Case Report:
Sternocleidomastoid Muscle with Five Fleshy Bellies and Thirteen Heads of Origin

Authors
Sudarshan Surendran, Satheesha B Nayak, Deepthinath Reghunathan, Venu Madhav Nelluri
Melaka Manipal Medical College (Manipal Campus), Manipal Academy of Higher Education/Manipal University, Madhav Nagar, Manipal-576104, Karnataka State, India.

Address for Correspondence
Dr. Satheesha Nayak B,
Professor of Anatomy,
Melaka Manipal Medical College (Manipal Campus), Manipal Academy of Higher Education/Manipal University, Madhav Nagar, Manipal-576104, Karnataka State, India.
E-mail: nayaksathish@gmail.com

Citation

Abstract: Sternocleidomastoid (SCM) is the main landmark muscle of the neck. Knowledge of variations of this muscle is very important for radiologist, surgeons, chiropractitioners, plastic surgeons and clinicians in general. We report a unique unilateral variation of SCM observed in an adult male cadaver. The clavicular head of right SCM had four fleshy bellies (B1, B2, B3 and B4). The most medial belly (B1) had three tendons of origin; the next belly just lateral to it (B2) had three tendons of origin; third belly (B4) had four tendons of origin and the lateral most belly (B4) had two tendons of origin. Thus, including the tendon of sternal head, in total, the right SCM had thirteen heads of origin. To the best of our knowledge, this is the first report on a thirteen headed sternocleidomastoid muscle. We review the literature and discuss the clinical importance of the variation in this report.

Key Words: Sternocleidomastoid, variation, radiology, neck surgery, central venous catheterization.

Introduction: Sternocleidomastoid is one of the functionally and clinically important muscles of the neck. It is a landmark for many clinical, surgical and radiological procedures. It is related to the major nerves and vessels of the neck and involved in dividing the neck into anterior and posterior triangles. Usually, it has a sternal and a clavicular head. Sternal head arises from the anterior surface of the manubrium sterni and the clavicular head takes origin from the superior aspect of the medial part of the clavicle. The two heads unite as they ascend up; the clavicular fibres forming the deeper and the sternal fibres forming the superficial strata. The muscle gets inserted to the posterior part of the lateral surface of the mastoid process and the lateral part of the superior nuchal line. Variations of the sternocleidomastoid muscles are rare. In extremely rare cases, SCM may be congenitally absent. A few variations in its origin have been reported earlier. Its insertion seldom shows any variation. Reported variations on its attachment include unilateral or bilateral duplication of sternal or clavicular heads. A case of six headed SMC has also been reported. We report here a unique case of SCM with five fleshy bellies and thirteen heads of origin. This is the first report as far as the number of heads of origin or SCM is concerned. We discuss its clinical importance of this variation in our report.

Case Report
During our routine dissection classes for the first year Medical students at Melaka Manipal Medical College (Manipal Campus), in a male cadaver, approximately aged 60 years, we found multiple origins in the sternocleidomastoid muscle (SCM) (figure.01). This variation was unilateral and was found on the right side of the neck. The sternal head of the muscle had a single tendon of origin from the anterior surface of the manubrium sterni and continued up as a single fleshy belly. However, the clavicular head was split into four fleshy bellies as shown in figure 02. Because of the presence of four bellies, the origin of clavicular head extended laterally until the midpoint of the clavicle. The unique feature observed in this case was that the four fleshy bellies of clavicular head of SCM took their origin from clavicle through twelve clearly identifiable tendons (T1-T12 in figure 2). The most medial belly of clavicular head (B1) had three tendons; the second belly (B2) had three tendons; third belly (B3) had four tendons and fourth (lateral most) belly (B4) had two tendons of origin. The four fleshy bellies of sternal head remained separate until they merged with the sternal head of the muscle. While merging with the sternal head, B1 being the shortest belly, was the first to merge with sternal head and the B4 being the longest belly, was the last to merge with the sternal head. There were no variations in the insertion and innervation of the muscle. We believe that this is the first report on a thirteen headed sternocleidomastoid muscle with five fleshy bellies.
t in r aesthetic 
tional heads may cause problems in anesthesia, 
seful to 
eons. SCM myocutaneous flaps are 
-
h sternal and clavicular 
of the muscle. Functionally, SCM is very importan 
the myotome would have divided a few times incompletely in 
formation of supernumerary bellies.(10,11) In the current case, 
fusion between these two muscles, leading to absence of the 
from the same myotome of the occi 
attributed to its development. The trapezius and SCM develop 
variable number of bellies and continuity with trapezius are 
Most of the variations of SCM such as congenital absence, 
Discussion: 
addition to plastic surgeons. SCM myocutaneous flaps are 
are used to correct facial and oral cavity defects.(18) SCM 
flaps are also used in many other head and neck surgeries such 
as reconstruction of head and neck defects (19), in lowering 
the incidence of Frey's syndrome after parotidectomy (20), in 
reconstruction of temporomandibular joint (21), in 
reconstruction of laryngo-tracheal defects after tumor 
resection.(22)

Novelty and clinical importance of the current case: 
To the best of our knowledge, this is the first report on a SCM 
with five fleshy bellies and thirteen tendinous origins. We 
believe that the embryonic reason for this variation is 
incomplete multiple splitting of the myotome in the lower part 
of the neck. This variation might be a curse to the individual 
aesthetically. However it would prove to be a boon if the 
individual requires any SCM myocutaneous flaps when he 
undergoes any reconstructive surgery. Plastic surgeons are 
largely discouraged from using both sternal and clavicular 
heads for reconstructive surgery since it leads to a 'flat neck 
decority'. (23) The additional part of the muscle (B3 and B4 
in the current case) can be used without causing functional 
disturbances and at the same time giving better aesthetic 
appearance to the neck of the patient. The additional heads of origin and fleshy bellies naturally cover the suprclavicular 
part of the brachial plexus. Hence they may cause problems 
during administration of brachial plexus anesthesia. In the 
current case the greater and lesser supraclavicular fossae are 
not very obvious because of the multiple origins of SCM. This 
might cause problems in central venous cannulations and 
venous pressure recordings. The movements of the neck may 
not be very symmetrical when the variation is unilateral 
because the direction of the pull of head by the most lateral 
part of the variant SCM is not the same as the normal muscle of the opposite side. The lateral most clavicular head might 
alter the chances of fracture of the clavicle since it is attached 
almost at the middle of the clavicle and might heal the 
fractures if any, faster due to the increased blood supply from 
the muscular vessels to the fracture. The two lateral most 
additional bellies in the current case may 
result in difficulties or errors in the 
catheterization procedure.(12) Patients with irradiation 
induced spasm of SCM and conditions such as anterocollis 
are treated with injection with botulinum toxin. The SCM 
with additional bellies may require a larger dosage of the toxin 
in order to relieve the spasm.(13,14) Patients with forward 
head posture require SCM activation. Accessory bellies such as 
the ones being reported here might hinder the neck 
kinematics.(15)

Knowledge of normal and variants of SCM is useful to 
Chiropractitioners also. Presence of supernumerary bellies 
may pose problems in specific stretches, trigger point therapy, 
pillow positioning and exercises.(16,17)

Knowledge of normal anatomy and variations of SCM is also 
important to plastic surgeons. SCM myocutaneous flaps are 
being used to correct facial and oral cavity defects.(18) SCM 
flaps are also used in many other head and neck surgeries such 
as reconstruction of head and neck defects (19), in lowering 
The current knowledge of this variation is important for various specialties in the medical field.

Conclusion: 
The current case of SCM with five fleshy bellies and thirteen 
tendons of origin is unique and being reported first time in the 
literature. Some of the additional tendons can be used for 
tendon grafts without altering the functioning of the muscle. 
The additional heads may cause problems in anesthesia,
central venous cannulation procedures and can cause diagnostic dilemmas to the radiologists. The additional bellies may cause aesthetic and functional disadvantage but at the same time, could be very useful for plastic surgeons in raising SCM myocutaneous flaps.

References: