

# A RARE CASE OF BILATERAL STERNOCLEIDOMASTOID MUSCLE VARIATION

Laura Vanessa Téllez- Hernández<sup>1</sup>, Iván Alonso Tibaduiza- Rodríguez<sup>2</sup>, Humberto Ferreira-Arquez<sup>3</sup>

<sup>1</sup> Physician. San Martin University Foundation, <sup>2</sup> Physician. University of Pamplona, <sup>3</sup> Professor Human Morphology, Medicine Program. University of Pamplona. Morphology Laboratory Coordinator- University of Pamplona. Pamplona-Norte de Santander, Colombia, South America.

## CORRESPONDING AUTHOR

Humberto Ferreira – Arquez, University of Pamplona Laboratory of Morphology

University Campus Kilometer 1 - Via Bucaramanga.

Phone number: 573124379606.

Fax number: 75682750

Zip code: 543050.

City: Pamplona.

Country: Norte de Santander- Colombia- Suramérica

E- mail: humfear@unipamplona.edu.co

Received: 27.06.18, Revised: 27.07.18, Accepted: 27.08.18

Email. humfear@unipamplona.edu.co

## ABSTRACT

**Background:** The abnormal origin, presence of additional head and layered arrangement of fibers are the reported variations of sternocleidomastoid muscle.

**Aims:** The aim of the present study is report a rare bilateral anatomical variation of the sternocleidomastoid muscle.

**Materials and Methods:** The anatomical variations were found during a routine dissection performed in the laboratory of Morphology of the University of Pamplona.

**Findings:** In accordance with their origin, insertion, in the right side, in the superficial layer were dissected muscular bundle considered as sternocleidooccipital and sternomastoid muscle. In the deep layer, muscular bundles considered as cleidomastoid and sternocleidomastoid muscle was observed. In the left side, additional head originated from the investing deep layer of cervical fascia in the roof of the lesser supraclavicular fossa, traversed obliquely downward, backward, fused with clavicular head.

**Conclusion:** The presence of this anatomical variation it might cause difficulty in assessing the vital neurovascular structures of the neck.

**KeyWords:** Anatomical variations, sternocleidooccipital muscle, sternomastoid muscle, cleidomastoid muscle, additional heads.

## INTRODUCTION

Sternocleidomastoid muscle lies obliquely across the side of the neck and divides the side of the neck into anterior and posterior triangles. It originates as two heads, the medial or the sternal head which is tendinous and rounded; and the lateral or the clavicular head. The sternal head originates from the upper part of the anterior surface of the manubrium sterni. The lateral head originates from the superior surface of the medial end of the clavicle. The triangular interval between the two heads of origin forms a surface depression, the lesser supraclavicular fossa. The two heads blend into round, thick muscle belly which is then inserted as a strong tendon onto the lateral surface of the mastoid process from its apex to superior border, and as a thin aponeurosis into the lateral half of the superior nuchal line of the occipital bone. 1-4

The objective of the present study is report a rare combination bilateral anatomical variation of the sternocleidomastoid muscle, in the same cadaver, which has not been previously described in the available literature.

## MATERIALS AND METHODS

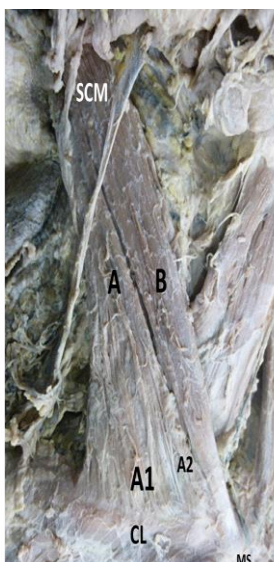
This work was previously approved by the Ethics Committee in Research and Environmental Impact of the University of Pamplona, conformed by resolution 030 of January 16 of 2014 and Resolution No. 008430 of 1993 of October 4 of the Ministry of Health of Republic of Colombia, which regulates the scientific, technical and administrative norms for health research. The anatomical variations were observed in the right and left region neck of a 65-year-old male cadaver that was dissected in the Laboratory of Morphology of the University of Pamplona. This work was carried out by routine dissection classes for undergraduate medical students. Topographic details of the variations were examined, recorded and photographed. Measurements were taken with assistance of a sliding Vernier caliper with an accuracy of 0.01 mm during the anatomical dissection.

## FINDINGS

On the right neck region, a lot of abnormal muscles and a muscular bundle were discovered and dissected. Sternocleidooccipital muscle, which was the first muscle on the superficial layer, had two heads Figure 1. The lateral part of sternocleidooccipital muscle was the clavicular

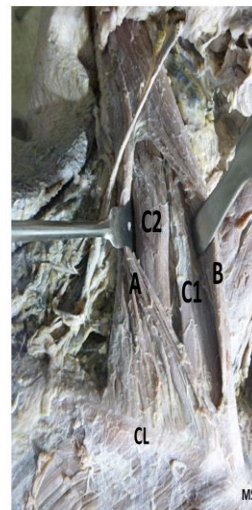
head originating from the medial 2/3 of clavicle. The medial part of sternocleidooccipital muscle was the sternal head, which originated from the upper surface of the manubrium sterni. The clavicular and sternal head lied toward up and inserted into linea nuchae superior on occipital bones. Both heads had fleshy inserts at level of clavicle. The sternomastoid muscle, which is the second muscle on the superficial layer, originated from the upper surface of the manubrium sterni with a round tendon and ended on the lateral region of the mastoid process. Figure 1.

Surprisingly no anatomical lesser supraclavicular fossa was found on the right side of the neck. The distance between sternomastoid muscle and sternocleidooccipital muscle was of 1.5 mm in the inferior 1/3 and 2 mm in the superior 2/3 of the lateral region of neck. Both heads were a continuous sheet, with a small gap of 1.5 mm in the lower third of the base of the neck. Figure 1.



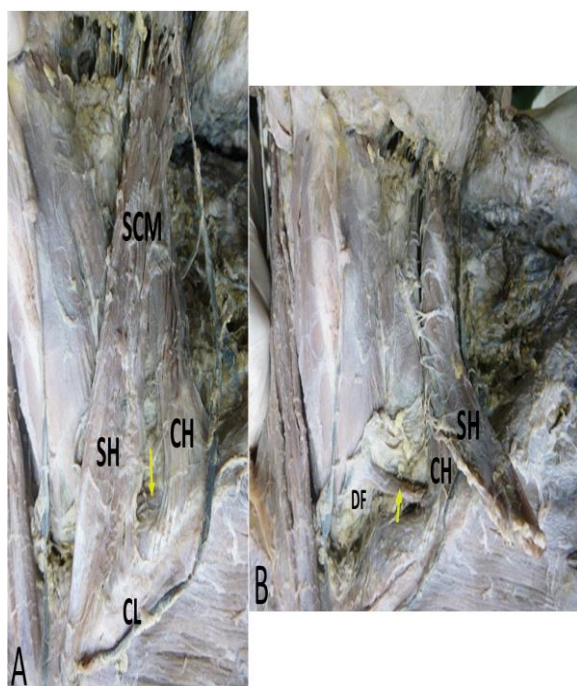
**Figure 1. Right side of the neck region. (Superficial layer):** SCM: sternocleidomastoid muscle; A: sternocleidooccipital muscle; A1: clavicular head; A2: sternal head; B: sternomastoid muscle; MS: manubrium sterni; CL: clavicle.

In the deep layer, was observed two muscular heads. The lateral head was the cleidomastoid muscle originating from the medial 1/3 of clavicle. The medial part was the sternocleidomastoid muscle, which originated from the upper surface of the manubrium sterni, the sternoclavicular joint and the medial 1/3 of clavicle. The muscular heads were supplied by the spinal accessory nerve. One of these parts, the medial one, inserted into the front region of the mastoid process while the lateral part inserted into the back of this process. Figure 2.



**Figure 2. Right side of the neck region (deep layer):** A: sternocleidooccipital muscle; B: sternomastoid muscle; C1: sternocleidomastoid muscle; C2: cleidomastoid muscle; MS: manubrium sterni; CL: clavicle.

In the left side of region neck, in addition to its normal sternal and clavicular heads, the left sternocleidomastoid muscle had an additional muscular head from the investing layer of deep cervical fascia near the lower part of roof of the lesser supraclavicular fossa, close to the clavicle. The additional head was arising at 2.8 cm medial to the clavicular head. The fibers of the additional head were directed obliquely downward and backward to fuse with the clavicular head at 3 cm from the clavicle. The additional head divided the lesser supraclavicular fossa into large superior and small inferior compartments. All three heads were blending into a flat, thick muscle belly, which was inserted normally onto lateral surface of the mastoid process and the lateral part of superior nuchal line of the occipital bone. The additional head was widely separated from the clavicular head (2.8 cm) when compared to the interval between the sternal and clavicular heads (1.6 cm). The muscular heads were supplied by the spinal accessory nerve. Figure 3.



**Figure 3. Left side of the neck region. A. SCM: Sternocleidomastoid muscle; SH: sternal head; CH: clavicular head; yellow arrow: additional head; CL: clavicle. B. SH: sternal head reflected; CH: clavicular head; yellow arrow: additional head; DF: Deep fascia**

## DISCUSSION

Comparative studies in mammals have demonstrated that the sternocleidomastoid muscle frequently separated into five parts, which are arranged in two layers: a superficial sternomastoid, sternooccipital and cleidooccipital part; and a deep layer consisting of a deep sternomastoid and cleidomastoid part. 5 In humans, the presence of multiple layers such as sternocleidooccipital, cleidomastoid and sternomastoid, 6 a supernumerary cleidooccipital muscle, separate from the sternocleidomastoid muscle have been reported. 7 The bilateral variation of additional head in the sternal origin, 8 and additional head in the clavicular origin of sternocleidomastoid have been reported. 9

In the present case, like the reports of Bergman et al., 5 the superficial layer consisted of superficial sternomastoid, sternocleidooccipital muscles; but differs why in our case no anatomical lesser supraclavicular fossa was formed on the right side of the neck. The distance between sternomastoid muscle and sternocleidooccipital muscle was of 1.5 mm in the inferior 1/3 and 2 mm in the superior 2/3 of the lateral region of neck. Both heads were a continuous sheet. In the present case, like the reports of Bergman et al., 5 the deep layer consisted of deep cleidomastoid muscle, but differ in the sternomastoid muscle, in our case was observed a sternocleidomastoid muscle, which originated from the upper surface of the manubrium sterni, the sternoclavicular joint and the medial 1/3 of clavicle.

Sirasanagandla et al., 1 reported additional head originated from the investing layer of cervical fascia in the

roof of the subclavian triangle close to the clavicle and traversed obliquely upward, forward and fused with clavicular head. In the present case, similar to the reports of Sirasanagandla et al., 1 additional muscular head was observed originated from the investing layer of deep cervical fascia, close to the clavicle and to fuse with the clavicular head of the left sternocleidomastoid muscle, but differs why in our case the fibers of the additional head were directed obliquely downward and backward and divided the lesser supraclavicular fossa into large superior and small inferior compartments.

The Sternocleidomastoid muscle is named the Pandora box, has many vital structures lying under its cover, like the common carotid artery, accessory nerve, brachial plexus roots, cervical plexus nerves and lymph nodes. 10 An accurate and appropriate anatomical knowledge for anaesthetists is mandatory before attempting a central venous catheterization approach for internal jugular vein cannulation. The presence of an additional clavicular belly narrows the minor supraclavicular fossa of the neck, leading to cumbersome internal jugular vein cannulation. This difficulty during cannulation can accidentally puncture the neighboring neurovascular structures thereby leading to haematoma formation or resulting in neural deficits. 11-13

## CONCLUSION

In view of the anatomical variations reported in the present study, may be stated the awareness and precise knowledge of the presence of additional heads of sternocleidomastoid muscle is of relevance in the clinical practice and should be kept in mind during surgical operations or MR imaging observations of the neck region.

## INSTITUTION RESPONSIBLE FOR RESEARCH SUPPORT AND/OR FINANCIAL SUPPORT

University of Pamplona

## COMPETING INTERESTS

None

## ACKNOWLEDGEMENT

The authors thanked to the University of Pamplona for research support and/or financial support; at National Institute of Legal Medicine and Forensics Sciences and Erasmo Meozo University Hospital in Cucuta, North of Santander, Colombia for the donation of cadavers identified, unclaimed by any family, or persons responsible for their care, process subject to compliance with the legal regulations in the Republic of Colombia.

## FUNDINGS

This study was supported by University of Pamplona.

## REFERENCES

1. Sirasanagandla SR, Bhat KMR, Pamidi N, Somayaji SN. Unusual third head of the sternocleidomastoid muscle

- from the investing layer of cervical fascia. *Int. j. morphol.* 2012; 30(3):783-5.
2. Arias-Hurtado DK, Ferreira –Arquez H. Bilateral supernumerary sternocleidomastoid heads with clinical and surgical implications. *J Chem Pharm Res.* 2016; 8(5):527-37.
  3. Ferreira-Arquez H. Muscular variation in the neck region with narrowing of the minor and major supraclavicular fossa. *International Archives Of Medicine.* 2017; 10. Available from: <http://imedicalsociety.org/ojs/index.php/iam/article/view/2328> DOI: <https://doi.org/10.3823/2478>.
  4. Ferreira- Arquez H. Multi Headed Sternocleidomastoid Muscle: An Anatomical Study. *Int J Pharma Bio Sci.* 2018 January; 9(1): (b) 249-56.
  5. Bergman RA, Thompson SA, Afifi AK, Saadek FA. *Compendium of human anatomical variation.* Baltimore; Urban Schwarzenberg; 1988. p. 40–41.
  6. Coskun N, Yildirim FB, Ozkan O. Multiple muscular variations in the neck region--case study. *Folia Morphol. (Warsz).* 2002;61(4):317-9.
  7. Mustafa MA. *Neuroanatomy. 10th. National Congress of Anatomy;* September 5-10. Bordum, Turkey, 2006.
  8. Nayak SR, Krishnamurthy A, Pai MM, Prabhu LV, Jetty R. A rare case of bilateral sternocleidomastoid muscle variation. *Morphologie.* 2006; 90(291):203-4.
  9. Ramesh RT, Vishnumaya G, Prakashchandra SK, Suresh R. Variation in the origin of sternocleidomastoid muscle. A case report. *Int. J. Morphol.* 2007; 25(3):621-3.
  10. Hasan T. Variations of the Sternocleidomastoid Muscle: A literatura Review. *Internet J. Human Anatomy.* 2010; 2(1):1-6.
  11. Pushpa MS, Nandhini V. Unusual bilateral presence of third head of sternocleidomastoid muscle and its clinical significance – A case report. *International Journal of Recent Scientific Research.* 2014; 5(1): 5-7.
  12. Mehta V, Arora J, Kumar A, Nayar AK, Ioh HK, Gupta V et al. Bipartite clavicular attachment of the sternocleidomastoid muscle: A case report. *Anat Cell Biol.* 2012;45: 66-9.
  13. Ferreira-Arquez H. *Manual de disección humana. Cabeza, cuello, tórax y miembro superior.* Saarbracken; Editorial Académica Española;2016.p. 172-177