Original Research

Curcumin: A Herbal Approach in the Management Of Gingivitis

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Abstract: *Aim:* To evaluate the clinical efficacy of oral curcuma gel in the management of gingivitis, to assess the adverse effects & tolerance of gel. *Materials and Methods:* This randomized clinical trial comprises of 30 patients with severe gingivitis. Fifteen control sites were treated by subgingival scaling and root planning alone, and 15 test sites were treated with subgingival scaling and root planning followed by gingival massage with 1% curcumin gel. Patients were instructed to apply curcuma oral gel, twice a day for three weeks, after brushing and instructed to leave the gel in the mouth for at least 10 minutes after application. Clinical parameters i.e gingival index, plaque index & sulcular bleeding index were assessed at different time intervals (Baseline, 7 & 21 days) and recorded. Results: After 21 days the mean GI in control group decreases significantly 1.30 ± 0.13 & 1.47 ± 0.10 in test group respectively as compared to baseline ($p<0.05$). Mean PI within the groups, the PI in control group decrease significantly 0.94 ± 0.51 & 1.52 ± 0.25 in test group respectively as compared to baseline ($p<0.05$). Mean SBI in control group decrease significantly 1.19 ± 0.50 & 2.59 ± 0.53 in test group as compared to baseline ($p<0.05$). Conclusion: Within the limits of this clinical study, it can be concluded that the gel containing curcuma longa extract was efficient in treating gingivitis as an anti-inflammatory agent as a local application adjunct to scaling.

Keywords: Anti-inflammatory; Antimicrobial; Curcumin; Gingivitis.

INTRODUCTION

Gingivitis is an inflammation of the gingiva, which is characterized by the presence of clinical signs of inflammation that are confined to the gingiva. Local factors may contribute to gingivitis, in addition to the plaque retentive calculus formation on crown and root surface. Pathologic changes in gingivitis are associated with the presence of oral microorganisms attached to the tooth and perhaps in or near the gingival sulcus[1] which is a paramount factor in initiation and progression of gingival and periodontal diseases.[2]

Mechanical plaque control like scaling is the first recommended step in the management of gingivitis and periodontitis and is an indispensable phase of periodontal therapy. Many chemical agents have been tested as adjuncts to mechanical methods which can reduce plaque associated gingivitis. Chlorhexidine, Triclosan, Povidone iodine and various phenolic compounds have been used successfully as anti-plaque agents. However, side effects such as allergy, discolouration of teeth and unpleasant taste can occur when these chemicals are used for an extended period of time.[3]

Hence, a need was felt of an alternative medicine that could provide a product already enmeshed within the traditional Indian setup and is also safe and economical.[2] Herbal medicines have been used for thousands of years in developing countries and more than 80% of the population relies on their use for health care needs. Turmeric, neem, aloevera, clove, cinnamon are among the common herbal products used in dentistry.[3]

Turmeric is an ancient spice derived from the rhizome of Curcuma longa, a perennial plant belonging to the Zingiberacae (ginger) family. Turmeric contains a class of compounds known as the curcuminoids, comprised of curcumin, demethoxycurcumin and bisdemethoxycurcumin. Curcumin is the principal curcuminoids and comprises approximately 2-5 % of turmeric; it is responsible for the yellow color of the spice as well as the majority of turmeric's therapeutic effects.[4] Curcumin possess antioxidant, anti-inflammatory, anti-carcinogenic, antimicrobial, astringent properties.[5]

The present study is taken up to evaluate the efficacy of oral curcuma gel (Curenext) containing each gram 1 mg of Curcuma longa

extract. The objective of study is to evaluate the clinical efficacy of oral curcuma gel in the management of gingivitis, to assess the adverse effects & tolerance of gel.

MATERIALS AND METHODS:

Patients for this study were selected from the outpatient Department of Periodontics, Rama Dental College and Hospital, Kanpur, India. Verbal and written informed consent was obtained from every interested participants. This randomized clinical trial comprises of 30 patients were selected amongst the following selection criteria: Patients of age between 16-35 yrs. With the minimum of 20 teeth should be present in the dentition, Patients with severe gingivitis (red and inflamed gingiva) with the papillary bleeding index score of 3, Probing depth ≤ 3mm, Patient who had not received any periodontal therapy for past six months. Patients excluded from the study were: Subjects taking antibiotics or any other drugs within last three months, pregnant women and lactating mothers. Patients with any systemic disease, medically compromised, Smokers and with known hypersensitivity to curcuma.

After obtaining ethical clearance patient's clinical parameters were recorded for Plaque index, gingival index and Sulcular bleeding index (Fig 1). Fifteen control sites were treated by subgingival scaling and root planning alone, and 15 test sites were treated with subgingival scaling and root planning followed by gingival massage with 1% curcumin gel (Fig 3), Curenext oral gel (Abbott Pharmaceuticals), Per gram of gel contained 10 mg of curcuma longa extract (Fig 2).

Figure 1: Gingivitis observed on first day.

Figure 2: Curcumin gel application being done.

Patients were instructed to apply curcuma oral gel, twice a day for three weeks, after brushing and instructed to leave the gel in the mouth for atleast 10 minutes after application and thereafter rinsed with water to clear any residual medication. Clinical parameters are assessed at different time intervals (Baseline, 7 & 21 days) and recorded (Fig 3&4).

Figure 3: Healing of gingiva after 7th day

Figure 4: Healing of gingiva after 21st day

RESULTS

All 30 patients were able to complete the clinical trial. The experimental gel had a good patient's acceptance and did not show adverse reactions such as ulceration or allergic reactions. In the present study results were compared between test and control group at baseline, 7th day & 21th day respectively.

Gingival Index: The baseline, 7th day & 21th day GI of two groups are summarized in table 1. The mean GI in both the group decreased after the treatment, and the improvement was evident higher in test than control group. Comparing the mean GI within the groups, the GI in control group decreased significantly after both 7 & 21 days with mean (±SD) 2.15 ± 0.30 and 1.30 ± 0.13 respectively as compared to baseline. Similarly, in test group, the GI also decreases significantly after 7 & 21 days with mean (±SD) 2.17 ± 0.26 and 1.47 ± 0.10 respectively as compared to baseline. However mean GI in test group decreases significantly ($p<0.05$) after 7 days & significant decrease was found after 21 days in test group ($p < 0.05$) . Further, comparing the mean GI between the groups, the GI did not differ between the two groups at baseline indicating that GI were comparable.

TABLE 1: Showing the gingival index mean difference between test & control group at baseline, 7day & 21 day

Gingival Index	**Control**		**Test**		P–Value
	Mean	SD	Mean	SD	
Baseline	2.67	.29	2.67	.29	-
7 Days	0.53	.55	0.51	.55	0.334, Ns
21 Days	1.37	.23	1.20	.23	0.001: Sig

Plaque Index: The baseline, 7th day & 21th day PI of two groups are summarized in table 2. The mean PI in both the group decreased after the treatment, and the improvement was evident higher in test than control group. Comparing the mean PI within the groups showed PI in control group decreased significantly after both 7 & 21 days with mean (±SD) 1.43 ± 0.33 and 0.94 ± 0.51 respectively as compared to baseline. Similarly, in test group, the PI also decreases significantly after 7 & 21 days with mean (±SD) 1.81 ± 0.21 and 1.52 ± 0.25 respectively as compared to baseline. However mean PI in test group decreases significantly ($p<0.05$) after 7 days and significant decrease was found after 21 days in test group ($p < 0.05$). Further, comparing the mean PI between the groups, the PI did not differ between the two groups at baseline indicating that PI was comparable.

TABLE 2: Showing the plaque index mean difference between test & control group at baseline, 7day & 21 day

Plaque Index	**Control**		**Test**		P-Value
	Mean	SD	Mean	SD	
Baseline	2.75	.28	2.77	.26	0.334: Ns
7 Days	1.32	.26	0.95	.05	<0.001, Sig
21 Days	1.81	.36	1.25	.08	0.001: Sig

TABLE 3: Showing the sulcular bleeding index mean difference between test & control group at baseline, 7day & 21 day

Sulcular Bleeding Index	**Control**		**Test**		p-value
	Mean	SD	Mean	SD	
Baseline	3.47	.38	3.87	.34	0.001: Sig
7 Days	2.15	.44	2.05	.46	0.090
21 Days	2.28	.51	1.29	.37	<0.001: Sig

Sulcular Bleeding Index: The baseline, 7th day & 21th day SBI of two groups are summarized in table 3. The mean SBI in both the group decreased after the treatment, and the improvement was evident higher in test than control group. Comparing the mean SBI within the groups, showed SBI in control group decreased significantly after both 7 & 21 days with mean (±SD) 1.32 ± 0.45 and 1.19 ± 0.50 respectively as compared to baseline. Similarly, in test group, the SBI also decreases significantly after 7 & 21 days with mean (±SD) 1.82 ± 0.48 and 2.59 ± 0.53 respectively as compared to baseline. However mean SBI in test group decreases significantly ($p < 0.05$) after 7 days and also

significant decrease was found after 21 days in test group ($p < 0.05$). Further, comparing the mean SBI between the groups, the SBI did not differ between the two groups at baseline indicating that SBI were comparable.

DISCUSSION

Plaque is the main cause for the breakdown of periodontal tissues leading to periodontal disease. The inability of the adult population to perform adequate mechanical tooth cleaning has stimulated the search for chemotherapeutic agents added to dentifrices to improve plaque control and prevent gingivitis. So various means have been established and search is going on to reduce the bacterial load. Herbal products are one group of agents which has been used extensively in reducing the bacterial population. Phyto-therapeutic products have been investigated with these purposes and have shown satisfactory results. This made us to evaluate the efficacy of curcuma on gingival health and its use in the treatment of gingivitis.[1]

Curcumin has been widely studied throughout literature for its anti-inflammatory, anti-oxidant, antibacterial and wound healing properties.[6]

According to Behal et al. the experimental local drug delivery of 2% curcumin gel along with scaling and root planning is effective in removing the local irritants, reducing gingival inflammation and bleeding on probing. Also, in terms of taste and comfort, the experimental material 2% curcumin gel was found to be acceptable by all the subjects in their study. There was good biological acceptability, as evidenced by the absence of burning sensation, dryness/soreness, ulcer formation and staining of teeth. Turmeric in mouthwash form was used by Bhandari and Shankwalkar, whereas turmeric in gel form was used in this study. [7]

Muglikar et al., studied the efficacy of curcumin mouth wash as an adjunct to scaling and root planning in the treatment of chronic gingivitis and to compare chlorhexidine in terms of its anti-inflammatory and anti-microbial properties. They concluded that curcumin is comparable to chlorhexidine as an anti-inflammatory mouth wash and it is an effective adjunct to mechanical periodontal therapy.[8]

According to Deevaraj and Neelakantan, a short term clinical trial has shown that curcumin irrigation was superior in restoring gingival health by reducing gingivitis using BOP and visual assessment of redness as indicators.[9]

The present study reported statistically significant reduction of gingival inflammation, plaque index & sulcular bleeding index at 21 days, proving the efficacy of curcumin as an anti inflammatory & antibacterial property.

Curcumin modulates the inflammatory response by down-regulating the activity of cyclooxygenase-2 (COX-2), lipoxygenase, and inducible nitric oxide synthase (iNOS) enzymes; inhibits the production of the inflammatory cytokines tumor necrosis factor-alpha (TNF-a), interleukin (IL) -1, -2, -6, -8, and -12, monocyte chemoattractant protein (MCP), and migration inhibitory protein; and down-regulates mitogen-activated and Janus kinases.[10]

Besides these properties, turmeric has strong antimicrobial properties. The growth of histamine-producing bacteria was inhibited by garlic and turmeric extracts at a 5% concentration.[11]

However, the drawback of the study was a small sample size. Results of the present study indicate that the local application of curcumin gel following scaling and root planning is effective in removing the local irritants and reducing gingival inflammation. It is also biologically accepted without any side effects.

CONCLUSION: Within the limits of this clinical study, it can be concluded that the gel containing curcuma longa extract was efficient in treating gingivitis by reducing its inflammatory components. This study is unique in the patient selection by taking into account of only severe gingivitis cases and

evaluating their anti-gingivitis property. At the end of the study period the subjects showed change in the colour of the gingival with the good patient acceptance and reduced inflammatory load, which was also statistically significant. Curcuma oral gel has anti-inflammatory effects. Randomized controlled trial with and without mechanical therapy concludes that curcuma can be an effective adjunct to mechanical periodontal therapy. In future, we can also incorporate curcuma in nanoparticles for widespread use in the treatment of periodontal disease.

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How to cite this article: Roopa DA, Singh S, Gupta S, Pandey YN, Goswami A, Johari S. Curcumin: A Herbal Approach in the Management of Gingivitis. Rama Univ J Dent Sci 2016 Mar;3(1):1-5.
Sources of support: Nil **Conflict of Interest**: None declared