

Unilateral omohyoid muscle absence: a cadaveric case report

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ABSTRACT:

Introduction: The omohyoid muscle is a slender infrahyoid muscle composed of two bellies (superior and inferior) connected by an intermediate tendon. It serves as a critical anatomical landmark in cervical lymph node classification, neck dissection surgeries, and brachial plexus exploration. Variations of this muscle, though uncommon, carry clinical significance due to their proximity to major neurovascular structures.

Main Clinical Finding: During routine cadaveric dissection of the neck in a 72-year-old Indian male cadaver, the complete unilateral absence of the omohyoid muscle on the left side was observed. The right side displayed a normal omohyoid muscle with both bellies and intermediate tendon intact.

Diagnosis: Congenital unilateral agenesis of the omohyoid muscle on the left side, identified during anatomical dissection.

Intervention: No clinical intervention was required, as the case was identified during anatomical dissection. The variation was thoroughly documented with anterior and lateral photographs for educational and academic reference.

Outcome: The absence of the omohyoid was confirmed to be congenital, as there was no evidence of trauma, surgery, or pathological changes. Recognition of this variation contributes to anatomical knowledge and highlights the importance of being vigilant about such anomalies during surgeries involving the neck.

Conclusion: This case highlights a rare anatomical variation—unilateral agenesis

of the omohyoid muscle—which has significant clinical implications. Awareness of such variations is essential for accurate surgical navigation, diagnostic precision, and effective medical education. Documentation and reporting of such anomalies ensure better preparedness in both clinical and academic settings.

Key words: Omohyoid, Surgical implication, Agenesis of Omohyoid.

INTRODUCTION:

The Omohyoid belongs to a group of Infrahyoid muscles. It consists of superior and inferior bellies and an intermediate tendon, which runs obliquely in the lateral cervical region and this intermediate tendon is connected to the clavicle by a fascial sling.¹ Among all the infrahyoid muscles, the sternohyoid and omohyoid are located more superficially, whereas the sternothyroid and thyrohyoid occupy the deeper layers. These muscles receive innervation from the ansa cervicalis and contribute significantly to functions such as vocalization, swallowing, and mastication. The inferior belly of the omohyoid originates from the upper border of the scapula, near the scapular notch, as well as from the superior transverse scapular ligament. It courses posterior to the sternocleidomastoid muscle and terminates at the intermediate tendon. This intermediate tendon lies over the internal jugular vein (IJV) at the level of the cricoid cartilage and is anchored to the clavicle by a fascial pulley. The superior belly arises from this intermediate tendon, ascends vertically along the lateral border of the sternohyoid, and inserts into the lower

border of the hyoid bone, just lateral to the insertion of the sternohyoid muscle. The intermediate tendon of the omohyoid muscle divides the deep cervical lymph nodes into upper and lower groups. The omohyoid muscle (Om) serves as a key anatomical landmark in cervical lymph node classification, neck dissections for head and neck cancers, and cervical spine surgeries.²

Variations of the omohyoid muscle are clinically significant due to their close proximity to major blood vessels and the brachial plexus. When the muscle's tendon is directly attached to the wall of the internal jugular vein, its contractions can directly affect the vein.³ The omohyoid muscle is also recognized as a dependable landmark in the supraclavicular region for endoscopic approaches to brachial plexus exploration. (Krishnan et al., 2004).

Unilateral absence of the omohyoid muscle, though rare, is clinically important as it may lead to misidentification of anatomical landmarks during surgery, affect internal jugular vein dynamics, and provide insights into embryological development. Recognizing such variations is crucial to avoid surgical or diagnostic errors and hence necessary to report.

CASE REPORT:

During the routine dissection of neck region of a male cadaver of Indian origin aged 72 yrs, the omohyoid muscle was found to be absent on left profile of neck while the right profile holds normal presence of Omohyoid muscle at its anatomical position. The cadaver showed no evidence of scarring, adhesion, trauma, or prior surgical intervention.

In this cadaver, both sided neck triangles were explored and during the process, the muscle omohyoid was missing at the left side while its both bellies with intermediate tendon was present on right side. On left side the sternohyoid muscle was present and deep to it was present Sternothyroid and Thyrohyoid muscle. There was no evidence of a superior

belly, inferior belly, or the intermediate tendon on the left profile.

The variation was photographed from anterior as well as left lateral aspect of Cadaver to clearly provide the anatomical variation scenario of missing Omohyoid on left side. (image 1 & 2) (Source of image: Self clicked by Authors at time of Dissection)

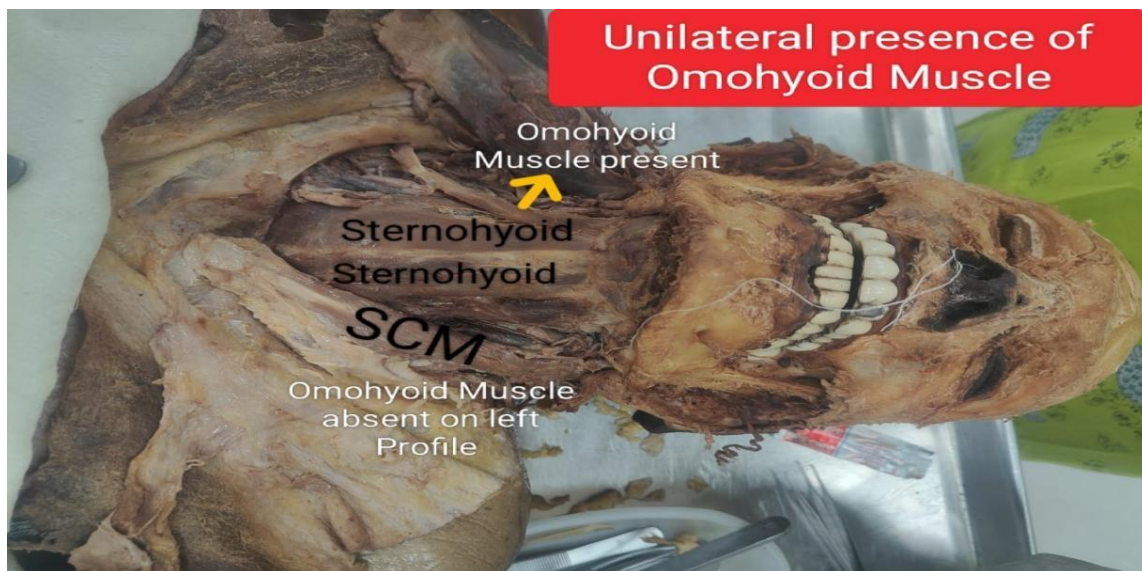


image-1

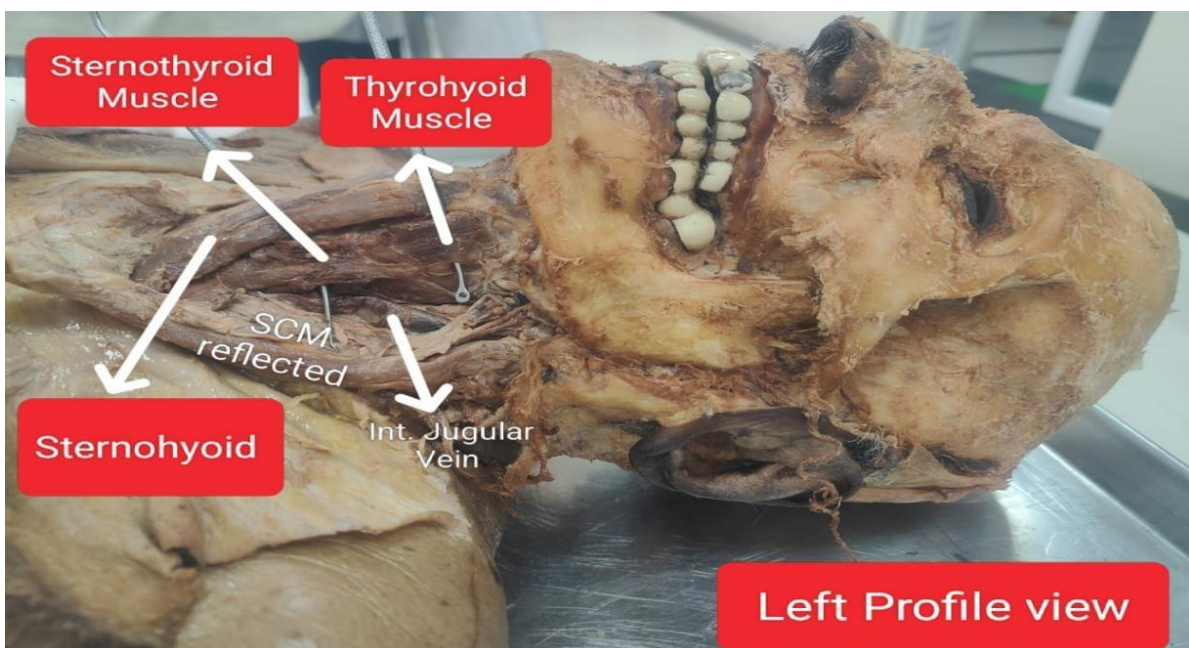


image-2

Table: 1 – Representing the showcasing of variation in photographs.

S.No.	Photograph Number	Presentation
1.	Photograph 1	Represents Anterior profile of neck showing the omohyoid presence in right side and absence in left side.
2.	Photograph 2	Represents Left profile of neck clearly showing the sternothyroid and thyrohyoid muscles deep lateral to Sternohyoid muscle and absence of Omohyoid muscle.

REVIEW OF OMOHYOID VARIATIONS

Although numerous variations of the omohyoid muscle have been documented, the most commonly encountered anomalies were systematically categorized by Loth (1931) and Yamada et al. (1960).

Loth's Classification (1931):

Loth proposed that the omohyoid represents a remnant of a composite muscle he termed the *sterno-cleido-omohyoid*, comprising two parts: the sterno-cleido-hyoid and the omohyoid components. He described five types:

- Type 1: Only the cleido-hyoid component is present.
- Type 2: Both cleido-hyoid and omohyoid parts are present, but without an intermediate tendon.
- Type 3: The omohyoid is present, while the cleido-hyoid segment is replaced by a tendinous sheet.
- Type 4: A true omohyoid muscle exists, but lacks both the intermediate tendon and the cleido-hyoid portion.
- Type 5: A fully developed omohyoid muscle with a clearly defined intermediate tendon —

considered the most common configuration.

Yamada's Classification (1960):

Yamada and colleagues expanded on the classification system, identifying six distinct types of omohyoid variations:

- Type 1: Complete absence of the omohyoid muscle.
- Type 2: Duplication or supernumerary bundles involving the superior belly or the entire muscle.
- Type 3: Abnormal course or morphology of the inferior belly.
- Type 4: Presence of a cleido-hyoid muscle or an accessory cleido-hyoid muscle.
- Type 5: Aberrant insertion pattern of the omohyoid muscle.
- Type 6: Presence of an accessory omohyoid muscle.

DISCUSSION:

The omohyoid muscle is a key infrahyoid muscle with two distinct bellies—superior and inferior—connected by an intermediate tendon. Anatomically it plays an important role in depressing the hyoid bone as it holds and anchor the hyoid bone in its place. The action of this muscle lifts the hyoid bone and researchers believe that it also

pulls the lower part of the neck of the deep fascia during prolonged inspiration, reducing the tendency of aspirating soft tissues inward. Some researchers stated that the omohyoid muscle is activated during mandibular pressure and rotation of the head.⁴ It is important in serving as a surgical and anatomical landmark, especially in neck dissections, cervical lymph node mapping, and supraclavicular approaches to the brachial plexus.⁵

In the present case, the complete unilateral absence of the omohyoid muscle on the left side was observed in a 72-year-old male cadaver, with the right side showing the typical anatomical

configuration. The absence was not associated with any surgical or traumatic history, suggesting a congenital anomaly rather than acquired loss. This can be explained on basis of embryological development of Omohyoid muscle.

Embryologically, the infrahyoid muscles develop from the second to fifth cervical myotomes and are innervated by the ansa cervicalis. The failure of myoblast migration or improper splitting of muscle primordia may lead to hypoplasia or agenesis, as likely occurred in this case.⁶

ANATOMICAL & CLINICAL IMPLICATIONS:

Table 2 (Source: Self tabulated): Indicating the procedure, its importance and anatomical or clinical implication due to absence of Omohyoid Muscle:

S. NO.	PROCEDURE	IMPORTANCE	IMPLICATION
1.	Neck Dissection	Triangles of neck are subdivided by the Omohyoid muscle especially by the inferior belly of Omohyoid.	The boundaries of posterior triangle can not be established and hence the differentiation of boundaries of subclavian triangle and occipital triangle cannot be established.
2.	Brachial Plexus Exploration	The inferior belly of the omohyoid traverses the supraclavicular triangle, which houses the roots and trunks of the brachial plexus. It forms the roof of this triangle, thereby helping to demarcate the area of exploration.	In minimally invasive or endoscopic approaches to the brachial plexus, the omohyoid muscle is used as a reliable reference to navigate the deeper anatomical layers safely which can be hampered due to its absence.
3.	Radical Neck Dissection Surgery	This procedure depends on Omohyoid as a landmark for identifying lymph node levels.	The absence of Omohyoid can lead to disorientation for performing this surgery as landmark would be lacking.

4.	Internal Jugular Vein cannulation	In the success of this process the fascial sling of Omohyoid muscle may impact venous flow.	Absence of Omohyoid muscle may affect the success rate of this procedure.
5.	Radiological Imaging	To identify any pathology over that area	The unfamiliarity with such a variation might lead to misdiagnosis of muscle atrophy or pathology.

CONCLUSION:

The current finding adds to the anatomical knowledge by documenting and reporting the unilateral agenesis of Omohyoid muscle, reinforcing the importance of anticipating muscular variations during both educational dissections and clinical interventions. From an anatomical and educational perspective, such findings underscore the necessity of maintaining a high index of awareness regarding muscular anomalies, particularly in the infrahyoid region, where muscles are often used as standard reference points during both teaching and examination.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest related to this publication.

AUTHORS' CONTRIBUTIONS

First Author: Dissection, data collection, and drafting of the manuscript.

Second Author: Conceptualization of the case.

Third Author: Review of Variations found relevant.

Fourth Author: Critical analysis and review of the final draft.

Fifth Author: Scientific editing and Proof reading of the manuscript.

All authors have read and approved the final manuscript.

DATA AVAILABILITY STATEMENT

All relevant dissection data generated or analysed during this study are included in the article. Further details or clarifications can be made available from the corresponding author upon reasonable request.

DECLARATION:

The authors acknowledge the use of an AI language model (ChatGPT by OpenAI) for assistance in refining the language, improving the structure, and enhancing the clarity of the manuscript. The content, interpretation, and final approval of the text remain the sole responsibility of the authors

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