

An Anatomic Variation of the Trapezius Muscle in a Korean: The Cleido-occipitalis Cervicalis

Hyun-Ho Kwak¹, Hee-Jin Kim¹, Kwan-Hyun Youn¹, Hyun-Do Park¹, and In-Hyuk Chung²

¹*Division in Anatomy and Histology, Department of Oral Biology, Oral Science Research Center, College of Dentistry, Yonsei University, Seoul, Korea;*

²*Department of Anatomy, Yonsei University College of Medicine, Brain Korea 21 Project for Medical Science, Seoul, Korea.*

A variation of the trapezius muscle was observed in a Korean female adult cadaver during routine student dissection. The lateral, upper three-fourths of the descending portion of the trapezius muscle were separated from the remainder of the muscle. This single, isolated bundle fused above the insertion of the midpoint of the clavicle, and attached to the clavicle as a separate tendon. The remaining descending portion inserted into the clavicle and scapula as usual. This abnormal muscle bundle is considered as a variant of the cleido-occipitalis cervicalis, and formation of this variation is discussed based on the embryological development of the relative muscular structures.

Key Words: Cleido-occipitalis cervicalis, trapezius muscle, variation

INTRODUCTION

The trapezius is a complex muscle consisting of three distinct parts that may not always be present.¹ Variations of the trapezius muscle are common. Most of the asymmetries observed in this muscle result from the variable extent of the occipital, cervical, vertebral and/or clavicular attachments.² Deficiencies observed in the trapezius muscle range from a lack of some fibers,³ especially of the occipital component,⁴ to the total absence of the muscle.⁵

During a routine dissection, we encountered a rare case of cleido-occipitalis cervicalis, consisting

of a separated lateral part of the descending portion of the trapezius muscle. Formation of this variation is discussed based on the embryological development of the relative muscular structures.

CASE REPORT

We found an anatomic variation of the trapezius muscle in the left side of a 52-year-old Korean female cadaver. The lateral, descending portion of the trapezius originated from the medial half of the superior nuchal line and from the external occipital protuberance, in the form of a flat, thin, aponeurotic sheet (Fig. 1A and 2). The greater occipital nerve and the occipital artery were found to perforate the lateral part of this aponeurosis (4.2 cm in width). As a single, isolated bundle, this cleido-occipitalis cervicalis coursed inferiolaterally to the clavicle, independently of the remainder of the trapezius muscle. This remaining descending portion originated from the ligamentum nuchae at the level of the third to seventh cervical spines and then inserted into the corresponding scapula in the normal manner.

The cleido-occipitalis cervicalis fused partially with the remaining descending portion, and some of the conjoint fibers proceeded independently toward the clavicle. This accessory slip was separated from the remaining fibers by a cleft (2.7 cm in length). Finally, the slip tapered into a slender tendon that inserted into the posterior aspect of the clavicle at its midpoint. The remainder of the muscle inserted normally into the left clavicle and the scapula (Fig. 1B and 2).

Received March 12, 2003

Accepted July 4, 2003

Reprint address: requests to Dr. In-Hyuk Chung, Department of Anatomy, Yonsei University College of Medicine, 134 Shinchon-dong, Seodaemun-gu, Seoul 120-752, Korea. Tel: 82-2-361-5166, Fax: 82-2-365-0700, E-mail: chinhy@yumc.yonsei.ac.kr

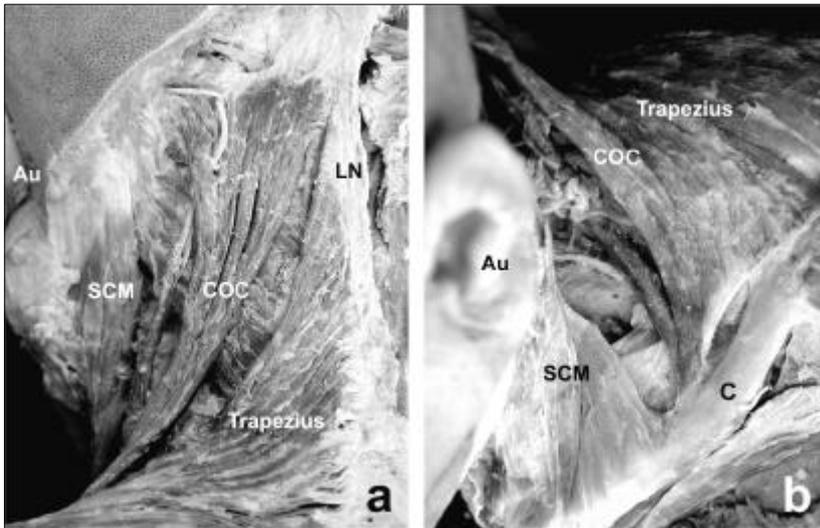


Fig. 1. Views of the origin (a), and of the insertion (b) of the cleido-occipitalis cervicalis. The cleido-occipitalis cervicalis originates from the medial half of the superior nuchal line and the external occipital protuberance, in the form of a flat, thin, aponeurotic sheet (4.2 cm in width), which inserts into the posterior aspect of the clavicle at its midpoint. COC, Cleido-occipitalis cervicalis; SCM, Sternocleidomastoid muscle; C, Clavicle; LN, Ligamentum nuchae; Au, Auricle.

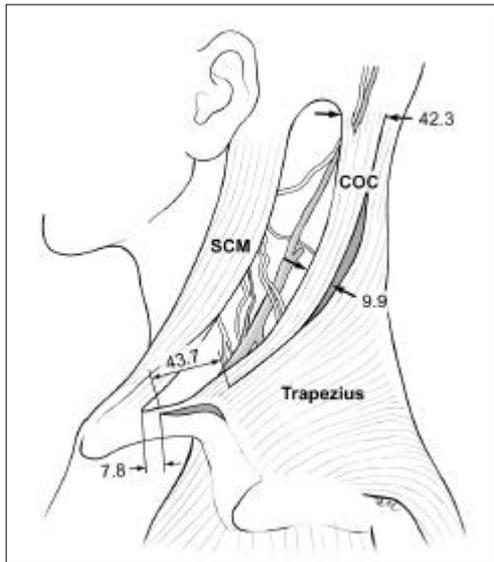


Fig. 2. Schematic illustration showing the orientation and topography of the cleido-occipitalis cervicalis (mm). COC, Cleido-occipitalis cervicalis; SCM, Sternocleidomastoid muscle.

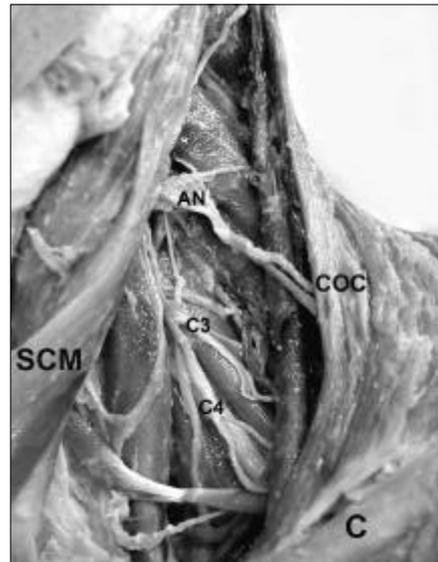


Fig. 3. Left anterolateral view showing the nerve supply to the cleido-occipitalis cervicalis. COC, Cleido-occipitalis cervicalis; SCM, Sternocleidomastoid muscle; AN, Spinal accessory nerve; C3, Branch from the third cervical nerve; C4, Branch from the fourth cervical nerve; C, Clavicle.

The origin of the cervical portion of the trapezius was normal, and the spinal accessory nerve and the branches from the third and fourth cervical nerves entered the deep surface of the trapezius (Fig. 3).

DISCUSSION

The trapezius and sternocleidomastoid (SCM)

are of mixed origin, derived partly from the branchial mesoderm and partly from the adjacent myotomes.^{2,6} This common origin arises from the occipital region just caudal to the last branchial arch and develops as a thick columnar mass. It then separates to the ventral part, forming the SCM, and to the dorsal part, forming the trapezius.⁶ For this reason, the clavicular attachment of the trapezius varies in extent, sometimes reaching

mid-clavicle and, more rarely, blending with the SCM.⁴ The SCM shows many variations in the extent of its origin from the clavicle. When the clavicular origin is broad, it is occasionally subdivided into several slips.⁷ Comparative anatomical studies have concluded that the SCM is composed of five parts arranged in two layers.⁸ They are frequently separated into cleidomastoid and sternomastoid components. In addition, the muscle frequently separates into other components: a superficial layer consisting of a superficial sternomastoid, a sterno-occipital, and a cleido-occipital component, and a deep layer consisting of a deep sternomastoid and a cleidomastoid component. Wood⁹ described the cleido-occipitalis muscle as a frequent variation of the SCM. Bergman, et al.² also reserved the term cleido-occipitalis muscle for their cases, stating its prevalence as 33%. In addition, Sarikcioglu, et al.¹⁰ found it in one out of 24 cadavers.

Like the SCM, the trapezius is a compound muscle consisting of three distinct portions. The portion of the muscle that inserts into the tuberosity of the scapular spine represents what is termed in lower mammals the dorso-scapularis inferior, while the portion that inserts into the spine and acromion represents the dorso-scapularis superior.⁸ The clavicular portion in the lower forms, on the other hand, is associated with the cleido-occipitalis element of the SCM, and therefore may be termed the 'cleido-occipitalis cervicalis'.

Rahman and Yamadori¹¹ reported an anomalous muscle with a separate descending portion and a partially deficient cervical portion of the trapezius muscle on both sides. They reserved the term 'cleido-occipitalis' muscle for this variant, and suggested it might be the result of partial degeneration, rather than partial agenesis, of the trapezius anlage.

In the present case, the cervical portion of the trapezius originated from the ligamentum nuchae at the level of the third to seventh cervical vertebrae and then inserted into the posterior border of the lateral third of the clavicle as usual.

However, an isolated bundle from the trapezius originated separately from the medial half of the superior nuchal line and inserted into the mid-clavicle near the cleido-occipitalis portion of the SCM.

After reviewing previous reports, and examining origin, insertion and innervation features, we now consider the abnormal muscle in our case to be a variant of the cleido-occipitalis cervicalis, seemingly isolated during separation of the trapezius and SCM from the common muscle anlage. This cleido-occipitalis cervicalis, however, does not compress any vascular or nervous structures and therefore, its functional significance is uncertain.

REFERENCES

1. Tountas CP, Bergman RA. Anatomic variations of the upper extremity. New York: Churchill Livingstone; 1993. p.57-8.
2. Bergman RA, Thompson SA, Afifi AK, Saadeh FA. Compendium of human anatomic variation. Baltimore: Urban & Schwarzenberg; 1988. p.32-3.
3. Emsley JG, Davis MD. Partial unilateral absence of the trapezius muscle in a human cadaver. *Clin Anat* 2001; 14:383-6.
4. Williams PL, Bannister LH, Berry MM, Collins P, Dyson M, Dussek JE, et al. *Gray's Anatomy*. 38th ed. London: Churchill Livingstone; 1995. p.835-6.
5. Gross-Kieselstein E, Shalev RS. Familial absence of the trapezius muscle with associated shoulder girdle abnormalities. *Clin Genet* 1987;32:145-7.
6. McKenzie J. The development of the sternomastoid and trapezius muscles. *Contrib Embryol* 1962;37:123-9.
7. Marecki B, Lewandowski J, Jakubowicz M. Anthropomorphology of sternocleidomastoid muscle. *Morphol Jahrb* 1989;135:491-503.
8. Piersol GA. *Human anatomy*. 3rd ed. Philadelphia and London: J.B.Lippincott Company; 1911. p.499-501.
9. Wood J. On some varieties in human myology. *Proc R Soc Lond* 1864;13:299-303. (cited from Bergman, et al.²)
10. Sarikcioglu L, Donmez BO, Ozkan O. Cleidooccipital muscle: an anomalous muscle in the neck region. *Folia Morphol* 2001;60:347-9.
11. Rahman HA, Yamadori T. An anomalous cleido-occipitalis muscle. *Acta Anat* 1994;150:156-8.