Bilateral Acessory Psoas Tertius Muscles and Interactions with the Femoral Nerve: A Case Report of an Adult Male Cadaver

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Introduction

- Psoas muscle group typically consists of the psoas major and the psoas minor[1,2]
- Psoas major attaches to vertebral bodies and transverse processes at T12-L5, inserts at lesser trochanter of the femur via the iliopsoas tendon[1,2]
- Psoas minor runs medially and anteriorly the psoas major, attaches to vertebral bodies of T12 and L1, inserts at iliopubic ramus[1,2]
- Femoral nerve, composed of posterior divisions of the ventral rami of L2-L4, forms and travels with in psoas major and emerges at lateral border, passes deep to the inguinal ligament to innervate muscles of anterior compartment of thigh[1,2]
- Psoas tertius is a rare accessory muscle with variable anatomy, joining with the iliopsoas tendon and inserting at lesser trochanter of femur[3]

Methods

- Anatomical variation identified during an anatomy elective at the Michigan State University College of Human Medicine following prosection by a medical student
- Cadaver was a 97-year-old male with medical history significant for hypertensive heart disease, congestive heart failure, and diabetes
- Bilateral psoas tertius muscles causing splitting of the femoral nerve were identified during cadaveric dissection

Case Summary

- Male cadaver with bilateral psoas tertius muscles splitting the femoral nerves
- Left psoas major, minor, and tertius removed to expose surrounding nervous structures
- Right psoas major, minor, and tertius kept intact to preserve the accessory structure and show integration with surrounding structures.
- Splitting originated 2 cm distal to the joining of L2-L4, total split length of 8 cm before rejoining just proximal to the inguinal ligament

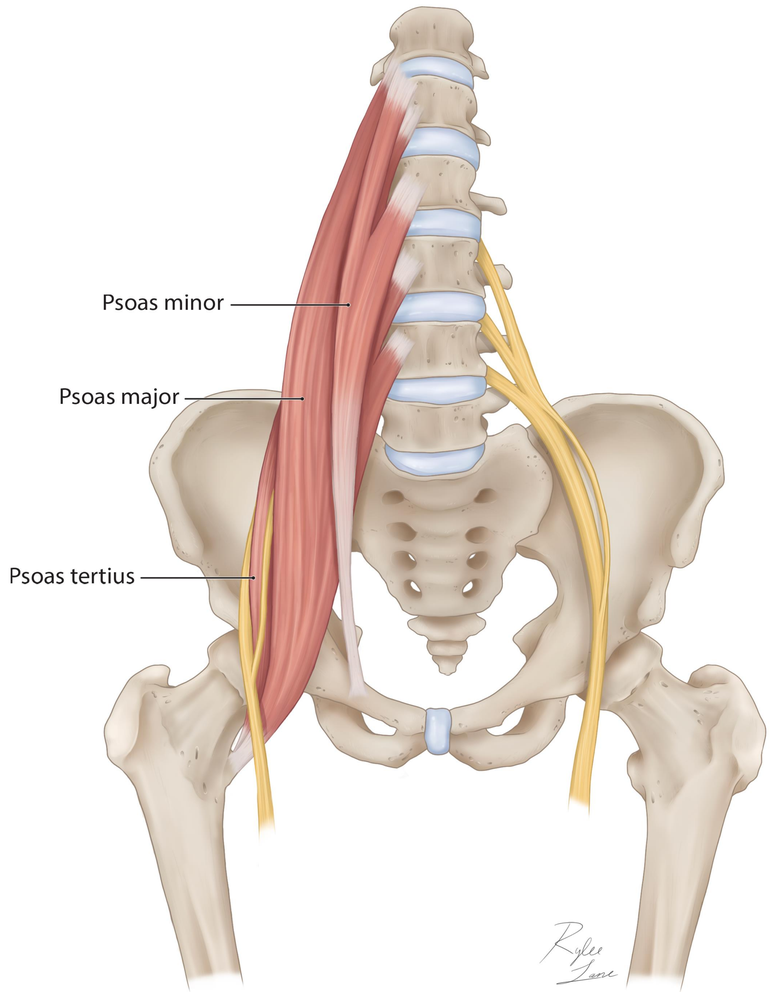


Figure 1. Illustration of psoas tertius and split femoral nerve. This illustration demonstrates the psoas tertius and the relationship with psoas major and psoas minor as the muscle pierces and splits the femoral nerve (right). The illustration depicts the bilateral nature of the finding showing the split femoral nerve in the absence of the psoas major, minor, and tertius (left). *Illustration by Rylee Lane.*

Discussion

- Psoas tertius is a rare anatomical variation with few documented cases[3]
- In this case, bilateral psoas tertius muscles directly interact with the femoral nerves, altering the course and structure of the femoral nerve as evidence by the bilateral splitting
- Alteration of the typical femoral nerve course and structure raises questions regarding potential effects on nerve conduction and motor or sensory function
- Compression, stretching, or entrapment of the femoral nerve by an accessory muscle like the psoas tertius may contribute to femoral neuropathy
- The psoas tertius could have clinical relevance, though rare, in patients presenting with symptoms of refractory lumbar radiculopathy[3]
- With such limited literature, further documented incidence of the psoas tertius may lead to better understanding of the accessory structure and how it may present clinically in its interaction with the femoral nerve

References

1. Hansen JT, Gdowski MJ. Lower Limb. In: *Netter's Clinical Anatomy.* 6th ed. Elsevier; 2026:315-406.
2. Dalley AF II, Agur AMR. Lower Limb. In: *Moore's Clinically Oriented Anatomy.* 10th ed. Lippincott Williams and Wilkins; 2026.
3. Khalid S, Iwanaga J, Loukas M, Tubbs RS. Split Femoral Nerve Due to Psoas Tertius Muscle: A Review with Other Cases of Variant Muscles Traversing the Femoral Nerve. *Cureus*. 2017;9(8):e1555. Published 2017 Aug 9. doi:10.7759/cureus.1555

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