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ORIGINAL ARTICLE

Assessment of facial artery variation and its clinical implication for facial surgeries

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ABSTRACT:
Aim: Assessment of facial artery variation and its clinical implication for facial surgeries. **Materials & methods:** A total 10 formalin-fixed faces of unknown cadavers were dissected. The age of the cadavers was not noted. Course, main branches and termination of facial artery on face was noted and photographed. Facial artery was noted at two regions, namely at the point of its origin and at the antero-inferior angle of masseter where it enters the face. Gross variations in the arterial supply of face were also noted. **Results:** Out of 10 cases, type I facial artery was seen in 30 percent of the cases while type II facial artery was seen in 50 percent of the cases. In the remaining 20 percent of the cases, type III facial artery was seen. **Conclusion:** The facial artery musculo-mucosal flap has many advantages. Hence; adequate knowledge about the precise course and branching pattern of the facial artery is required.
Key words: Facial artery, Surgery

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INTRODUCTION

In the mending of lip defects, using techniques such as the Abbe flap procedure, knowledge of the vascular anatomy of the face is indispensable. This type of reconstructive lip flap is used in the rebuilding of lateral upper and lower lip defects (due to cancerous, congenital, or traumatic events), which involve onethird to one-half of the upper or lower lip, in cases where the oral commissure is intact. Utilization of the Abbe flap involves rotation of the flap on its _ vascular pedicle (consisting in large part of the superior labial artery [SLA]). The Estlander (involving one-half to two-thirds of the lip) and Goldstein flap procedures also involve similar consideration of the labial vasculature.[1- 3] The main blood supply of the face is provided by the facial, transverse facial, and infraorbital arteries. Among them, the facial artery plays a major role in supplying blood to the face. Unfortunately, facial artery has different interindividual variations. Previous studies, most of which were limited to cadaveric studies, showed discrepancies between each other in the proportion of branches of the facial artery, especially in the angular branch. Understanding the detailed anatomy of the facial artery is very important for performing facial surgery or cosmetic procedure in terms of avoiding complications associated with the facial artery. Another artery, the infraorbital artery, is derived from the maxillary artery and supplies the infraorbital area of the face. The infraorbital artery also shows variations in its end branch and anastomosis with the angular branch of the facial artery or the distal ophthalmic artery. Additional knowledge of variations in the infraorbital artery will also be helpful to understanding the arterial supply of the face and to minimizing complications during facial surgery and cosmetic procedures.[4- 7]Hence; the present study was conducted for assessing facial artery variation and its clinical implication for facial surgeries.

MATERIALS &METHODS

The present study was conducted for assessing facial artery variation and its clinical implication for facial surgeries. A total 10 formalin-fixed faces of unknown cadavers were dissected. The age of the cadavers was not noted. Course, main branches and termination of facial artery on face was noted and photographed. Facial artery was noted at two regions, namely at the point of its origin and at the antero-inferior angle of masseter where it enters the face. Gross variations in the arterial supply of face were also noted. Analysis of results was done using SPSS software. Univariate analysis was done for evaluation of results.

RESULTS

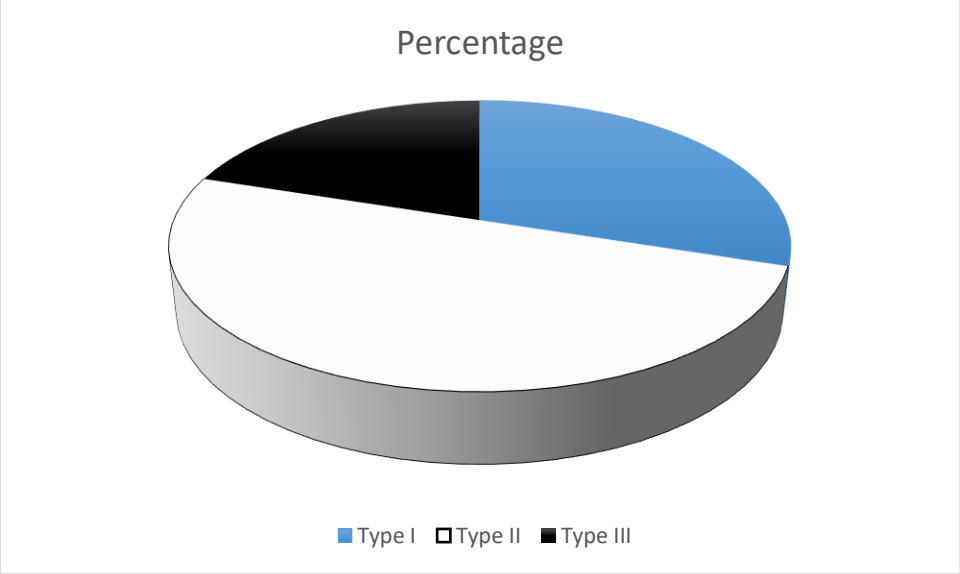
Facial artery variations were recorded and categorised into three study groups as follows: Type I category – Facial artery terminated as angular artery; Type II category – facial artery terminated as superior labial; Type III – Facial artery terminated as inferior labial. Out of 10 cases, type I facial artery was seen in 30 percent of the cases while type II facial artery was

seen in 50 percent of the cases. In the remaining 20 percent of the cases, type III facial artery was seen.

Table 1: Variation of facial artery

Variation	Type	Percentage
Type I	3	30
Type II	5	50
Type III	2	20
Total	10	100

Graph 1: Variation of facial artery



DISCUSSION

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. In the face, it runs upwards and forward, laterals to angle of the mouth, and terminates as angular artery at medial angle of eye.[7-10]Hence; the present study was conducted for assessing facial artery variation and its clinical implication for facial surgeries.

Facial artery variations were recorded and categorised into three study groups as follows: 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. Out of 10 cases, type I facial artery was seen in 30 percent of the cases while type II facial artery was seen in 50 percent of the cases. In the remaining 20 percent of the cases, type III facial artery was seen. Loukas M et al examined 284 hemifaces derived from 142 formalin fixed cadavers. Observations regarding the distribution patterns of the facial artery were recognized and categorized into five Types, labeled "A" through "E". Type A (135, 47.5%): facial artery bifurcates into superior labial artery (SLA) and lateral nasal (the latter gives off inferior and superior alar and ends as angular); Type B (110, 38.7%): similar to Type A, except lateral nasal terminates as superior alar (angular artery is absent); Type C (24, 8.4%): facial artery terminates as SLA; Type D (11, 3.8%): angular artery arises directly from facial arterial trunk rather than as the termination of lateral nasal, with the facial artery ending as superior alar; Type E (4, 1.4%): facial artery terminates as a rudimentary twig without providing any significant branches. Furthermore, they were able to categorize variations within each Type. Sub-Type variations were examined in Types A through C (A: 1-7; B: 1-4; C: 1-3).[10]

In another study conducted by Hong SJ et al, authors assessed the variant branching pattern of the facial artery and its branches using conventional angiography. Two radiologists retrospectively reviewed 284 cases of angiographies of the external carotid artery in 198 patients. The courses of the facial artery and infraorbital branch of the maxillary artery were classified into 4 types and 2 types, according to the end branch. Among 284 cases of facial artery, type 1 (angular branch) made up 104 cases (36.6%), type 2 (lateral nasal branch) made up 138 cases (48.6%), type 3 (superior labial branch) made up 24 cases (8.5%), and type 4 (inferior labial branch) made up 18 cases (6.3%). Regarding the 284 total cases of maxillary artery, 163 cases (57.4%) had anastomosis with the angular artery or extended to the territory of the angular artery. In addition, 121 cases (42.6%) had

nothing done in regard to the angular artery. The results may be helpful for avoiding complications related to facial and maxillary arteries during facial surgeries and cosmetic procedures.[11] Lohn JW et al explored the course of the facial artery and vein, branching patterns, terminations, and anomalous variants. Cadaveric dissections of 201 facial arteries and 198 facial veins 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). The facial vein was predictable in position except for 2 instances, being replaced by a transverse facial vein (unilateral). Facial arterial dominance in facial blood supply is common but unpredictable.[12]

CONCLUSION

The facial artery musculo-mucosal flap has many advantages. Hence; adequate knowledge about the precise course and branching pattern of the facial artery is required.

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