








Efficacy of Oil Pulling in the Management of Oral Submucous Fibrosis: A Preliminary Study

Swatantra Shrivastava¹, Shushma Gurumurthy², Bharati Doni³, Ruchi Agrawal⁴, Santosh Rayagouda Patil¹, Hesham Shokry Ismail⁵, Mohammad Khursheed Alam⁶

¹Department of Oral Medicine and Radiology, New Horizon Dental College and Research Institute, Bilaspur, India.

²Department of Dentistry, Koppal Institute of Medical Sciences, Karnataka, India.

³Department of Dentistry, Koppal Institute of Medical Sciences, Karnataka, India.

⁴Department of Public Health Dentistry, New Horizon Dental College and Research Institute, Bilaspur, India.

⁵Department of Oral Radiology, Faculty of Dentistry, Suez Canal University, Ismailia, Egypt.

⁶Department of Orthodontics, College of Dentistry, Jouf University, Kingdom of Saudi Arabia.

Correspondence: Santosh R. Patil, Department of Oral Medicine and Radiology, New Horizon Dental College and Research Institute, Chhattisgarh, India. **E-mail:** drpsantosh@gmail.com

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ABSTRACT

Objective: To evaluate the effectiveness of oil pulling in the management of oral submucous fibrosis (OSMF). **Material and Methods:** A total of 62 patients clinically and histopathologically diagnosed as OSMF were incorporated in the present study. The subjects are randomly divided equally into two groups, Group A (oil pulling group) and Group B (placebo group). Subjects in Group A were asked to perform OP with sesame oil on an empty stomach in the morning for 3 months and Group B was given placebo capsules for 3 months. Assessment of various clinical parameters was done regularly, and data were analyzed using the Chi-square test. **Results:** Eighty-two percent had a habit of betel nut chewing, while 18% of the patients had tobacco chewing habits, which were among the main causative factors for OSMF. Clinical improvements in mouth opening, tongue protrusion, difficulty in speech and deglutition, and burning sensation were significant in the Group A. None of the patients reported any discomfort or side effects. The symptoms were not severe in nature and resolved in few days without stopping the therapy. **Conclusion:** Oil pulling can bring about significant clinical improvements in the symptoms like a mouth opening and tongue protrusion.

Keywords: Oral Submucous Fibrosis; Precancerous Conditions; Therapeutics.

Introduction

Oral submucous fibrosis (OSMF) is a premalignant condition affecting the oral cavity, pharynx, and upper gastrointestinal tract, characterized by progressive difficulty in jaw opening and inflammation and fibrosis of the submucosal tissues [1].

The symptoms and signs of OSMF are due to inflammation and, primarily, fibrosis. The most common symptoms and signs are a burning sensation, xerostomia, blanching of oral mucosa and formation of ulcers. The burning sensation frequently occurs while consuming spicy food [2]. Blanching of the oral mucosa is seen due to impairment of local vascularity secondary to fibrosis resulting in marbling appearance [3].

Various therapeutic approaches to relieve the symptoms in OSMF patients have been employed before, but none have proved successful to date. Stopping the causative factor is the initial step of preventive measures, which can be brought about by educating and counseling the patients. The symptomatic improvements such as improved jaw opening can be brought about by medical therapy, which particularly includes corticosteroids, placental extracts, interferon-alpha, pentoxifylline, lycopene, antioxidants, aloe vera, etc. [4].

It has been reported in the literature that oil pulling (OP) can treat various conditions, including oral diseases [5]. Furthermore, sesame oil is known to possess anti-inflammatory and antioxidant properties [6]. Therefore the presents study was carried to assess the efficacy of oil pulling in the management of OSMF.

Material and Methods

Study Design and Sample

This prospective interventional study included 62 patients clinically and histopathologically diagnosed as OSMF attending the Department of Oral Medicine and Radiology. Patients of either gender with OSMF were incorporated in the present study. Patients with any systemic diseases and who were not willing to participate were excluded from the study. A detailed family and medical history with a history of associated deleterious habits was documented. A detailed clinical examination was carried out, and all positive findings were documented.

The Sample size was calculated by using the following formula: $n = t^2 \times p(1-p)/m^2$ in which, n = required sample size, t = confidence level at 95% (standard value of 1.96), p = estimated prevalence of OSMF, m = margin of error at 5% (standard value of 0.05) and the power of test was set at 80%.

Data Collection

The patients were randomly divided equally into Group A (OP group) and Group B (placebo group). Subjects in Group A were asked to perform OP with sesame oil (Idhayam Oil, V.V.V. & Sons Edible Oils Ltd., Virudhunagar, India) on an empty stomach in the morning for three months. Patients are advised to take a tablespoon full of sesame oil and start swishing for 10 minutes or till they feel fullness in mouth. They were also instructed not to use any other treatment modalities during the study period. Patients in Group B were given placebo capsules for three months. Mouth opening was documented by calculating the distance between the center of incisal edges of upper central incisors and lower central incisor at maximum jaw opening. In edentulous subjects, the interalveolar distance along the midline was recorded.

Three measurements were recorded consecutively, and the average value was calculated and recorded. Tongue protrusion was calculated as the distance between the mesial contact area of the lower central incisor and the tip of the tongue on protrusion.

Evaluation for the presence, absence, or reduction of burning sensation, difficulty in deglutition, and speech was done at the intervals of 30 days, 60 days, and 90 days by using a visual analog scale. The score of 0-1 was considered as absent, 1-6 was considered as reduced, and 7-10 was evaluated. The subjects were also advised and encouraged to quit the associated habit.

Data Analysis

The data were entered using computer software SPSS 20.0 (SPSS Inc., Chicago, IL, USA) and analyzed using the Student's paired t-test and Chi-square test. $P < 0.05$ was considered statistically significant.

Ethical Clearance

Ethical clearance was obtained from the Institutional Review Board (Protocol No. 20/47), and consent was obtained from all the participants.

Results

There were 52 males and 10 females with a mean age of 32.2 ± 4.6 years. Eighty-two percent of the patients had a habit of betel nut chewing, while 18% of the patients had tobacco chewing habits, which were among the main causative factors for OSMF. Clinical improvements in mouth opening, tongue protrusion, difficulty in speech and deglutition, and burning sensation were significant in the Group A. None of the patients reported any discomfort or side effects. The symptoms were not severe in nature and resolved in few days without stopping the therapy. None of the subjects were dropped out due to any reason. The effect of OP and placebo in improving mouth opening is mentioned in Table 1, while the effect of OP in improving tongue protrusion is represented in Table 2.

Table 1. Effect of OP and placebo in improving mouth opening (mean values in mm).

Time Interval	OP	Placebo	p-value
Baseline	21.2 ± 3.1	20.6 ± 4.2	0.010
After 30 Days	23.4 ± 3.7	21.1 ± 3.6	
After 60 Days	25.6 ± 4.1	21.9 ± 5.3	
After 90 Days	28.3 ± 5.8	22.8 ± 1.6	

Table 2. Effect of OP in improving tongue protrusion (mean values in mm).

Time Interval	OP	Placebo	p-value
Baseline	10.9 ± 2.6	10.1 ± 1.6	0.002
After 30 Days	12.9 ± 5.4	10.9 ± 2.4	
After 60 Days	19.9 ± 1.5	11.4 ± 2.7	
After 90 Days	24.1 ± 3.7	12.2 ± 3.4	

The improvement of speech after OP is mentioned in Table 3 and improvement in swallowing after OP is showed in Table 4.

Table 3. Effect of OP on the difficulty in speech.

Time Interval	OP			Placebo		
	Present N	Absent N	Reduced N	Present N	Absent N	Reduced N
Baseline	29	3	—	24	2	—
After 30 Days	23	4	5	20	3	3
After 60 Days	16	7	9	15	6	5
After 90 Days	11	14	7	13	7	8

Table 4. Effect of OP on the difficulty in swallowing.

Time Interval	OP			Placebo		
	Present	Absent	Reduced	Present	Absent	Reduced
	N	N	N	N	N	N
Baseline	28	2	—	27	1	—
After 30 Days	22	3	5	24	2	2
After 60 Days	17	8	5	20	5	3
After 90 Days	9	14	7	15	9	4

The improvement of burning sensation after OP is represented in Table 5.

Table 5. Effect of OP on burning sensation.

Time Interval	OP			Placebo		
	Present	Absent	Reduced	Present	Absent	Reduced
	N	N	N	N	N	N
Baseline	31	—	—	31	—	—
After 30 Days	25	2	4	26	2	3
After 60 Days	18	6	7	22	4	5
After 90 Days	11	12	8	15	9	7

Discussion

The etiopathogenesis of the OSMF is not clearly established to date, but the etiology is known to be multifactorial. This condition is known to develop because of chronic areca nut chewing, which is the chief composition in betel quid. The components of the areca nut induce elevated reactive oxygen species, which leads to damage of the cellular structures. This is accompanied by deficiency of iron and vitamins and malnutrition, which disrupts repairing the inflamed oral mucosa, which results in impaired healing. This leads to thinning of mucosa, which becomes more vulnerable to the deleterious effects of the areca nut [7-9].

The overall prevalence rate of OSMF in India is believed to be about 0.2-0.5%, and the prevalence by gender is reported to vary from 0.2-2.3% in men to 1.2-4.5% in women [10,11]. The malignant potential of OSMF is known to range between 2.3% and 7.6% [12]. The treatment of the OSMF still remains a challenge till date. Many therapeutic and surgical treatment modalities have been employed to relieve the symptoms of the OSMF patients, but no proven and universally accepted therapeutic approach is available till date. It is mentioned in the literature that when a disease has developed, there is no regression and no effective treatment, and this holds true for OSMF [4].

Various approaches in managing OSMF include topical and intralesional corticosteroids, curcumin, colchicine, hyaluronidase, placental extracts, lycopene, pentoxifylline, aloe vera, spirulina, oxtard capsules, surgical excision, laser removal, etc. [13-16]. These modalities have proved to provide symptomatic relief and are more commonly focused on improving mouth opening. However, each treatment has its own limitations, and the medical management of OSMF is both empirical and unsatisfactory [8].

Sesame oil is a notable eatable vegetable oil regularly utilized in India. The scientific fervor has been booming with respect to the nutritional values of sesame oil because of its colossal health benefits. It has been reported that sesame oil possesses anti-inflammatory, anti-atherosclerotic properties; it is known to reduce high blood pressure, lower blood glucose levels, improve plasma lipid profile, and minimizes oxidative stress. Thus, many researchers have focused on the characterization of sesame oil composition to recognize the responsible molecular network related to sesame oil's health benefits [17,18].

Sesame oil is synthesized from *Sesamum indicum*, and it is composed of monounsaturated and polyunsaturated fatty acids. It is a rich source of oleic acid and linoleic acid. It is also comprised of lignans such as sesamin and sesamol and several antioxidants such as sesamol and sesaminol and other methylenedioxyphenol derivatives [17,19].

The importance of physiotherapy in improving mouth opening has been reported in the literature [20], OP procedure involves the action of multiple orofacial musculatures, so this fact, along with the beneficial effect of sesame oil, might have resulted in significant improvement in OSMF patients.








Cessation habit is very important for any of the treatment modalities, and if OSMF is detected at a very early stage, discontinuation of the betel quid or areca chewing habit is sufficient. In the present study, along with the Sesame oil pulling, the patients were advised and encouraged to quit the deleterious habit.

The present study's findings show a significant improvement in the subjects of Group A, and it can be concluded that OP can be used as a routine therapeutic modality in OSMF. However, further multicenter studies with larger sample size and a longer period of follow-up are advised.

Conclusion

The observations of the present study showed that OP was found to be effective in the management of OSMF. However, no side effects were reported; it showed better patient outcomes.

Authors' Contributions

SS		https://orcid.org/0000-0003-3762-3730	Conceptualization and Data Curation.
SG		https://orcid.org/0000-0002-9612-8839	Validation, Writing - Original Draft and Supervision.
BD		https://orcid.org/0000-0001-9721-1039	Validation and Supervision.
RA		https://orcid.org/0000-0001-8024-3317	Formal Analysis and Writing - Review and Editing.
SRP		https://orcid.org/0000-0003-0715-497X	Writing - Original Draft and Writing - Review and Editing.
HSI		https://orcid.org/0000-0002-0113-3900	Writing - Original Draft and Writing - Review and Editing.
MKA		https://orcid.org/0000-0001-7131-1752	Conceptualization, Methodology, Writing - Review and Editing and Project Administration.
All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.			

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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