

Variations in the Mode of Termination of Facial Artery

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Abstract

Introduction: Accurate knowledge of the normal and variant arterial anatomy of the facial artery is important for vascular radiology and will provide an anatomical basis to assist surgeons in performing maxillo-facial surgeries successfully. **Materials and Methods:** Formalin-fixed faces of unknown sex adult cadavers were dissected following the Cunningham's manual of practical anatomy, volume 3. The age of the cadavers was not noted. **Results:** The variations in the facial artery were grouped under three categories following the classification of Bayramet.al, 2010. Type I category – Facial artery terminated as angular artery; Type II category – facial artery terminated as superior labial; Type III – Facial artery terminated as inferior labial. In present study (type-II) is seen. Premasseteric branch was observed. **Discussion:** Niranjana NS (1988) observed the variations of facial artery in 50 hemi-faces. According to him, facial artery terminated as angular artery in 68% of hemi-faces, lateral nasal artery in 26% of hemi-faces, Superior labial artery in 4% of hemi-faces and 2% terminated at the alar base. In present study facial artery terminates as superior labial artery. A study conducted by Magden et.al (2009), on the premasseteric branch, suggested that in 3% cases the diameter of premasseteric branch was larger than the facial artery. **Conclusion:** This study shows that the variation in the branching pattern of facial artery variations, which help in avoiding the mishaps during certain surgical procedures.

Keywords: Facial Artery; Plastic Surgery; Variation.

Introduction

Blood vascular system in the body is very important as the blood flows from heart to various regions of the body through arteries, which are thick walled tubes as the air tubes.

Variations in origin and branching pattern are common in arteries. Facial artery is an important vessel which distributes blood to entire face. It has much clinical significance. Aneurysm of the artery is a very often reported clinical entity. Branches of facial artery are of importance in raising vascular skin flaps for reconstructive surgeries.

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Branches of facial artery are of importance in raising vascular skin flaps for reconstructive surgeries. This knowledge of branches of facial artery are important in different surgical and clinical procedures.

The part of facial artery distal to its terminal branch is called the angular artery.

Review of Literature

Midy D et al. (1986) done work on 40 facial arteries and their collaterals. They observed 4 types of arteries based on mode of termination which are labial, angular, nasal and abortive.

In 1988, Niranjana NS, carried out dissection of 50 facial arteries in 25 adult cadavers where the facial artery was symmetrical in 17 of 25 (68%).

The facial artery terminated as angular artery in 34 (68%), lateral nasal vessel in 2 (4%); as alar in 1 (2%) and longer course was identified in 5 (10%) facial arteries.

Soikkonen K et al. (1991) classified facial artery into 4 types based on dominance:

Type A -22%

Type B-49%

Type C-20%

Type D-9% hypoplastic artery

In 2002, Nakajima et al. examined 25 facial arteries and classified major branches of it into three types based on anatomy of lateral nasal artery. In 22 cases (88%) it bifurcated into lateral nasal and superior labial artery. In 2 cases (8%) it became an angular artery after branching into lateral nasal and superior labial artery. In 1 case (4%) it became angular artery after branching off into superior labial artery and lateral nasal artery.

Koh KS et al. (2003) investigated 47 Korean cadavers and described that the final branch of facial artery as lateral nasal branch in 44.0%, angular branch in 36.3% cases. It ended symmetrically in 54.5% cases. They also reported that superior and inferior labial arteries on right side were more dominant than those on left side.

Marios loukas et al. (2005) examined facial artery in 142 cadavers (284 hemifaces) and categorized its distribution into five types with emphasis on superior labial artery:

Type A (47.5%)-it bifurcates into superior labial and lateral nasal [it gives off inferior and superior alar and ends as angular]

Type B (38.7%)-similar to type A, except lateral nasal artery terminates as superior alar (angular artery is absent).

Type C (8.4%)-facial artery terminates as superior labial artery.

Type D (3.85%)-angular artery arises directly from facial arterial trunk rather than terminating as lateral nasal, with facial artery ending as superior alar.

Type E (1.4%)-it terminates a rudimentary twig without providing significant branches.

Sule Biyik Bayram et al. (2010) investigated 25 facial arteries in fetuses and described that in type 1, it terminated as angular, in type 2 as superior labial and in type 3, it terminated as inferior labial artery.

Materials and Methods

This project work consists of the study of facial artery in adult human specimens obtained from cadavers placed in the department of anatomy for

student dissection. The total numbers of specimens studied are 25 (out of which 21 are males and 4 are females).

The facial artery is exposed by the following dissection method. Facial artery in carotid triangle is opened by giving following incisions.

Incisions

On Neck:

1. A midline incision from chin to hyoid bone.
2. A transverse incision from chin to mastoid process on both sides.

Incisions:

On Face:

1. A median mid line incision from root of nose to chin encircling the lips on both sides.
2. A transverse incision from root of nose to upper border of zygomatic arch encircling the eye lids on both sides.

Steps:

1. Skin is reflected infero-laterally on neck till the anterior border of sternocleidomastoid.
2. Clean fascia to define posterior belly of digastic and superior belly of omohyoid. Then observe facial artery and its branches in carotid triangle.
3. Skin is reflected laterally on face. Remove fascia to define course and branches of facial artery.
4. Origin, course, termination and branching pattern of facial artery are to be studied.

Variations noticed are noted and photographed.

Termination

The part of facial artery distal to its terminal branch is called the angular artery (Figure 1). It is observed in 19 specimens (34 hemi faces). In specimen no.8 on left side facial artery terminated as angular artery by a separate twig that arose from main trunk (Figure 2).

Facial artery terminated as superior labial artery in specimen no. 7 on right side and in specimen no.3, 4 on left side. In specimen no.1 facial artery terminated as superior labial artery on both sides (Figure 3).

In specimen no.3 on right side and in specimen no.6, 7, 19 on left side it terminated as lateral nasal branch. In specimen no.5, 20 and 21 it terminated as lateral nasal branch on both sides (Figure 4).

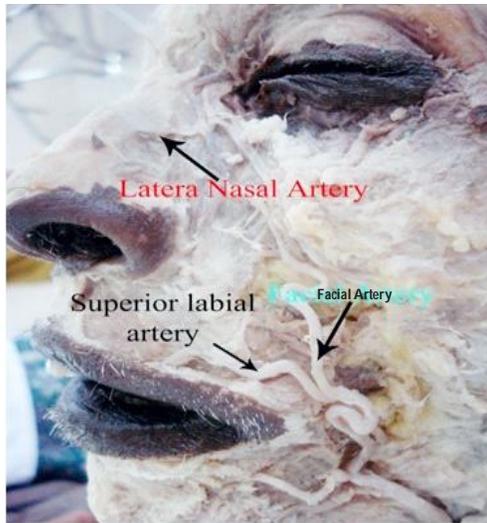


Fig. 1:

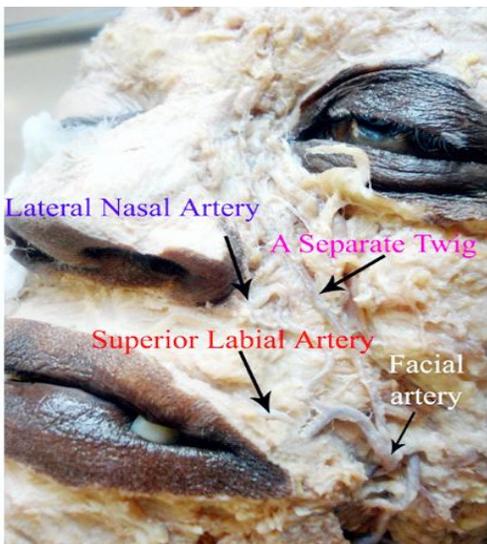


Fig. 2:

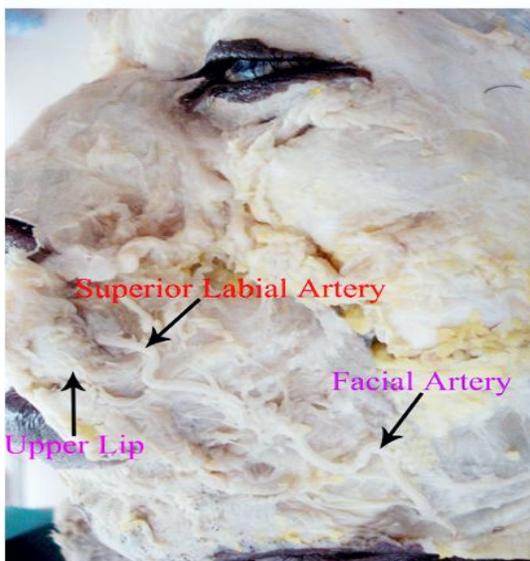


Fig. 3:

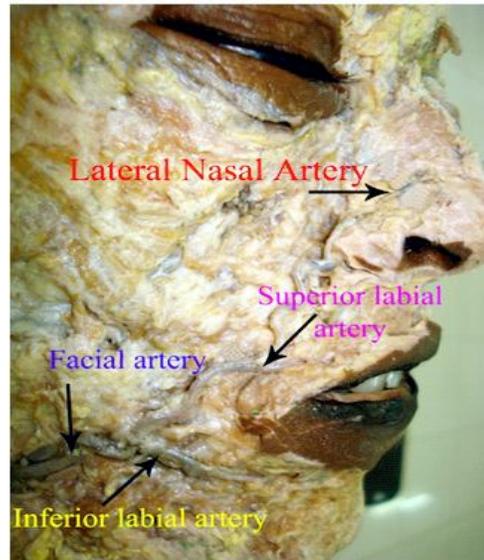


Fig. 4:

Discussion

Termination

The part of facial artery distal to its terminal branch is called angular artery.

In present study in 19 specimens (34 hemi faces) angular artery is observed which is in conformity with Susan Standring [1], Romanes G.J [2], Hollinshead W.H [3], Datta A.K [4], Keith L. Moore [5], Sahana S N [6], Niranjana N.S [7], Nakajima et al [8], Koh KS et al [9], Marios Loukas et al [10], Sule Biyi K. Baysam et al [11], (Type I) and Eid N [12].

In 1 (1 hemiface) specimen facial artery terminated as angular artery that arose directly from facial arterial trunk which is in conformity with Marios Loukas et al. [10] (Type D). Marios Loukas et al. (Type C) [10] and Sule Biyi K. Bayram et al [11], (Type II), described the terminal branch of facial artery as superior labial artery. In 4 (5 hemifaces) specimens in present work similar pattern is seen coinciding with their findings (Table 8).

Niranjana N.S., Nakajima et al., [8] (88%), Koh KS et al. (44%) [9] and Marios Loukas et al. [13] (Type B) described the terminal branch as lateral nasal artery. Similar pattern is seen in 7 specimens (10 hemifaces) in present work. Marx Chakravarthy et al. [13] described termination of facial artery as inferior labial artery which is not seen in present work.

Summary and Conclusion

Termination of facial artery is normal on both sides in 68%. The final termination is superior labial artery

in 10% and as lateral nasal artery in 20%. In 2% it is by a separate twig from the main arterial trunk.

References

1. Susan Standring. Gray's anatomy. The anatomical basis of clinical practise. 49th edition, 2008; 446-447, 490.
2. Hollinshead WH. Text book of anatomy. 1962; 378-379, 824-825, 996.
3. Datta AK. Essentials of human anatomy. 4th edition, 2009; 76, 120.
4. Keith L Moore. Clinically oriented anatomy. 6th edition, 2010; 856, 1004.
5. Sahana SN. Sahana's human anatomy. 1990; 58-60.
6. Niranjana NS. An anatomical study of facial artery. *Ann Plast Surg*. 1988; 21(1): 14-22.
7. Nakajima, Hideo, Imanishi, Nobuaki, Aiso, Sadakazu. Facial artery in the upper lip and nose: Anatomy and a clinical Application plastic and reconstructive surgery. *Journal of the American society of plastic surgeons*. 2002; 109(3): 855-861.
8. Koh KS, Kim HJ, Oh CS, Chung H. Branching patterns and symmetry of the course of the facial artery in Koreans. *Int J oral Maxillofacial surgery*. 2003; 32(4): 414-8.
9. Marios Loukas, Joel Hullett, Robert G. Louis Jr, Theodoros Kapos, Jamie Knight, Ryan Nagy Damien Maryez. A detailed observation of variations of the facial artery, with emphasis on the superior labial artery. *Surg Radiol Anat*. 2006; 28: 316-324.
10. Sule Biyik Bayram K, Ahmet Kalaycioglu. Branching patterns of facial artery in fetuses. *The new journal of Medicine*. 2010; 27: 227-230.
11. Eid N, Ito Y, Otsuki Y. Anomalous branching pattern of external carotid artery. *Clin. anat*. 2011; DOI. 1002/Ca-21126.
12. Chakravarthy Marx, Kumar P, Sreenivasulu Reddy, Venkata Ramana Vollala. Bilateral variation of facial artery: a case report. *Romanian Journal of Morphology and Embryology*. 2008; 49(3): 399-401.