Versatility and aesthetic performance of the submental flap for reconstruction of skin defects in head and neck

VERSATILITY AND AESTHETIC PERFORMANCE OF THE SUBMENTAL FLAP FOR RECONSTRUCTION OF SKIN DEFECTS IN HEAD AND NECK

Gabriele Molteni[1], MD, PhD, FEBORL-HNS; Virginia Dallari[1], MD; Nicole Caiazza[1], MD; Andrea Sacchetto[2], MD.

1 Unit of Otorhinolaryngology, Head & Neck Department, University of Verona, Piazzale L.A. Scuro 10, 37134, Verona, Italy

2 Department of Otolaryngology, Ospedale San Bortolo, Via Ferdinando Rodolfi 37, 36100, Vicenza, Italy

Corresponding author

Virginia Dallari

Unit of Otorhinolaryngology, Head & Neck Department, University of Verona, Piazzale L.A. Scuro 10, 37134, Verona, Italy

Phone: +39 0458128333

CONFLICT OF INTEREST

The authors have no financial relationship to disclose.

AUTHOR CONTRIBUTIONS

Gabriele Molteni, conceived the study and performed the surgical procedure; **Virginia Dallari** and **Nicole Caiazza**, wrote the paper and edited the video; **Andrea Sacchetto**, corrected the paper and supervision of the work.

DISCLOSURES

Competing interests: None.

Sponsorships: None.

Funding source: None.

ETHICAL APPROVAL

All of the procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The Ethics Committee for clinical trials of the Provinces of Verona and Rovigo exempted this study from its approval.

All of the authors have read and approved the manuscript.

KEY WORDS

Submental flap, face reconstruction, skin defects, pedicled flap, reconstructive surgery.

ABSTRACT

The submental flap (SMF) is a reliable option for head and neck reconstruction. It is a pedicle flap based on the submental artery and vein, divisions of the facial pedicle.

The purpose of this Operative Technique is to describe the step-by-step setup of the submental flap for reconstruction of the preauricular region and to briefly examine its versatility and range of choices in skin and soft tissue defect reconstruction (see Supplemental Video in the online version of the article).

The harvesting of the SMF provides an aesthetically acceptable result for both the donor and reconstructed sites. The main advantages of the flap are its excellent color and texture match to the tissue in the cheek, and the possibility of restoring pilosity in male patients.

In the opinion of the authors, the SMF is one of the best reconstructive alternatives for defects in the lower two-thirds of the face in elderly male patients.

INTRODUCTION

The submental flap (SMF) is indicated in patients with skin or mucosal defects that are not reconstructable in a functionally or aesthetically acceptable manner using local techniques. It can be used for the reconstruction of soft tissue defects in the middle and lower third of the face, and is mainly indicated in patients who are unsuitable for free microvascular transfer and those with a sufficient excess of submental soft tissue[1,2].

METHODS

This clinical case describes an 80-year-old male patient who experienced a recurrence of squamous cell carcinoma of the skin in the right parotid region that infiltrated the muscular plane and the parotid gland. After multidisciplinary evaluation, it was decided that he should be selected for surgical resection of the tumor. Total right parotidectomy with sacrifice of the

overlying skin and type III modified radical neck dissection were performed. Reconstruction of the skin defect in the parotid region was performed using a submental flap. The final stage was rpN3b R0 G2/3, and the patient underwent adjuvant radiotherapy.

RESULTS

Our case shows excellent aesthetic and functional results obtained using the SMF for reconstruction of a preauricular skin defect in a male patient.

The flap design and dissection must always consider the course of the marginal branch of the facial nerve. Compared to other reconstructive alternatives, the flap offers an excellent cosmetic match without significant differences in texture and skin color between the donor and recipient sites. These results are even more pronounced in male patients because the hair-bearing nature of the flap allows the transfer of hair by restoring the presence of a beard or moustache.

DISCUSSION

Since its first description, the SMF has offered different potential reconstructive applications for both extraoral facial reconstruction and intraoral lining. The long vascular pedicle allows it to be used for coverage of a wide variety of mucosal and skin defects. In particular, the SMF has been successfully used for the reconstruction of various defects in the lower two-thirds of the face, such as the preauricular or mental region, cheek, and upper and lower lips[3].

SURGICAL PROCEDURE (see Supplemental Video in the online version of the article)

1 | Flap design

In the horizontal direction, the limits of safe harvesting are usually determined by the angles of the mandible, beyond which the vascularity of the skin becomes compromised on both the ipsilateral and contralateral sides. The flap was designed to be centered along the ipsilateral anterior belly of the digastric muscle because that is where the cutaneous perforators are located[4,5].

Age plays a critical role in determining the vertical dimensions of the harvested skin. This is limited by the laxity of the cervical skin which can be used for tension-free primary closure. Furthermore, a pinch test is performed to ensure that the defects will be closable.

2 | Vascular anatomy

The submental artery (SMA) arises as a branch of the facial artery which courses over the superior surface of the submandibular gland. It runs anteriorly on the inferior surface of the mylohyoid muscle with branches to that muscle and to the anterior belly of the digastric muscle, and then terminates in the submental area[4].

3 | Step 1: Landmark identification and flap dissection

The main landmarks for harvesting the SMF are the facial pedicle, the lower border of the mandible, the marginal mandibular branch of the facial nerve, and the digastric muscle.

The skin is incised starting from the inferior boundary of the marked flap. The subplatysmal dissection is elevated until the intermediate tendon of the digastric muscle has been identified.

A superior incision is made along the mandibular lower border. The marginal mandibular branch of the facial nerve must be identified to protect it from surgical injury. The body of the mandible is exposed and represents the superior limit of dissection. The flap is elevated from the contralateral side towards the side of the vascular pedicle. The plane of dissection on the contralateral side is over the submandibular gland fascia and over the contralateral anterior belly of the digastric muscle. The attachment of the ipsilateral anterior belly of the digastric muscle to the mandible is identified and sectioned.

The intermediate tendon of the ipsilateral digastric muscle is also sectioned to allow harvesting of the anterior belly to protect the cutaneous perforator supplying the skin.

4 | Step 2: Identification of vessels in the pedicle

The facial artery and vein are isolated and ligated distally to the origin of the submental artery and vein, and as they continue over the mandible.

The submental artery and vein are identified coursing in an anteromedial direction under the flap and over the top of the submandibular gland. The submental pedicle is progressively isolated throughout its course.

5 | Step 3: Dissection of the submental pedicle from the submandibular gland

The submandibular gland is dissected, ligating the vessels originating directly from the submental artery. The gland is removed after ligation and sectioning of the Wharton duct.

6 | Step 4: Mobilization of the pedicle vessels and flap transposition

The SMF is isolated from the ipsilateral facial artery and vein, which are extensively separated from surrounding tissue. Dissection of the facial artery can be performed up to the external carotid artery while the submental vein is dissected up to the internal jugular vein to optimize the arc of rotation of the flap transposed to the midface region.

A check for good patency of the pedicle vessels is performed.

The pedicle SMF is set up and is ready to be transposed to cover the skin defect. Closure of the neck is performed.

CONCLUSION

This report shows the potential and versatility of the SMF for reconstruction in the lower two-thirds of the face in elderly male patients. The hair-bearing nature of the flap allows the transfer of hair by restoring the presence of a beard or moustache.

The use of the SMF is a safe and feasible procedure for the reconstruction of facial skin defects and is an excellent alternative to free-flap reconstruction, particularly in elderly patients with a high comorbidity profile.

REFERENCES

1. Martin D, Pascal JF, Baudet J, et al. The submental island flap: a new donor site. Anatomy and clinical applications as a free or pedicled flap. Plast Reconstr Surg 1993;92(5):867–873.

2. Saad M, Matteucci P. The pedicled submental flap in facial reconstruction. Ann R Coll Surg Engl 2021;103(5):e159–e164. doi:10.1308/rcsann.2020.7075

3. Bertrand B, Honeyman CS, Emparanza A, et al. Twenty-five years of experience with the submental flap in facial reconstruction: evolution and technical refinements following 311 cases in Europe and Africa. Plast Reconstr Surg 2019;143(6):1747–1758. doi:10.1097/PRS.0000000000005678

4. Urken ML, Cheney ML, Blackwell KE, Harris JR, Hadlock TA, Futran N. Atlas of regional and free flaps for head and neck reconstruction: flap harvest and insetting. 2nd edition. Baltimore, MD: Lippincott Williams & Wilkins; 2012, pp. 102–121.

5. Eskander A, Strigenz D, Seim N, Ozer E. Submental artery island flap with simultaneous level I neck dissection. Head Neck 2018;40(4):842–845. doi:10.1002/hed.25044