

Tongue Flap for Management of Large Palatal Fistulas

Carlos Giugliano,^{*†} Nicole Roldán,[‡] Pilar Claure,[†] and Vivian Suarez[†]

Abstract: One of the worst complications after a primary palatoplasty is the lesion of the neurovascular bundle, results into a type of flap necrosis, having as a final consequence a residual palatine fistula.

In our institution the authors usually use tongue flap to repair large fistulas.

The authors retrospectively reviewed all patients with large palatal fistulas that were repaired with tongue flap at Fundación Gantz between January 2002 and December 2020.

Fundación Gantz has 1.067 patients with palatal surgeries, with an incidence of 5,8% for palatal fistulas and 3,2% (n = 2) were considered large.

Surgery was done on 24 patients with large residual palatal fistula, all of them with tongue flaps as outpatient surgery. Fifteen were girls and 9 were boys, between 13 and 40 years.

The average size of the fistula was 2,5 cm and 100% are localized in the anterior palate.

The incidence of complications with tongue flap was 12, 5%: 2 dehiscences and 1 persistent residual fistula. The authors had no complications in phonation due to the lingual donor area.

The authors consider that this outpatient surgery, is a reproducible and safe technique, with a low rate of complications, which allows us to recommend it for the treatment of large palatal fistulas.

Key Words: Palatal fistula, surgical technique, tongue flap

(*J Craniofac Surg* 2022;33: 2091–2094)

Labio-palatine clefts comprehend a wide range of clinical presentation from isolated unilateral lip to bilateral lip-alveolus-palatal cleft; these can be associated with other malformations or formative syndromes.¹ The incidence is 1 to 1.8 for each 1.000 live newborns depending on the kind of lesion.^{1,2} In

From the *Department of Plastic Surgery, Hospital del Niño Fisurado, Fundación Gantz, Member of LATICFA; †Department of Plastic Surgery, Surgery Service, Clínica Alemana de Santiago; and ‡Resident of Pediatric Surgery, Faculty of Medicine, Universidad del Desarrollo, Santiago, Chile.

Received August 11, 2021.

Accepted for publication February 4, 2022.

Address correspondence and reprint requests to Nicole Roldán, Las Luciernagas 2025, La Reina, Región Metropolitana, Chile; E-mail: Nroldan@alemana.cl

The authors report no conflicts of interest.

Supplemental digital contents are available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.jcraniofacialsurgery.com).

Copyright © 2022 by Mutaz B. Habal, MD

ISSN: 1049-2275

DOI: 10.1097/SCS.00000000000008600

the presence of a palatal cleft, isolated or associated to lip and alveolus cleft, a primary palatoplasty must be done as early as 9 to 12 months of age.

One of the worst complications after a primary palatoplasty is the residual palatal fistula, which has as a consequence, the passage of liquids and/or food from the mouth to the nose during feeding and/or alterations of the speech with a hypernasal voice with loss of pressure of the phonemes²⁻⁴ (Fig. 1).

Nevertheless, there are other causes for palatal fistulas, such as: surgical sequels in the resection of palatal pharyngeal cancer, fractures of the nasomaxillary complex, extraction of dental pieces of the premaxilla, sequels of diseases such as syphilis or use of vasoconstrictive drugs such as cocaine, among others.^{5,6}

Multiple prognostic factors have been described associated to the presence of secondary palatal fistulas in the cleft patients, being the severity of the cleft previous to the primary palatoplasty the main factor that is statistically significant. This risk rises 2,64 times as we advance in the Veau classification for palatal fissures. Other studies have concluded that the risk is statistically significant in fissures of more than 15 mm wide.⁷

The surgical principles that must be accomplished in every palatoplasty, which influence the post-operative prognosis are: a careful liberation of the major palatal artery to preserve the vitality of the flaps, a free tension closure and a surgical debrided technique with gentle management of tissue and neat haemostasis.^{7,8}

The lesion of the neurovascular bundle results into a type of flap necrosis, having as a final consequence a residual palatine fistula.^{4,7,8}

Other associated causes to the occurrence of residual palatal fistulas are postsurgical infection, lesion of the anterior palatal artery and trauma in the surgical area.^{3,4}

There are many ways of classifying palatal fistulas according to size (Supplementary Digital Content, Table 1, <http://links.lww.com/SCS/D912>).

The most frequent location of these fistulas is between the hard and the soft palate (type III of Pittsburgh classification). The frequency of this, depends on the studied population, reported between 3% and 25% in children, and 50% in adults, with a postsurgical recurrence of up to 65%.^{6-8,12,14}

The techniques of palatal fistulas repairs, have as an objective, the closure in 2 levels, oral and nasal, with a full coverage of the defect without tension.⁷⁻⁹ Surgically there is no

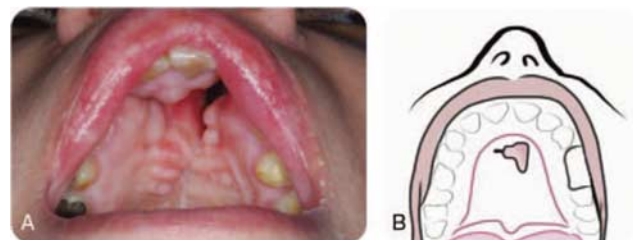


FIGURE 1. (A) Palatal fistula. (B) Diagram.

single technique, and the choice of this will be determined by the size, location, quality of the local tissue and the records of the primary surgery available.⁵⁻⁸

In small to medium size fistulas, local palatal flaps are used, but in big fistulas, regional flaps are necessary, such as: tongue flap, facial artery myomucosal flap, muscle flap and temporary fascia and/or microsurgical free flaps.

Our institution is a reference center for fissured patients at an international and national level, we receive external referred patients for previous surgical sequels, among them large residual palatal fistulas.

For the repair of large fistulas, we usually use the tongue flap. The tongue, as it is well irrigated and a mobile organ, it allows us to obtain flaps without altering its function.

The objective of this manuscript is to describe our experience in the management of large palatal fistulas with tongue flap as outpatient surgeries.

MATERIALS AND METHODS

Retrospective review of patients with tongue flaps used in the management of large palatal fistulas at Fundación Gantz between January 2002 and December 2020.

Socio-demographical information was gathered, as well as information about the hospital or derivative institution, number of interventions and previous management, localization and size of the fistula, type of flap used, results and complications.

Protocol Used Patient Selection

Patients older than 13 years, which had a previous psychological evaluation to ensure suitability and cooperation for the recovery process.

Surgical Management

- Outpatient surgery.
- Strict phone and presental follow up during the first week.
- Two surgeries, separated by 21 days.

Tongue Flap Surgical Technique

1st Surgery:

1. Nasal-tracheal intubation.
2. Realization of the 2 planes closure of oral and nasal mucosa in the fistula zone with neighboring local flaps to the fistula, and turn over type.
3. The anterior or posterior position of the base of the flap will depend on the location of the fistula.
4. Thickness of the flap: 5 mm.
5. Dimensions of the flap will depend on the size of the fistula.
6. The length of the flap base must be sufficient to allow certain mobility of the tongue during deglutition and phonation.
7. Avoid intervening the lingual area of the circumvallate papillae.
8. Suture of the flap from posterior to anterior with separate stitches of polyglycolic acid 4-0 and 5-0.
9. Primary closure of the lingual donor area in 2 levels (Figs. 2-5).

2nd Surgery:

- After 21 days of the first surgery, the section of the flap's pedicle is done.
- Suture of the lingual giving area in 2 levels.
- Suture of the lingual margin in the anterior receptive area of the fistula (Figs. 6 and 7).

In the last 18 years at Fundación Gantz, 1.067 patients have been operated on palatal surgeries, with a fistula incidence of 5,8%. From these, 3,2% (n = 2) were considered

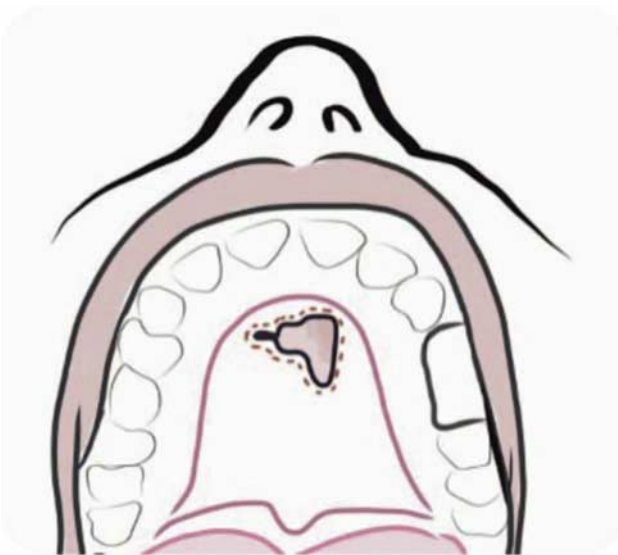


FIGURE 2. Diagram incision line of palatal fistula (red).

large according to the subjective classification presented in Supplementary Digital Content, Table 1, <http://links.lww.com/SCS/D912>.

Considering patients originally from our institution and those referred from other centers (n = 22), in the last 18 years there have been 24 patients with large residual palatal fistula.

Ninety percent of patients were because of iatrogenic injury of the major palatal artery.

All of the patients were resolved with tongue flaps as outpatient surgeries.

Fifteen were girls and 9 were boys, between the ages of 13 and 40, with an average of 19 years old at the time of the surgery.

Unilateral Labiopalatine cleft was present in 6 patients, and 18 had bilateral compromise.

The average size of the fistula was 2,5 cm (between 2 and 3,5 cm) and 100% are localized in the anterior palate.

The average follow-up was 4 years (2-10 years).

The incidence of complications with tongue flap was of 12, 5% (3 patients): 2 dehiscences and 1 persistent residual fistula. There were no sequels in phonation in the lingual giving area. Dehiscence of flap was defined as an early separation of the lingual flap to the receptive site. All dehiscences were managed with double stitching. There were no necrosis or loss of the flap, nor fistula relapse or infections.

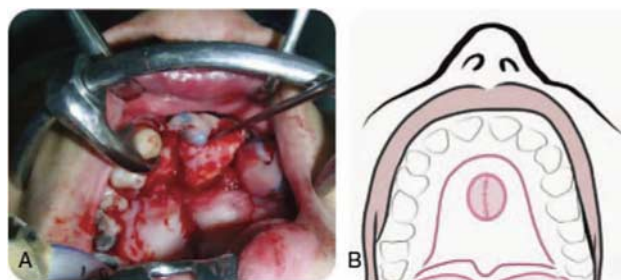


FIGURE 3. Suture of nasal level: (A) Picture (B) Diagram.

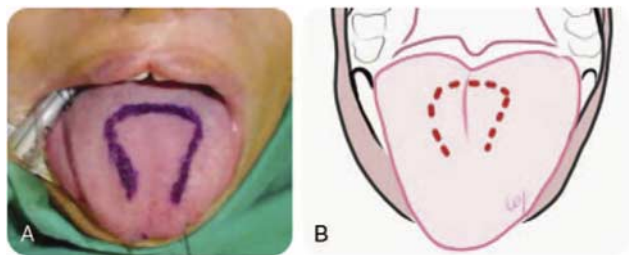


FIGURE 4. Design of the lingual flap: (A) Picture (B) Diagram.

DISCUSSION

The palatal fistula is a pathological communication of the oral and nasal cavity, which allows the passage of liquids and/or food from the mouth to the nose during feeding and/or alterations of the speech with a hyper nasal voice with loss of pressure of the phonemes.²⁻⁴

There are many ways to classify fistulas according to size; in our center the subjective classification has been chosen as it is more practical to decide the management.

In small or medium size fistulas, local flaps can be made, but in the case of large fistulas, utilization of regional flaps will be needed, being the tongue flap the 1 used regularly in our center.

It is important to point out that palatine fistulas are considered a complication of the repair of a primary palatine fistula, meaning an error in the surgical technique.^{4,8,9} In our center, we have a low rate in residual palatine fistulas (5,8%) in comparison to the international publications, which goes up to a 25%.^{13,14}

Among associated factors to the presence of palatal fistulas, the only statistically significant 1 is the severity of the fissure previous to the primary palatoplasty, increasing the risk by 2,64 times as Veau classification increases, and being even higher, in those larger than 15 mm.⁸

In 90% of patients in our series the cause to large residual palatine fistulas was identified; being the injury to the major palatine artery during primary palatoplasty. This is why we insist in the careful dissection of this element.^{4,8,9}

In 1996 Guerrero-Santos and Altamirano introduced the dorsal flap of anterior base for the surgical closure of wide palatal fistulas, evidencing major versatility and a lower rate of complications. Other techniques use side tongue flaps, posterior and posterolateral.^{4-13,15}

Arnold Komisar compares the different types of dorsal flaps of tongue for the use of reconstructive surgery. He concludes

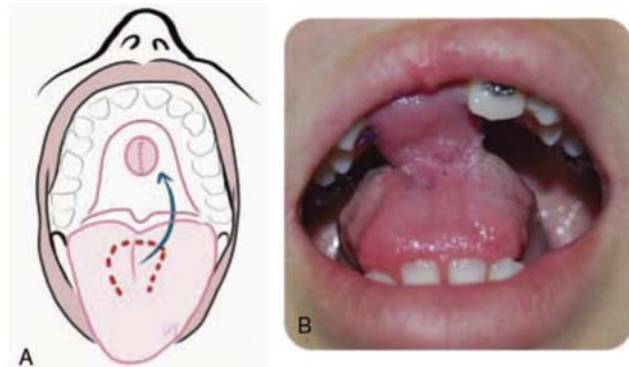


FIGURE 5. Positioning of the lingual flap in the fistula area. (A) Diagram (B) Picture.



FIGURE 6. (A) Suture of the lingual giving area after 21 days. (B) Lingual flap in the fistula area. (C) Diagram of both steps.

that the ones of anterior base are more recommended since they would avoid injuries in the hypoglossal nerve and in the lingual artery as it happened with the ones of posterior base. The reported complications in this group are, edema, infection, necrosis (partial or total), dehiscence, and residual fistulas.⁷⁻¹⁵

We have experience in outpatient surgical management of patients with labio-palatine clefts with a low rate of complications; besides being a well-tolerated procedure by patients and their families,²¹ which is why we consider performing tongue flaps with this modality as well.

Until now, there are no published series about outpatient management of tongue flap in patients with palatine fistulas; nevertheless, Barazarte²² has a similar management but with 24 hours inpatient surgery, with a low rate of complications.

There were 2 types of complications in our series: 2 cases of partial dehiscence of tongue flap in the area of the fistula and 1 residual fistula (8,3%), which were posteriorly repaired without recurrency. There were no documented infections, post-operative hemorrhages or any other type of complications.

Fatma Nihal Durmus reports a 26% of dehiscence in his series, being 1 of the most frequent complications identified by different authors, reaching up to 30%. In comparison with the international literature, we have a low rate of dehiscence.

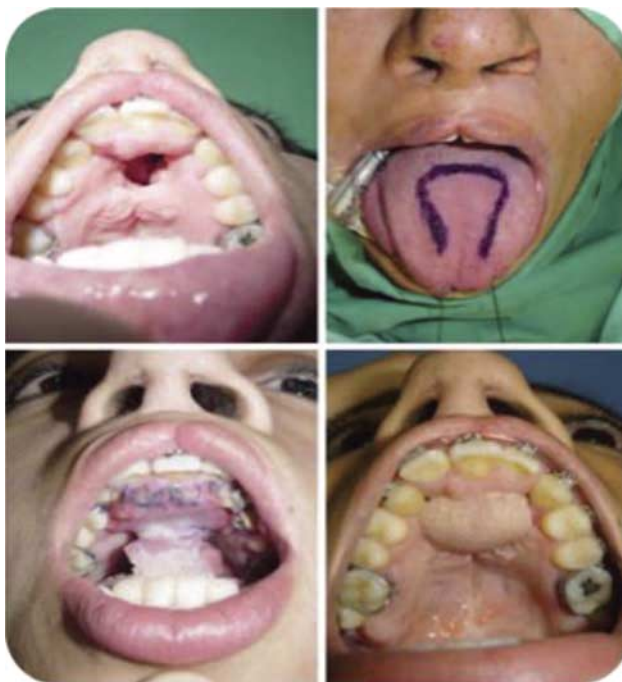


FIGURE 7. Resume.

On the other hand, other types of complications have been described such as: bleeding, necrosis of the flap, regurgitation of content to the nasal cavity, diminishment of tongue size, difficulty in phonation after finishing the procedure and swelling of the flap. In our series, there were none of the above.

We consider tongue flap as part of the surgical tools for the repair of palate sequels. Nevertheless, I has to remember that an important limiting condition is the age of the patient, not being able to present this technique in preadolescents or with behavioral problems because of the obvious effect in the psychological state and the necessary cooperation. Zhou²² published a case report of a double tongue flap in a patient of only 10 years old, and Vasistha¹³ had patients from 4 years of age, not specifying psychological aspects or sociocultural ones in their publications, just as in many of the reports of cases and series.

We do not use platen or a splint to fix the tongue at the moment of taking the flap as other authors describe.

In our opinion, 1 of the key elements of the surgical technique, is to consider a thickness of at least 5 mm for the flap and to maintain its vitality. It should not be thicker to avoid vascular-nervous damage of the tongue.

Very voluminous flaps on the other hand, will impede a correct phonation and will provoke discomfort in the patient.¹¹⁻¹⁹

We consider in terms of a secure grip, 21 days to be sufficient time to pass before the second surgery where a section of the flap is made, just as published by Sodhi and Prakash.^{17,20}

Study limitations: being a retrospective investigation and lack of available data about primary palatoplasty before referral to our center.

CONCLUSIONS

The palatal fistulas are originated in most cases, as a surgical complication from the primary palatoplasty.

The tongue, as it is a mobile and well irrigated organ, allowing to obtain flaps without altering its function. In our institution we use anterior position of the base of the flap with good functional results.

The selection of patients is key for an adequate result, since it is not possible to apply this technique in preadolescent patients or with behavioral problems.

We consider that this tongue surgery, is a reproducible and safe method, with a low rate of complications, which allows us to recommend it in large palatal fistulas.

REFERENCES

- Giugliano C. Patología de cabeza y cuello. In: Rostion C, ed. *Cirugía Pediátrica*. Santiago: Publicaciones Técnicas Mediterráneo; 2014;394-411
- Sorolla JP. Anomalías craneofaciales. Dpto Cirugía plástica. Hospital Militar. *Rev MedClinCondes* 2010;21:5-15
- S Cecchi GW. Colgajo lingual excelente alternativa para el cierre de Fistulas Oronasales: reporte de un caso. *Horizonte Médico* 2016;16:66-70
- Yuan N, Dorafshar AH, Folmar KE, et al. Effects of cleft width and veau type on incidence of palatal fistula and velopharyngeal insufficiency after cleft palate repair. *Ann Plast Surg* 2016;76:406-410
- Ruiz-Rodríguez R, Lopez-Noriega JC. Reoperations in cleft lip and cleft palate treatment. *Oral Maxillofac Surg Clin North Am* 2011;23:169-176
- Ogle OE. The Management of oronasal fistulas in the cleft palate patient. *Oral Maxillofac Surg Clin North Am* 2002;14:553-562
- Piggot RW, Reiger FW, Moodie FA. Tongue flap repair of cleft palate fistula. *Br J Plast Surg* 1984;37:285-293
- Cohen SR, Kalinowski J, LaRossa D, et al. Cleft palate fistulas: a multivariate statistical analysis of prevalence, etiology, and surgical management. *Plast Reconstr Surg* 1991;87:1041-1047
- Bykowski MR, Naran S, Winger DG, et al. The rate of oronasal fistula following primary cleft palate surgery: a meta-analysis. *Cleft Palate Craniofac J* 2015;52:e81-e87
- Rossell-Perry P. Two methods of cleft palate repair in patients with complete unilateral cleft lip and palate. *J Craniofac Surg* 2018;29:1473-1479
- Ruiz R. Cleft lip and palate. In: Miloro M, Peterson L, eds. *Peterson's Principles of Oral and Maxillofacial Surgery*. Shelton, CT: People's Medical Pub. House-USA; 2012:872-875
- Bracka E. The blood supply of the dorsal tongue flaps. *Br J Plastic Surg* 1980;34:379
- Vasistha SM, Krishnan G, Rai YS, et al. The versatility of the tongue flap in the closure of palatal fistula. *Craniofacial Trauma Reconstr* 2012;5:145-160
- Agrawal K, Panda KN. An innovative management of detached palatal mucoperiosteal flap from the hard palate (hanging palate). *Plast Reconstr Surg* 2005;115:875-879
- Posnick JC, Getz SB. Surgical closure of end-stage palatal fistulas using anteriorly-based dorsal tongue flaps. *J Oral Maxillofac Surg* 1987;45:907-912
- Hardwicke JT, Landini G, Richard BM. Fistula incidence after primary cleft palate repair: a systematic review of the literature. *Plast Reconstr Surg* 2014;134:618e-627e
- Licéaga-Escalera C, Vélez-Cruz M. Colgajo lingual para cierre de fistula oronasal: aportación a la técnica. *Rev Esp Cir Oral Maxillofac* 2012;34:31-34
- Sodhi SP, Kapoor P, Kapoor D. Closure of anterior palatal fistula by tongue flap: a prospective study. *J Maxillofac Oral Surg* 2014;13:546-549
- Durmus Kocaaslan FN, Tuncer FB, Sendur S, et al. The tongue flap for large palatal fistulas, a success or a failure? Our 15-year experience. *J Plast Surg Hand Surg* 2020;54:151-155
- Prakash A, Singh S, Solanki S, et al. Tongue flap as salvage procedure for recurrent and large palatal fistula after cleft palate repair. *Afr J Paediatr Surg* 2018;15:88-92
- Santos M, García J, Graf S, et al. Protocol for out patient management in cleft lip and palate repair. *Int J Pediatr Otorhinolaryngol* 2021;142:110592
- Barazarte D, Muñoz R, Golaszewski J, et al. Use of tongue flap as alternative for the closure of palatal fistulas in patients with sequela of palatoplasty. *Rev Esp Cir Oral Maxillofac* 2020;42:76-82