

# Cleidooccipital muscle: an anomalous muscle in the neck region

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*During our routine dissection studies, we encountered a case with abnormal muscle deep to the sternocleidomastoid muscle. According to its origin, insertion and innervation features, the abnormal muscle was considered as cleidooccipitalis muscle.*

**key words:** cleidooccipital muscle, abnormal muscle

## INTRODUCTION

The sternocleidomastoid muscle (SCM) passes obliquely in the lateral side of the neck. It arises from the sternum and clavicle by two heads and inserts onto the mastoid process [8]. Synonymies of SCM are *M. nutator capitis* (Meckel) [3], *M. mastoideus colli* (Arnold) [3], sternocleidomastoid muscle of Kofnicker [3], and sternomastoid muscle [8].

The SCM shows many variations in the extent of its origin from the clavicle: in some cases the clavicular head may be as narrow as the sternal. When the clavicular origin is broad, it is occasionally subdivided into several slips [8]. Demir et al. [6] reported a case with several such slips.

It has been reported by Kent [9], Goss [8], and Bergman et al. [3] that the trapezius and SCM arise from a common premuscle mass in the occipital region just caudal to the last branchial arch. This myotome separates to the ventral part forming SCM and the dorsal part forming trapezius. For this reason, more rarely, the adjoining margins of SCM and trapezius may be found in contact [8]. Besides, absence of SCM has also been reported [2, 10]. Knowledge of human embryology is a valuable asset in understanding human anatomic variation in this region [3].

In many animals (rabbit, sphenodon, crocodile), the cleidomastoid portion of the muscle is quite dis-

tinct from the sternomastoid portion; this condition is frequently found in humans [3, 9]. Bergman et al. [3] mentioned that cleidoepistrophic, cleidocervical and cleidoatlantic muscles are the variant of the cleidomastoid muscle. McKenzie et al. (cited by Kozumi et al. [11]) reported that deep portion of SCM derived from the myotome and was probably homologous with omocervical muscle within most other mammals.

The levator claviculae muscle or cleidocervical muscle arises from the transverse processes of the upper cervical vertebral bodies and inserts on the lateral aspect of the clavicle [12, 13, 15, 18]. Although its existence frequency was reported as less than 2% by O'Sullivan [13] and 2% to 3% by Rubinstein [15], Tomo et al [18] reported that it is not possible to estimate the frequency of its existence. Each of Leon et al. [12], O'Sullivan and Kay. [13], Rubinstein et al. [15] and Tomo et al. [18], reported a case with cleidocervical muscle and some of them explained its evolutionary pathway.

Literature contains few articles which report cleidooccipital muscle. Nagashima et al. (cited by Tomo et al. [18]) reported a case where the cleidocervical muscle was present bilaterally and a cleido-occipital muscle was located on the left side in the same cadaver. Rahman and Yamadori [14] also reported a case with cleidooccipital muscle bilaterally.

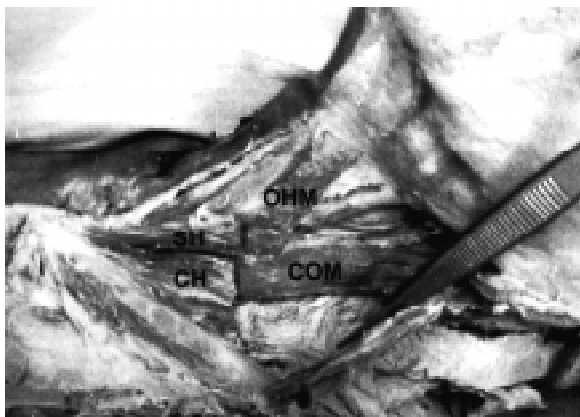
### CASE REPORT

During our routine dissection studies, we encountered a case with abnormal muscle deep to SCM (Fig. 1). The abnormal muscle originated from clavicle and attached to the mastoid process (Fig. 2). It was innervated by the accessory nerve. Accessory nerve was pierced both of the abnormal muscle and SCM then innervated the trapezius muscle. The upper third of SCM was found to be supplied by branches of the occipital artery, the middle third by a branch coming from the external carotid artery separating 1 cm above from the carotid bifurcation, and the lower third by a branch arising from the suprascapular artery. According to its origin, insertion and innervation features, the abnormal muscle was considered as cleidooccipital muscle.

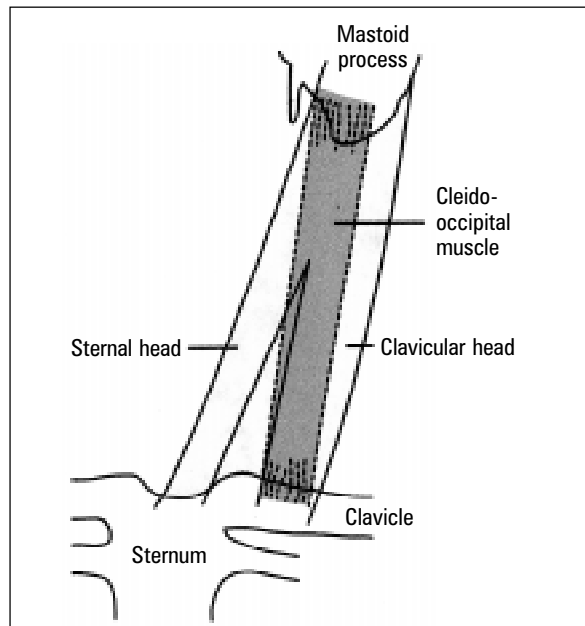
### DISCUSSION

A supernumerary cleido-occipital (Wood) muscle, more or less separate from the sternocleidomastoid muscle, has a reported frequency of 33% [3]. We found it in one out of 24 cadavers.

Comparative anatomical studies have concluded that SCM is composed of five parts arranged in two layers. The amount of fusion of the two heads of this muscle varies considerably. They are frequently separated into cleidomastoid and sternomastoid parts. In addition, the muscle frequently separates into other parts, which are arranged in two layers: a superficial layer consisting of a superficial sternomastoid, sterno-occipital, and a cleidooccipital part, and a deep layer consisting of a deep sternomastoid and a cleidomastoid part. Apart from these five parts, a sixth has been seen and described as sternomastoideus profundus [3].



**Figure 1.** The present case with cleidooccipital muscle; SH — sternal head; CH — clavicular head, COM — cleidooccipital muscle, OHM — omohyoid muscle.



**Figure 2.** Schematic presentation of the cleidooccipital muscle.

Mori (cited by Bergman [3]) also reported that the superficial and deep layers are rarely independent of each other. The independence of the cleidooccipital portion was found by Mori in 102 (10%) of 1020 body sides.

SCM is innervated by the accessory nerve and a branch from the cervical plexus. Koizumi et al. [11] reported a case with an anomalous nerve supply from the hypoglossal nerve (XII) to SCM. In the present case both sternocleidomastoid and cleidooccipital muscles were innervated by accessory nerve.

Sternocleidomastoid muscle can be used as myocutaneous flap for facial defects, carotid artery protection, and repair of oral cavity defects [1, 5], for esophagoplasty [7], after parotidectomy [17]. Therefore, these abnormal muscles (cleidooccipital muscle, cleidocervical muscle, etc.) can be used as myocutaneous flap as well.

Branstetter and Weissman [4] and Rubinstein et al. [15] emphasised that the levator claviculae muscle, accessory scalene muscle, hypertrophied levator scapulae muscle (when the trapezius muscle becomes atrophied, as in sacrifice of the spinal accessory nerve during neck dissection, the levator scapulae may undergo compensatory hypertrophy) should be considered for cervical lymphadenopathy. We think that, apart from these muscles, the presence of such a cleidocervical muscle [12, 13, 15, 18] and subclavial postical muscle [16] can become a matter of great concern to general surgeons, radiologists and oncologists, any of whom may perform surgical and radiological procedures in the neck region.

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