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Case Report

A fractal anterior digastric: a case report with surgical implications

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Matthew J. ZDILLA [1] ✦
Hannah J. SOLONINKA [1]
H. Wayne LAMBERT [2]

Department of Natural Sciences and Mathematics, West Liberty University, West Liberty, West Virginia [1], Department of Neurobiology and Anatomy, West Virginia University School of Medicine, Robert C. Byrd Health Sciences Center, Morgantown, West Virginia [2], USA.

✦ Dr. Matthew J. Zdilla, DC
Associate Professor of Biology
West Liberty University
Department of Natural Sciences
and Mathematics
CSC 139; P.O. Box 295
West Liberty, 26074, WV, USA.
☎ +1 (304) 336-8631
✉ mzdilla@westliberty.edu

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Abstract

A unique asymmetrical digastric muscle variant was discovered during glossectomy of a cadaver. The muscle gave rise to two smaller accessory bellies which, likewise, gave rise to another two smaller accessory bellies supported by a fascial sling. Although variant anatomy of the anterior belly of the digastric is common, we report a new structural presentation. Understanding the diverse anatomical variety among digastric muscles is particularly important with regard to both surgery and differential diagnosis of space occupying lesions in the submental triangle.

Key words [anterior digastric] [submental] [suprahyoid] [anatomical variation] [lipectomy] [rhytidectomy]

Introduction

The digastric muscle normally consists of a single posterior belly and single anterior belly joined by an intermediate tendon. The anterior belly originates from the digastric fossa of the mandible and inserts at the intermediate tendon to the body and greater horn of the hyoid, the same insertion as the posterior belly; however, the posterior belly originates at the mastoid notch of the temporal bone. Bilaterally, the digastric muscles function synergistically with the infrahyoid musculature to accomplish depression of the mandible against resistance as well as elevation and stabilization of the hyoid during deglutition and phonation [1]. Each belly of the muscle develops from different embryonic tissues; the first pharyngeal arch gives rise to the anterior belly while the second pharyngeal arch gives rise to the posterior belly [2]. Likewise, the anterior belly is innervated by the nerve to mylohyoid, a branch of the inferior alveolar nerve from the mandibular division of the trigeminal nerve (CN V3), while the posterior belly is innervated by the digastric (preparotid) branch of the main branch of the facial nerve (CN VII) [1]. Anatomical variations of the anterior belly have been demonstrated to occur unilaterally, bilaterally, symmetrically, and asymmetrically [3, 4]. Prior reports differ dramatically with regard to the frequency of variation among the anterior belly ranging from an incidence of 2.7% to 69.6% [5–8].

Case Report

While attempting to remove the tongue per suprahyoid musculature in a 75-year-old Caucasian male cadaver, a bilateral asymmetrical variation of the anterior bellies of the digastric muscles was observed. On the right side, the anterior belly bifurcated as it arose from the intermediate tendon to produce an oblique accessory belly partially continuous with the posterior muscle fibers of the anterior belly. The majority of the oblique accessory belly was found to insert into the mylohyoid raphe and the investing fascia of the mylohyoid itself; however, a small portion of superior fibers gave rise to a sagittal accessory belly which joined the anterior belly at the ipsilateral digastric fossa of the mandible. The sagittal accessory belly was also composed of fibers originating from the mylohyoid raphe (Figure 1a). Upon reflection of the anterior, oblique, and sagittal muscle bellies, the postero-inferior part of sagittal belly was observed to give rise to a small muscular loop which had a medial part that coursed superolaterally and reflected to become the lateral part which traveled inferomedially, encircled posterior fibers of the oblique belly, and joined the muscular fibers of the mylohyoid. The reflection of the muscular loop was supported by a fascial sling arising from the junction of the anterior and sagittal bellies (Figure 1b). It appeared that the digastric muscle gave rise to a smaller "digastric" muscle which then gave rise

to another even smaller "digastric" muscle. On the left side, the muscle belly of the anterior digastric was broader than that of the right side (15.0 mm and 10.0 mm, respectively). A small parallel bundle of muscle located on the medial aspect of the left anterior muscle belly, contributed to the difference in thickness. The parallel bundle was continuous with the anterior digastric belly anteriorly and inserted into the investing fascia of the mylohyoid posteriorly. A small oblique accessory muscular bundle, which made no evident direct attachment with other muscle tissue, but rather invested into connective tissue overlying the mylohyoid, was oriented obliquely. The small oblique accessory muscle mirrored the fiber direction of the oblique accessory belly on the right side (Figure 1a).

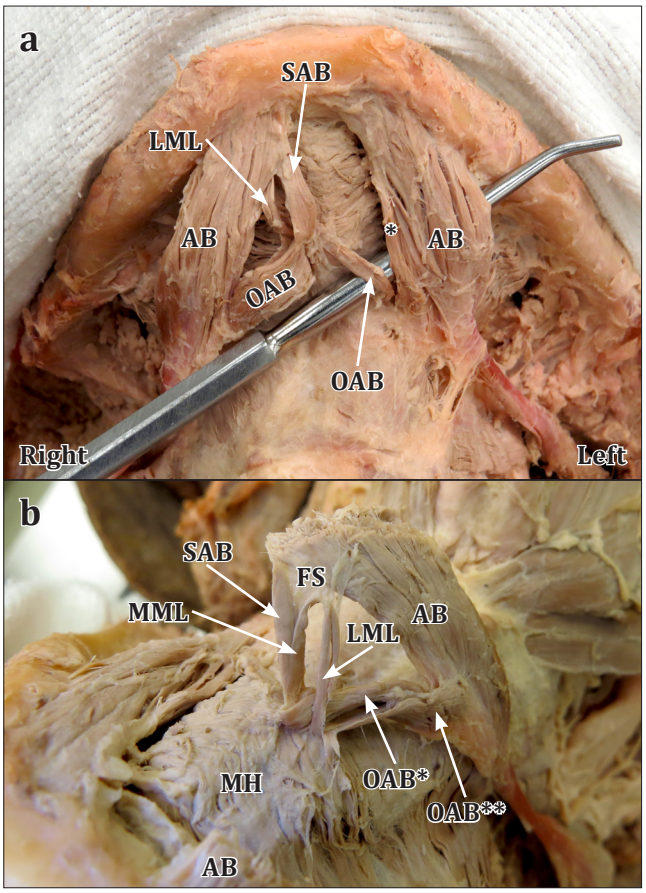

Figure 1. a) Inferior view of the variant digastric musculature. *(**AB**: anterior belly; **OAB**: oblique accessory belly; **SAB**: sagittal accessory belly; **LML**: lateral part of the muscular loop; *: parallel bundle of the left anterior belly)* **b)** Superolateral view of the reflected variant right-sided digastric musculature. *(**AB**: right anterior belly –severed near the mandible and reflected; **OAB***: anterior part of oblique accessory belly; **OAB****: posterior part of oblique accessory belly; **SAB**: sagittal accessory belly; **MML**: medial part of muscular loop; **FS**: fascial sling; **LML**: lateral part of muscular loop; **MH**: mylohyoid muscle)*

Discussion

Although this case report is unique, variant anatomy of the anterior digastric belly is common. Because of the commonality of variant anterior digastric musculature, it is of particular clinical importance to understand the anatomical diversity of the submental triangle, particularly with regard to surgery. The described variant has implications in procedures including submental lipectomy, rhytidectomy, and surgically altering the contour of the cervicomental angle via partial resection of the anterior digastric belly [4, 9]. Also, it is important to be aware of variant submental musculature for the purposes of differentiation between normal muscle tissue, submental lymph nodes, space occupying lesions, and muscular asymmetries due trigeminal nerve lesion [5,10–13]. Additionally, the anterior belly of the digastric serves as a landmark for identification of the lateral border of the mylohyoid, which, subsequently, is utilized to locate the lingual nerve and the submandibular salivary gland duct [12]. Thus, it is important for a surgeon to be aware of variant musculature in order to avoid disorientation during surgery. While most reports of variant digastric anatomy are from cadaveric studies, variations have been reported with the use of CT and MR imaging [5,13]. Therefore, in addition to physical examination, advanced imaging techniques may be utilized to aid in differentiating the anatomy of the submental triangle. Additionally, in the case of marginal mandibular branch of the facial nerve palsy, anterior digastric musculature has been utilized in muscular transfer surgery as a surrogate for the depressor anguli oris and depressor labii inferioris by tethering the digastric tendon to the orbicularis oris [14]. Variant anterior digastric musculature may be a viable option for procedures involving muscular transfer surgeries [15].

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