ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 08, pp.55714-55719, August, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

BUCCAL PAD OF FAT AS INTERPOSITIONAL MATERIAL IN ORAL SUBMUCOUS FIBROSIS - A SYSTEMATIC REVIEW

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ARTICLE INFO

Article History:
Received 08th May, 2017
Received in revised form
10th June, 2017
Accepted 24th July, 2017
Published online 31st August, 2017

Key words:

Buccal pad of fat,
Oral submucous fibrosis,
Interpositional material,
Limited mouth opening.

ABSTRACT

Aim: To evaluate the effectiveness of buccal fat pad as interpositioning material in surgical management of oral submucous fibrosis.
Search strategy: Used Medline, Pubmed, Mesh. English literature articles and human trials were searched for.
Selection criterias: Articles were selected which used Buccal Pad Fat after fibrotomy for management of oral submucous fibrosis. Non randomised single interventions and retrospective trials were selected.
Data collection and analysis: The primary outcome was assessment of postoperative mouth opening as compared to preoperative mouth opening using buccal pad of fat as interpositional material after fibrotomy in oral submucous fibrosis management in the experimental group in parallel design studies. Analyses were undertaken for the items assessed for quality and publication bias.
Results: The primary outcome of the review to assess the postoperative mouth opening compared to preoperative mouth opening using buccal pad of fat as interpositional material after fibrotomy in oral submucous fibrosis. Secondary outcomes included assessment of recurrence, time taken for epithelisation, donor site morbidity. Four trials provided data for this review. No studies fulfil all the methodological quality assessment criteria.
Conclusion: The data shows significant increase in mouth opening postoperatively with use of buccal pad of fat as interpositional material after fibrotomy in oral submucous fibrosis. No sufficient evidence of studies to prove that buccal pad is most reliable interpositional material for buccal mucosa reconstruction in oral submucous fibrosis due to heterogeneity in studies and lack of randomised controlled trials to reach to a concrete conclusion.

Citation: Dr. Karthick Sekar, Dr. Radhika Rawal, Dr. Arva Kapasi and Dr. Prabhu Manickam Natarajan 2017. "Buccal pad of fat as interpositional material in oral submucous fibrosis - A systematic review", *International Journal of Current Research*, 9, (08), 55714-55719.

INTRODUCTION

Aim

To evaluate the effectiveness of buccal fat pad as inter positioning material in surgical management of oral submucous fibrosis.

MATERIALS AND METHODS

Search strategy

The search strategy was in accordance with the Cochrane guidelines. A search was done in PUBMED CENTRAL, MESH and MEDLINE for the related topic with no time limit using the key words listed below. The article search included only those listed in English literature. Articles were also hand searched from journals

- Journal of oral and maxillofacial surgery
- International journal of oral and maxillofacial surgery
- British journal of oral and maxillofacial surgery

Selection Criteria

The titles of the articles and the abstracts were reviewed. Articles using buccal pad of fat as interpositional material after fibrotomy were included for further review. The selection Criteria was as follows: Nonrandomised single intervention trials and Retrospective studies were selected. Only human trials were taken into consideration.

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Types of Studies

Study population: The study population was based on clinical grading of oral sub mucous fibrosis (Stage III and Stage IV).
Type of intervention: Studies using buccal pad of fat as interpositional material after fibrotomy.
Type of Outcome measures: Primary outcome measure: the difference in the inter incisal mouth opening pre operatively and post operatively,
Secondary outcome measure: Reccurence of the lesion, time taken for the epithelialisation of flap and postop morbidity were assessed.

Search		Result
#31	Search (#29) AND #30	318
#30	Search ((((((((((#15) OR #16) OR #17) OR #18) OR #19) OR #20) OR #21) OR #22) OR #23) OR #24) OR #25) OR #26) OR #27) OR #28	9217
#29	Search (((((((((#1) OR #2) OR #3) OR #4) OR #5) OR #6) OR #7) OR #10) OR #13) OR #14	144058
#28	Search anterolateral thigh flap	611
#27	Search island palatal mucoperiosteal flap	16
#26	Search tongue flap	1062
#25	Search radial forearm flap	1541
#24	Search temporalis flap	769
#23	Search nasolabial flap	387
#22	Search split thickness skin graft	1927
#21	Search split thickness flap	868
#20	Search coronoidectomy	72
#19	Search fibrotomy	7
#18	Search adipose tissue oral	2888
#17	Search buccal fat pad	244
#16	Search buccal fat	261
#15	Search buccal pad	228
#14	Search fibrosis mouth	2183
#13	Search burning sensation	1820
#10	Search osf	518
#7	Search osmf	49
#6	Search intolerance to spices	15
#5	Search limited mouth opening	373
#4	Search fibrotic bands mouth	10
#3	Search oral submucous fibrosis	589
#2	Search submucous fibrosis	647
#1	Search fibrosis	141578
	MeSH SEARCH STRATEGY	
#20	Search (((#4) OR #1) OR #2) OR #3	
#3	Search fibrosis mouth	
#2	Search fibrosis	
#1	Search oral	
#4	Search submucous fibrosis	

Data extraction and Analysis

Once a final conclusion was attained regarding the articles to be reviewed, data were extracted from each article were tabulated. This was later cross checked. A quality assessment of the studies was made as follows:
The quality assessment of included trials was undertaken independently as a part of data extraction process. Four main quality criteria were examined:

1. Method of Randomization, recorded as
   a. Yes – Adequate as described in the text
   b. No – Inadequate as described in the text
   c. Unclear in the text
2. Allocation Concealment, recorded as
   a. Yes – Adequate as described in the text
   b. No – Inadequate as described in the text
   c. Unclear in the text
3. Outcomes assessors blinded to intervention, recorded as
   a. Yes – Adequate as described in the text
   b. No – Inadequate as described in the text
   c. Unclear in the text
4. Completeness of follow- up (was there a clear explanation for withdrawals and dropouts in each treatment group) assessed as:
   a. Yes – Dropouts were explained
   b. No – Dropouts were not explained
   c. None – No Dropouts or withdrawals

Table 1. Quality assessment of included studies

Citation	Method of Randomization	Allocation Concealment	Outcomes assessors blinded to intervention	Completeness of follow- up
Mehrotra *et al* 2009	unclear	unclear	unclear	yes
Sharma *et al* 2011	no	no	unclear	yes
Yeh *et al* 1996	no	no	unclear	yes
Lai *et al* 1995	unclear	unclear	unclear	yes

RESULTS

Description of Studies

The search identified 318 publications out of which 312 were excluded after reviewing the title or abstract. Full articles were obtained for 5 studies. Of which 4 articles fulfilled all criteria for inclusion.

In order to assess the presence of heterogeneity a funnel plot was drawn. The results of the funnel plot showed presence of heterogeneity.

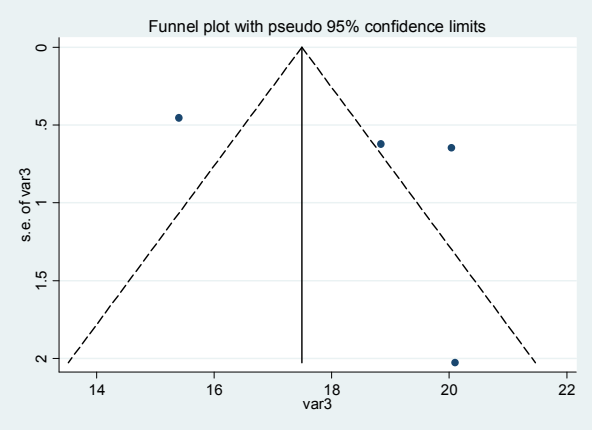

Figure 1. Funnel plot of the results of the individual studies

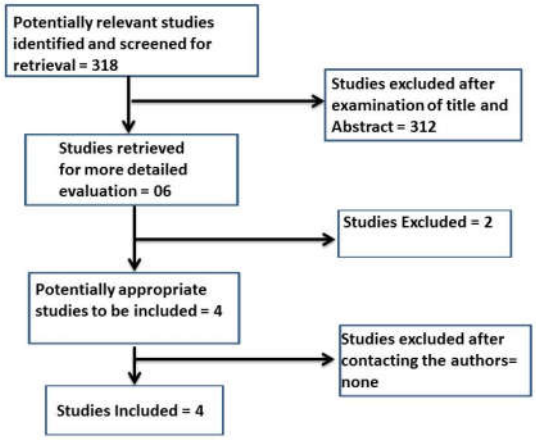

Figure 2. Study selection flow chart

Table 2. Description of Individual Studies

Author	Type of study	No of patients	Clinical preoperative mouth opening	Clinical postoperative mouth opening	Mean increase in mouth opening	Recurrence	Other parameters
MEHROTRA *ET AL* (2009)	Retrospective study Group I : Buccal fat pad graft Group II : Tongue flap Group III : Nasolabial fold flap Group IV : Split thickness skin graft	100	Gp I 14.88mm SD 4.521 Gp II 14.96mm SD 4.227 Gp III 14.68mm SD 4.705 Gp IV 14.76mm SD 4.323	Gp I 34.92mm SD 2.900 Gp II 34.16mm SD 3.118 Gp III 35.52mm SD 3.029 Gp IV 35.08mm SD 3.328	Gp I 20.04mm Gp II 19.20mm Gp III 20.84mm Gp IV 20.32mm	RELAPSE 4(Gp IV) HAIR GROWTH 16(Gp III) DIFFICULTY IN SPEECH 22(Gp II)	PAIN Gp I 4.26+/- 1.21 Gp II 3.25+/- 1.01 Gp III 3.18+/- 1.32 Gp IV 3.10+/- 1.34 ESTHETICS Gp I 3.42+/-1.42 Gp II 3.24+/- 1.08 Gp III 3.39+/- 1.89 GP IV 3.33+/- 1.31 FUNCTION Gp I 3.61+/- 0.67 Gp II 2.82+/- 1.3 Gp III 3.49+/- 0.58 Gp IV 3.29+/- 0.65
LAI *ET AL* (1995)		75	< 20 mm (gp D split thickness skin graft gp E fresh amnion graft gp F buccal fat pad graft)	30-35 mm	Decrease of interincisal distance in the range of 5-10 mm after 2 years follow up (%) Gp D : 50 Gp E : 62 Gp F : 38	Not mentioned	Graft and wound contracture most for fresh amnion group and least for BFP.
C.Y. YEH *ET AL* (1996)	Phase IV clinical trial	9	12.1 mm (8-16mm)	31.2 mm (16-38mm)	19.1 mm	2 (failure to exercise adequately)	Time for epithelization of BPF : 3-4 wks
SHARMA *ET AL* (2011)	Phase IV CLINICAL TRIAL	28	GROUP I : 19.6 mm (SD 2.43) GROUP II : 12.92mm(SD 1.21)	GROUP I : 35.00 mm (SD 1.96) GROUP II : 31.76 mm(SD 1.97)	GROUP I :15.4 mm GROUP II : 18.84 mm	2 cases in group II	Time for epithelization of BPF : GROUP I : 4 WEEKS GROUP II : 5 WEEKS Time for establishment of normal contour after grafting GROUP I :12.25 wks (SD 1.42) GROUP II : 15.07wks (SD 1.26)

Table 3. Level of evidence of Included studies

S.No.	Author	Year	Study design	Level of evidence
1	Yeh *et al*	1996	Nonrandomised single intervention study	3
2	Lia *et al*	1995	Non randomised single intervention study	3
3	Mehrotra *et al*	2009	randomised retrospective study	1
4	Sharma *et al*	2011	Non randomised single intervention study	3

The pre operative and post operative mouth opening levels in individual studies are listed in Table 4.

Study	Year	Pre opening		Post opening		N	Effect Size	95% CI
		Mean	SD	Mean	SD			
Yeh *et al*	1996	12.1	2.93	32.2	7.76	9	20.10	16.127 - 24.073
Mehrotra	2009	14.8	4.52	34.92	2.90	25	20.04	18.770 21.310
Sharma e tal 1	2011	19.6	2.43	35.0	1.96	15	15.40	14.512 - 16.288
Sharma *et al* 2	2011	12.92	1.21	31.76	1.97	13	18.84	17.623 - 20.057
		I – Pooled					17.49	16.875 - 18.109

Table 4. Assessment of four main methodological quality items

Study	Randomization	Allocation Concealed	Assessor Blinding	Dropouts Described	Risk of Bias
Mehrotra *et al* 2009	unclear	Unclear	Unclear	none	High
Sharma *et al* 2011	unclear	unclear	Unclear	none	High
Yeh *et al* 1996	Yes	No	Unclear	None	High
Lai *et al* 1995	unclear	unclear	Unclear	none	High

Table 5. Minor Criteria

Study	Sample Justified	Baseline comparison	I/ E Criteria	Method Error
Mehrotra *et al*2009	No	Yes	Yes	Yes
Sharma *et al* 2011	No	No	Yes	Yes
Yeh *et al* 1996	No	No	Yes	Yes
Shah 1995	No	Yes	Yes	Yes

The studies for inclusion in this review represent examples of use of Buccal pad fat as transpositional material after fibrotomy in oral submucous fibrosis. The description of the individual studies is listed in Table 2 and the level of evidence is listed in Table 3.

Risk of Bias in Included Studies

The assessments for the four main methodological quality items are shown in table 4. The study was assessed to have a "High risk" of bias if it did not record a "Yes" in three or more of the four main categories, "Moderate" if two out of four categories did not record a "Yes", and "Low" if randomization assessor blinding and completeness of follow – up were considered adequate.

DISCUSSION

Oral submucous fibrosis is an insidious chronic disease affecting any part of the oral cavity and sometimes pharynx, although occasionally preceded by and/or associated with vesicle formation, it is always associated with juxta epithelial inflammatory reaction followed by fibro elastic changes in lamina propria, with epithelial atrophy leading to stiffness of oral mucosa causing trismus and difficulty in eating". It is multifactorial origin with the high incidence of the disease in association with the consumption of the areca nut. Areca nut (betel nut or supari), plays a crucial role in etiology of oral submucous fibrosis. Arecoline, an alkaloid component, stimulates fibroblastic proliferation and collagen synthesis

The increase in mouth opening levels were pooled in and meta analysis was done using a random effect model. The pooled in increase in mouth opening was found to be 17.49 mm.

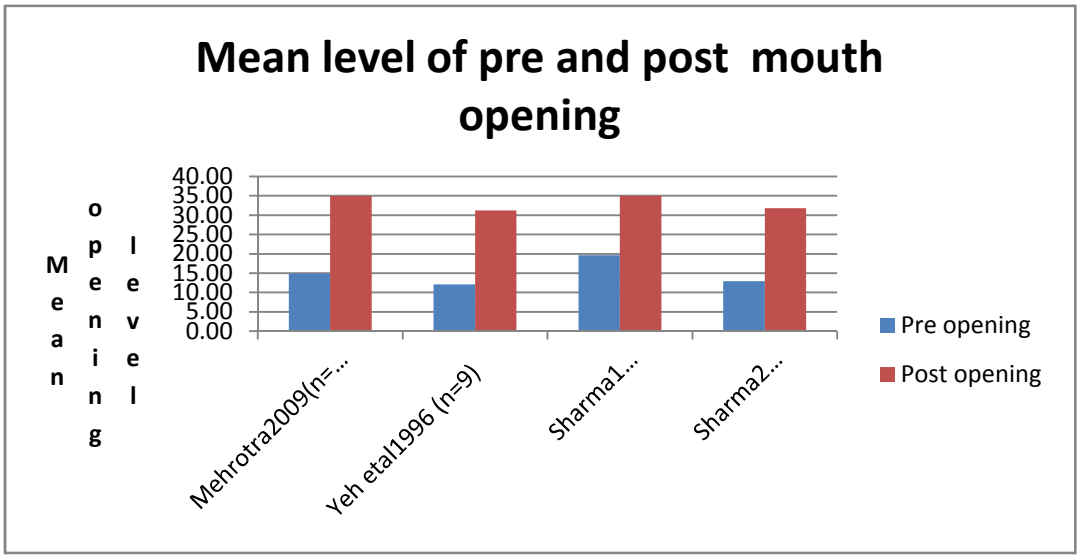

Figure 4. Mean level of pre and post op mouth opening levels.

Risk of publication Bias

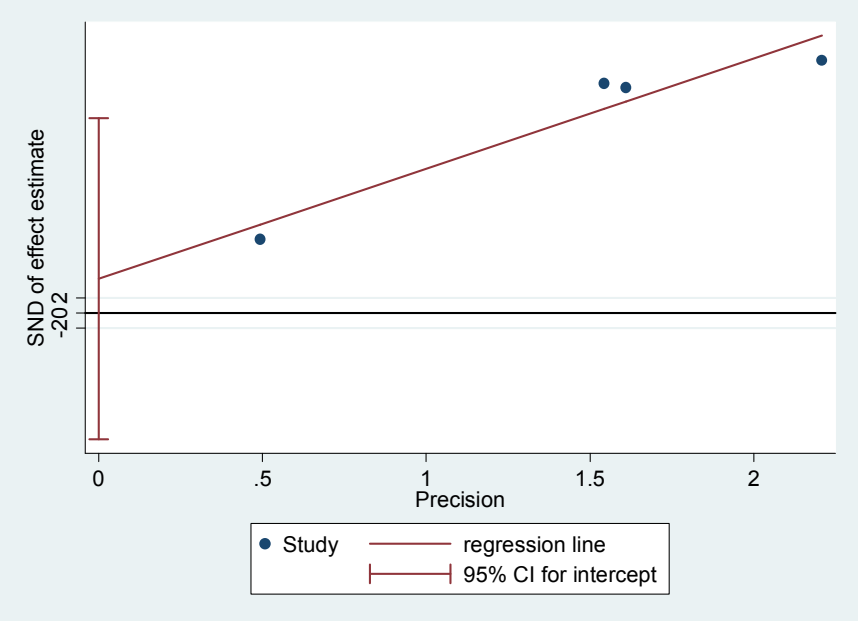

Figure 5. Test of H0: no small-study effects P = 0.457. Analysis of small study effects indicates that there is no publication bias

which ultimately leads to reduced mouth opening. The management of oral submucous fibrosis falls under two broad categories: Medical and Surgical. The medical management includes injection of Hyaluronidase, hydrocortisone, placentral extract, triamcinolone plus vitamin and iron supplements and jaw opening exercises. Non-surgical measures results have poor results in advanced cases and confined to early stages only. Surgical measures include release of fibrous bands and covering of the raw areas with split thickness skin graft, bilateral nasolabial flaps, palatal island flaps, tongue flaps, radial forearm flaps, temporalis myotomy and coronoidectomy. Simple release of fibrosis and skin grafting showed recurrence due to scarring and graft contraction. Bilateral tongue flaps is very damaging procedure and requires flap division at a second stage. Tongue flaps are bulky and require additional surgery for detachment. Bilateral tongue flaps cause severe dysphagia and disarticulation along with the risk of postoperative aspiration. Nasolabial flaps cannot be extended adequately to cover the raw area, and they also cause facial scars and at times are hair bearing. Island palatal mucoperiostal flap based on greater palatine artery is possible only when it is not involved with fibrosis and second molar tooth extraction is required for flap cover without tension. Also bilateral palatal flaps leave a large raw area on palatal bone. Bilateral radial forearm flap is bulky and hair bearing and requires microvascular expertise.

Conclusion

Though the data shows significant increase in mouth opening postoperatively effect size ratio of 17.49 mm with 95% confidence interval (16.875 - 18.109) using Random Effect model with use of buccal pad of fat as interpositional material after fibrotomy in oral submucous fibrosis. But heterogeneity in studies as shown by funnel plot and lack of randomised controlled trial suggest need for good quality randomised controlled trials to reach to a concrete conclusion.

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