



**Original Article:**

**A Cadaveric Study of the Origin of Sublingual Artery from Facial Artery and its Clinical Significance**

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**Abstract:** Sublingual artery has attracted growing interest among dentists, because vascular injury to the floor of the mouth during the placement of dental implants, in oral surgery. The study was designed to evaluate the variant origin & course of the sublingual artery and its clinical significance. Present study was carried out on 30 formalin fixed adult cadavers of age varying from 35 to 60 years. The variant origin of the sublingual artery from facial artery was identified, colored and photographed. The artery was running deep to mylohyoid and crossed by mylohyoid nerve. Out of 60 specimens, (30 on right side and 30 on left side) in one of the cadaver the right sublingual artery originated from facial artery. The knowledge of variant origin of sublingual artery will conceivably contribute to safer dental implant surgery and more accurate interpretation of angiographic images of arteries in the floor of the mouth. It is also of clinical relevance to the surgeons and radiologists while performing cervicofacial reconstructive surgeries.

**Key Words:** Sublingual artery, facial artery, variant origin

**Introduction:**

Knowledge of variations of major arteries and their branches in the neck region is essential during neck surgeries and radiological examinations. The sublingual artery arises from the lingual artery and supplies sublingual gland, extrinsic muscles of tongue, mucous membrane of the floor of mouth and gums.[1] The sublingual artery, has attracted growing interest among dentists, because vascular injury to the floor of the mouth associated during dental implant surgery.[2] Several gross anatomical studies conducted by Katsumi et al., 2013 [3] on the courses of the sublingual artery were confined to the peripheral distribution of the artery and its point of entrance into the anterior mandible and focused on the relationship to vascular injury associated with dental implant surgery. When usual sublingual artery arising from lingual artery is absent, it may be replaced with submental branch of the facial artery which pierces the mylohyoid to reach the sublingual region

[4] or it can also directly arise from facial artery.[3] The infrahyoid muscles of neck with the thyroid arteries are used as myocutaneous flaps for reconstructing surgical defects in the head and neck. The cut flaps are nourished by muscular perforator vessels, branches from surrounding arteries. The facial artery musculo-mucosal flaps introduced by Pribaz J et al.,[5] has many advantages with its long rotational arc. Thus, knowledge about the unusual branches of the facial artery is required to maximize the use of such flaps. The aim of this report is to describe a rare origin of variant sublingual artery arising from facial artery in the neck with its clinical perspective.

**Materials and Methods and Objectives:**

**a) Cadaveric specimens**

The present study was carried in the department of Anatomy of Kasturba Medical College, Manipal. The study was carried out on 30 formalin fixed adult cadavers. The age of the cadavers ranged from 35 to 60 years. No specimen with any pathology and abnormality of neck and head was included.

**b) Dissection procedure**

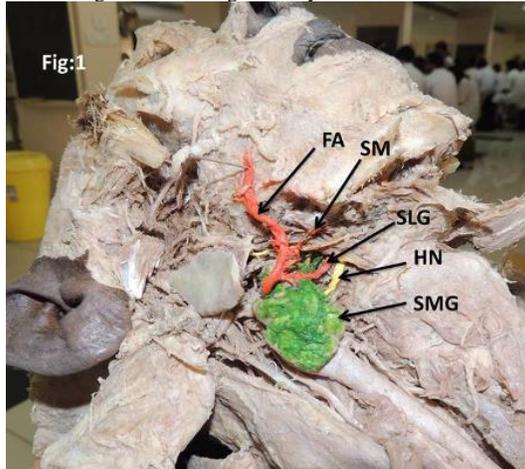
The study was designed to evaluate the rare origin and course of sublingual artery in the neck. The neck and its structures were carefully dissected in the cadavers, Branches of external carotid artery and facial artery was exposed to study the anatomical variations. The variant origin of the sublingual artery from facial artery was identified. Mylohyoid muscle was cut from its origin from mandible to trace further course of the artery. The artery was running deep to mylohyoid and crossed by mylohyoid nerve. The sublingual artery was colored and photographed.

**Results**

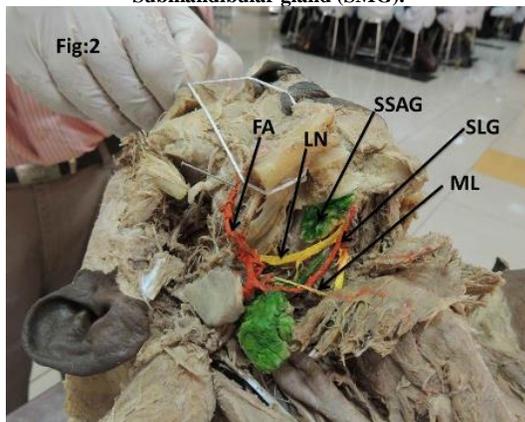
Out of 30 formalin fixed cadavers aged between 35-60 Years (30 cadavers) on right side and 30 on left side) in one specimen a variant origin of sublingual artery from facial artery on the right side was noted. Further the sublingual artery was colored

and photographed. The level of origin of sublingual artery was also noted.

The origin of facial and lingual arteries were normal arising from the external carotid artery. The facial artery while grooving submandibular gland, gave an unusual sublingual branch which traversed superficial to hyoglossus along with hypoglossal nerve deep to mylohyoid muscle. (Fig.1) It was crossed superficially by mylohyoid nerve. (Fig.2) The submental artery was arising from facial artery just above sublingual artery. On the left side the sublingual artery had its normal origin from the lingual artery.



**Fig. 1: Right side of the neck showing the origin of sublingual artery (SLG) from facial artery (FA). Submental artery (SM), Hypoglossal nerve (HN), Submandibular gland (SMG).**



**Fig.2: Right side of neck after reflection of mylohyoid muscle. Sublingual artery (SLG); Facial artery (FA); Mylohyoid nerve (ML), Lingual Nerve (LN), Sublingual gland (SSAG).**

### Discussion

The development of arteries in the head and neck region is through a process of angiogenesis and remodelling with the annexation and regression of vessels. Branches from lingual and facial arteries compensate another via anastomoses in the sublingual, submental and suprahyoid region contributing to the efficient linguofacial collateral pattern as cited by Mahendrakar MA.[6]

The sublingual artery arises from the lingual artery in the sublingual region. The facial artery gives off mainly the submental artery and other small muscular and glandular branches in the neck region. Anatomical study of the branches of the facial artery in the cervical region is of interest for

reparative surgeries and in surgeries of certain neck swellings: benign as well as malignant. It is also helpful in radiological evaluation and furthermore for therapeutic purposes of certain tumors for embolization.

It is stated that the collateral vessels should be preserved as far as possible while raising the infrahyoid myocutaneous flaps in reconstructive surgeries as cited by Tincani AJ et al.[7]

In dental implant surgery, anatomically determining the peripheral distribution of the sublingual artery and its anastomotic relationships to the submental artery is very important.[3] The reasons for this are as follows: first, serious bleeding complications frequently occur in the anterior mandible during dental implant surgery [8]; second, in edentulous patients, implant placement in the anterior mandible has been routinely performed for stability and maintenance of complete dentures [2]; third, the peripheral distribution of the sublingual artery is confined to a region immediately lingual to the anterior mandible.[9] Anatomical research on the accessory anterior lingual mandibular foramina, which comprise the entrance to the mandible for the terminal twigs of the sublingual artery, has also been conducted from these points of view.[8]

Masui T et al. 2005 [10] investigated gross anatomically the arteries supplying the floor of the mouth and the tongue using 101 sides of 53 cadavers and proposed for safer dental implant surgery and more accurate interpretation of angiographic images of arteries in the floor of the mouth. The courses were divided into 3 categories: those passing medial (M) or lateral (L) to the hyoglossus and that piercing the mylohyoid (P); they were subdivided into five types. In M Category M lingual artery took the usual pattern of distribution and is regarded as usual one. In Categories L and P, the sublingual artery arose from the facial or submental artery, had the respective two types and were collectively regarded as the unusual type. 61 and 36 of the 101 sides were of the usual and unusual types, respectively, the latter of which included 17 of category L and 19 of category P. The remaining four were variations of the lingual artery itself.

On examination by gender, the usual type was more often in females (75.6 %), whereas the unusual type was more often in males (48.1 %). Bilateral occurrence of the same type was often found in both the usual type (77.4 %) and the unusual type (65 %).

### Conclusion:

An unusual sublingual artery arising from the facial artery as described is of clinical relevance to the surgeons and radiologists. Injury to the sublingual artery can occur accidentally by rotating disks or skipping of sharp instruments while working on mandibular teeth. Injury to this artery during mandibular implant placement has been reported and it may lead to large sublingual hematoma which if not controlled can compress airway and may be life threatening. It is a small artery and local clamping of the artery and application of electro cautery usually controls the bleeding. An awareness and knowledge of possible variant branches from the facial artery may be helpful for surgeons operating in the head and neck region.

**Conflicts of Interest:** The authors have none to declare

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