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## Research Article

### CURCUMA GEL AS AN ADJUNCT FOR TREATMENT OF GINGIVITIS: A PILOT STUDY

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#### ABSTRACT

Gingivitis is the most prevalent form of periodontal disease. Mechanical plaque control and use of chemotherapeutic agents is the basic treatment for gingivitis, but there are adverse effects of these conventional compounds. This led to the search of natural products which are biocompatible and beneficial. Turmeric (curcuma longa) is a dietary spice, widely used as a traditional medicine in Asian countries. Curcuma has widespread biological actions. Therefore a study was conducted to evaluate the role of curcuma in the control of plaque and resolution of gingivitis. Objective: To evaluate the role of oral curcuma gel in the management of gingivitis as an adjunct to scaling and polishing. **Materials And Methods:** Twenty subjects diagnosed with chronic gingivitis were selected from the Out Patient Department of Periodontology. After scaling and oral hygiene instructions, subjects were divided into experimental and control groups consisting of 10 subjects each. Subjects in the experimental group were instructed to apply the oral curcuma gel for 3 weeks. The Plaque index, Gingival index and papillary bleeding index were assessed at baseline, 1 week, 2 weeks and 3 weeks for control and experimental groups. **Results:** Plaque index score did not show statistically significant reduction. Experimental group showed statistically significant reduction in Gingival index and papillary bleeding index score at 3 weeks compared to test group. **Conclusion:** Within the limits of the study it was concluded that oral curcuma gel can be used as an adjunct to scaling in gingivitis patients. This was the first study of its kind conducted to evaluate the role of turmeric (curcuma) in the form of gel as an adjunct to scaling for the treatment of gingivitis.

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#### INTRODUCTION

Gingivitis is the most prevalent form of periodontal disease. The primary etiological agent in gingivitis is plaque. Studies conducted by Loe *et al.* 1965 confirmed the relationship of plaque and gingival inflammation.<sup>1</sup>

Gingivitis if left untreated it may lead to irreversible damage to the underlying periodontal structures. The basic treatment plan for gingivitis is debridement of tooth surface to remove supra and subgingival plaque and calculus and the use of chemotherapeutic agents.

Chemotherapeutic agents like Chlorhexidine, Triclosan, Povidone iodine and phenolic compounds are used as an adjunct to mechanical plaque control. However side effects like allergy, unpleasant taste, discoloration of teeth may occur if these agents are used for an extended period of time. This has led to research of novel products which are biocompatible and beneficial.

Various herbal products like aloe vera, clove, cinnamon, neem and turmeric can be used in dentistry as an adjunct to

mechanical plaque control. Turmeric is commonly known as haldi in India and is named as curry spice by British. It is used as an antiseptic in the traditional system of Indian Medicine. Its use dates back to around 4000 years and it is extensively used in Ayurvedic and Unani forms of medicine.

Turmeric is derived from the rhizome of curcuma longa, a perennial plant belonging to the Zingiberaceae (ginger) family. It contains a class of compounds known as the curcuminoids, comprised of curcumin, demethoxycurcumin and bisdemethoxycurcumin. Curcumin is the principal curcuminoid and comprises approximately 2-5% of turmeric; it is responsible for the yellow colour of the spice as well as for its widespread biological activities like antioxidant, anti-inflammatory, chemotherapeutic and chemo preventive. It also has antitumor, antiviral, antifungal properties and thus has a potential against various diseases including diabetes, asthma, allergies, arthritis, atherosclerosis, neurodegenerative disease and other chronic illness like cancer.<sup>2</sup> Due to these properties, it is quite useful in dentistry as well. Turmeric can also be used as a pit and fissure sealant, mouth wash, and subgingival irrigant

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in different preparations. It can also be used as a component in local drug delivery system in gel form.

Most currently available curcumin contains approximately 77% diferuloylmethane, 18% desmethoxycurcumin and 5% bis-desmethoxy curcumin.<sup>2</sup> In the present study the role of oral curcuma gel was evaluated in the management of gingivitis as an adjunct to scaling and polishing.

### Aim

To evaluate the role of oral curcuma gel in the management of gingivitis as an adjunct to scaling and polishing.

## MATERIALS AND METHODS

A double blind clinical study was conducted. Twenty subjects diagnosed with chronic gingivitis were selected from the Out Patient Department of Periodontology, Dr.G .D Pol Foundation's Y.M.T Dental College and Hospital, Kharghar Navi Mumbai. Informed consent was obtained from all the subjects.

### Inclusion Criteria

1. Subjects within the age of 18-55 years.
2. Subjects with atleast 20 teeth present.
3. Systemically healthy subjects.
4. Subjects demonstrating good compliance.
5. Subject willing to be a part of the study.
6. Probing depth  $\leq$  3mm.

### Exclusion Criteria

1. Medically compromised patients.
2. Pregnant, lactating females and those on oral contraceptives.
3. Smokers and tobacco chewers.
4. Subjects with any para functional habits such as mouth breathing, bruxism.
5. History of any local and/ or systemic antibiotics therapy within past 6 weeks.
6. Uncooperative subjects.

### Clinical Parameters

The following clinical parameters were recorded at baseline, 1 week, 2 weeks and 3 weeks:

- Plaque Index (Turesky Gilmore Glickman modification of Quigley Hein Plaque Index, 1970)<sup>3</sup>
- Gingival Index (Loe and Silness J 1963)<sup>3</sup>
- Papillary bleeding Index (Saxer and Muhlemann, 1977).<sup>4</sup>

A detailed case history was recorded from all the subjects participating in the study. The selected subjects than underwent scaling and oral hygiene instructions were given to them. The oral hygiene instructions included the use of standardized soft tooth brush, standardized dentifrice and modified bass method of brushing was demonstrated to all the participants. All subjects in the study were asked to refrain from the use of any mouthwash or interdental aids and analgesics during the course of the study. They were divided into two groups by random coin toss method.

Group I-(Experimental group): Scaling and polishing and oral curcuma gel (Curenext)<sup>TM</sup> application.

Group II-(Control group): Scaling and polishing.

Scaling and polishing for the subjects included in both the groups was carried out by a single operator.

Subjects in the experimental group were instructed to apply the curcuma oral gel twice a day for three weeks, after brushing.

They were instructed to leave the gel for atleast 10min after application and thereafter rinse with water to remove any residual medication.

Following this the clinical parameters were measured at baseline, 1 week, 2 week and 3 weeks. The evaluation was carried out by an investigator who was not aware in which group the subject belonged to.

### Statistical Analysis

Descriptive statistics were expressed as means and standard deviations for each group. Within group comparison for the study variables was analyzed using paired t test. Between group comparisons for the study variables was analyzed using unpaired Student t test. In the above tests, p value less than or equal to 0.05 ( $p \leq 0.05$ ) was taken to be statistically significant. All analysis was performed using SPSS software version 10.

## RESULTS

The study was carried out in 20 subjects (both male and female). All the 20 subjects were able to complete the clinical trial. Experimental group used the oral curcuma gel and did not show any adverse reactions such as allergy or ulcerations.

Plaque index, gingival index and papillary bleeding index was measured at baseline, 1 week, 2 week and 3 week.

Intergroup comparison of plaque index, gingival index and papillary bleeding index at different time interval. (Figure 1, Figure 2, Figure 3 and Table 1)

**Table no. 1** Inter group comparison for mean change for test and control group for all indices from baseline to 3 weeks

INDICES	Time interval	Test group	Control group	P value
Plaque index	Baseline	1.45 $\pm$ 0.47	1.24 $\pm$ 0.40	0.31
	1 week	1.10 $\pm$ 0.38	0.92 $\pm$ 0.19	0.21
	2 week	0.70 $\pm$ 0.09	0.64 $\pm$ 0.33	0.59
	3 week	0.43 $\pm$ 0.14	0.48 $\pm$ 0.29	0.60
Gingival index	Baseline	1.49 $\pm$ 0.17	1.58 $\pm$ 0.39	0.53
	1 week	1.24 $\pm$ 0.19	1.25 $\pm$ 0.26	0.95
	2 week	0.96 $\pm$ 0.24	1.11 $\pm$ 0.28	0.20
	3 week	0.66 $\pm$ 0.14	0.90 $\pm$ 0.16	0.002*
Papilla bleeding index	Baseline	1.13 $\pm$ 0.28	1.10 $\pm$ 0.14	0.75
	1 week	0.81 $\pm$ 0.37	0.90 $\pm$ 0.14	0.45
	2 week	0.60 $\pm$ 0.30	0.78 $\pm$ 0.17	0.11
	3 week	0.35 $\pm$ 0.25	0.61 $\pm$ 0.20	0.02*

\*statistical significance,  $p < 0.05$

### Plaque Index

#### Group I and Group II at baseline

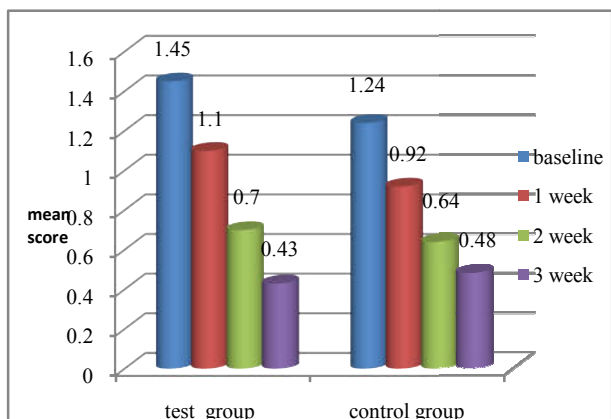
The mean plaque index score at baseline was 1.42  $\pm$  0.47 for group I and 1.24  $\pm$  0.4 group II.

**Group I and group II at 1 week**

The mean reduction in plaque index score at 1week was  $1.10 \pm 0.38$  for group I and  $0.92 \pm 0.19$  for group II which was not statistically significant( $p=0.21$ ).

**Group I and group II at 2week**

The mean reduction in plaque index score at 2week was  $0.7 \pm 0.09$  for group I and  $0.64 \pm 0.3$  for group II which was not statistically significant( $p=0.51$ ).(Table 1/Fig 1)



**Figure no 1** Inter group comparison for mean change for test and control group for Plaque index from baseline to 3 weeks

**Group I and group II at 3week**

The mean reduction in plaque index score at 3 week was  $0.43 \pm 0.14$  for group I and  $0.48 \pm 0.29$  for group II which was not statistically significant( $p=0.6$ ).

**Gingival index**

Group I and Group II at baseline.

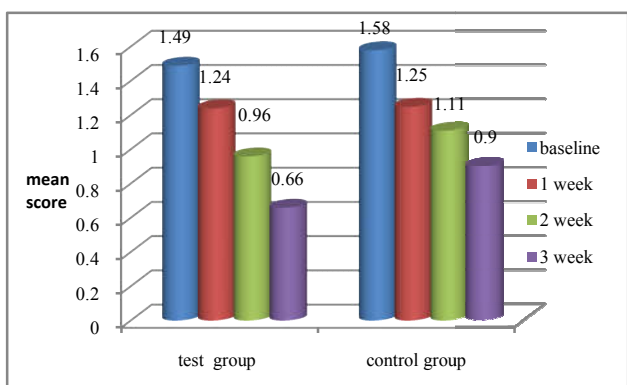
The gingival index score at baseline was  $1.49 \pm 0.17$  for group I and  $1.58 \pm 0.39$  for group II.

Group I and Group II at 1 week

The mean reduction in gingival index score at 1 week was  $1.24 \pm 0.19$  for group I and  $1.25 \pm 0.26$  for group II which was not statistically significant( $p=0.95$ ).

Group I and Group II at 2 week

The mean reduction in gingival index score at 2 week was  $0.96 \pm 0.24$  for group I and  $1.11 \pm 0.28$  for group II which was not statistically significant( $p=0.20$ ).



**Figure no. 2** Inter group comparison for mean change for test and control group for Gingival index from baseline to 3 weeks

**Group I and Group II at 3 week**

The mean reduction in gingival index score at 3 week was  $0.66 \pm 0.14$  for group I and  $0.90 \pm 0.16$  for group II which was statistically significant( $p=0.002$ ).

Therefore the gingival index showed a statistically significant reduction from baseline to 3 weeks.(Table 1/Fig 2)

**Papillary bleeding Index**

Group I and Group II at baseline.

The papillary bleeding index score at baseline was  $1.13 \pm 0.28$  for group I and  $1.10 \pm 0.14$  for group II.

Group I and Group II at 1 week

The mean reduction in papillary bleeding index at 1 week was  $0.81 \pm 0.37$  for group I and  $0.9 \pm 0.14$  for group II which was not statistically significant( $p=0.45$ ).

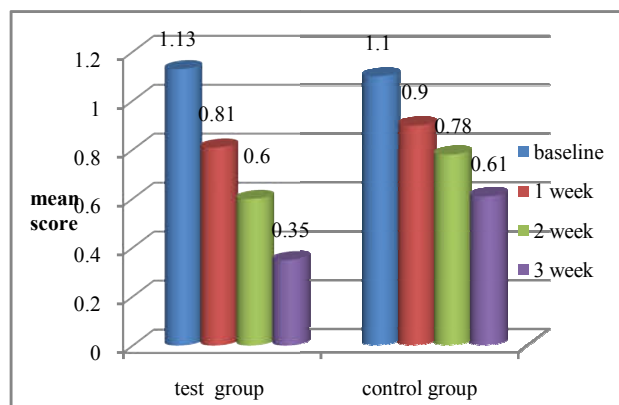
Group I and Group II at 2 week

The mean reduction in papillary bleeding index at 2 week was  $0.60 \pm 0.30$  for group I and  $0.78 \pm 0.17$  for group II which was not statistically significant( $p=0.11$ ).

Group I and Group II at 3 week

The mean reduction in papillary bleeding index at 3 week was  $0.35 \pm 0.25$  for group I and  $0.61 \pm 0.25$  for group II which was statistically significant ( $p=0.02$ ).

Therefore the papillary bleeding index showed a statistically significant reduction from baseline to 3 weeks.(Table 1/Fig 3)



**Figure no. 3** Inter group comparison for mean change for test and control group for Papilla Bleeding index from baseline to 3 weeks.

**DISCUSSION**

Plaque is the primary etiological factor for periodontal disease. The removal plaque regularly is of paramount importance in the prevention of periodontal disease Apart from regular mechanical and chemotherapeutic agents herbal products are extensively used in reducing the bacterial load.

Phytotherapeutic products have also been investigated and have show satisfactory results. The present study was conducted to evaluate the efficacy of oral curcuma gel as an adjunct to scaling in the treatment of gingivitis. In this study scaling plus oral curcuma gel application group(Experimental) showed statistically significant difference in gingival index(0.002) and papillary bleeding index(0.02) from baseline to 3 weeks These finding were in accordance with the finding of Farjana et al.(2014).<sup>5</sup>

Farjana *et al.* (2014) conducted a study to evaluate the clinical efficacy of oral curcuma gel in gingivitis and to assess any adverse effects of the gel and concluded that gel containing curcuma longa extract was efficient in treating gingivitis by reducing its inflammatory components.

Waghmare *et al* (2011) compared the turmeric and chlorhexidine gluconate mouthwash in prevention of plaque formation and gingivitis and concluded that chlorhexidine gluconate as well as turmeric mouthwash can be effectively used as an adjunct to mechanical plaque control in prevention of gingivitis.<sup>6</sup>

Mali *et al* studied comparative evaluation of 0.1% turmeric mouthwash with 0.2% chlorhexidine gluconate in prevention of plaque and gingivitis: A clinical and microbiological study and concluded that chlorhexidine gluconate as well as turmeric mouthwash can be effectively used as an adjunct to mechanical plaque control in prevention of plaque and gingivitis. Both the mouthwashes have comparable anti-plaque, anti-inflammatory and anti-microbial properties.<sup>7</sup>

Muglikar S *et al.* (2013) studied the efficacy of curcumin mouthwash as an adjunct to scaling and root planning in the treatment of chronic gingivitis and compared it with chlorhexidine and concluded that curcumin is comparable to chlorhexidine as an anti-inflammatory mouthwash and it is effective adjunct to mechanical periodontal therapy.<sup>8</sup> Gottumukkala *et al* studied effectiveness of subgingival irrigation of an indigenous 1% curcuma solution on clinical and microbiological parameters in chronic periodontitis patients and concluded that curcumin solution showed a mild to moderate beneficiary effect when used as an adjunct to scaling and root planning.<sup>9</sup>

Behal *et al*, did evaluation of local drug delivery system containing 2% whole turmeric gel used as an adjunct to scaling and root planing in chronic periodontitis.<sup>10</sup>

## CONCLUSION

Within the limits of the study it was concluded that oral curcuma gel can be used as an adjunct to scaling in gingivitis patients. This was the first study of its kind conducted to evaluate the role of turmeric (curcuma) in the form of gel as an adjunct to scaling for the treatment of gingivitis. However further long term studies are required with larger sample size and prolonged duration. In future, curcuma nanoparticle can also be incorporated for widespread use in the treatment of periodontal disease.

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