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IDEAS AND INNOVATIONS

Reconstructive

Successfully Closing an Acquired Palatal-fistula Using a Turnover Flap from a Previously Transferred Forearm-free-flap

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Summary: Palatal fistula between the oral and nasal cavities occurs in about 20% of palatal repairs after oncologic resection. Although healing by secondary intention may be employed as an initial strategy, persistent nonhealing symptomatic fistula necessitates intervention. Folded free flap used for primary repair of palatectomy defects enables placement of epithelialized tissue on both the oral and nasal cavities. In case of acquired palatal fistula, a turnover flap can be easily created, based on the free margin of the folded forearm free flap to serve as a reconstructive lifeboat. *(Plast Reconstr Surg Glob Open 2017;5:e1598; doi: 10.1097/GOX.0000000000001598; Published online 28 December 2017.)*

Surgical resection of palatal tumors creates a palatomaxillary defect, leading to a variety of potential complications including hypernasal speech, oronasal regurgitation, difficulty in swallowing, and impaired masticatory function. Any of these complications can substantially diminish health-related quality of life.[1] The postpalatomaxillectomy defect can be reconstructed using either a palatal obturator or a free tissue transfer with or without a bone graft. One particular option is a radial forearm free flap (RFFF) folded onto itself to create a double-layer closure allowing both oral and nasal cavities to be lined by epithelialized tissue. However, incomplete healing between the flap and native palate may lead to an acquired fistula occurring in up to 20% of patients.[2] The literature on the management of acquired fistulae after cleft palate repair is abundant; however, information on oncologic fistula repair is scant.[3] The aim of this report is to present a case of acquired palatal fistula closed using a novel local turnover flap based on the previous free flap used for closure of the initial palatectomy defect.

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CASE REPORT

A 48-year-old man with a $11 \times 10 \times 21\ mm^3$ adenoid cystic carcinoma of the left hard palate underwent a left partial maxillectomy, resulting in a Cordeiro type 2A maxillectomy defect of size 40 mm at the junction of the soft and hard palate. Immediate reconstruction was achieved using a folded RFFF (FRFFF) with 2 skin islands, each measuring $55 \times 50\ mm^2$. One island was used intraorally, whereas the other was used for reconstruction of the nasal floor. Microvascular anastomosis was performed between the radial and facial arteries in the end-to-end fashion, and cephalic and internal jugular vein, using nonabsorbable suture. Postoperatively at 2 weeks, the patient presented with a $5 \times 5\ mm^2$ oronasal fistula at the junction of the neopalate and native hard palate (Fig. 1).

As the fistula remained patent and symptomatic, closure of the oronasal fistula was performed at 6 months. Intraoperatively, the fistulous tract was completely excised. Separate flaps were designed to reconstruct the nasal lining and palatal mucosa (Fig. 2). First, a $15 \times 15\ mm^2$ turnover flap with its base at the free margin of the radial forearm flap was created to close the nasal floor. The flap was incised and turned over like a book such that the radial forearm skin now lined the nasal cavity (Fig. 3). The incised margin of the flap was sutured laterally to an intact portion of the nasal lining. The palatal defect was then closed using a posteriorly based $10 \times 25\ mm^2$ palatal transposition flap supplied by the greater palatine artery (Fig. 3). The transposition flap was elevated off the remaining hard palate to completely cover the former fistula site with a second layer of vascularized tissue. The donor areas for the radial forearm turnover and palatal transposition flaps were allowed to remucosalize secondarily.

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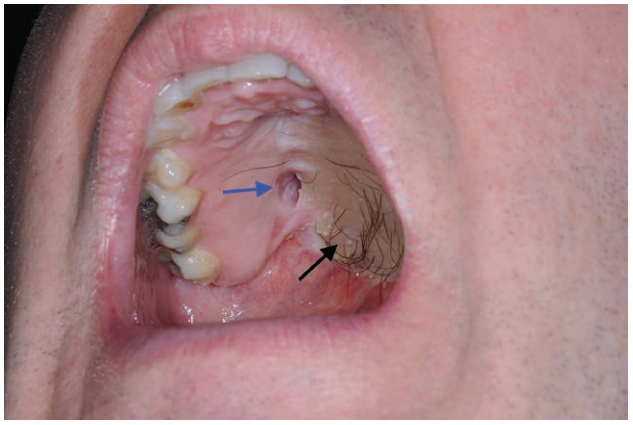

Fig. 1. The acquired fistula (blue arrow) located between the previous folded radial forearm free flap (black arrow) and the native palatal tissue.

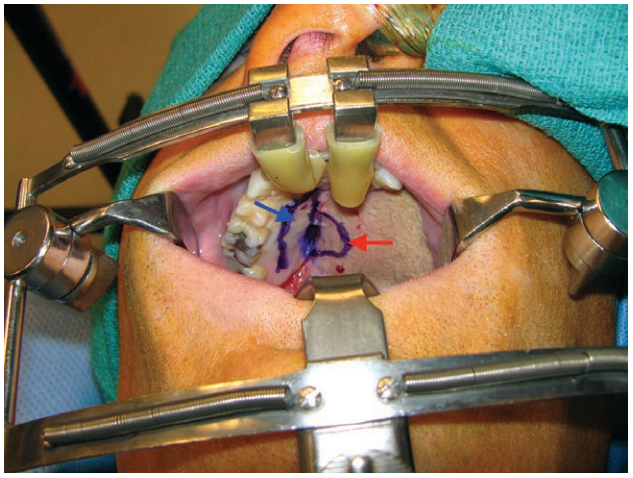

Fig. 2. A turnover flap (red arrow) and a transposition flap (blue arrow) are marked with dye. The turnover flap will be turned over like a page of a book, based at the free margin of the folded radial forearm flap, to cover the fistula.

Postoperatively, the patient was put on a nasogastric tube for 7 days followed by slow dietary advancement. At 2-month follow-up, the patient showed complete healing of the fistula and flap donor sites (Fig. 4). On functional assessment, he was able to eat and drink without oronasal regurgitation and had normal speech. The patient subsequently underwent laser ablation of hair follicles. At 2-year follow-up, there were no signs of recurrent cancer or fistula formation (Fig. 4).

DISCUSSION

Free tissue transfers are the most effective means to close acquired palatal defects, specifically either the radial forearm or anterolateral thigh free flaps because of their thin pliable skin and ease of being folded onto themselves.[4,5] Soft-palate fistula presents a variety of complications, which disturbs oronasal function,[2] making closure necessary for oral proficiency and improved quality of life. Given the folded nature of the original forearm flap reconstruction, a turnover flap based on the blood supply from the nasal skin island can be employed to close the acquired fistula. A local palatal transposition flap can then be used to stabilize the turnover flap, creating a bilayer closure. Similar approaches of creating a local turnover flap have been described in the literature for the closure of tracheocutaneous and urethrocutaneous fistula.[6]

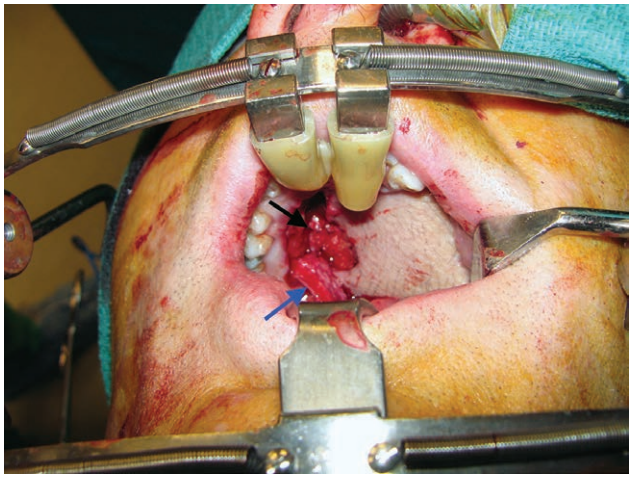

Fig. 3. The turnover flap has been incised, turned over, and sutured over the fistula, with its subcutaneous tissue (black arrow) facing the oral cavity and its blood supply based on the nasal skin island. The local transposition flap supplied by the greater palatine artery is incised (blue arrow) and transposed over the fistula to provide a second layer of closure.

The ability to perform a turnover flap is contingent upon the original reconstruction being performed with 2 skin islands, as there would be no blood supply to a turnover flap of a single island at its free margin. Furthermore, single island flaps, which leave a raw surface on the nasal side, are not preferred because they can be associated with crusting, nasal discharge, and bacterial overgrowth causing malodor. Anterolateral thigh flaps are equally versatile and offer high success rates similar to those of radial forearm flap reconstruction of the palate.[4] Thus, free flaps are the ideal means of repairing most moderate-sized oncologic palatal defects because of their ability to introduce highly vascularized tissue for primary wound healing.

Other reconstruction approaches have been described for acquired palatal fistula, but there is no well-defined classification system or treatment algorithm similar to postpalatoplasty fistulae repair for congenital defects.[7] Traditionally, locoregional flaps such as the pharyngeal, tongue, and uvulopalatal flap have been described for palatal fistula repair.[3,8] The facial artery musculomucosal flap is perhaps the most utilized intraoral flap because of its robust blood supply and the favorable arc of rotation; however, a sacrifice of the facial artery often occurs along with the removal of the submandibular gland as part of the neck dissection. For small fistulae in the setting of limited local options, acellular dermal matrices can be used, but with a high failure rate.[9] Prevention of fistulae formation in oncologic oral reconstruction may be attained by

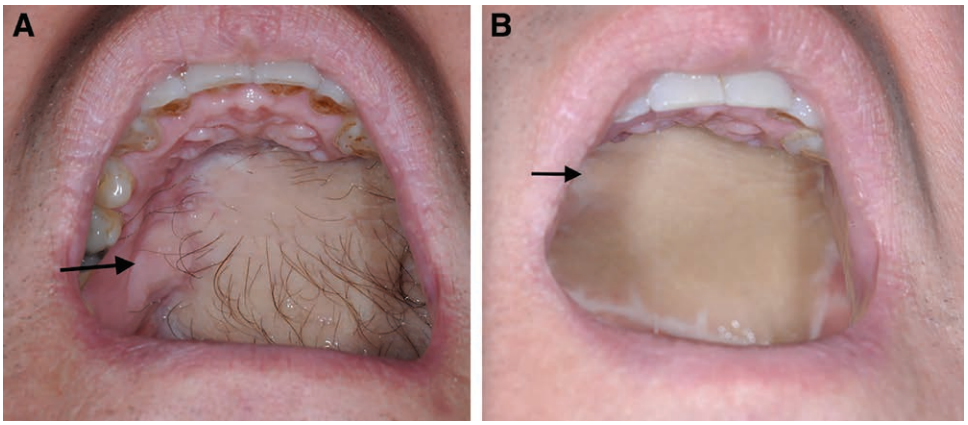

Fig. 4. Healed fistula before (A) and after laser hair removal (B).

use of Mitek mini bone anchors, which can provide secure support to the soft flap and avoid dehiscence.[10]

CONCLUSION

The bilayer design of a folded free flap for oncologic palatal repair provides an opportunity for the creation of a turnover flap in the event of postoperative fistula formation.

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