

Morphological Variation of PSOAS Minor Muscle

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Abstract: *Introduction:* The psoas muscle group is part of the posterior abdominal wall and is comprised of long muscles – major, minor. Out of those, only the psoas major muscle is an obligatory muscle present in all individuals. Psoas minor is a slender muscle of posterior abdominal wall, having short fleshy belly and long tendon, lying medial to Psoas major muscle. The psoas minor muscle (PMM) originates as vertical fascicles from the bodies of the last thoracic and first lumbar vertebrae and inserting into the iliopectineal eminence, pectineal line and iliac fascia. It is innervated by ventral ramus of L1 spinal nerve. The muscle provides weak flexion of the lumbar spine. The psoas muscle group, however, is extremely variable and the muscles have differences not only in their structure and morphology but also in their innervation. The psoas minor is an extremely variable inconstant, degenerative muscle. **Materials & Methods:** 22 embalmed cadavers were used for the present study. Posterior abdominal wall muscles were exposed after removal of abdominal viscera. Presence of Psoas minor muscle was noted. The muscle was cleaned from its origin to insertion. Length and maximum width of its fleshy belly and tendon were measured with the help of digital vernier caliper, thread and scale. **Results:** The psoas minor muscle was present in one out of twenty two cadavers. During a standard posterior abdominal wall dissection of an adult male cadaver a unilateral left-sided psoas minor muscle was established, with a complete absence of the same muscle on the contralateral side. The unilateral left-sided psoas minor muscle was located superficially and medial to the psoas major muscle. **Conclusion:** The psoas muscle group is one of the most variable muscle groups in the human body. Psoas minor could be bilateral – located on both sides of the vertebral column on medial to psoas major muscle. Our case is representation of one of the rare presentation variations of the psoas minor muscle with muscle morphology extremely representative of this type of unilateral variation.

Keywords: psoas muscle, psoas minor, posterior abdominal wall, morphology.

1. Introduction

The posterior abdominal wall is a complex region of anatomy. It is formed by the lumbar vertebrae, pelvic girdle and the posterior abdominal muscles - the iliacus, psoas major, quadratus lumborum, their associated fascia and the variable psoas minor. Topographically a portion of the diaphragm also resides on the posterior abdominal wall, although it does not per se belong to this muscle group. The psoas muscle group is comprised of long fusiform muscles – major, minor, with only the psoas major muscle being an obligatory muscle present in all individuals. The muscles from the psoas muscle group, however, have differences not only in their structure and morphology but also in their innervation. The psoas major is a constant muscle in the human body. It is divided into a deep and superficial part. The deep part originates from the transverse processes of the lumbar vertebrae (L) - L1 to L5. The superficial part originates from the lateral surfaces of the last thoracic (Th) and the first four L vertebrae - Th12-L4 and their neighboring intervertebral discs. Innervation of the psoas major is through the anterior rami of L1 to L3 nerves. Its function is flexion of the hip and lateral flexion of the vertebral column. In extremely rare instances a small bundle of muscle fibers can arise directly from variable places of the psoas major muscle. The psoas minor is an inconstant, degenerative muscle. It originates as vertical fascicles from the bodies of the T12 and L1 vertebrae and inserted into iliopectineal eminence. It is innervated from the anterior rami of the L1 nerve. This variable muscle is a prime example for a vestigial structure in the human body. Although its actions include bending of the lumbar spine and

stabilization of the hip joint, these actions are extremely limited and the absence of the muscle does not reflect on them in any manner. In rare instances the muscle can be present only unilaterally. The psoas tertius is the least studied muscle of the psoas group as its presence is extremely rare in humans. The muscle is extremely variable in its places of origin and there have been several reports of extremely variable morphology, some with a clinical manifestation due to the muscle penetrating and splitting the femoral nerve. The psoas muscle group is not per se an individual group of muscle, as it can also be viewed as part of the ileopsoas muscle, together with the iliacus muscle, due to the joining together of their tendons.

2. Results

The psoas minor muscle was present in one out of 22 cadavers. During a standard posterior abdominal wall dissection of an adult male cadaver a unilateral left-sided psoas minor muscle was established, with a complete absence of the same muscle on the contralateral side. The unilateral left-sided psoas minor muscle was located superficially and medial to the psoas major muscle, the average length of the muscle was 19.66 cm (range: 14.4 cm - 21.7 cm), average width was 1.73cm (range: 1.0 cm - 3.2 cm).

3. Discussion

psoas minor muscle could be bilateral – located on both sides of the vertebral column on the medial to psoas major

muscle. It could be absent on both sides. In rare cases it could be present unilaterally – only on the one side, left or right, of the vertebral column. Another variation of the psoas minor muscle could be due to gender and racial differences. For example, there were many reported cases of prevalence of psoas minor in Japanese population which ranges from 35% to 55%. The psoas minor muscle is also more frequently absent in females, regardless of side or race. However, there is great variance from the Indian populations where the PMM was present in only 30%.

4. Conclusion

Our case is representation of one of the rare presentation variations of the psoas minor muscle with morphology extremely representative of this type of unilateral variation.

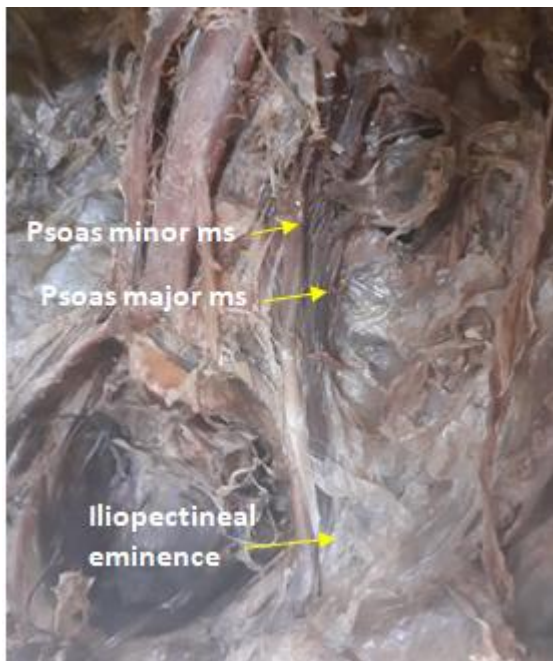


Figure 1: Unilateral psoas minor muscle (ms)



Figure 2: Unilateral left sided psoas minor muscle (ms)

References

- [1] Mori M. Statistics on the Musculature of the Japanese. *Okajimas Folia Anat Jpn.* 1964;40(3):195–300. doi: 10.2535/ofaj1936.40.3_195
- [2] Standring S, Healy J C, Johnson D, Collins P, Crossman A R, Gatzoulis M A, Borley N R, Mahadevan V, Newell R LM, & Wigley C B; *Grays Anatomy: The Anatomical Basis of Clinical Practice.* 40thEdn. London Churchill Livingstone; 2008, pp 1072, 136
- [3] Woodburne RT; *Essentials of Human Anatomy,* 7th Edn. Oxford University Press, New York 1983, pp 465
- [4] Moore KL: *Clinically oriented anatomy,* 2nd Edn. Williams and Wilkins, Baltimore, London 1985, pp 275.
- [5] Wood Jones F; *Buchanans Manual of Anatomy: in The Abdomen,* 8th Edn. Bailliere, Tindall and Cox 7 and 8 Henrietta ST, W.C. London 1953, pp 841-842.
- [6] Snell RS; *Clinical Anatomy by Regions,* 8th Edn. Wolters Kluwer /Lippincott, Williams and Wilkins, Baltimore, New York 2008, pp 174, 175, 580.
- [7] Moore KL, Dalley AF. *Anatomia orientada para a Clínica.* ed. Rio de Janeiro: Guanabara Koogan, 2007. 546 p. 4.
- [8] Tellez, Vs. & Acuña, Leb. *Consideraciones Anatómicas de los Músculos Inconstantes.* MedUnab, 1998, vol. 1, n. 3, p. 165-170.
- [9] Gray H. *Anatomia.* 29. ed. Rio de Janeiro: Guanabara Koogan, 1977. 401 p.
- [10] Anson, BJ. *Morris's Human Anatomy.* New York: MacGraw- Hill, 1966.
- [11] Farias MCG et al, *Morphological and morphometric analysis of Psoas Minor Muscle in cadavers.* J. Morphol. Sci., 2012, vol. 29, no. 4, p. 202-205
- [12] Gardener E; Gray DJ & O'rahilly RO *abdome.* In: Gardener, E.; Gray, D.J. & O'Rahilly, R. *Anatomia. Parede abdominal posterior.* 4th ed. Rio de Janeiro, Guanabara Koogan, 1988. P.356.