

**NASOLABIAL FLAP VS TEMPOROPARIETAL FLAP RECONSTRUCTION IN ORAL
SUBMUCOUS FIBROSIS**

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ABSTRACT

Aim: The present study was conducted to evaluate and compare the versatilities of two reconstructive modalities, i.e. NLF and TPF for the reconstruction of the defect in buccal mucosa. **Material and method:** The prospective study was conducted among 30 cases, which were divided into two groups i.e. Group I: Nasolabial flap and Group II: Temporoparietal flap. Surgical techniques were performed for group 1 and 2. Subjective facial pain, range of mandibular motion, venous congestion, arterial blockage, temperature, skin edema, wound dehiscence and hematoma were assessed and compared at pre-operative, 1st week, 1 month and 3 months among group 1 and group 2. The statistical significant difference among groups was determined by the Chi square and t test and the level of significance was set at $p < 0.05$. **Results:** Mean IIMO preoperative and postoperative after 1 week, actively in Group I was 11 ± 4.05 mm and 26.67 ± 3.08 mm while in Group II the values were 12 ± 3.03 and 26.33 ± 1.86 . Mean IIMO after 1 and 3 month passive and active increased more in Group I in comparison to Group II. **Conclusion:** NLF should be done in young patients who consent and preferably old patients and TPF in patients who are concerned with esthetics and unilateral OSMF cases.

KEYWORDS: OSMF, Nasolabial flap, Temporoparietal flap, Mouth opening.

INTRODUCTION

Oral submucous fibrosis is "a chronic, insidious disease affecting any part of oral cavity and may extend to the pharynx and the oesophagus and may be preceded or associated with vesicle formation."^[1] A malignant transformation rate of 3% to 7.6% was found in OSMF cases.^[2,3] OSMF is predominantly seen in people of South Asia and South- East Asia – India, Bangladesh, Sri Lanka, Pakistan, Taiwan, Southern China, etc. where consumption of arecanut or its flavored formulations or as an ingredient in the betel quid is more prevalent.^[4] Numerous other factors such as routine consumption of chili in food, nutritional deficiency, hereditary susceptibility, autoimmune and collagen disorders have been the etiologic factors concerned in the pathogenesis of this condition.

The treatment modalities include medical management (placental extract, steroids, vitamins and hyaluronidase) and surgical procedures. However the role of these medications in advanced cases of oral submucous fibrosis with established restricted mouth opening is

limited.^[5] The various surgical procedures include excision of fibrous bands with or without grafts.

The use of nasolabial flap (NLF) in reconstruction of head and neck defects has proved to be effective and reliable. Numerous articles report use of this flap for closure of fibrotomy defect and also defect of the upper lip, tongue and gingival sulcus.^[6,7]

The Temporoparietal flap (TPF) has been widely used for the repair of defects in oral submucous fibrosis with advantages and limitations compared to nasolabial flap. TPF are reliable, thin, and supple and have a good arc of rotation and minimal donor site morbidity. They may be used to cover bone, cartilage, or implants, may be folded for bulk, may be used to carry blood to poorly vascularized recipient sites, or may be used to nourish bone, cartilage, skin, and mucosal grafts.^[8]

Hence the present study was conducted to evaluate and compare the versatilities of two reconstructive modalities, i.e. NLF and TPF for the reconstruction of

the defect in buccal mucosa, secondary to the resection of the fibrotic bands in oral submucous fibrosis.

MATERIALS AND METHOD

The prospective study was conducted in Department of Oral and Maxillofacial Surgery, MM College of Dental Sciences and Research, Ambala. In this study, two flaps were compared, which were divided into two groups i.e. Group I: Nasolabial flap and Group II: Temporoparietal flap. The patients were selected if they fulfill the following inclusion and exclusion criteria.

Inclusion criteria

1. 18 years and above
2. Tobacco chewing as the causative factor
3. Inter incisal mouth opening (IIMO) between 0-15mm.
4. Well motivated patient for follow up and cessation of habit (minimum 6 months)

Exclusion criteria

1. More than 25mm of mouth opening
2. Medically and immune-compromised patient.

A total of 12 cases with OSMF were undertaken for the study. Out of the 12 cases, 6 received Nasolabial flap and 6 received Temporoparietal flap. Written consent was taken from the patient participating in the study.

Clinical Armamentarium: Required was standard soft tissue surgical instruments, calipers with scale for measurements, Heisters or Fergusons mouth opening device, mouth mirror, tweezers, suction cannula, surgical scalpel, B.P. blade no. 15, electrocautery knife, Kelly's Hemostatic /artery forceps, periosteal elevators, needle holder, Adsons tissue forceps, scissors, straight mosquito forceps, Langenbeck's retractor and tongue depressor.

Evaluation criteria: Patients was evaluated at the regular interval of 1 week, 1 month, 3 months, and 6 months for the following 8 parameters as mentioned in table 1.

Surgical techniques: After the clearance from anesthesia patients were taken to Operation Theater and the intubation was carried under general anesthesia.

Nasolabial flap technique (Group 1): The intraoral incisions was placed bilaterally on the buccal mucosa to release the fibrous bands were made using electrosurgical knife along the buccal mucosa at the level of occlusal plane away from Stenson's duct orifice. The wounds created were further freed by finger dissection and undermining was done by blunt dissection until no resistance was felt. Using Fergusson's mouth gag forcible mouth opening in the range of 30-35 mm was achieved and a bite block was placed. The maxillary and mandibular third molars were extracted for the proper orientation of the flap and to ease in suturing. The marking for the flap design was done using methylene blue ink.

An elliptical shaped nasolabial flap was designed to be centered over the nasolabial groove. The lateral dimension of the flap was outlined for maximum cosmetic results. The width was kept as 1.5 cm to 2.5 cm and was largely limited to the laxity of the cheek, so as to avoid distortion of the angle of the mouth. The medial incision line precisely followed the nasolabial folds on its inferior third, thus causing less distortion after flap transfer and allowed for improved arc of rotation. The elliptical design of the flap avoids skin puckering or dog ear formation in the closure of the donor nasolabial area.

The pedicle was positioned at the region of the modiolus wherein the facial artery enters the skin. The transbuccal tunnel was made in the region of the modiolus just medial to the pedicle. The tunnel was large enough to easily accommodate 1 or 2 fingers. The flap was then transferred into the oral cavity in a tension free manner and inset onto the defect with a series of simple interrupted sutures using 3 - 0 absorbable vicryl (polyglactin).

Generous undermining of the donor site was performed in the subcutaneous plane, and layered closure of the donor defect was then performed using 3 - 0 vicryl suture for deeper layer and 5 - 0 prolene for final skin closure.

Temporoparietal Flap technique (Group 1): The intraoral incisions to release the fibrous bands were made using electrosurgical knife along the buccal mucosa at the level of occlusal plane away from Stenson's duct orifice. The wounds created were further freed by finger dissection and undermining was done by blunt dissection until no resistance was felt. Infiltration of the incision from the pre-auricular region extending to the temporal region is done 10 min before the incision. Sub periosteal dissection is performed over the zygomatic arch and the zygomatic maxillary area. The origin of the masseter muscle is released completely from the zygomatic arch and the zygomatic process of the maxillary bone. This allows partial release of the fibrosis. The dissection is carried along the coronoid process. Insertion of the temporalis muscle is released from the coronoid process and the anterior border of the ramus of the mandible.

An intraoral incision is made to release the mucosa, buccinator muscle, and pterygomandibular raphe. This procedure is repeated on the opposite side allowing complete release of submucous fibrosis with full mouth opening. This release creates a big mucomuscular defect. Using Fergusson's mouth gag forcible mouth opening in the range of 35-50 mm was achieved and a bite block was placed. A superficial temporal fascia flap is elevated from the pericranium and the deep temporal fascia. The flap is pedicled on the superficial temporal vessels and turned over the zygomatic arch and brought intraorally to fill in the defect in a tension free manner and inset onto the defect with a series of simple interrupted sutures using 3 - 0 absorbable vicryl (polyglactin). The tie over

dressing is removed on the fifth post-operative day. All cases in this series showed full survival of the flap.

Post-operative in both techniques: Extraoral and intraoral sutures were removed by the end of seventh and fifteenth day respectively. Patients were started on mouth opening exercises (using wooden sticks) from the 10th postoperative day, with a frequency of four times a day with duration of half an hour, and later the frequency and duration was increased to facilitate improvement in the mouth opening until values that were achieved intra-operatively. After a latent period of 10 days, physiotherapy was started to prevent contractures and relapse. The patients were instructed and motivated to continue the physiotherapy themselves with wooden spatulas for up to 3 months.

Statistical analysis: Data so collected was tabulated in an excel sheet, under the guidance of statistician. Data was analyzed using IBM SPSS. Statistics Windows, Version 22.0. (Armonk, NY: IBM Corp) for the generation of descriptive and inferential statistics. The statistical significant difference among groups was determined by the Chi square and t test and the level of significance was set at $p < 0.05$.

RESULTS

The mean age of the patients in group 1 and group 2 was 44.17 and 30.33 years respectively (table 1). In group 1, Male: Female ratio was 3:3, showing 50% male & 50% female predilection while in group 2, Male: Female ratio was 6:0, showing 100% male predilection (table 1).

The mean preoperative Inter-Incisal Mouth Opening (IIMO) was 11 ± 4.05 mm and intraoperative IIMO 41.83 ± 1.83 mm. Postoperatively IIMO was increased by 311.67% as compared to preoperative. After 1 month

active and passive IIMO was increased by 197.22% and 176.11% respectively as compared to preoperative ($p < 0.01$). The mean IIMO preoperatively and after 3 months actively was 11 ± 4.05 mm and 38.5 ± 4.05 mm respectively with statistically significant difference as $p < 0.01$. After 3 month passive IIMO was increased by 135.00% as compared to preoperative (Table 3).

Intraoperative IIMO was increased by 366.67% as compared to preoperative. This was significant statistically with a p value of < 0.0001 . Postoperatively IIMO was increased by 352.83% as compared to preoperative ($p = 0.0004$). The mean IIMO preoperative and postoperative after 1 week passively was 12 ± 3.03 mm and 22.67 ± 1.75 mm respectively with statistically significant difference ($p = 0.001$). After 1 month active and passive IIMO was increased by 276.10% and by 252.20% respectively as compared to preoperative. After 3 months active and passive IIMO was increased by 266.67% and 244.65% as compared to preoperative. The difference was significant statistically with as $p < 0.05$ (Table 4).

Mean IIMO preoperative and postoperative after 1 week, actively in Group I was 11 ± 4.05 mm and 26.67 ± 3.08 mm while in Group II the values were 12 ± 3.03 and 26.33 ± 1.86 . Mean IIMO postoperative after 1 week passively, increased more in Group I as compared to Group II with statistically significant difference. Mean IIMO after 1 and 3 month passive and active increased more in Group I in comparison to Group II (table 5).

The mean pre-operative VAS was 4.5 for Group 1 Nasolabial Flap (NLF) and 4 in Group 2 (TPF). Extraoral scar absent in all Group II patients and present in all the patients of Group I (table 6).

Table 1: Evaluation criteria.

Assessment Intervals (Follow-up)	Subjective Facial Pain; VAS (0-10)	Range Of Mandibular Motion (MIO) In (mm)	8 CRITERIAS CONSIDERED													
			Venous Congestion		Arterial Blockage		Temperature		Skin Edema		Wound Dehiscence		Hematoma			
			Blue /Purple	Black	Pale	White	Cold	Warm	Present	Absent	Donor	Receptor	Donor	Receptor		
Pre-Operative																
1 st Week																
1 Month																
3 Months																

Table 2: Distribution of patients by age and gender.

Variables		Flap		Total	P value
		NLF	TPF		
Gender	Female (F)	3 (50.00%)	0 (0.00%)	3 (25.00%)	0.182
	Male (M)	3 (50.00%)	6 (100.00%)	9 (75.00%)	
Total		6 (100.00%)	6 (100.00%)	12 (100.00%)	
Age (years)	≤ 40	3 (50.00%)	5 (83.33%)	8 (66.67%)	0.545
	> 40	3 (50.00%)	1 (16.67%)	4 (33.33%)	
Total		6 (100.00%)	6 (100.00%)	12 (100.00%)	

Table 3: Comparison of pre-operative to 3 months active and passive mouth opening in nasolabial flap group.

Nasolabial flap group	Mean \pm SD	Min-Max	P value
Maximal inter-incisal opening (mm) Pre-op	11 \pm 4.05	5-15	
Maximal inter-incisal opening (mm) Intra-op	41.83 \pm 1.83	40-45	<.0001
Maximal inter-incisal opening (mm) 1 week (Active)	26.67 \pm 3.08	23-30	<.0001
Maximal inter-incisal opening (mm) 1 week (passive)	25.5 \pm 2.43	22-28	0.0002
Maximal inter-incisal opening (mm) 1 month (Active)	34.67 \pm 2.16	32-38	<.0001
Maximal inter-incisal opening (mm) 1 month (Passive)	32.5 \pm 3.08	28-36	0.0002
Maximal inter-incisal opening (mm) 3 month (Active)	38.5 \pm 2.88	35-42	0.0001
Maximal inter-incisal opening (mm) 3 month (passive)	36 \pm 4.05	30-40	0.0002

Table 4: Comparison of pre-operative to 3 months active and passive mouth opening in Temporoparietal flap group.

Temporoparietal flap group	Mean \pm SD	Min-Max	P value
Maximal inter-incisal opening (mm) Pre-op	12 \pm 3.03	7-15	
Maximal inter-incisal opening (mm) Intra-op	35.17 \pm 2.32	33-38	<.0001
Maximal inter-incisal opening (mm) 1 week (Active)	26.33 \pm 1.86	23-28	0.0004
Maximal inter-incisal opening (mm) 1 week (passive)	22.67 \pm 1.75	20-25	0.001
Maximal inter-incisal opening (mm) 1 month (Active)	32.17 \pm 3.71	28-38	0.0002
Maximal inter-incisal opening (mm) 1 month (Passive)	29.5 \pm 3.08	26-35	0.0004
Maximal inter-incisal opening (mm) 3 month (Active)	34.33 \pm 2.88	30-38	0.0002
Maximal inter-incisal opening (mm) 3 month (passive)	31.17 \pm 2.99	27-36	0.0004

Table 5: Comparison of Nasolabial flap and Temporoparietal flap with inter-incisal mouth opening from pre-operative to 3 months active and passive.

Maximal inter-incisal opening (mm) Pre-operative	NLF	TPF	P value
Sample size	6	6	0.639
Mean \pm SD	11 \pm 4.05	12 \pm 3.03	
Maximal inter-incisal opening (mm) Intra-operative			0.0003
Sample size	6	6	
Mean \pm SD	41.83 \pm 1.83	35.17 \pm 2.32	
Maximal inter-incisal opening (mm) 1 week (Active)			0.825
Sample size	6	6	
Mean \pm SD	26.67 \pm 3.08	26.33 \pm 1.86	
Maximal inter-incisal opening (mm) 1 week (passive)			0.043
Sample size	6	6	
Mean \pm SD	25.5 \pm 2.43	22.67 \pm 1.75	
Maximal inter-incisal opening (mm) 1 month (Active)			0.184
Sample size	6	6	
Mean \pm SD	34.67 \pm 2.16	32.17 \pm 3.71	
Maximal inter-incisal opening (mm) 1 month (Passive)			0.123
Sample size	6	6	
Mean \pm SD	32.5 \pm 3.08	29.5 \pm 3.08	
Maximal inter-incisal opening (mm) 3 month (Active)			0.031
Sample size	6	6	
Mean \pm SD	38.5 \pm 2.88	34.33 \pm 2.88	
Maximal inter-incisal opening (mm) 3 month (passive)			0.041
Sample size	6	6	
Mean \pm SD	36 \pm 4.05	31.17 \pm 2.99	

Table 6: Comparison of Nasolabial flap and Temporoparietal flap with (VAS 0-10) from pre-operative to 3 months and scar.

VAS (0- 10) pre op		NLF	TPF	P value
Sample size		6	6	0.625
Mean \pm SD		4.5 \pm 1.87	4 \pm 1.55	
VAS (0- 10) 1 week				0.444
Sample size		6	6	
Mean \pm SD		5.33 \pm 2.16	4.5 \pm 1.38	
VAS (0- 10) 1 month				1
Sample size		6	6	
Mean \pm SD		1.5 \pm 1.22	1.5 \pm 1.22	
VAS (0- 10) 3 months				-
Sample size		6	6	
Mean \pm SD		0 \pm 0	0 \pm 0	
Comparison of Scar Assessment (Visible/Not visible; NV)		NLF	TPF	Total
Scar Assessment (Visible / Not visible)	N.V.	0.00%	100.00%	50.00%
	Visible	100.00%	0.00%	50.00%
Total		100.00%	100.00%	100.00%

DISCUSSION

OSMF should be treated at the earliest so as to avoid the potentially malignant nature of this condition. Hence the present study was conducted to appraise the versatilities of two reconstructive modalities, i.e. Nasolabial flap (NLF) and Temporoparietal flap (TPF) in the OSMF treatment.

In the present study, it was found that, preoperative and postoperative mouth opening in Group I (NLF) were 11 mm and 36.00 mm respectively, while in Group II (TPF) the values were 12 mm and 31.17 mm respectively. In our study it was established that NLF is superior in comparison with TPF. The drawback of TPF is its inability to cover entire intraoral defect especially in the commissure area. The other critical areas are retromolar trigone (RMT) region, faucial area adjacent to uvula. The advantage of TPF is that the scar is not visible and is hidden by hairs. Extra oral scar (Using Stony Brooke scar assessment scale 32) was absent in TPF group (Group II) and present in NLF group (Group I). The drawback of NLF patients after it repaired is extra oral scar and hair growth intra orally, particularly in male patients which are visible.

The assessment among NLF patients revealed a satisfactory outcome after 3 month. It is prudent to counsel the patient going in for NLF about the extraoral scar and weighing the benefits on long period of time. In our study all the patients accepted the scar without any significant complaints. The hair growth although was seen in early post phase period, however It was reduced on longer follow up.

In the present study, none of the flaps showed either bluish or whitish discoloration in the postoperative phase and no infection was encountered in any of our cases. Complications such as flap loss, flap avulsion, obstructive sialadenopathy or wound dehiscence were not encountered in our series. Intraoral hair growth was

observed on the 3rd-4th postoperative day, which was managed by regular trimming initially followed by epilation after 1½ months.

The donor site healed uneventfully in all our cases except in 4, where dehiscence was noted at the modiolus region where maximal tension was observed during closure. This complication usually occurred at the 2nd – 3rd month and was managed with systemic antibiotics and local dressings till the defect healed secondarily. The cause for the dehiscence could be attributed to the excessive muscular forces exerted in that region during vigorous physiotherapy and hence proper layered closure, especially at the modiolus region is mandatory. Initially the scars were inconspicuous but later increased in width (2-3mm) which was readily perceptible in 4 of our cases. Although the scars were perceptible in all cases, they were readily accepted by the patients.

CONCLUSION

NLF lead to one sided scar and therefore unaesthetic but on other hand NLF has been providing very successful surgical outcome in terms of mouth opening and healing as compared to TPF. Therefore we conclude by suggesting that NLF should be done in young patients who consent and preferably old patients and TPF in patients who are concerned with esthetics and unilateral OSMF cases. As far as achieving the goal of mouth opening is concerned, TPF reconstruction has resulted in an average 4-5mm less mouth opening compared to NLF, but both are successful in achieving an average of 32mm of mouth opening. The sample size in our study was less and hence, we suggest a larger sample size with longer period of follow-up.

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