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Case Report

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Rhomboid muscle variations: notes on their naming and classification principles

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Abstract

In this report we present two cases of rhomboid muscle variations observed during routine anatomical dissections. In the first case, on the left side of an adult male cadaver, a long and slender aberrant muscle was identified starting from the lateral part of the superior nuchal line and inserting to the scapula between the rhomboid minor and levator scapulae. The muscle was identified as the rare rhomboid capitis. In the second case, in an adult female cadaver, a bilateral variation in the origin of the rhomboid major fibers was described. On the left side, the rhomboid major fibers started from spinous processes of C1–C6, while on the right side it was narrower and originating from spinous processes of C1–C3. Reviewing the literature about the rhomboid muscles variations, we conclude that one and the same aberrant structure might be named differently. We also discuss the presentation of the known variations of the rhomboids in a common scheme instead of classification.

Keywords: human; rhomboid muscle; variation

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Introduction

The superficial muscles of the back connect the upper limb to the axial skeleton. In the upper back region, the rhomboids (minor and major) and levator scapulae muscles can be identified inserting on the medial scapular border under the trapezius.[1,2] The rhomboids fix the medial border of the scapula to the thoracic wall and also retract this bone superiorly and medially and rotate it to depress the glenoid cavity.[1,3] Variations of the rhomboids have been described in different names depending on the authors' understanding of the nature of variant muscles.[4–12]

In this report, we present two cases of variations of the rhomboids and also provide a critical review of the present literature on this topic. Additionally, we aimed to discuss the controversies with the naming of these muscle variations and their proper grouping.

Case Report

In the first case (**Figure 1**), during routine anatomical dissection of a 70-year-old Caucasian male cadaver, after cutting and retracting the trapezius muscle, a small aberrant muscle bundle was identified between the rhomboid minor and levator scapulae on the left side. The complete dissection revealed that the variant muscle bundle originated form the lateral part of the superior nuchal line next to the base of the mastoid process. As it passed downwards, it crossed the fibers of the splenius capitis near its cranial insertion. Finally, the aberrant slip inserted to the superior scapular angle, between the scapular attachments of rhomboid minor and levator scapulae. Based on its origin and insertion, the variant muscle slip was identified as rhomboid capitis muscle.[13,14] It had a length of 21 cm and a width of 6–7 mm.

In the second case (**Figure 2**), routine anatomical dissection of a 67 year-old Caucasian female cadaver revealed quite asymmetrical rhomboids. On the left side, rhomboid major had an extended origin from T1 to T6 spinous processes, as the lowest part of the muscle was mostly aponeurotic. On the right side, the rhomboid major seemed much narrower and originated from T1 to T3 spinous processes.

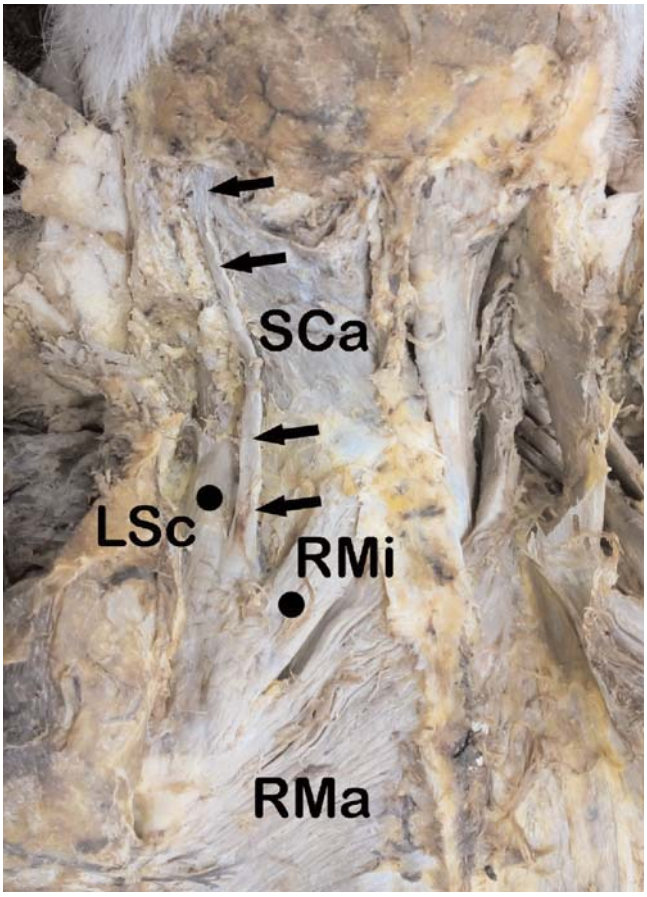

Figure 1. Photograph of the rhomboid capitis muscle (**arrows**), observed on the left side and described in Case 1. **LSc:** levator scapulae; **RMa:** rhomboid major; **RMi:** rhomboid minor; **SCa:** splenius capitis.

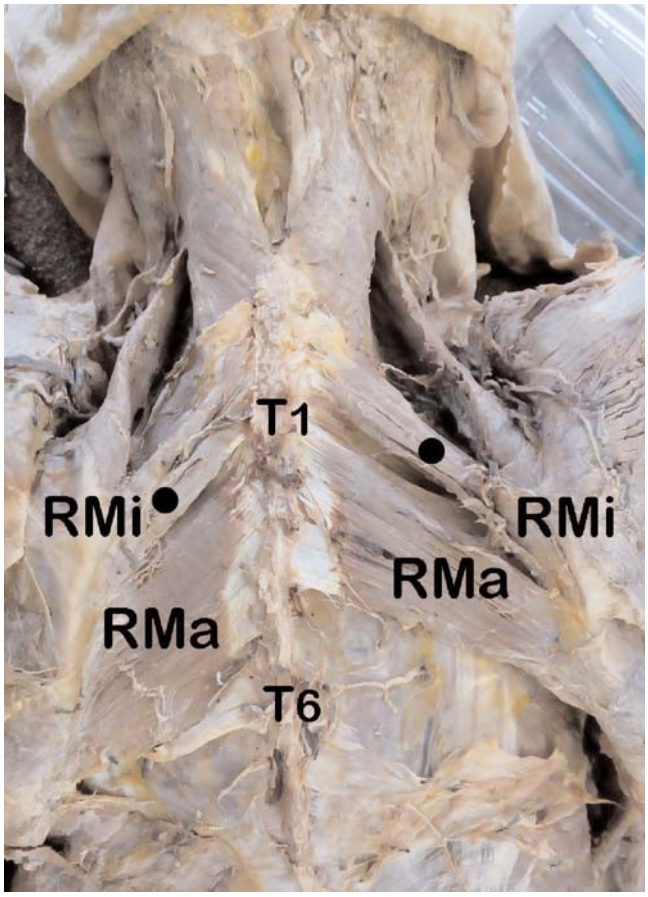

Figure 2. Photograph of the asymmetrical rhomboid muscles layer described in Case 2. **RMa:** rhomboid major; **RMi:** rhomboid minor.

Discussion

The rhomboids are composed usually of six flat slips that originate from the spinous processes of either C7–T5 vertebrae[1,3] or C6–T4 vertebrae.[2,15] The fibers of the muscles run downwards and laterally to insert on to the medial border of scapula. The upper two slips of the rhomboids belong to the rhomboid minor muscle, while the lower four slips to the rhomboid major muscle. The rhomboids are mainly supplied by the dorsal scapular nerve of the brachial plexus made up of C4 and C5 spinal nerve fibers.[3] Additional fibers contributing from C3 and C6 spinal nerves were also reported in some studies.[16]

Variations of the rhomboids were previously reported as case reports,[9,14,17] or in large series.[4–8,10] One and the same aberrant muscle is named and grouped differently in majority of these reports. A common problem is the description of this variant muscle with different names, depending on its complete separation or fusion with the usual muscle (**Figures 3a** and **b**). Such examples might be the rhomboid minimus (or minus)[10,12,18] and rhomboid tertius muscles.[11,19] When these aberrant muscles are fused with or being a part of the rhomboids they are described as extended attachments or increased number of the slips; however, when well separated from the usual muscles, they are called by their own names (**Figures 3a** and **b**). Rhomboideus minimus is a small, nearly horizontal variant muscle below the rhomboid major, which was described by von Haffner.[18] A muscle with the same morphology was named as rhomboideus minus by Mori,[10] who also mentioned that this muscle is common in Japanese. Interestingly, a muscle also called rhomboid minimus was described in quite a different location; just superior to the rhomboid minor.[12] Another interesting variation reported is the rhomboid capitis (rhomboid occipitalis),[13,14] also named as occipitoscapular muscle.[4,5] Basically, the rhomboid capitis is a common neck muscle in many lower mammals.[14] But it is quite a rare finding in humans and great apes.[13] Some authors still named the same muscle based on its origin and insertion simply as occipitoscapular muscle.[17,20]

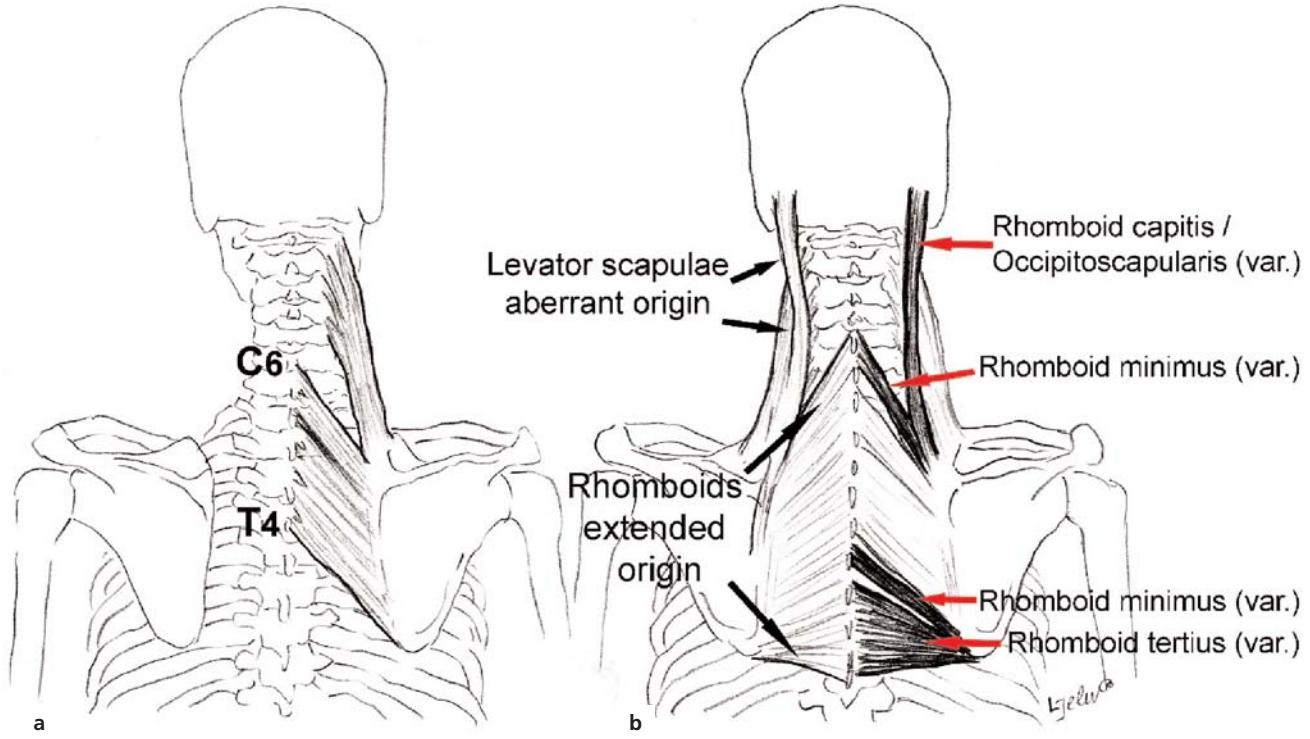

Figure 3. Diagrams presenting the normal anatomy (**a**) and variations (**b**) of the rhomboids. (**b**) Variations of extended origin and aberrant attachment are presented on the left side, while on the right side the red arrows show similar muscular structures, separated from the main muscles and named differently.

Some interesting descriptions of non-vertebral origins of a muscle originating from the skull and closely related to rhomboids can be noted in previous reports reviewing the variations of the levator scapulae (**Figure 3b**).[12,21] This might be another example of a variation, same as rhomboid capitis, which is fused completely with the usual levator scapulae. In summary, after all these notes on the rhomboid muscles variations, it seems quite difficult to present a classification. The classification principles are simply not clear. To present one and the same structure in different groups with different names simply because it might be well-separated or non-separated is not reasonable. Instead, we propose a scheme that demonstrates the range of rhomboid muscles variations (**Figure 3b**).

Conclusion

All of these variant muscles can manifest, despite rare, with some clinical symptoms. The rhomboids, rarely presenting aberrant attachments which might influence the proximal myofascial pain of the upper limb.[22] On ultrasound, CT scan and MRI, variant and non-expected muscles like rhomboid capitis, can mimic a tumor.[23] So, it is important to have knowledge about the variations of these muscles for avoiding misinterpretations of diagnostic imaging and approaching the patients with myofascial pain of the upper limb.

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Author Contributions

All authors equally contributed.

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