

A Surgical Technique for the Management of Suction Cup-Induced Palatal Perforation: A Technical Note

AMIN RAHPEYMA¹, SAEEDH KHAJEHAHMADI²

ABSTRACT

Suction cap-induced palatal perforation is uncommon today. In the surgical management of such a complication, the surgeon should consider the large bony defect hidden behind the small slit in the palatal mucosa. In this article a case is presented, in which a combination of anteriorly based inferior turbinate flap and posteriorly based palatal submucosal flap solved the problem properly. The advantages of this technique are two-layer closure and predictability of the technique.

Keywords: Inferior turbinate flap, Palatal flap, Palatal fistula

CASE REPORT

The patient was a 68-year-old female who had a semilunar palatal fistula 5mm in length in the midline of the hard palate [Table/Fig-1]. Entrance of fluids into the nose was the chief complaint of the patient. She had been wearing this denture for eight years and had been edentulous for 23 years. On the tissue surface of the upper denture, there was a place for fitting the suction cup and she reported that she did not remove the dentures during the night. She had cardiac disease and high blood pressure.

5mm posterior to the palatal fistula an imaginary horizontal line was drawn perpendicular to the median raphe. Under general anesthesia a crestal incision was made on the top of the edentulous ridge to join the ends of this line on the top of the crest. Full-thickness mucoperiosteal palatal flap reflection was performed with a blunt end periosteal elevator. Nasopalatine vessels were cut during dissection. After flap reflection, a posteriorly based submucosal flap containing greater palatine artery was developed, turned over and sutured in the midline to cover the palatal fistula from the inside [Table/Fig-2].

The palatal process of the maxilla had been perforated near the midline. Nasal mucosa floor was disrupted and the inferior turbinate was visible through the hole [Table/Fig-3]. Posterior attachment of the inferior turbinate was detached from the lateral nasal wall and brought to the oral cavity through this hole and the flap was sutured to the bony margins in four corners [Table/Fig-4a-c].

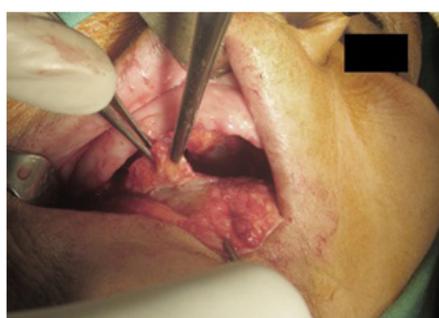
The elevated palatal flap was replaced back on its original site and sutured to the alveolar ridge through the bony holes. This obviated the need for a surgical stent to retain the palatal mucosa in close contact with the underlying bone [Table/Fig-5].

DISCUSSION

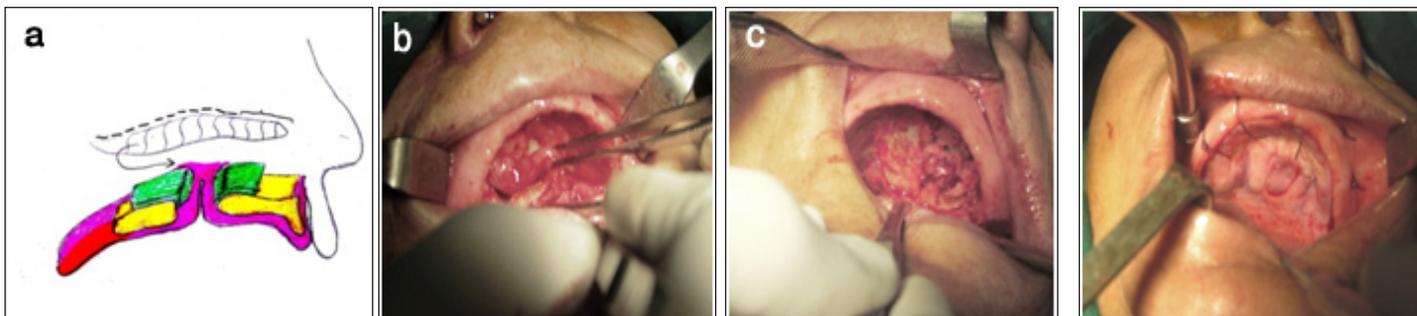
Oronasal fistula occurs most commonly after palatal closure in cleft patients, subsequent to trauma and after pathologic resections [1-3]. An uncommon cause for palatal perforation is the continuous pressure from suction cups inserted into the tissue surface of upper complete dentures [4]. This device is not advised according to academic recommendations but it is used by non-dentist denturists who traditionally fabricate complete dentures without scientific knowledge. Suction cup increases the denture retention but palatal perforation is a reported complication.

Continuous negative pressure from the vacuum effect of suction cup resorbs the underlying bone and atrophies the mucosa beneath the suction cup. Such a case is reported in this article and the surgical management is explained.

Palatal perforation beneath the suction cup under the maxillary upper denture is a challenge for reconstruction. The common rule for two-layer closure of fistula by turning over the adjacent mucosa for nasal floor reconstruction and rotation mucoperiosteal flaps from intact neighbouring palatal mucosa may not be applicable in this situation. For this reason the surgical management of these fistula is often accomplished through the single-layer closure techniques [5,6]. Although it is highly recommended for double flap repair when possible. Formation of the nasal floor seal by hinged flaps is often difficult because the soft tissue cover in the region of perforation is usually very thin [7]. The thin atrophied mucosa around the palatal fistula is not suitable for turning over and the large bony defect below this fistula makes wound bed unsupported. Failure to close these fistulas in the first surgical intervention certainly will lead to a larger fistula that needs more extensive Surgeries such as tongue/ buccal flaps for closure.



[Table/Fig-1]: Semilunar palatal perforation 5mm in length [Table/Fig-2]: Posteriorly based submucosal flap based on greater palatine artery, is elevated [Table/Fig-3]: Inferior turbinate is visible through the palatal bony perforation



[Table/Fig-4a-c]: a) Schematic representation of anteriorly based inferior turbinate flap. 1cm of anterior attachment is preserved. b) Inferior turbinate is brought to the mouth c) The composite flap is held in place with four bone sutures and the extra mucosa is trimmed **[Table/Fig-5]:** The palatal flap is returned to its original site and sutured to the alveolar process through the mucosal bone holes. The mucosal flaps are sutured together edge to edge after that

Differences between the surgical techniques used in this article for management of denture induced palatal perforation and the other methods that are explained in the literature are: first, this method is two layer closure technique that is more ideal reconstruction. Second, topography of the palate does not change and the third advantage is that this technique does not need to the surgical splint to prevent hematoma.

Both of the flaps used in this case for palatal fistula closure have an axial pattern blood supply; therefore, they are very predictable [8,9].

Prevention of palatal fistula and night rest of the supporting tissue is the rule. In the early stages when palatal perforation had not been occurred yet use of tissue conditioner is helpful [10]. Sato et al., reported a significant appearance of osteoclasts in rat palatal bone tissue under continuous mechanical pressure of 4.9 kPa [11]. This finding is accordance with the reported case in this article that showed large bony perforation behind slit like mucosal fistula. Closure of such a fistula is difficult and needs general anesthesia that is not without risk in medically compromised patients. Prosthetic obturator for a palatal perforation from a rubber suction disk has been reported [12]. It seems that these devices are far from satisfaction.

CONCLUSION

Two-layer closure of palatal fistula induced by upper denture suction cup is possible by combination of two axial-pattern flaps: anteriorly based inferior turbinate flap and posteriorly based palatal submucosal flap. There are two advantages for the reported technique: the two-layer closure is more predictable than one-layer repair and there is little alteration in the shape of the palate before and after surgery.

ACKNOWLEDGEMENTS

This study was supported by a grant from the Vice Chancellor of Research of Mashhad University of Medical Sciences.

REFERENCES

- [1] Eberlinc A, Koželj V. Incidence of residual oronasal fistulas: a 20-year experience. *Cleft Palate Craniofac J.* 2012;49:643-48.
- [2] Fonseca Oliveira MT, Rodrigues Freire D, Zanetta-Barbosa D, Mambrini Furtado L, Dantas Batista J, Sargenti-Neto S. Two-flap palatoplasty for treatment of oronasal fistula by trauma sequel. *MinervaStomatol.* 2011;60:551-53.
- [3] Goiato MC, dos Santos DM, Moreno A, Santiago JF Jr, Haddad MF, Pesqueira AA, et al. Prosthetic treatments for patients with oronasal communication. *J Craniofac Surg.* 2011;22:1445-47.
- [4] Stafford GD. Perforation of the palate due to a suction disc on a denture. *Br Dent J.* 1974;136:240.
- [5] Ordulu M, Emes Y, Ates M, Aktas I, Yelchin S. Oronasal communication caused by a denture with suction cups: a case report. *Quintessence Int.* 2006;37:659-62.
- [6] Rao Y, Yadav P, Singh J, Patel D, Aggarwal A. Surgical and prosthetic management of suction cup induced palatal perforation: case report. *J Clin Diagn Res.* 2013;7:2086-87.
- [7] Stellmach R, Frenkel G. Complications resulting from dento-surgical operations in the area of the maxillary sinus. *Surgical closure with a double flap repair.* 1972;3:23-29.
- [8] Gil Z, Margalit N. Anteriorly based inferior turbinate flap for endoscopic skull base reconstruction. *Otolaryngol Head Neck Surg.* 2012;146:842-47.
- [9] Yamazaki Y, Yamaoka M, Hirayama M, Shimada H. The submucosal island flap in the closure of oro-antral fistula. *Br J Oral Maxillofac Surg.* 1985;23:259-63.
- [10] Cayetano O, Boone ME. Suction cups on maxillary dentures: report of case. *J Am Dent Assoc.* 1987;115:577.
- [11] Mori S, Sato T, Hara T, Nakashima K, Minagi S. Effect of continuous pressure on histopathological changes in denture-supporting tissues. *J Oral Rehabil.* 1997;24:37-46.
- [12] Yotnuengnit B. Obturator for a palatal perforation from a rubber suction disc. *J Dent Assoc Thai.* 1979;29:1-13.

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Oral and Maxillofacial Surgery, Oral and Maxillofacial Diseases Research Center, School of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran.
2. Assistant Professor, Department of Oral and Maxillofacial Pathology, Dental Research Center, School of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Saeedeh khajehahmadi,
Dental Research Center of Mashhad University of Medical Sciences, Vakilabad Blvd, Mashhad, P.O. Box: 91735-984, Iran.
E-mail : khajehahmadis@mums.ac.ir, saeedeh.ahmady@yahoo.com

FINANCIAL OR OTHER COMPETING INTERESTS: As declared above

Date of Submission: **Mar 10, 2015**
Date of Peer Review: **May 25, 2015**
Date of Acceptance: **Jun 01, 2015**
Date of Publishing: **Jul 01, 2015**