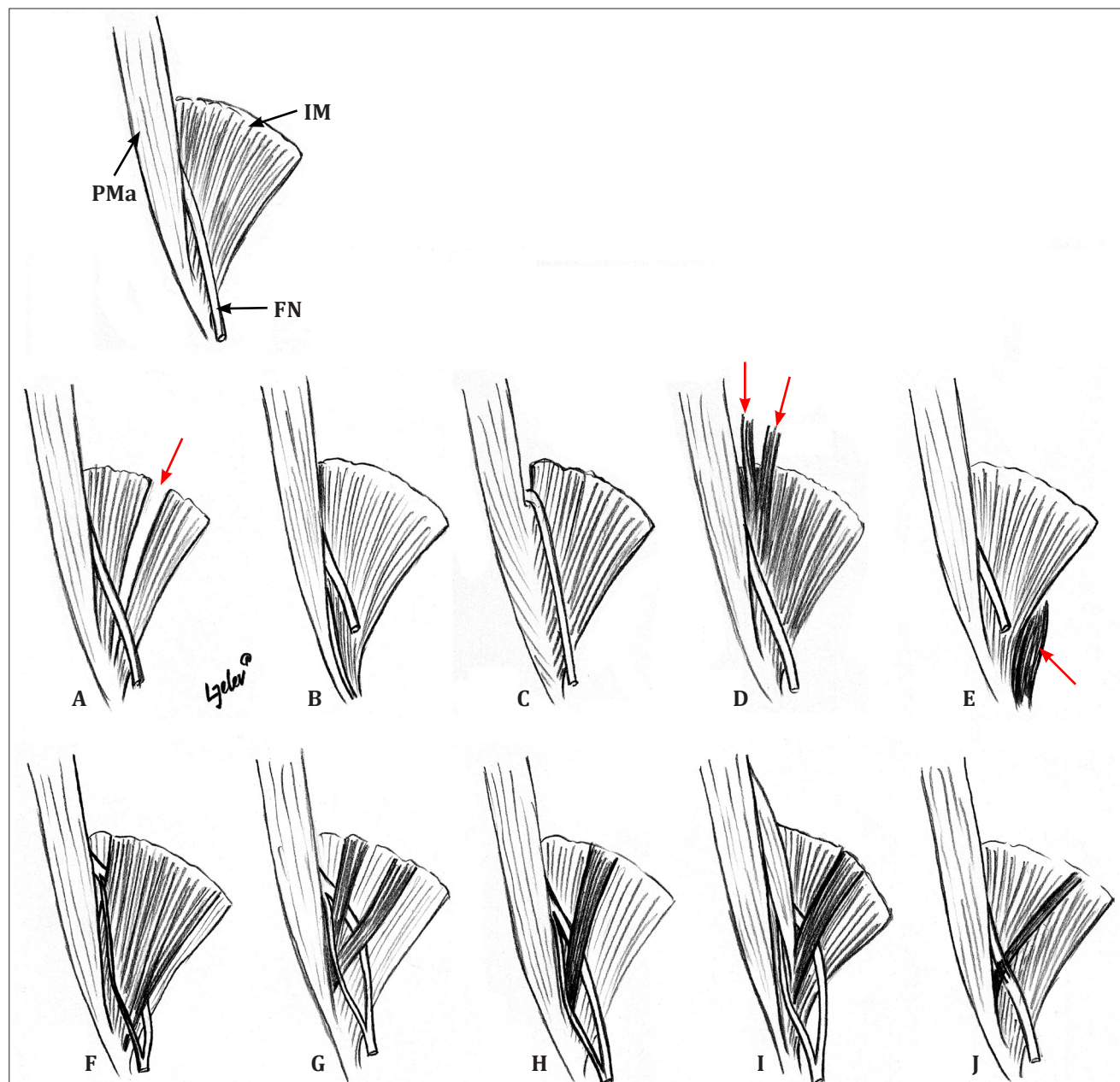
In common, as Fabrizio et al. [16] mentioned, the variations of the iliopsoas muscle complex may be divided according

to their relation to the structure and course of the femoral nerve. There are some variations related to a normal, compact femoral nerve (Figures 3A-E). Of all these, only in the case of complete muscle fusion (Figure 3C) some altering in the nerve course might be expected [16]. The second group of variations (Figure 3F-J) is usually related to varying degrees of interruption (splitting) of the femoral nerve. Running between the iliopsoas and psoas major, the femoral nerve may be split into two or more fascicles. Saadeh and Bergman [17] explained most of the existing variations of the iliopsoas muscle complex with aggressive ingrowths of the femoral nerve through the developing muscular blastema.

The reported variations of the iliopsoas muscle may have several clinical implications such as altered abdominal imaging, mimicking of lumbar disk herniation and increased pain with neurodynamic testing [16]. An existing variant



**Figure 2.** Photograph of reported findings in Case 2. (*IM*: iliopsoas muscle; *asterisks*: aberrant iliopsoas slip piercing through the femoral nerve; *PMa*: psoas major; *FN*: femoral nerve)



**Figure 3.** Common scheme of the iliacus muscle variations, reported in the literature. **A:** partial agenesis; **B:** complete separation of the iliacus and psoas major; **C:** complete fusion of the iliacus and psoas major; **D:** aberrant slips of higher origin; **E:** presence of iliacus minor (iliocapsularis); **F:** splitting of the iliacus into a deep and superficial layers; **G:** presence of two large aberrant slips; **H:** presence of a single large aberrant slip; **I:** presence of an accessory iliacus joining accessory psoas major; **J:** presence of a small muscular slip piercing through the femoral nerve. (*IM: iliacus muscle; PMa: psoas major; FN: femoral nerve*)

slip may also cause some tension of the femoral nerve and should be suspected in patients with referred pain to the hip and knee joints and to the lumbar dermatomes [11, 13].

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