

Efficacy of Curcumin and Topical corticosteroids in the treatment for Oral Submucous Fibrosis: A Comparative Study

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ABSTRACT

Background: To compare the efficacy of Curcumin and Topical Corticosteroids in the treatment of Oral Submucous Fibrosis

Materials and Methods: The randomized controlled clinical trial was carried out on 40 clinically diagnosed patients with OSMF, within the age range of 18–50 years of either sex and interincisal opening of more than 30mm were selected within the time period of 6 months. Mouth opening measurement was done with the help of Vernier Caliper and Heister's Jaw Opener was used as physiotherapy device for mouth opening.

Results: Comparison of efficacy of Curcumin and Topical Corticosteroids for the treatment of Oral Submucous fibrosis was made using Standard Student's *t*-test and a statistically significant difference was seen in Curcumin group than the control group in terms of reducing Burning sensation.

Conclusion: Curcumin is more effective in reducing burning sensation than Clobetasol group.

Keywords: Burning sensation, Curcumin, Interincisal distance, Mouth opening, Vernier Caliper.

INTRODUCTION

Oral submucous fibrosis (OSMF) is an insidious chronic disease affecting any part of the oral cavity and sometimes pharynx. It is associated with juxta-epithelial inflammatory reaction followed by fibroelastic changes in the lamina propria layer, along with epithelial atrophy which leads to rigidity of the oral mucosa proceeding to trismus and difficulty in mouth opening.¹ A nut chewing is the main etiological factor responsible for OSMF.² Clinical features of OSMF include stiffening and blanching of oral mucosa resulting in reduced mouth opening. Fibrous bands in lips, cheeks and soft palate are the hallmark of the disease. It progresses to oropharynx and upper third of oesophagus with time.³

For the treatment of OSMF, various treatment modalities have been used. Turmeric is a medicinal plant extensively used in Ayurveda, Unani and Siddha medicine as a home remedy for various diseases.⁴ A large number of studies have revealed that Curcumin has wide therapeutic actions such as anti-inflammatory, antioxidant and anticancer properties. Several studies have been carried out for the use of Curcumin in the treatment of OSMF.⁵ The present study aims to determine the efficacy of curcumin along with corticosteroids in the treatment of OSF and compare this to one of the available standard noninvasive drug treatment as topical application of corticosteroid such as clobetasol propionate (0.05%).

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To study the efficacy of curcumin and topical corticosteroids in treatment of Oral submucous fibrosis.

Objective

1. To educate the patients about the risk of developing OSMF and its complications.
2. To evaluate possible limitations and complications of each.

MATERIALS AND METHODS

The randomized controlled clinical trial at Mahatma Gandhi Dental College and Hospital, Jaipur, Rajasthan, India was carried out with 40 patients. An informed consent and ethical clearance were obtained from ethical clearance committee. Vernier Calliper was used for the measurement of mouth opening and Heister's Jaw Opener was used as mouth exercise device.

Inclusion Criteria

A total of 40 clinically diagnosed patients with OSMF, diagnosed on the basis of reduction in interincisal distance on maximum mouth opening and palpable fibrous bands involving oral mucosa within the age range of 18–50 years of either sex and interincisal opening of more than 30 mm were selected within the time period of 6 months.

Diagnosis of OSMF was made on the basis of natural history and characteristic clinical features which included the presence of burning sensation in the mouth, presence of palpable fibrous bands and decreased mouth opening.

Using the interincisal distance, the patients were divided into four different groups based on Lai's (1995)⁶ staging of OSMF as follows:

- Group A: >35 mm
- Group B: Between 30 and 35 mm
- Group C: Between 20 and 30 mm
- Group D: <20 mm

Exclusion Criteria

Patients with:

Group C-Interincisal distance between 20-30 mm,
Group D-Interincisal Distance <20 mm

- Patients who showed malignant changes or who were not willing for treatment were excluded.
- Cases complaining of difficulty in opening the mouth due to other reasons like inflammation etc. were excluded from the study.
- Patients with a systemic problem and allergic to study drugs will be excluded from the study.

After 1 month of the treatment, 40 subjects were selected to continue the study and were evaluated for the baseline evaluation criteria (condition of the patient at the start of study) which would be re-evaluated in the further study visits.

- 20 clinically diagnosed OSMF patients were recruited for the test (Curcumin) group. The test (Curcumin) group were given Turbocort ointment. The dose was within the safety limits.
- 20 clinically diagnosed OSMF patients were given topical steroid application and were considered under the control group topical clobetasol propionate-Clonate Ointment. All the patients were instructed to apply the ointment intraorally 3 times daily.
- The physiotherapy was indicated for both the groups by mouth exercise device (Heister Jaw Opener). Patients were instructed to exercise for 20 min (10 min on each side) with the help of the Heister Jaw Opener 5 times a day for 2 months.

Follow-up Clinical Evaluation

The baseline and recall evaluations were done on the basis of:

- Measurement of interincisal distance on maximum mouth opening over two fixed reference points with the help of Vernier Caliper.
- The criteria for Burning sensation on Visual Analog Scale (VAS SCALE) included any spicy food item with distinct addition of chilies.
- VAS Scale: no pain (0-4 mm), mild pain(5-44 mm), moderate pain (45–74 mm), and severe pain (75–100 mm).



Fig 1: Pre-treatment mouth opening 34mm.



Fig 2: Interincisal Distance 35mm (Follow up after 1 month).



Fig 3: Bilateral Blanching of Oral Mucosa.

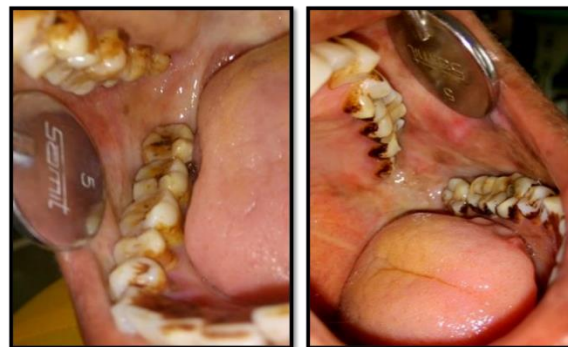


Fig 4: Reduced Bilateral Blanching of Oral Mucosa.

Table 1: Pre-Treatment Burning sensation and Interincisal distance/Mouth opening.

Groups	N	Burning sensation m±SD(mm)	Interincisal Distance m±SD(mm)	P
Test (Curcumin)	20	41.1±25.67	22.64±3.87	0.0002
Control	20	38±31.90	22.23±5.45	0.0005

Table 2: Post-Treatment Burning sensation and Interincisal distance/Mouth opening.

Groups	N	Burning sensation m±SD(mm)	Interincisal Distance m±SD(mm)	P
Test (Curcumin)	20	27±22.10	23.64±4.24	0.0004
Control	20	34±29.13	23.35±5.67	0.0051

RESULTS

Pre and Post treatment comparison of Burning sensation and Interincisal distance/Mouth opening (Figure I,II) was made between the Test (Curcumin) and Control (Topical Clobetasol Propionate) group (Table I and Table II). A statistically difference in terms of reduced burning sensation was seen in Curcumin group than the control group. Also, reduction in blanching of oral mucosa was seen Post treatment (Figure III,IV)

Statistical Analysis

Standard Student's *t*-test was used to evaluate the statistical significance.

DISCUSSION

Oral cancer is quite common in India. Primary prevention by avoiding the use of tobacco in any form and good oral hygiene are ideal.⁷ However,

already several thousands of persons are affected by Oral Submucous Fibrosis (OSMF), a precancerous condition.⁸ Degree of disease progression and clinical involvement form the basis of treatment of OSMF. Treatment is basically divided into three stages, early stages are treated by stopping habit and nutritional supplements while in moderate stages, conservative treatment such as intralesional injections along with medical treatment is provided but surgical interventions are needed at advanced stages.²

Relief of burning sensation and partial reversal of opening of the mouth as measured by the calipers and a reduction of micronuclei in the buccal smears when TO was administered for 3 months have been shown in initial studies. The local symptoms of burning sensation and pain were reduced.^{9,10,11}

Human clinical trials have indicated that Curcumin has no toxicity when administered at doses of 10 g/day.⁷ Turbocort (Curcumin) were well tolerated by all the patients. Only six patients reported yellowish coating over the teeth and dorsum of the tongue, which was removed by oral prophylaxis procedures and oral hygiene maintenance by patients. The total dosage of topical corticosteroid should not exceed 50 g/week because of the ability of the drug to suppress the hypothalamic-pituitary-adrenal axis. That would make a total dosage of 15 g/week.¹² None of the patients reported any gastrointestinal disturbances, rashes or allergic reactions.

The results of our study were in accordance with the study conducted by Das AD et al where statistically significant improvement was observed in the clinical signs and symptoms of patient treated with Curcumin.¹³

Remarkable symptomatic relief with topical application of ethanol extract of turmeric and curcumin ointment in 70% of the 62 cases with external cancer have been reported by Kuttan R et al. They also reported that Curcumin possess fibrinolytic action in liver and lung fibrosis. Turmeric and Curcumin are regarded as fibrinolytic agents in Chinese medicine.⁸

Li CJ et al in their study has attributed the fibrinolytic action of Curcumin to its three properties namely inhibition of lipid peroxidation,

checking cellular proliferation and inhibition of collagen synthesis.¹⁴ Hastak et al in their study have found turmeric to be effective in the amelioration of clinical signs and symptoms in patients with OSMF.¹¹

CONCLUSION

Thus, it can be concluded that the both groups are effective in reducing Burning Symptoms, but Test (Curcumin) is more effective than control (Clobetasol) group. Both drugs are ineffective in treating trismus/furthermore there was no significant difference found in between two.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

REFERENCES

1. Pindborg JJ. Oral submucous fibrosis as a precancerous condition. *J Dent Res*. 1966;45(3):546-53.
2. Passi D, Bhanot P, Kacker D, Chahal D, Atri M, Panwar Y. Oral submucous fibrosis: Newer proposed classification with critical updates in pathogenesis and management strategies. *Natl J Maxillofac Surg* 2017;8(2): 89-94.
3. Kerr AR, Warnakulasuriya S, Mighell AJ, Dietrich T, Nasser M, Rimal J et al. A systematic review of medical interventions for oral submucous fibrosis and future research opportunities. *Oral Diseases* 2011;17(Suppl 1): 42-57.
4. Chattopadhyay I, Biswas K, Bandyopadhyay U, Banerjee RK. Turmeric and Curcumin: Biological actions and medicinal applications. *Current Sci* 2004;87(1): 44-53.
5. Kohli K, Ali J, Ansari J, Raheman Z. Curcumin: A natural inflammatory agent. *Indian J Pharmacol* 2005;37(3): 141-47.
6. Rangnathan K, Mishra G. An overview of classification schemes for oral submucous fibrosis. *J Oral Maxillofac Pathol* 2006;10(2): 55-58.

7. Joshi J, Ghaisas S, Vaidya A, Vaidya R, Kamat DV, Bhagwat AN et al. Early human safety study of turmeric oil (*Curcuma longa* oil) administered orally in healthy volunteers. *J Assoc Ind* 2003;51: 1055-60.
8. Kuttan R, Sudheeran PC, Joseph CD. Turmeric and curcumin as topical agents in cancer therapy. *Tumori* 1987;73(2): 29-31.
9. Bhide SV, Jakhi SD. Clinical studies on turmeric treatment of precancerous oral lesions. Proceedings of XVI International Cancer Congress Abstract 351; 1994.
10. Hastak K, Lubri N, Jakhi SD, More E, John A, Ghaisas SD, Bhide SV. Effect of turmeric oil and turmeric oleoresin on cytogenetic damage to patients suffering from oral submucous fibrosis. *Cancer Letters* 116:265-269; 1997.
11. Hastak K, Jakhi SD, More C, John A, Ghaisas SD, Bhide SV. Therapeutic response to Turmeric oil and Turmeric oleoresin in Oral Submucous Fibromucosis patients. *Amla Res Bull* 1998;18: 23-8.
12. Dhar S, Seth J, Parikh D. Systemic side-effects of topical corticosteroids. *Indian J Dermatol* 2014;59(5): 460-64.
13. Das AD, Balan A, Sreelatha KT. Comparative study of the efficacy of Curcumin and Turmeric oil as chemopreventive agents in oral submucous fibrosis: A clinical and histopathological evaluation. *J Ind Acad Oral Med Radiol* 2010;22(2): 88-92.
14. Li CJ, Zhang LJ, Dezube BJ, Crumpacker CS, Pardee AB. Three inhibitors of type 1 human immunodeficiency virus long terminal repeat-directed gene expression and virus replication. *Proc Natl Acad Sci* 1993;90: 1839-42.