

Assessment of Palatal Fistula Repair Using a Conchal Cartilage Graft

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INTRODUCTION

The Usefulness of free conchal cartilage grafts for the reconstruction of lower eyelid ectropion, augmentation rhinoplasty, nose deformity resulting from cleft lip and recently for repair of palatal fistula, has already been reported by several authors (1), (2), (3), (5), (6), (7), (8)). The aim of the present study was to compare conchal cartilage graft to traditional methods used for repair of palatal fistula associated with palatoplasty in our clinic (4),. Thirteen patients with palatal fistula after primary palatoplasty were evaluated post-operatively. These subjects had undergone operative repair of a palatal fistula using a free conchal cartilage graft with or without a local mucosal flap. The result of the operation, speech intelligibility before and after surgery, and aerodynamic characteristics were assessed.

SUBJECTS

Thirteen patients diagnosed with palatal fistula at our special cleft palate outpatient clinic were evaluated (Table 1, 2). One of these patient had cleft palate alone, while the others had cleft lip and palate. Among the latter group were three patients with bilateral cleft lip and palate. Patient age ranged from 3 to 24 years.

CRITERIA FOR PALATAL REPAIR SURGERY

Indications for palatal repair surgery were:

- 1) Fistula diameter of at least 5 mm,
- 2) Midline fistula location with velopharyngeal dysfunction or faulty articulation

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Table 1. Distribution of age, sex and Diagnosis in 13 patient's with palatal fistulas.

Patient Number	Age	Sex	Diagnosis
1. S.N.	3:0	F	UCLP
2. K.Y.	3:2	M	UCLP
3. R.F.	3:3	M	UCLP
4. Y.S.	3:9	M	UCLP
5. Y.S.	6:6	M	UCLP
6. M.Y.	7:1	M	BCLP
7. N.Y.	7:3	F	BCLP
8. K.K.	7:4	M	BCLP
9. I.M.	9:0	F	CP
10. I.S.	11:9	F	UCLP
11. S.M.	18:6	F	UCLP
12. A.G.	19:5	F	UCLP
13. S.K.	24:2	M	UCLP

CP=cleft palate

UCLP=unilateral cleft lip and palate

BCLP=bilateral cleft lip and palate

Table 2. Distribution of Fistula Length (in mm), Width (in mm), Size (in mm), and grafted cartilage size (Length×Width).

Patient Number	Fistula Length (mm)	Fistula Width (mm)	Fistula Size (mm ²)	Cartilage Size (Length×Width) mm mm
1.	7.3	5	36.5	12 × 17
2.	8	4.2	33.6	18 × 15
3.	6.4	2.0	12.8	7 × 6
4.	7.3	1.5	10.95	16 × 12
5.	12.9	2.9	37.4	23 × 13
6.	—	—	—	10 × 7
7.	7.7	1.3	10	15 × 10
8.	9.8	4.9	48	8 × 20
9.	—	—	—	12 × 5
10.	9.9	4.9	48.51	10 × 22
11.	13.4	1.8	24.12	15 × 27
12.	7.5	4.3	32.25	13 × 10
13.	15.0	4.2	63	13 × 35

(Partient 6 and 9 has no measured in size of fistula.)

and nasal snorting resulting from fistula,

- 3) Patient discomfort due to passage of food and liquids through the fistula into the nasal cavity,
- 4) Aerodynamic evidence of increase of intraoral pressure as a result of fistula obstruction.

SURGICAL PROCEDURE

The incision line was established along the anterior aspect of the anti-helix of the auricle (Fig. 1). Before incision lidcaine with epirenamine was injected just above the perichondrium to facilitate undermining of the conchal cartilage.

The mucosal flap was moved over the fistula and turned over to close the nasal side (Fig. 2). A deep pocket for insertion and fixation of the conchal cartilage was created. This procedure is important to a successfull outcome. Through to Through suturing was performed (Fig 3, 4, 5). In the case of anterior palatal fistula, a transpositioned vestibular-mucosal flap was applied to cover the grafted cartilage. When the fistula was located in the posterior part of the palate, a tie-over fixation was usually used.

The surgical field was covered with a acrylic prosthesis to prevent infection. If necessary, the conchal cartilage was flattened by cross-hatching.



Fig. 1. The incision line was placed along the anterior aspect of the anti-helix.

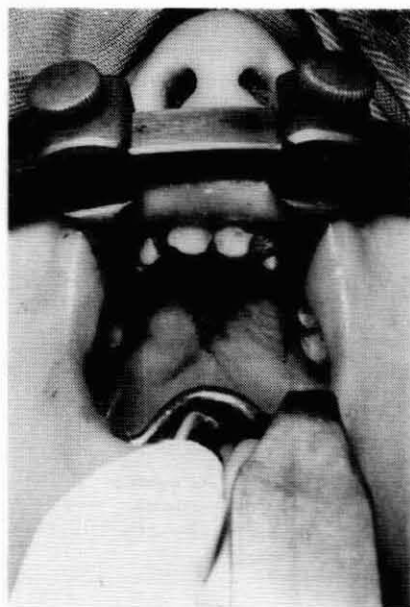


Fig. 2. The nasal side of palatal fistula was closed with turnover flap.

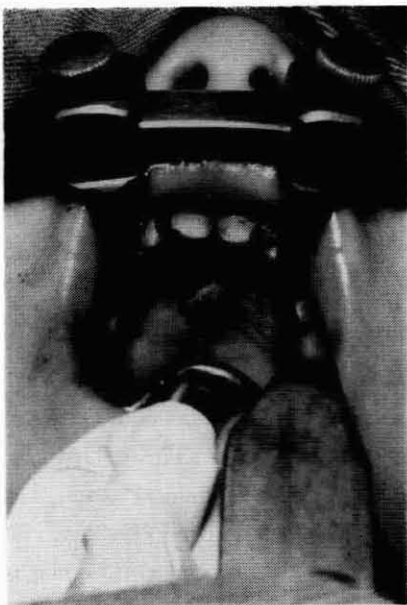


Fig. 3. The conchal cartilage was inserted into the deep pocket around the palatal fistula.

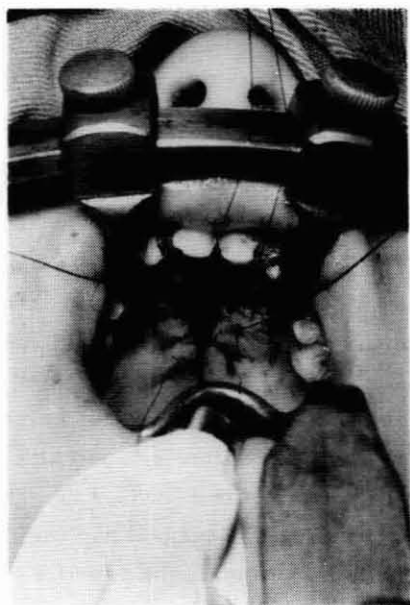


Fig. 4. The conchal cartilage was tightly fixed using of through to through suturing.

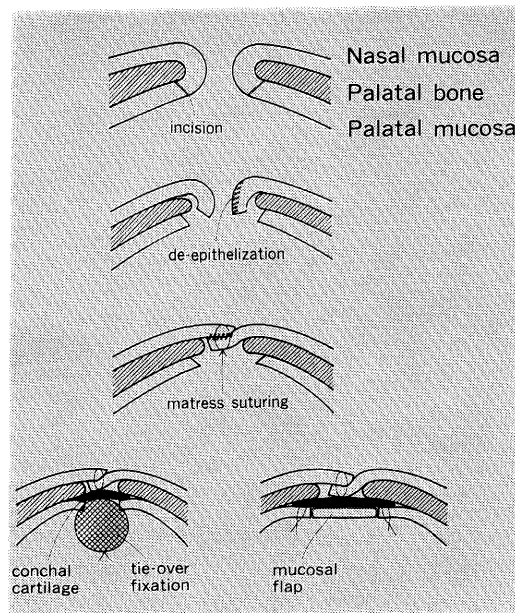


Fig. 5. Schema of the methods for our palatal fistula repair.

RESULTS

The surgical results were evaluated as “good”, “fair”, or “poor” in comparison to results previously obtained in our clinic.

Complete fistula closure was graded “good”. “Fair” signified that an asymptomatic narrow fistula remained, while “poor” designated a failure to repair the fistula. In the present study all of the cartilage implants produced results that were fair or good (Table 3). Pre-and post operative aerodynamic results and speech intel-

Table 3. Operative procedure for repair in palatal fistula and results.

Patient Number	Operation Methods	Results
1.	C	Fair
2.	C+V	Good
3.	C	Good
4.	C+V	Good
5.	C	Good
6.	C	Fair
7.	C	Fair
8.	C	Fair
9.	C	Good
10.	C	Fair
11.	C	Good
12.	C+V	Good
13.	C+V	Good

C= Conchal cartilage

V= Vestibular mucosal flap

Table 4. Aerodynamic study for palatal fistula patients with velopharyngeal incompetence.

Patient Number	pre-operation		post-operation	
	VPR	Hyper nasality	VPR	Hyper nasality
6. M.Y.	4.2	+	371.4	—
11. S.M.	86	+	605	—
13. S.K.	107.7	+	2319	—

VPR=velopharyngeal resistance (dyne·sec/cm⁵)

Table 5. Speech intelligibility before and after palatal repair operation with faulty articulation patients.

Patient Number	pre-operation	post-operation
5. Y.S.	5	2
6. M.Y.	5	3
8. K.K.	5	2

5 : faulty articulation for some consonants
 4 : distorted on some consonant production
 3 : slightly distorted on some consonant production
 2 : almost normal
 1 : normal

ligibility are given in table 4 and table 5.

DISCUSSION

The problems of speech associated with palatal fistula commonly depend on loss of intraoral air pressure and audible nasal escape. Hypernasality is also one of the symptoms associated palatal fistula (9), 10), 11),). Fiberoptic examination and aerodynamic analysis with temporary closure of the palatal fistula with an obturator indicated velopharyngeal activity improvement. Therefore, the size and location of the palatal fistula should be carefully examined before a fistula repair operation. In addition, fluid and food regurgitation into the nasal cavity through the palatal fistula are major problem for the patient's quality of life. This aspect receives careful attention our clinic. The most common location of the palatal fistula is the anterior region of the hard palate, and on mid line with a defect of palatal bone in the cleft palate patient. To prevent fistula formation in primary palatoplasty, Isshiki has described turning over the flap to double the closure layer of the anterior region of the cleft palate, and results have been satisfactory (12),). Unfortunately, several cases have resulted in palatal fistula after primary palatoplasty, in particular cases of bilateral cleft lip and palate. The incidence of palatal fistula has been reported by many authors, operator's skill may account for differences in incidence (14),). A number of methods to close the palatal fistula after primary palatoplasty have been described, including mucosal flap, mucoperiosteal flap, free mucosal graft in the case of small fistula, and tongue flap for large fistula (13), 15),). The problem of fistula repair surgery is the existence of an area of avascular scarring around the fistula. Failure of

Table 6. The result of using conchal cartilage grafting versus our previous report.

	Good	Fair	Poor
* Previous Report	12	6	5
Conchal cartilage	8	5	0

*=Vestibular mucosal flap, Mucoperiosteal flap and free mucosal graft not included tongue flap.
(Palatal Fistula Repair. Studia Phonologica, XXIII, 1989)

fistula closure, such as necrosis of the flap commonly resulted from excessive tension, careless suturing, and infection. In this study, palatal repair was performed using not only a local mucosal flap but also conchal cartilage with perichondrium grafting. The cartilage is protected from infection and epithelization is soon seen, The result of using cartilage is satisfactory compared to our previous report (Table 6,). The cases grading "fair" in this study were founded to result from immediate loss of grafting cartilage. To prevent the early loss of the grafting cartilage, through to through suturing and air tight shield fixation between cartilage and mucosal flap are necessary. For palatal fistula located in the anterior region of palate, it is possible to cover the surface of the grafted cartilage by using a vestibular transposition of the mucosal or musculo-mucosal flap. Mucosal-flap covering provides a good result compared with tie over covering of the cartilage. A palatal fistula diameter of less than 5 mm is a good indication for the use of conchal cartilage graft alone. However, by using a conchal cartilage together with a local mucosal flap, in particular a buccal transposition flap, it is possible to close a fistula of more than 5 mm in the anterior region of the palate. The success of this operation depends on 1) Excision of an adequately large conchal cartilage with perichondrium, 2) Air tight shield fixation, 3) Through to through mattress suturing, 4) Covering the implanted cartilage.

SUMMARY

The result of Palatal fistula repair surgery in thirteen patients were assessed.

In the present study all of the conchal cartilage implants produced results that were fair or good. The result of using cartilage is satisfactory compared to our previous study.

The Usefulness and advantages of conchal cartilage graft for repair of palatal fistula were discussed. The success of this operation summarized as follows, :1) Excision of an adequately large conchal cartilage with perichondrium, 2) Air tight shield fixation, 3) Through to Through mattress suturing, 4) Covering the implanted cartilage.

REFERENCES

- [1] Stark, RB., Frileck, SP.,: Conchal cartilage grafts in augmentation rhinoplasty and orbital floor fracture.: *Plast Reconstr Surg* 43: 591-596, 1969.

- [2] Brent, B.: The vestibular cartilage autograft: Current trends in clinical trasplantation. *Clinics in Plastic Surgery*, 6. 163-180. 1979.
- [3] Muenker, R.: The bilateral conchal cartilage graft: A new technique in Augumentation Rhinoplasty. *Aesth. Plast Surg.* 8. 37-42, 1984.
- [4] K, Nose., N. Isshiki, M. Sawada., T. Taira., et al: Palatal Fistula Repair-Methods and results. *Studia Phonologica XXIII*, 23-32, 1989.
- [5] Matsuo, K., Hirose, T., Takahashi, N., et al: Lower eyelid reconstruction with a conchal cartilage graft. *Plast. Reconstr. Surge.*, 80: 547-552, 1987.
- [6] Ohsumi, N.: Experimental study and clinical sue of auricular cartilage graft for postoperative oronasal fistulae. *J. Jpn. P.R.S.* 10.: 193-202, 1990.
- [7] Ohsumi, N., Onzuka, T., Haraguchi, K., Ohkubo, F., et al: Clinical use of auricular cartilage graft for closure of palatal fistulae following cleft palate surgery.: *J. Jpn. R.P.S.* 10: 478-490, 1990.
- [8] Matsuo, K., Kiyono, M., Hirose, T.: A simple technique for closure of a palatal fistula using a conchal cartilage graft. *Plast. Reconstr. Surge.*, 88: 334-337, 1991.
- [9] Shelton, R.L., Blank, J.L.: Oronasal fistulas, Intraoral air pressure, and Nasal air flow during speech.: *Cleft Palate Jornal* 21; 91-99, 1984.
- [10] Isberg A., Henningsson G.: Influence of palatal fistulas on velopharyngeal movements: A cineradiografic study: *Plast Reconstr Surg* 79. 525-530, 1987.
- [11] Henningsson, G., Isberg, A., Influence of palatal fistulae on speech and resonance: *Folia Phoniat.* 39: 183-191, 1997.
- [12] Isshiki N., Morimoto M.: Anterior cleft palate closure by turnover flaps, *Plast Reconstr Surg* 42: 249-251, 1968.
- [13] Guerrero-Santos, J., Altamirano, J.T.: The use of lingual flaps in repair of fistulas of the hard plate. *Plast Reconstr Surg* 38: 123-128, 1966.
- [14] Cohen SR., Kalinowski, J., et al: Cleft palate fistulas: A multivariate statistical anlysis of prevalence, etiology, and surgical management. *Plast Reconstr Surg* 87: 1041-1047, 1991.
- [15] Millard Jr DR., *Cleft Craft* 3. Secondary Fistulae, pp. 809-824. Little Brown Co, Boston 1980.