

RELATIONSHIP BETWEEN THE FACIAL ARTERY AND SUBMANDIBULAR SALIVARY GLAND

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ABSTRACT

Knowledge of relationship between the facial artery and submandibular salivary gland is essential for the surgeon operating in the submandibular region. This study has been under taken to have the knowledge of this relationship. Submandibular region has been dissected on 20 male cadavers in the Department of Anatomy, Sree Narayana Institute of Medical Sciences, Kerala. The course of the facial artery and its relationship to submandibular salivary gland has been followed carefully. The standard description of ascent of the facial artery along the entire length of posterior border of the submandibular salivary gland was seen in 15 out of the 20 sides studied. In 4 out of 20 sides dissected the facial artery reached only the upper part of the posterior border of the gland. The facial artery arose high on the external carotid artery near the angle of the mandible in one specimen. It reached the gland only at its postero-superior angle, pierced through the gland and emerged on the upper part of the lateral surface of the gland. Our study shows that only 1/5 of instances facial artery courses along the posterior border of the gland. In 4/5 of instances it reaches only the upper part of the posterior border.

KEYWORDS: Facial artery, External carotid artery, Submandibular Salivary gland, High origin, Sialoadenectomy.

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INTRODUCTION

Vascular variations in the human body are common. Although, most of the times these variations doesn't affect the functions for the human body, where as knowledge about these variations is important to understand the various common possible variations. It is very important for the clinicians and surgeons to know the exact frequency and variations of the arteries in the areas of their specialization.

The anatomical understanding of the facial artery and its branches are especially important

in the practice of medical and dental care, in the surgeries of neck and face; and also for the radiologist to understand and interpret facial artery imaging during the head angiography. Moreover, anatomical knowledge of the head and neck arteries is important for the less invasive treatment of diseases in those regions. In general, knowledge of angio-architecture contributes to skillful segmentectomies, helping to preserve tissue, perform better surgery, and reduce both anesthesia and hemorrhage [1,2].

The facial artery normally arises from the external carotid artery, just above the lingual artery, at the level of greater cornu of hyoid bone in the carotid triangle. It then passes upwards and forwards medial to the ramus of the mandible. It passes deep to the superficial part of the submandibular salivary gland making a characteristic loop, winds around the base of the mandible to enter the face at antero-inferior angle of the masseter muscle. On the face, it runs upwards and forward, laterals to angle of the mouth, and terminates as angular artery at medial angle of eye by anastomosing with the dorsal nasal branch of Ophthalmic artery. Its branches in the face include: inferior labial artery, to the lower lip; superior labial artery, to the upper lip; lateral nasal artery, to supply the ala and dorsum of the nose [1].

The reported variations of the facial artery include: its intra parotid origin [3]; arising as a common trunk with the lingual artery as linguo-facial trunk [4]; And in case of its absence the function is being taken over by maxillary artery, transverse facial artery or the dorsal nasal branch of ophthalmic artery.

Various authors reported facial artery branching variations. Marx, Kumar, Reddy et al. [5] reported bilateral anomalous of facial artery. The right facial artery taking origin from the external carotid artery did not make any loop in the submandibular region, entered the face by winding round the lower border of mandible, and terminated as the inferior labial artery. The upper part of the right side face in this case was supplied by various branches of transverse facial artery, infra orbital artery and dorsal nasal artery. The origin, course and branching pattern of the left facial artery was normal except the inferior labial artery was missing from it. This case may be considered similar to the Type E of the Loukas, Hullett, Louis Junior et al. [6] study, the difference being in their case the facial artery is providing branches to the lower lip [5,6]. Lohn, Penn, Norton et al. [7] studied the course of the facial artery and vein, branching patterns, terminations, and anomalous variants. Cadaveric dissections of 201 facial arteries were performed. All branches originated from a single facial arterial trunk in 86% of specimens and branching patterns were symmetrical in 53%.

The facial artery predominantly terminated as a lateral nasal artery (49%). In 5 cases, the facial artery was undetectable with transverse facial arterial dominance (1 case bilateral). Facial arterial dominance in facial blood supply is common but unpredictable (Lohn, Penn, Norton et al.)[7].

Although many facial artery branching previous descriptions, we reported a variation not yet described: in the right hemiface, a super-numerary branch of the facial artery emerged between the origins of submental and inferior lip arteries, close to the bottom edge of the mandible body. Unfortunately, it was not possible to describe its course and possible branches. Because this material was for medical education purpose, when we noticed this variation most part of the facial arteries branches have already been dissected improperly.

MATERIALS AND METHODS

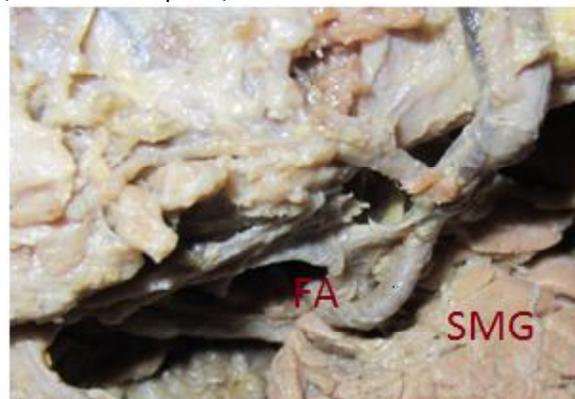
During routine cadaveric dissections for the teaching and learning to the under graduates, submandibular region has been dissected and observed on 20 sides of the male cadavers in the Department of Anatomy, Sri Narayana Institute of Medical Sciences.

The course of the facial artery and its relationship to submandibular salivary gland has been observed very carefully for their temporal relations.

OBSERVATIONS

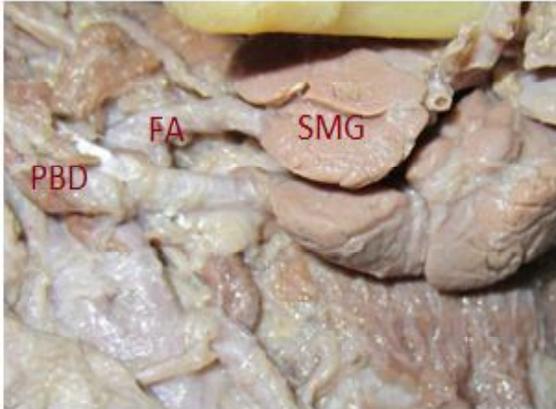
The standard description of ascent of the facial artery along the entire length of posterior border of the submandibular salivary gland was seen on 15 of the 20 sides dissected.

Fig. 1: Right side of sub mandibular region showing facial artery course and submandibular salivary gland. (Normal Description)



FA- Facial Artery, SMG- Submandibular Salivary Gland.

Fig. 2: Right side of sub mandibular region showing facial artery course and submandibular salivary gland. (Upper part of the posterior border of the gland)

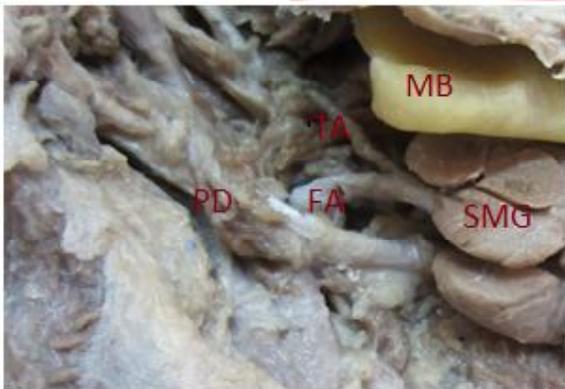


PBD- Posterior Belly of Digastic, FA- Facial Artery, SMG- Submandibular Salivary Gland.

In 4 out of 20 sides dissected the facial artery reached only the upper part of the posterior border of the gland.

The facial artery arose high on the external carotid artery near the angle of the mandible in one specimen. It reached the gland only at its postero- superior angle, pierced through the gland and emerged on the upper part of the lateral surface of the gland.

Fig. 3: Right side of sub mandibular region showing facial artery course and submandibular salivary gland. (High origin of Facial Artery)



PD- Posterior Belly of Digastric muscle, FA- Facial Artery, TA-Superior Thyroid Artery, MB- Mandible, SMG- Submandibular Salivary Gland.

DISCUSSION

Understanding about the neuro vascular structures present in the next region is utmost important as they supplies vital organs such as head and cervical organs/ structures and also important in the cases of surgeries over the submandibular region.

Three types of neuro vascular variations found between the facial artery and the submandibular

salivary gland as described by the Li L, Xiu-lai G, Yi-zhi S, et al [8].

i) Facial artery arose from the ECA slightly superior to the greater horn of the hyoid bone and lower border of the posterior belly of digastric , and entered the cortex of the SMG from its postero superior part,

ii) Facial artery stemmed from the ECA, arched upwards to the superior part of the SMG from the lower border of the gland, ran along the groove of the 1/3rd of the superior border of the SMG spinning off branches to the gland,

iii) Facial artery ran around the posterosuperior part of the SMG, passing along the lower border of the gland and the mandible as it gave long and short branches to the gland.

Neuro vascular variations in this region is significant important in the sialadenectomy, The sialadenitis of the submandibular salivary gland is reported more frequent than that of the parotid gland as reported by the Torroni AA et al and others [9, 10].

Where as in the present study shows that only 1/5 of instances facial artery courses along the posterior border of the gland and in 4/5 of instances it reaches only the upper part of the posterior border, which should be needed attention of the surgeons in the cases like submandibular sialoadenectomy.

CONCLUSION

Knowledge and recognition of variations in the facial artery and its branches with distributing pattern, is important during radiological and vascular reconstructive procedures. Caution must be taken to protect the facial artery from being damaged during surgeries of sub mandibular region in order to avoid serious postoperative complications.

Conflicts of Interests: None

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