The Upper Buccal Musculomucosal Flap for Nasal Lining and Columellar Defect Reconstruction

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Abstract: Restoring the nasal lining is a great challenge in the reconstruction of nasal defects. In this series, the authors present our experience in using the upper buccal musculomucosal (UBMM) flap for the reconstruction of full thickness columellar or nasal lining defects. Ten patients who underwent UBMM flap reconstruction of columellar or nasal lining defects, with or without composite grafting, were identified between December of 2014 and February of 2017. The records were retrospectively reviewed to determine the demographics, nasal deformity etiology, surgical technique, complications, flap survival rate and duration of follow-up. Of these ten patients, three were men, and seven were women; the average age was 48.1 years (range, 34–66 years). Four patients underwent bilateral UBMM flaps, and 6 patients underwent unilateral UBMM flap reconstruction. All of the donor sites were closed without complications, except for one small granuloma that occurred 8 months later. Of the total 14 flaps, 7 healed well, 6 healed well after minimal debridement in the clinic, and one failed and was replaced with a contralateral UBMM flap. The average follow-up time was 20.1 months (range, 8–38 months). All patients had satisfactory aesthetic and functional outcomes. Due to the limited availability of healthy local tissue for nasal lining reconstruction after multiple surgeries, the UBMM flap serves as an applicable choice to restore columellar or nasal lining defects, with minimal donor site morbidity and no visible external scarring.

Key Words: Buccal musculomucosal flap, columella, nasal lining

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Restoring the nasal lining or columella is a great challenge in the reconstruction of nasal defects. Options for nasal lining reconstruction include skin grafting, mucosal grafting, perinasal local flap, turn-over flap, folded forehead flap, or finally free flap surgery.[1,2] However, for people who have undergone multiple nasal surgeries, the perinasal tissue is usually limited, and the wound bed over the lining or columella is often chronically inflamed, friable, and not healthy enough for either skin grafting or composite grafting.[3] In this series, we present our experience in using an intraoral pedicled flap, the upper buccal musculomucosal (UBMM) flap, for reconstruction of full thickness columellar or nasal lining defects.

MATERIALS AND METHODS

Ten patients who underwent unilateral or bilateral upper buccal sulcus musculomucosal flap reconstruction for columellar or nasal lining defects between December of 2014 and February of 2017 were identified. (Supplemental Table 1, http://links.lww.com/SCS/C76) Regarding to the location of the defect, three were pure columellar defects, three were lining defects and four were lining and columellar defects. The lining defects located at columellar lining (n = 3), soft triangle (n = 3) or nasal floor (n = 1). The size of the defect ranged from 1.2 cm x 1.2 cm to 1.5 cm x 1 cm. All patients presented nostril contracture and airway obstruction.

Surgical Technique

A distance of approximately 1 cm is preserved between the gingival border of the flap and the gingiva to facilitate wound closure. Laterally, the flap border is limited by the orifice of the Stensen duct. At the buccal side, the flap is usually designed with a 1.2 cm to 1.5 cm width to accommodate the size of the defect and for primary closure of the donor site. Dissection was carried out to the muscular layer, and the whole layer of the musculomucosal flap, including mucosa, submucosa and partial muscle, was harvested until an adequate length is achieved, usually approximately 4 cm in length (Fig. 1). The flap was pivoted around the midline of the upper gingivobuccal mucosa and was inserted into the columellar or nasal lining through an oral-nasal tunnel according to the orientation of the defect (Fig. 2). For bilateral case, we maintain a central 2 cm of intact midline mucosa to maintain blood supply to bilateral flaps. The flap was partially demucosalized at the tunnel and care must be taken to avoid torsion or compression of the pedicle. The flap was either maintained for secondary healing or covered with a composite graft simultaneously or at later stage. The donor site was closed primarily with absorbable sutures.

We initially performed a UBMM flap reconstruction as a single stage procedure and immediately resurfaced it with a composite graft (n = 6). We later modified the flap in a delayed fashion (n = 4) and waited for 7 to 11 days to transfer it to the defect through the oral-nasal tunnel in order to optimize the survival rate and reliability of the flap.

RESULTS

Four patients underwent bilateral UBMM flaps reconstruction, and 6 patients underwent unilateral UBMM flap reconstruction. Four flaps were left for secondary healing, 6 flaps were covered with a

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FIGURE 1. Dissection of upper buccal musculomucosal flap was carried out deep to the muscular layer, and the whole layer of the musculomucosal flap including the mucosa, submucosa and partial muscle was harvested until an adequate length is achieved.

FIGURE 3. A 35-year-old woman with (A) A severe columellar defect after multiple rhinoplasties. (B) Bilateral delayed UBMM flaps with a (C) composite graft from the conchal cartilage were utilized for columellar reconstruction. (D) Postoperative 13 month results.

composite graft simultaneously with flap harvesting, and four flaps were covered with a composite graft or a lining rotation graft at a later stage. Of the total 14 flaps, 7 healed well with full survival, 6 healed well after minimal debridement of the partial necrosis at our clinic, and one failed and was replaced with a contralateral UBMM flap. No major complications were encountered, except for one small granuloma over intraoral wound that occurred 8 months later, which was resolved after limited debridement. All patients gained additional soft tissue around the columellar and nasal lining defects and had improvement to the airway obstruction problem. With an average follow-up of 20.1 months (range, 8–38 months).

Case Report

A 35-year-old woman had a severe columellar contracture and soft tissue deficiency after multiple rhinoplasty surgeries (Fig. 3A), as well as airway obstruction. Delayed bilateral upper buccal musculomucosal flaps were utilized to restore the columellar and surrounding lining defects (Fig. 3B). After 1 week of flap harvesting, the flap was transferred to the defect through the oral-nasal tunnel and simultaneously covered with a composite graft from the conchal cartilage (Fig. 3C). Postoperative healing was uneventful, and the airway obstruction improved significantly. The patient was satisfied with both functional and aesthetic results after the 13 month follow-up (Fig. 3D).

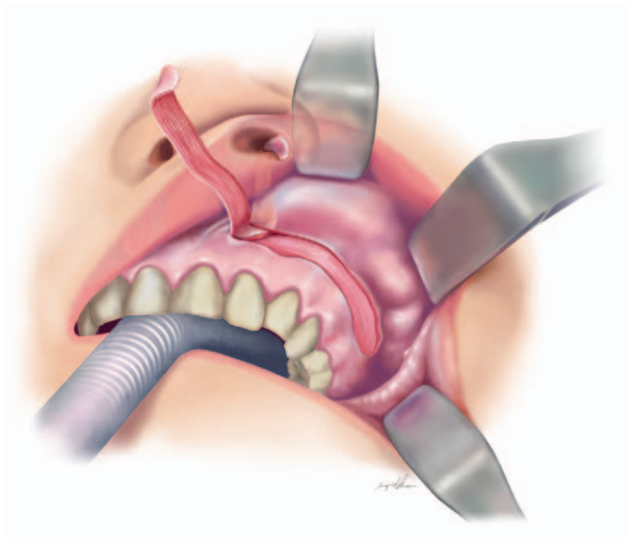

FIGURE 2. The flap is pivoted around the midline of the upper gingivobuccal mucosa and inserted into the columellar or nasal lining through the oral-nasal tunnel.

DISCUSSION

Restoring the nasal lining has a paramount role in the reconstruction of full thickness nasal defects.[4] Providing thin and well-vascularized lining flaps is the most important point in corrective nasal surgeries and is critical to the final results.[4] The facial artery musculomucosal (FAMM) flap was first described in 1992 by Pribaz et al, and subsequent publications developed new modifications to make it sufficiently versatile for the correction of oral cavity, head and neck defects.[5–12] Nevertheless, a literature review showed very few applications of this flap in nasal reconstruction.[3,4,13,14] Traditionally, the flap is outlined longitudinally over the course of the facial artery, which can be superiorly pedicled on the angular artery with a retrograde flow or inferiorly based on the anterograde flow of the facial artery.[3–14] However, dissection of the facial artery pedicle takes time, and the flap reaches the intranasal lining or columellar area with difficulty, even with a relatively long rotation arc.

The UBMM flap consists of the mucosa, submucosa and a portion of the muscle, which is similar to the FAMM flap. Nevertheless, the design of the upper gingivobuccal incision makes reaching of the nasal lining and the columellar area much easier compared to traditional lateral buccal incisions. Park et al showed that the terminal end branches of the facial artery anastomosed with those from the contralateral side through a vertical and a horizontal vascular network.[5,15] Retrograde flow might be provided to the flap although the flap is more like a random fashion. In addition, the flap has the advantages of a long rotational arc, is straightforward and easy to harvest, is thin and pliable, is proximal to the defect, is similar to the mucosal lining, results in the absence of a visible external scar and exhibits minimal donor site morbidity.

For lining defects only, one stage of UBMM flap transfer may be adequate since the character of nasal lining and mucosa are similar based on principle of replacing like with like. Nevertheless, for columellar defect reconstruction, we need not only skin replacement but also some volume and support for better columellar shape. In addition, mucosa of UBMM is not suitable for columella skin

replacement because of color and texture mismatch. Therefore, we prefer utilizing UBMM flap as lining base and combing composite graft transfer on the top whether in the same stage or later stage, or multiple composite graft transfer to pursue a better outcome.

Initially, we harvested and transfer the flap at the same stage and encounter some partial necrosis problem, so we modified to delayed fashion in order to optimize the survival rate and reliability of the flap. We believe the delayed fashion make the flap more reliable and it almost became a routine procedure for us now due to more safety concern and less chance of flap necrosis, and we highly recommended doing so.

According to a recent systemic review,[5,8] among the 376 reported FAMM flap reconstructions, there was a low rate of partial and complete flap necrosis. In our series, one UBMM flap failed and was thought to be related to smoking or tension of the pedicle over the oral-nasal tunnel. Although nearly half of the flaps had partial necrosis, they all healed well after minimal debridement at our clinic and still served as a well-vascularized tissue, either for secondary healing or composite graft transfer simultaneously or at a later stage.

In our series, 3 were pure columellar defects, three were lining defects and 4 were lining and columellar defects. The lining defects located at columellar lining, soft triangle or nasal floor. Based on our clinical observation, the location did not affect flap survival. For more posterior lining defects, it may be too far for the UBMM flap to reach, which was the limitation of this flap. Besides, releasing of scarring and recreation of the defect with immediate filling with a soft tissue buccal flap is likely to be followed by flap collapse due to poor support, and once contracted, the replaced buccal flap may be difficult to re-expand. We may consider put conchal cartilage graft under the buccal flap as a support to maintain its shape and prevent the flap collapse.

For severe columellar defects, usually it requires forehead flap or more extensive repairs. Our UBMM flap offered an alternative choice for the patient who could not tolerate the forehead scar or extensive surgery, and it serves as an applicable choice to restore columellar shape with combination of composite graft transfer.

Previous literature mentioned the donor site morbidity of the intraoral flap, including a reduction in mouth opening, obliteration of the vestibule, injury to the Stensen duct and fibrous bands in the buccal mucosa.[16] We observed a slight shortening of the upper lip in some patients or a slight asymmetry of the bilateral upper lip if a unilateral UBMM flap was harvested. However, the change was unapparent.

CONCLUSIONS

Due to the limited availability of healthy local tissue for nasal lining reconstruction after multiple surgeries, the upper buccal musculomucosal flap serves as an applicable choice to restore columellar or nasal lining defects. Both Satisfactory aesthetic and functional results are achievable.

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