

## Case Report

# UNILATERAL ABSENCE OF THE STERNOHYOID MUSCLE WITH CONTRALATERAL TENDINOUS BELLY OF SUPERIOR BELLY OF OMOHYOID MUSCLE: A VERY RARE FORM OF INFRAHYOID MUSCLE VARIATION

Prabhas Ranjan Tripathy <sup>\*1</sup>, Chappity. Preetam <sup>2</sup>.

<sup>\*1</sup> Assistant Professor, Department of Anatomy, All India Institute of Medical sciences, Bhubaneswar, Odisha, India.

<sup>2</sup> Assistant Professor, Department of ENT & HNS, All India Institute of Medical sciences, Bhubaneswar, Odisha, India.

## ABSTRACT

The sternohyoid, sternothyroid, thyrohyoid and omohyoid constitute the infrahyoid group of anterior neck muscles. All these muscles are supplied by Ansa cricalis related to the anterior wall of carotid sheath. During regular cadaveric dissection in the Department of Anatomy at AIIMS, Bhubaneswar, a case of right sided absence of sternohyoid muscle with left sided tendinous superior belly of omohyoid muscle was found. Though literature survey shows the tendinous belly (or absence) of superior belly of omohyoid muscle, but its presence in combination with absence of opposite side sternohyoid muscle is hardly reported. The omohyoid muscle has effect on intracerebral venous hemodynamics. Developing from a common muscle primodium the infrahyoid muscle group shows a number of variations. Because of increased use of Infrahyoid myocutaneous flaps for medium sized head and neck reconstruction surgery this knowledge will be helpful for handling and selecting a flap.

**KEY WORDS:** Infrahyoid, Sternohyoid, Omohyoid Muscles, Infrahyoid Myocutaneous Flap.

**Address for Correspondence:** Dr. Prabhas Ranjan Tripathy, Assistant Professor, Department of Anatomy, All India Institute of Medical sciences, Bhubaneswar, Odisha, India. Mob. +919861187082  
**E-Mail:** [prabhas\\_ranju@yahoo.co.in](mailto:prabhas_ranju@yahoo.co.in)

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## INTRODUCTION

The infrahyoid muscles include sternohyoid, sternothyroid, thyrohyoid and omohyoid muscle. The sternohyoid and omohyoid lie superficially and the sternothyroid and omohyoid lie in deep strata. They are innervated by ansa cervicalis. These muscles are involved in the process of vocalization, swallowing and mastication [1]. Various forms of anomalies are reported for these muscles and due to the degenerating nature the omohyoid muscle shows a high degree of variations [2].

## CASE REPORT

During regular Anatomy dissection, while dissecting the anterior triangle of neck on right side the Sternohyoid muscle was found to be absent in the muscular triangle. The boundary of the muscular triangle is formed by the Superior belly of omohyoid muscle, anterior border of lower part of sternocleidomastoid muscle and the anterior midline. The sternothyroid and thyrohyoid muscles were present at the normal position. The loop of ansa cervicalis provides only two branches i.e. to

inferior belly of omohyoid and sternothyroid muscle, as the sternohyoid muscle was absent in this case. The superior belly of omohyoid appeared too thickened in this case. On left side the sternohyoid muscle was present in the muscular triangle, but the superior belly of omohyoid appeared as a tendinous structure. On both sides the inferior belly of omohyoid muscle was normal in appearance.

**Photo 1:** Showing right side neck with right side absent sternohyoid muscle with sternothyroid and thyrohyoid muscle.



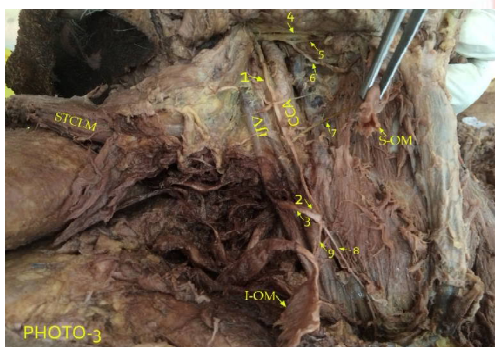
I-OM (Inferior belly of Omohyoid M.), S-OM (Superior belly of Omohyoid M.), STT (Sternothyroid M.), SCLM (Sternocleidomastoid M.), TH (Thyrohyoid M.)

**Photo 2:** Showing left side neck with tendinous superior belly of omohyoid muscle and presence of sternohyoid muscle



I-OM (Inferior belly of Omohyoid M.), S-OM (Superior belly of Omohyoid M.), SCLM (Sternocleidomastoid M.), STH (Sternohyoid M.)

**Photo 3:** Right side neck with sternocleidomastoid (SCLM) muscle is cut and reflected and two bellies of omohyoid (S-OM & I-OM) are separated to show the branches from loop of ansa cervicalis.



IJV-Internal Jugular Vein, CCA-Common Carotid Artery, 1-Superior Root of Ansa cervicalis (Desendens Hypoglossi), 2 -Loop of Ansa cervicalis 3- Inferior Root of Ansa cervicalis 4-Hypoglossal Nerve 5-Nerve to Geniohyoid muscle, 6- Nerve to Thyrohyoid muscle, 7-Branch to Superior belly of Omohyoid muscle, 8-Branch to Sternothyroid muscle, 9-Branch to Inferior belly of Omohyoid muscle.

## OBSERVATIONS AND DISCUSSION

The two bellies of Omohyoid muscle divides the anterior and posterior triangles of neck into a number of sub triangles and portrays an important land mark for many neck structures. Case reports and studies pertaining to variation in morphology of omohyoid muscle have been reported. Anomalies can be related to the presence or absence of bellies, origin and insertion, no of bellies and its proximity/ attachment to other infrahyoid muscles. Some of the reported anomalies are unusual attachment of S-OM to transverse process of C6 vertebra [3], absent inferior belly of OM with the superior belly attached to clavicle [4], duplicated superior belly of the OM [5], unilateral duplicated superior and inferior bellies [6] duplicated Omohyoid and appearance of the Levator Glandulae Thyroideae Muscles [7], triplication of superior belly and insertion of superior belly to the thyroid cartilage [8], normal omohyoid muscle with a cleido-hyoid attachment [9] and absence of muscular part of the superior belly of the omohyoid with a fibrous tendon [10,11,27] as in our case.

In the study by Rajlaxmi Rai et al [2] regarding the anatomic variation of Omohyoid muscle, apart from normal superior and inferior belly attachment in 85% cases 4 other varieties i.e. Type I Double omohyoid (superior & inferior omohyoid) 3%, Type II Cleido-hyoideus - Inferior belly from clavicle & superior belly attached to hyoid bone 6%, Type III Short OH - Inferior belly from clavicle & superior belly merging with Sternohyoid 3%, Type IV Superior belly receiving Slips from sternum with normal inferior belly 3% have been reported.

Four types of intermediate morphologies between normal and anomalous morphologies of the superior belly of the omohyoid muscle observed by Sukekawa R et al [12] are type 1 with unclear anterior margin of the superior belly due to the poor myofiber development; in



type 2, the superior belly was composed of a posterior large belly and an anterior small belly; in type 3, superior belly composed of three to five bellies and the bellies were arranged in a roof tile-like morphology; in type 4, the superior belly was found to consist of two bellies arranged parallel to each other in anterior-posterior direction as in our case.

Loth and Miura et al. have also classified different forms of anomalies into five types and six types respectively [13, 5].

Though the text book mentions that the sternohyoid muscle may be absent or double (1), literature survey shows no report about the absence of sternohyoid muscle and this is the first case to be reported. Its association with opposite side tendinous superior belly of omohyoid muscle (claimed to be absence of superior belly by some others) is also a very rare case. In this case the superior belly of omohyoid muscle is supplied by the descendens hypoglossi and the loop of ansa cervicalis provides two branches i.e. to inferior belly of omohyoid and sternothyroid, as the sternohyoid muscle is absent.

Other rare form infrahyoid anomaly are the thyrohyoid is often continuous with the sternothyroid, the medial fibers on both sides of sternothyroid may form a cruciate pattern, the muscle may exist in two strata, or it may be divided longitudinally into bundles; the lateral bundle may terminate in cervical fascia [26].

**Physiological Significance:** Because of proximity of the intermediate tendon of Omohyoid muscle to the anterior wall of the carotid sheath and sharing the cervical fascia, the contraction of the omohyoid muscle has a direct effect on the lumen of internal jugular vein [14] and this may lead to modifications in intracerebral venous hemodynamics, which can be affected during yawning [15] and also compression may act like venous valves, which may have a cerebral protective mechanism during process like as laughing or forced inspiration. Contracted infrahyoid muscles (the omohyoid muscles in particular), may be responsible for the creation of an air embolus by dilating the penetrating neck veins after trauma or surgery to this region [16].

**Surgical Significance:** The commonly used pedicled myocutaneous flaps for head and neck reconstruction are pectoralis major, trapezius, latissimus dorsi etc. The use of infrahyoid myocutaneous (IHMC) flaps for reconstructing head and neck surgical defects is well accepted. Wang [17] is considered to be the father of this flap surgery, though the concept of infrahyoid flap was first given by Clairmont and Conley(1977) [18]. The IHF free flaps is used in the management of medium sized defects (average size being 7×4 cm) of the floor of mouth, alveolar ridge, and base of tongue [19]. It includes the sternohyoid, sternothyroid and omohyoid muscle muscles and the skin paddle overlying it. They get a segmental supply from Superior and inferior thyroid artery and perforators of the infrahyoid muscles (20). They can be used for muscle reconstruction, treatment of bowed vocal-cord and laryngeal repair, surgery for oropharyngeal cancer [21] etc. Previous thyroid surgery or neck dissection, N3 neck metastasis, previous irradiation and positive lymph nodes at level III–IV are some limitations in selecting the flaps [19]. Though the flap raises doubts over adherence to oncological principles, its use in a N0 neck, radiologically proven neck is invaluable. The omohyoid muscle serves as a reliable landmark for the radical neck dissection and endoscopic exploration of the brachial plexus [22, 23]. It is also the surgical landmark for level III and IV lymph node metastases [24].

**Morphological Significance:** Developing from a muscle primordium in the anterior cervical area the infrahyoid muscles [25] are first divided into a shallow layer and a deep layer. The deep layer becomes the sternothyroid and thyrohyoid muscles. The shallow layer becomes the splenius spread in the cervical region, the intermediate part of which in humans is degenerated and the splenius is separated into the internal and external muscles. The internal muscle becomes the sternohyoid muscle and the lower part of the external muscle becomes the omohyoid, which runs obliquely in the lateral cervical area [25]. The anomalies caused by the omohyoid and the sternohyoid and various forms of adhesion between two muscles represent the primitive morphology of the splenius. It has been

suggested that because the human omohyoid is degenerating, the incidence of anomalies is high [2]. Unusual omohyoid forms described by Bergman et al. are cleidofascialis, cleido-hyoideus, and hyofascialis [26].

## CONCLUSION

The Head and Neck reconstructive surgery is in a stage of evolution and the use of Infrahyoid myocutaneous (IHMC) flap for medium size defects is an emerging concept. Study on various anomaly of infrahyoid muscles will help a lot in dealing with various surgical challenges. This case of unilateral absence of sternohyoid muscle with contralateral tendinous superior belly of omohyoid muscle is the first case to be reported.

**Conflicts of Interests: None**

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