

Case Report

ANATOMICAL VARIATION OF DIGASTRIC MUSCLE AND ITS CLINICAL IMPLICATIONS

Chaithra Rao B R ^{*1}, Sunkeswari Sreepadma ², Veena Kulkarni ³, Subhash K Deshpande ⁴.

^{*1} Assistant Professor, Department of Anatomy, Sapthagiri Institute of Medical Sciences, Bangalore, Karnataka, India.

² Associate Professor, Department of Anatomy, Sri Dharmasthala Manjunatheshwara College of Medical Sciences, Sattur, Dharwad, Karnataka, India.

³ Professor, Department of Anatomy, Sri Dharmasthala Manjunatheshwara College of Medical Sciences, Sattur, Dharwad, Karnataka, India.

⁴ Professor & HOD, Dept of Anatomy, Sri Dharmasthala Manjunatheshwara College of Medical Sciences, Sattur, Dharwad- 580009, Karnataka, India.

ABSTRACT

Variations of digastric muscle when present are extremely significant not only for anatomists but also for clinicians and surgeons because they can hinder the diagnosis and treatment of various disorders and also can cause a few rare diseases. The report aims at enlightening the implications of this variation from a diagnostic and functional perspective. We report a case of bilateral variation of the anterior belly of digastric muscle detected during the routine dissection of a 55 year old male cadaver. Two accessory bellies, medial to the two normal anterior ones of digastric muscle, ran backwards and laterally from the mandible and inserted into the greater horn and body of hyoid bone.

KEY WORDS: Digastric muscle, hyoid bone, mandible, anterior belly.

Address for Correspondence: Dr. Chaithra Rao B R, Asst Prof, Dept of Anatomy, Sapthagiri Institute of Medical Sciences, no.15, Chikkasandra, Hesarghatta Main Road, Bangalore- 560090, Karnataka, India. Ph no.: +919916667709, fax- 08028393404. **E-Mail:** chaithra.rao5@gmail.com

Access this Article online

Quick Response code



DOI: 10.16965/ijar.2016.388

Web site: International Journal of Anatomy and Research
ISSN 2321-4287
www.ijmhr.org/ijar.htm

Received: 04 May 2016 Accepted: 06 Sep 2016
Peer Review: 26 Aug 2016 Published (O): 30 Sep 2016
Revised: None Published (P): 30 Sep 2016

INTRODUCTION

The digastric muscle has an anterior belly, an intermediate tendon and a posterior belly. The anterior belly originates from the digastric fossa of mandible while the posterior belly originates from the mastoid notch of the temporal bone. The anterior and posterior bellies meet at the intermediate tendon that passes through a fibrous sling connected to the body and greater horns of the hyoid bone [7].

The digastric muscle starts to form during the 4th week of embryo development. The myoblasts originated in the fourth somitomeres reach the first pharyngeal arch (Meckel arch), beginning the development of anterior belly of digastric muscle and the mylohyoid muscle with the mylohyoid nerve between them. The posterior belly of digastric muscle is formed from myoblasts migrating from the sixth somitomeres to the second pharyngeal arch (Reichert arch) [4].

Digastric muscle participates in deglutition by elevating the hyoid bone and in mastication by depressing the mandible, in addition it is involved in neck flexion [3].

Variations in the development of pharyngeal arches can lead to malformations with varying degrees of clinical consequences [6].

An accessory belly affects diagnostic imaging and therapeutic procedures in head and neck surgeries and must be considered in procedures involving sub-mental region [3].

CASE REPORT

Fig. 1: 1: hyoid bone; 2: accessory belly of digastric muscles; 3: anterior belly of digastric muscles; 4: mandible.

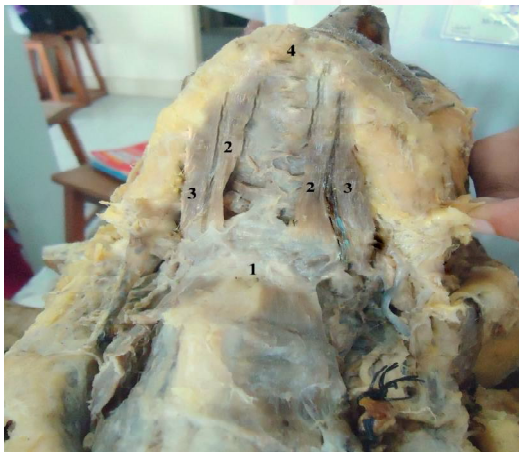


Fig. 2: 1: anterior belly of left digastric muscle; 2a: long segment, 2b: short segment of left digastric muscle; 3: intermediate tendon of left digastric muscle; 4: hyoid bone.



During dissection of the sub-mental region of a 55 year old male cadaver, a pair of accessory anterior bellies of digastric muscle were observed, one on each side (fig 1).

The attachments, measures and nerve supply of the accessory bellies were noted.

The accessory bellies were observed bilaterally medial to the anterior belly of digastric muscle. The bellies consisted of two segments – a long anterior and a short posterior segment connected by a tendinous intersection on both sides (fig 2). The accessory bellies originated from inner surface of mandible medial to digastric fossa and were inserted to greater horn and body of hyoid bone. On the left side, the long segment was 24mm long and 7mm wide and the short segment was 10mm long and 9mm wide. On the right side, the long segment was 22mm long and 9mm wide and the short segment was 12mm long and 8mm wide. On the midline the short segments of accessory bellies were linked to each other by dense connective tissue that also connected them to the body of hyoid bone inferiorly.

The anterior belly of digastric was 35mm x 12mm on the left side and 35mm x 14mm on the right side (length x width). The anterior and accessory bellies on both sides were innervated by mylohyoid nerve from the deeper surface of the muscle. The normal anterior and posterior bellies of digastric muscle on both sides had normal origins, courses and innervations. There were no signs of trauma nor surgical scars in the neck region.

DISCUSSION

There have been descriptions of anatomical variations in digastric muscle ever since 1847, as pointed out by Bergman et al (2002) [1]. Uzun et al reported 5.9% - 53% frequency of variations of suprahyoid musculature [2]. The incidence rates of variations in the anterior belly of digastric according various researchers are given in table 1 [1,3].

Table 1: Incidence rates of variations of anterior belly of digastric according to pioneer studies [1].

| RESEARCHERS | YEAR | INCIDENCE OF VARIATION |
|-------------|------|------------------------|
| Hallett | 1847 | 6.60% |
| Wood | 1862 | 5.90% |
| LeDouble | 1891 | 6.00% |
| Bavero | 1896 | 26% |
| Bianchi | 1896 | 36% |
| Stracher | 1928 | 48% |

Sarikcioglu et al. (1998), showed 3 accessory bellies and a fibrous band being inserted to mylohyoid raphe. Celik et al. (2002 and 1993), reported quadrification and triplication of anterior belly in 2 case reports. Holibkova et al. (1999), reported an anterior belly separated into medial and lateral heads which had different trajectories and accessory bundles connecting mandible, hyoid bone and intermediate tendon across the midline [4, 5].

According to Sargon and Celik (1984) and Perker et al. (2000), the unilateral variation of anterior digastric belly is more common [3]. Mangalagiri and Razvi (2009) are of the opinion that unilateral and bilateral variations in anterior belly occur equally as also observed by Liquidato et al. [6].

Mori M (1964), having studied 262 cadavers, classified variations of anterior belly into 7 types out of which the present case can be described as an independent muscle, mentohyoid muscle, extending between the body of the hyoid and the symphysis of the mandible. This muscle, may be found along the medial border of the anterior belly, and may be considered as a separate part of the digastric [1].

The muscle structures derived from first pharyngeal arch such as anterior belly of digastric muscle originate from the original mesoderm of the arch. Thus deficiency in differentiation of this layer on one side may be responsible for unilateral variation and deficiencies on both sides for bilateral variations.

Unilateral variations may be responsible for asymmetry in the anterior region of neck or even in movement of the floor of mouth or temporomandibular joint and perhaps imbalance in the movement in larynx. These types of asymmetry may lead to slight functional abnormalities or may even be confounded in clinical examinations and in imaging examinations like ultrasound, tomography and magnetic resonance with lymph nodes, benign cervical masses like thyroglossal cysts or neoplasia [2].

Alterations in intensity or symmetry of movement may occur depending on the origin, insertion and innervation of the accessory bellies [3].

The knowledge of muscular variations in the

suprahyoid region is important to oral surgeons and to head and neck surgeons to evaluate and avoid misinterpretation of metastases or tumour or enlarged lymph nodes [7].

The anterior belly of digastric is used by surgeons as a landmark to identify the lingual nerve or the duct of submandibular gland and in submandibulectomy. Consequently the presence of accessory anterior bellies could induce mistakes in surgical procedures [3, 2].

The digastric muscle may be of use in plastic surgery where the digastric anterior belly transfer technique is employed to restore the depressor function of lower lip in lesions of the facial nerve after tumour resection [3].

The anterior belly is removed in platysmarrhaphy and in cosmetic surgery. Supernumerary and accessory bellies should be looked for and removed by the surgeon for the best result of these procedures. Digastric muscle transplant is used in corrective surgery for lower lip asymmetry and harvested in pedicled submental flap. Accessory muscle slips can provide supplementary tissue to work with in these cases.

Accessory muscle slips may cause pharyngeal pain and foreign body sensation in the throat. These extra slips give a variant mobility to the hyoid bone leading to symptoms similar to stylohyoid syndrome. Digastric muscle sew-up procedure for the repair of floor of mouth following pull through operations for advanced oral cancers has been found to be simple, safe and time saving for small to medium sized defects of the floor of mouth created by ablative surgery [8,9], and an accessory belly may provide extra tissue to this aim.

Conflicts of Interests: None

REFERENCES

- [1]. Bergman R. A., Afifi A. K., Miyauchi R. (2002) Digastricus. In: Illustrated Encyclopedia of Human Anatomic Variation. Opus I: Muscular system. Available from: <http://www.anatomyatlases.org>
- [2]. Liquidato B. M., Barros M. D., Alves A. L., Pereira C. S. B. Anatomical study of the digastric muscle: Variations in the anterior belly. *Int. J. Morphol.* 2007;25(4):797-800.

- [3]. Mascaro M. B., Picoli L. C., Santos F. M., Bonsi A. B., Souza M. R., Prosdócimi F. C. Anatomical variation of the anterior belly of the digastric muscle: case report and clinical implications. *J. Morphol. Sci.* 2011;28(1):72-75.
- [4]. Reyes G., Contreras C., Ramirez L. M., Ballesteros L. E. The digastric muscle's anterior accessory belly: case report. *Med. Oral. Patol. Oral. Cir. Bucal.* 2007;12 E: 341-343.
- [5]. Sevinc O., Cetin Z. A., Barut C., Buken B., Arifoglu Y. Complex variation of the digastric muscle: a case report. *International Journal of Experimental and Clinical Anatomy* 2009:72-74.
- [6]. Singh Z., Kaur G., Kaur A. A variant digastric muscle. *International Journal of Anatomical Variations* 2011;4:120-122.
- [7]. Standring S. Neck. In: Standring S, Gray's Anatomy, 40th Ed., Churchill livingstone elsevier, Spain. 2008:437-441.
- [8]. Thakur A., Bertha A., Parmar S. K. Multiple variations in neck musculature and their surgical implications. *International Journal of Anatomical Variations.* 2011;4: 171-173.
- [9]. Venugopal S. P., Mallula S. B. Unique musculoaponeurotic attachment between two anterior bellies of digastric. *International Journal of Anatomical Variations.* 2010;3:156-157.

How to cite this article:

Chaithra Rao B R, Sunkeswari Sreepadma, Veena Kulkarni, Subhash K Deshpande. ANATOMICAL VARIATION OF DIGASTRIC MUSCLE AND ITS CLINICAL IMPLICATIONS. *Int J Anat Res* 2016;4(3):2882-2885. **DOI:** 10.16965/ijar.2016.388