Performance analysis and relative assessment of turmeric, chlorhexidine gluconate and vital oil mouthwash in anticipation of plaque development and gingivitis

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ABSTRACT

Aim: To evaluate and compare clinical parameters such as plaque index and gingival index in all the groups and to evaluate and compare anaerobic bacterial count in various groups.

Objective: To evaluate and compare the efficacy of bisbiguanide mouthwash (Chlorhexidine gluconate), herbal mouthwash and essential oil mouthwash in prevention of gingivitis and plaque formation.

Methodology: A total of 100 randomly selected subjects visiting the Department of Periodontology and Implantology at Jaipur Dental College, were considered for the study. The gingival index (GI) by Loe and Silness was recorded which was followed by TureskyGilmore-Glickman modification of Quigley Hein plaque index (TQHPI) at 0, 14 and 21 days. Individuals who gave an informed consent, subjects in the age group of 25 to 35 years with having fair and poor gingival index scores and a score >1 for plaque index, were included in the study.

Results: Results showed statistically significant reduction in mean plaque index, gingival index and microbial count when the three test groups were compared to the control group. All the three mouthwashes were found to be effective in reducing plaque index, gingival index and microbial count in comparison with control group. However intergroup comparison showed no statistically significant difference in the reduction between the test groups.

Conclusion: From the above observations, it can be concluded that all the mouthwashes can be effectively used following mechanical plaque as adjuncts to control plaque and gingivitis. However chlorhexidine gluconate and herbal and essential oil mouthwash exhibited greater reduction in gingival index, plaque index and microbial scores. Turmeric mouthwashes can be an effective alternative to commercially available mouthwashes.

Clinical significance: From this study, it could be stated that turmeric is definitely a good adjunct to mechanical plaque control. Further studies are required on turmeric based mouthwash to establish it as a low cost plaque control measure.

Keywords: Turmeric mouthwash, Chlorhexidine, Gingival index, Quigley Hein plaque index.

INTRODUCTION

Gingival and periodontal diseases are affecting the majority of population across the world. Several types of accretions occurring on the teeth are related to periodontal disease in one way or the other. Among these, dental plaque has posed a real challenge. Since bacterial plaque is the principle causative factor in gingival and periodontal diseases, the most rational methodology toward the prevention of periodontal diseases would be regular effective removal of plaque by personal oral hygiene protocol. Procedures for plaque control include mechanical and chemical means. Mechanical methods have proved to be very time-consuming and their effectiveness would depend on skills and technique of the individual, carrying out these procedures. The fact that most people experience difficulty in maintaining adequate levels of plaque control, particularly at interproximal sites, necessitates the use of chemicals for control of plaque as an
adjunct to mechanical plaque control procedures. A number of chemical agents have been advocated such as fluorides, bisbiguanides, essential oils, quaternary ammonium compounds, sanguinarine and triclosan, which are either available as a toothpaste/dentifrice or in the form of a mouthwash. Among these, chlorhexidine gluconate (CHX) is regarded as gold standard in dentistry for the prevention of dental plaque. 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. Turmeric, more commonly known as ‘Haldi’, possesses anti-inflammatory, antioxidant and antimicrobial properties, along with its hepatoprotective, immunostimulant, antiseptic, antimutagenic and many more properties. Due to these reasons, it was felt that promotion of turmeric in dental terrain may prove beneficial.

MATERIALS AND METHODS

The study was conducted in Department of Periodontology and Implantology at Jaipur Dental College, India. Nature of study was explained and an informed consent was obtained from all subjects. The subjects were randomly divided into any of the groups by toss of coin method for randomization. Scaling was done using ultrasonic scalers in a single siting. 21 days post scaling the baseline values were recorded. The clinical parameters assessed were plaque index (PI) by Silness and Loe and gingival index (GI) by Loe and Silness at 0 and 30 days in all the groups.

MICROBIOLOGICAL STUDY

The plaque samples were collected using paper point placed in the depth of the sulcus on buccal surfaces of tooth no. 16 and 36 and plaque index Silness and Loe (1964) was recorded on day 0 and day 30.
The gingival index Loe and Silness (1963) was recorded on day 0 and 30 using william graduated periodontal probe.

The plaque samples were transported to reduced transport fluid. Anaerobic bacterial count was done pre treatment and post treatment by incubating samples in 5% CO2 condition using candle jar dessicator at 37 degrees C for 48 hours.
Table 1: Comparison of Anaerobic Bacterial Count Between Various Groups Using Paired T-Test

<table>
<thead>
<tr>
<th></th>
<th>DEGREES OF FREEDOM</th>
<th>p-value</th>
<th>MEAN OF THE DIFFERENCES</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP 1 VS GROUP 4</td>
<td>t = -4.9858</td>
<td>9</td>
<td>&lt; 0.05</td>
<td>GROUP 1 IS MORE EFFECTIVE THAN GROUP 4</td>
</tr>
<tr>
<td>GROUP 2 VS GROUP 4</td>
<td>t = -5.6406</td>
<td>9</td>
<td>&lt; 0.05</td>
<td>GROUP 2 IS MORE EFFECTIVE THAN GROUP 4</td>
</tr>
<tr>
<td>GROUP 3 VS GROUP 4</td>
<td>t = -8.3684</td>
<td>9</td>
<td>&lt; 0.05</td>
<td>GROUP 3 IS MORE EFFECTIVE THAN GROUP 4</td>
</tr>
<tr>
<td>GROUP 1 VS GROUP 2</td>
<td>t = 0</td>
<td>9</td>
<td>&gt; 0.05</td>
<td>NO SIGNIFICANT DIFFERENCE BETWEEN GROUP 1 AND GROUP 2</td>
</tr>
<tr>
<td>GROUP 1 VS GROUP 3</td>
<td>t = 0.26881</td>
<td>9</td>
<td>&gt; 0.05</td>
<td>NO SIGNIFICANT DIFFERENCE BETWEEN GROUP 1 AND GROUP 2</td>
</tr>
<tr>
<td>GROUP 2 VS GROUP 3</td>
<td>t = 0.24396</td>
<td>9</td>
<td>&gt; 0.05</td>
<td>NO SIGNIFICANT DIFFERENCE BETWEEN GROUP 1 AND GROUP 2</td>
</tr>
</tbody>
</table>

**DISCUSSION**

In all the above studies in relation to turmeric, anti-inflammatory effect was observed but not in relation with gingiva. In our study, anti-inflammatory action of turmeric was evaluated on clinical parameters using the gingival index, which showed significant reduction. On evaluating the literature, the possible mechanism of action of turmeric as an anti-inflammatory agent could be due to its inhibitory action on prostaglandin synthesis and a strong stabilizing action on the lysosomal membranes. Taking into consideration the findings of our study, it is clear that The effectiveness of chlorhexidine on clinical and microbiological parameters is attributed due to anti plaque property of chlorhexidine gluconate. The molecule binds to cell membrane resulting in leakage of intercellular components. It is bacteriocidal in high concentration. The results go in agreement with studies carried out by Francetti et al (2002), Grundemann et al (2002), JL Leys (2002), and GA Vander, CJ Timmerman, MS Mantel (1998) who found improvement in clinical and microbiological parameters. The effectiveness of herbal (turmeric) mouthwash on clinical and microbiological parameters is attributed due to the anti-inflammatory property, which could be due to its inhibitory action on prostaglandin synthesis and strong stabilizing action on the lysosomal membranes.

**SUMMARY AND CONCLUSION**

In this paper, it can be concluded that chlorhexidine gluconate as well as turmeric mouthwash can be effectively used as an adjunct to mechanical plaque control methods in prevention of plaque and gingivitis. From the above observations, it can be concluded that all the mouthwashes can be effectively used following mechanical plaque as adjuncts to control plaque and gingivitis. However chlorhexidine gluconate and herbal and essential oil mouthwash
exhibited greater reduction in gingival index, plaque index and microbial scores. Turmeric mouthwashes can be an effective alternative to commercially available mouthwashes. 3 subjects complained of bitterness with chlorhexidine and 1 subject with essential oil mouth rinse. No discomfort was noted with use of herbal mouthrinse but further long term use needs to be assessed. Turmeric mouthwash was biocompatible and also well accepted by all the subjects without side effects.

REFERENCES