

A Rare Variation of the Digastric Muscle Anterior Belly Related to False Submandibular Triangle

Albert Gradev, Nikoleta Vulova, Lazar Jelev, Lina Malinova*

Department of Anatomy, Histology and Embryology, Medical University of Sofia, Sofia, Bulgaria

*Corresponding author e-mail: a.gradev@medfac.mu-sofia.bg

In the case reported, an interesting variation of the left digastric muscle of an adult female cadaver was found during routine anatomical dissection of the anterior neck region. Additionally to the usual anterior and posterior bellies, there was a well-developed aberrant muscular slip starting from the digastric anterior belly and inserting to the inner surface of the mandibular angle in a manner nearly parallel to the posterior belly. This additional slip, together with the anterior belly and mandibular base enclosed a small but false submandibular triangle. The submandibular gland was displaced slightly posteriorly with the submandibular duct passing between the aberrant slip and the usual posterior belly.

The reported muscle variation may have importance in open surgical procedures in the neck region. Our case report provides an additional understanding of digastric muscle variations and their clinical significance.

Key words: digastric muscle, submandibular triangle, anatomical variation, cadaver

Introduction

The digastric muscle is an important landmark in the regional anatomy of the anterior neck. This muscle is composed of two bellies having different embryonic origin and nerve supply, which bellies are united by an intermediate tendon. The anterior belly is attached to the digastric fossa of the mandible and directs posteroinferiorly to the hyoid bone. The posterior belly extends from the mastoid notch and goes in a direction downward and anteriorly. The two bellies and the base of mandible enclose the submandibular triangle, also called digastric triangle, which is an important topographic region [8]. Variations of this muscle are common and can occur independently for anterior and posterior bellies. They can be classified as absence, additional heads, abnormal insertion and aberrant slips, each of them occurring uni- or bilaterally with different frequencies [4]. Several gross anatomy classifications of the digastric muscle variations exist in the literature. Mori classified them into seven

types [5] and De-Ary-Pires into thirteen types [2]. Kim and Loukas summarize the variations into twelve types in their review article [4].

In the further description we chose to follow Mori's classification.

Materials and Methods

The reported variation was observed during routine anatomical dissection of a 68-year-old formalin-fixed female cadaver of Caucasian descent. All dissections took place at the Department of Anatomy, Histology and Embryology, Medical University of Sofia.

Case report

After cutting and retracting successively the skin, platysma and investing fascial layer in the anterior neck region we revealed an interesting variation of the digastric muscle on the left side (**Fig. 1, A, B, C**). Trying to present the submandibular triangle and its content, a smaller than normal triangle, was identified at first. Following complete dissection revealed a well-developed aberrant muscular slip that mimic the usual posterior belly of digastric muscle. It was starting from the lateral side of digastric anterior belly, nearly 3 cm from the digastric fossa, and inserting to the inner surface of the mandibular angle in a manner nearly parallel to the posterior digastric belly. Thus the additional muscular slip, together with the anterior belly and mandibular base enclosed a small, but in fact false submandibular triangle being just a part of the usual one. All this unusual anatomy affects the position of the submandibular gland (**Fig. 1 asterisk**), which was displaced slightly posteriorly with the submandibular duct passing up between the aberrant slip and the usual posterior belly. On the right side (**Fig. 1 D**), the digastric muscle showed normal anatomy.

Discussion

Variations of the digastric anterior belly, existing in multiple types, are among the commonest muscle variations in human anatomy, with estimated frequency of 53.9% [5]. These variations have been described in details and summarized by several authors – Mori [5], De-Ary-Pires et al. [2], Hsiao and Chang [3] and Kim and Loukas [4]. Some differences exist between the classification systems proposed, in respect to the basic criteria used – origin and insertion, presence of additional slips or additional heads. Most commonly these muscle variations exist in the submental area and include additional slips and heads of variable directions, some of them crossing the midline, others – fusing with mylohyoid muscle [3, 6, 7, 10]. The variation reported by us corresponds to the rare Type 6 in Mori's classification – additional slips to the mandible, with a frequency of 1.1% [5]. Despite the data were collected by dissections of human cadavers of Asian descent, Mori claimed that there are no statistical racial differences. According to the same author, the only remarkable difference was higher complexity of the variations in Asians. In the classifications of other authors, our additional slip is not mentioned as a separate subtype. In De-

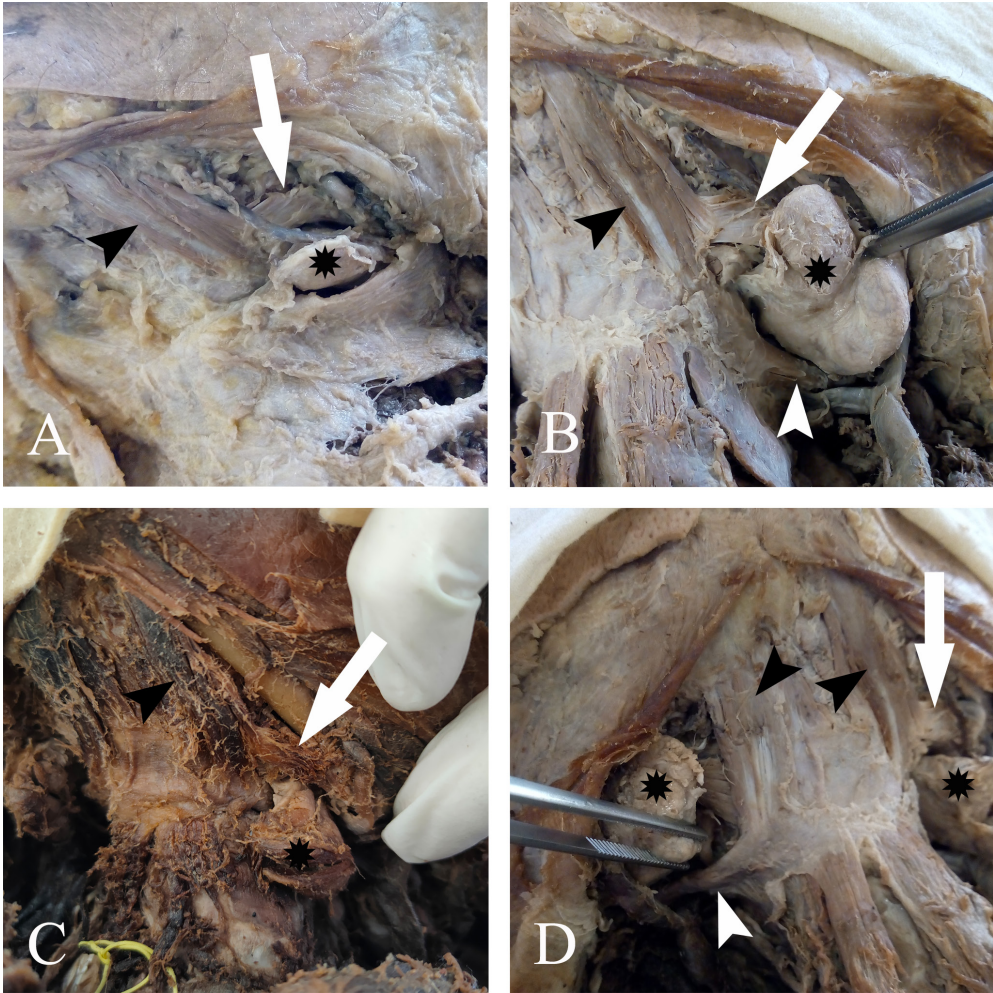


Fig. 1. Photographs of anterior neck region, on the left side (A, B, C) and on the right side (D): black arrowhead – anterior belly of digastric muscle; white arrowhead – posterior belly of digastric muscle; white arrow – aberrant muscular slip; asterisk – submandibular gland.

Ary-Pires classification [2] it can be put into Type 2 of anterior belly – two heads with additional slip to the mandible. Additionally, Kim and Loukas [4] analyzed the pertinent literature and presented a detailed reviewing table following De-Ary-Pires method, but a variation like ours is not included. Seems like in Caucasians the aberrant muscle bundle, reported here, has very low frequency. Despite rare, it may have clinical importance during open surgical dissection in the submandibular triangle because of mouth floor tumors and plastic surgical procedures. Moreover, in surgery the posterior belly can help in identifying accessory nerve, internal jugular vein, carotid arteries, and hypoglossal nerve, so it should not be missed with accessory

fascicles [9]. The anterior belly of the digastric is often included in submental flaps during facial reconstruction, as the submental vessels frequently courses deep to the muscle [1, 9].

Our case report provides an additional understanding of digastric muscle anatomical variations and their clinical significance, which should be well known by the surgical specialist working in neck region.

References

1. **Bertrand, B., C. S. Honeyman, A. Empananza, M. McGurk, I. E. Ousmane Hamady, A. Schmidt, R. Sinna, B. Pittet-Cuénod, N. Zwetyenga, D. Martin.** Twenty-five years of experience with the submental flap in facial reconstruction: Evolution and technical refinements following 311 cases in Europe and Africa. – *Plast. Reconstr. Surg.*, **143(6)**, 2019, 1747-1758.
2. **De-Ary-Pires, B., R. Ary-Pires, M. A. Pires-Neto.** The human digastric muscle: patterns and variations with clinical and surgical correlations. – *Ann. Anat.*, **185**, 2003, 471-479.
3. **Hsiao, T. H., H. P. Chang.** Anatomical variations in the digastric muscle. – *Kaohsiung J. Med. Sci.*, **35(2)**, 2019, 83-86.
4. **Kim, S. D., M. Loukas.** Anatomy and variations of digastric muscle. – *Anat. Cell Biol.*, **52(1)**, 2019, 1-11.
5. **Mori, M.** Statistics on the musculature of Japanese. – *Okajimas Fol. Anat. Jap.*, **40**, 1964, 212-219.
6. **Ortug, G., B. Sipahi, A. Ortug, H. O. Ipsalali.** Variations of the digastric muscle and accessory bellies – A study of gross anatomic dissections. – *Morphologie*, **104(345)**, 2020, 125-132.
7. **Ozgur, Z., F. Govsa, T. Ozgur.** The cause of the difference in the submental region: aberrant muscle bundles of the anterior belly of the digastric muscle. – *J. Craniofac. Surg.*, **18(4)**, 2007, 875-881.
8. **Standring, S.** Gray's anatomy: the anatomical basis of clinical practice. – In: *Head and Neck* (Ed. M. Gleeson), 41st ed., London, Elsevier, 2016, 444-449.
9. **Tranchito, E. N., B. Bordoni.** *Anatomy, Head and Neck, Digastric Muscle*. StatPearls Publishing, 2022, Available at: <https://www.ncbi.nlm.nih.gov/books/NBK544352/>
10. **Turan-Ozdemir, S., I. H. Oygucu, I. M. Kafa.** Bilateral abnormal anterior bellies of digastric muscles. – *Anat. Sci. Int.*, **79(2)**, 2004, 95-97.