Available online at www.sciencedirect.com

SciVerse ScienceDirect

British Journal of Oral and Maxillofacial Surgery 52 (2014) 535–538

BRITISH Journal of Oral and Maxillofacial Surgery

www.bjoms.com

Mucosal perforators from the facial artery

Mauricio E. Coronel-Banda [a,b,*], Jose M. Serra-Renom [a,b], Marian Lorente [c,b], Wendy P. Larrea-Terán [d]

[a] *Institute of Aesthetic and Plastic Surgery Dr. Serra-Renom, Hospital Quirón Barcelona, Plaza Alfonso Comín, 5-7, 08023 Barcelona, Spain*
[b] *Universitat Internacional de Catalunya, Spain*
[c] *Laboratory of Functional and Surgical Anatomy, Campus Sant Cugat, Josep Trueta S/N, 08195 Sant Cugat del Vallès, Spain*
[d] *Milenium Coruña Medical Center, C / Federico Tapia 45, 15008 A Coruña, Spain*

Accepted 16 March 2014
Available online 4 April 2014

Abstract

The cutaneous perforators of the facial artery have been well described, but to our knowledge the oral mucosal perforators have not. We studied 10 facial arteries from 10 hemifaces in 5 cadavers. The arteries were injected with latex, and we studied all perforators that extended from the facial artery and headed directly to the oral mucosa. The diameter and length of the facial artery and its mucosal perforators were measured and compared. We found 52 oral mucosal perforators in the 10 facial arteries injected with latex. Their mean (SD) diameter was 0.5 (0.2) mm and the mean (SD) number/facial artery was 5.2 (1.1). Their mean (SD) length was 16.4 (5.3) mm. Most of those to the cheek were localised between the branching-off points of the inferior and superior labial arteries. The facial artery has perforators to the oral mucosa of the cheek, most of them between the points at which the labial arteries emerge.

Keywords: Facial artery; Mucosal perforators; Oral mucosa

Introduction

The reconstruction of the oral mucosa is an area of interest to facial surgeons. Techniques have evolved considerably since the introduction of perforator flaps,[1] which have been described in detail in recent years.[2–4] The development of perforator flaps allows single-stage operations and the use of made-to-measure flaps.

Even though we suspect the existence of perforators in the oral mucosa, we need to prove their existence. The classic description of facial artery perforator flaps by Hofer et al. was limited to perforators that lead to the skin.[5]

The objective of this study was to identify the facial artery perforators in the oral mucosa of the cheek, and to find out how many there are, their diameter and length, and their distribution in relation to the facial artery. This information is relevant to the harvesting of flaps based on the mucosal perforators of the facial artery, and to the harvesting of the flaps that are already in routine use.

Material and methods

Five heads of fresh-frozen cadavers were used, with 10 hemifaces that were dissected. The perforators in the oral mucosa of the cheek that extended from the facial artery (previously injected with latex) were identified. A submandibular incision was made 2 cm below the lower edge of the jaw, and the facial artery and vein were identified at

* Corresponding author at: Institute of Aesthetic and Plastic Surgery Dr. Serra-Renom, Hospital Quirón Barcelona, Plaza Alfonso Comín, 5-7, 08023 Barcelona, Spain. Tel.: +34 93 284 81 89.
E-mail address: mauriciocoronelbanda@yahoo.es (M.E. Coronel-Banda).

http://dx.doi.org/10.1016/j.bjoms.2014.03.013

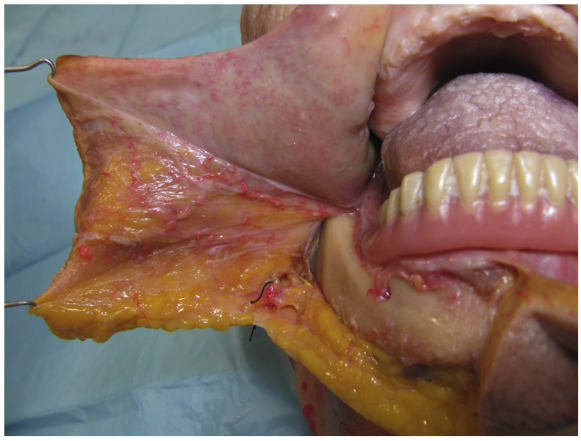

Fig. 1. Midline incision in the chin, oral mucosa incision, and raising of the cheek flap. Note the origin of the facial artery at the base of the jaw marked with a silk suture.

the level of their branching-off points below the edge of the jaw.

Injection of latex

The arteries were washed out with saline 30 ml, and two incisions made at the nasal philtrum to verify fluid outflow. Roughly 4 ml of diluted LME/R1 latex (Latex Compound Spanish SA Sabadell) was injected, until it was seen to flow out through the nasal incisions. The excess was removed and the samples frozen at −13 °C for 24 h.

An incision was made in the midline of the lower lip and chin. A flap was lifted in the oral mucosa at the level of the gingival sulcus that included the periosteum and reached the sphenomandibular ligament (Fig. 1). The dissection was submucosal to show the perforators that extended from the facial artery to perfuse the oral mucosa (Fig. 2).

Fig. 2. Red latex specimen. Exposure of facial artery and the mucosal perforators. The mucosal perforators (mp) can be seen between the points at which the superior and inferior labial arteries emerge (black arrows).

Descriptive anatomy

The facial artery was identified at its exit point from the mandibular branch. The dissection proceeded in an antegrade fashion from the artery to the mucosa up to its anastomosis with the angular artery. The diameter of the artery was measured at the base of the jaw. Dissection was continued to identify and preserve the oral mucosal perforators, and their origin over the facial artery, taking the base of the jaw as reference (Fig. 2). The perforators from the upper and lower labial arteries were not examined.

Measurements

We used the Image J software version 1.45s was used (W. S. Rasband, ImageJ, U.S. National Institutes of Health, Bethesda, MD, http://rsb.info.nih.gov/ij). The measurements were made on two photographs taken 30 cm away from the specimen. After it had obtained the scale and the conversion rate, the program converted the measurements into the distances recorded.

Statistical analysis

We used the STATA program version 11.1 (Lakeway Drive, Texas, USA). To assess the normality of the distribution of the variables we applied the Shapiro Wilk test, and to assess the normality of the variables we applied the normal probability plot technique. When the distribution of the variables was normal, we used the Spearman's R Correlation test to assess the significance of differences. When the distribution was not normal, the significance was assessed using Spearman's rank correlation coefficient. Probabilities of less than 0.05 were accepted as significant.

Results

Details of the measurements are given in Table 1. The distribution of the mucosal perforators from the facial artery shows that most of them were about 4–8 cm from the base of the jaw (Fig. 3).

Most of the mucosa of the cheek was reached directly by perforators from the facial artery. The mucosa of the lips was reached by perforators from the labial arteries, although these arteries were not the subject of our study. The superior labial artery was found in all cases. In two cases, the inferior labial artery was not found; in both these cases, the sublabial artery was identified.

Statistical analysis

There was a significant inverse correlation between the position of the mucosal perforator over the facial artery from the lower edge of the jaw and the length of the perforator ($p = 0.028$) (Fig. 4).