EVALUATION OF PLAQUE CONTROL EFFICACY OF CHLORHEXIDINE GLUCONATE MOUTHRINSE COMPARED TO TURMERIC MOUTHRINSES: A DOUBLE BLINDED RANDOMISED CONTROLLED CLINICAL TRIAL

Rittika Sarkar, Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Bhubaneswar

Harshit Vatse, Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Bhubaneswar

Sabyasachi Mallik, Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Bhubaneswar

Dr. Dhirendra Kumar Singh, Professor, Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Bhubaneswar

Corresponding Author: Dr. Dhirendra Kumar Singh, Professor, Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Bhubaneswar. Email ID: dr.dhirendra27@gmail.com

Abstract

Aim of the study: Through a study of the findings of the indices examining at baseline and after four weeks, compare the effectiveness of the two types of mouthrinses—a 0.12% chlorhexidine mouthwash and the other being a Turmeric mouthrinse—over a four-week period.

Materials and Methods

Sample Size: 20 individuals

Using G power software (version 3.0), the size of the sample was calculated to have a power of 80% and a level of significance of 5%

Source of the Data: Undergraduate students at the KIIT Deemed to be University in Bhubaneswar's Kalinga Institute of Dental Sciences.

Objectives of the study: Use the Oral Hygiene Index - Simplified (OHI-S) and Gingival index, Plaque index and Bleeding Index to clinically compare gingival inflammation between the groups.

Methods of collecting data: Undergraduate students studying at Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Bhubaneswar who willing participate in the study after meeting the inclusion criteria.

Study will include 20 individuals which will be conducted for a month and will be based on the inclusion and exclusion criteria and will be catagorised into two groups by computerised randomization:

Group A: 10 subjects receiving CHX as mouthrinse

Group B: 10 subjects receiving Turmeric mouthrinse

Procedure involved including armamentarium and material

Materials used:

Chlorhexidine gluconate mouthrinse

Turmeric mouthrinse

Armamentarium:

Mouth mirror

UNC 15 periodontal probe

Explorer No. 23

Introduction: Gums can become inflamed occasionally in a lot of people. Initially, gum inflammation or gingivitis typically doesn't result in any significant issues. However, it spreads to other parts of the periodontium—the soft tissue and bone that keeps our teeth in place—and harm them. Maintaining good dental health can assist to ward against gingivitis. Gums that are red, swollen, and bleeding are the main indicators of gingivitis. Due to the lack of pain or other signs, gingivitis frequently goes unnoticed for a long period of time.

The most common cause of gum irritation is plaque. Plaque appears to be a thin film primarily made of microorganisms at first glance. It may feel a little "furry" and is mainly prevalent where the tooth and gum converge. The gums may become inflamed and swollen as a result of the plaque; bacteria's ability to "eat" sugars as food from the mouth. Plaque may only be removed by thoroughly cleaning the teeth. In other words, maintaining regular oral hygiene can lower the risk of developing plaque and gingivitis.

Maintaining or improving oral health necessitates the removal of plaque and the prevention of its accumulation on the teeth and adjacent gingival tissues. About 80% of plaques are made of water and 20% of solids. Bacterial and salivary proteins account for approximately half of the plaque's dry weight. In addition to the plaque's high protein concentration, carbohydrates, and lipids, the plaque matrix contains approximately 25% of the plaque's dry weight. Plaques are categorized as supra- or sub-gingival based on their anatomical region. Typically, the sub-gingival sulcus is sparse and fine, but diseased periodontal pockets have much larger bacterial accumulations. Pathogenesis relies heavily on supragingival plaques, whereas marginal and subgingival plaques are involved in the onset of various periodontal diseases. There are two types of plaque control that can prevent gingivitis: mechanical and chemical methods. Scaling, brushing, and interdental cleaning are all considered mechanical methods of controlling plaque, and their efficacy in removing oral biofilm from the dentition has long been acknowledged. However, it was

also deemed to be very time-consuming, and the individual executing the procedures' effectiveness would depend on their skills and approach. There are numerous chemical methods for controlling plaque on the market, including mouthwashes containing fluorides, bisbiguanides, essential oils, and triclosan. For the purpose of preventing dental plaque, CHX is regarded as the gold standard in dentistry. A healthy periodontium can be achieved through the judicious timing of therapeutic interactions and the nonspecific application of chlorhexidine. Chlorhexidine, on the other hand, can discolor if used for an extended period of time. Because each person's coloration varies widely, the best concentration for a long-term application should always be determined on an individual basis. Chlorhexidine laundry can last for at least 30 to 45 washes. Turmeric, more frequently referred to as "haldi," has anti-inflammatory, antioxidant, and antimicrobial properties in addition to hepatoprotective, immune-stimulant, antiseptic, and antimutagenic properties. The optimal dose of chlorhexidene at this time may be limited to 30%.

The most popular method for maintaining regular oral hygiene is brushing your teeth and using mouthwash. Plaque and gingivitis can be reduced with the aid of a mouthwash. The use of an interdental cleaner, such as a dental pick, as a supplement to brushing and flossing can help to maintain oral hygiene by removing plaque from the teeth and preventing gingivitis.

Materials and Methods: A group of 20 subjects were selected from the college, Kalinga institute of Dental Sciences, Bhubaneswar, Orissa, India. All of the students gave their consent before the start of the treatment

Selection criteria

Inclusion Criteria

1. Age: 18-40 years
2. Systemically healthy
3. Possess more than twenty natural teeth.
4. Diagnosis of biofilm-induced gingivitis of an intact periodontium.
5. Absence of supra- or subgingival calculus detected visually or by using a periodontal probe, and perform regular tooth brushing.

Exclusion Criteria

1. Presently using any kind of mouth-rinse.
2. Habit of smoking, active caries present.
3. Ongoing orthodontic treatment (including post-treatment retainers).
4. Periodontal treatment within the past 6 months and a diagnosis of periodontitis.
5. Requiring antibiotic prophylaxis or taking antibiotics in the last four months.

6. Nonsteroidal anti-inflammatory medication taken orally or topically for the past four months.

7. Pregnancy/lactation, a history of heart valve replacement, and a known allergy or intolerance to mouth rinses.

8. Patients with mouthbreathing habits.

Study design: A double blinded randomised controlled clinical trail was carried out. Subjects will be divided into two groups post-randomization into group-A and B. Based on the protocol pertaining to each group mouthrinse will be provided in opaque identical bottles to blind the subjects as well as the examiner. Subjects will be urged to perform stringent oral hygiene protocol for four weeks along with the use of undiluted10ml of the mouthrinse.

Clinically compare gingival inflammation between the groups with the help of – Oral Hygiene Index – Simplified (OHI-S) and Bleeding index.

Clinical Parameters to be tested in the study are as follows:

At Baseline: OHI-S and gingival bleeding index (GBI), plaque index (PI), gingival index (GI) will be recorded after performing oral prophylaxis for all the groups.

Follow up: After 2 weeks: OHI-S, PI, GI and GBI

After 3 weeks: OHI-S, PI, GI and GBI

After 4 weeks: OHI-S, PI, GI and GBI

Statistical analysis: Changes from baseline to various time spans in different clinical boundaries were examined by the matched t-test i.e., Intra-group comparisons. Inter-group comparisons of post-treatment changes were analyzed by the unpaired t-test. A $p<0.05$ was considered as a statistically significant difference.

Results: There was no such significant difference between the two groups at the beginning of the study. considering to PI, GI, and GBI $p>0.05$.

The distinction between in mean plaque index between the 0th and 28th days of group A was statistically significant ($p < 0.01$) at 1.59 ± 0.33 and 2.48 ± 0.48, respectively. The distinction of mean gingival record between 0 to 21st day and 0 to 28th day was 0.90 ± 0.15 and 1.04 ± 0.67 separately, which was genuinely huge ($p < 0.01$)

In bunch B, the distinction of mean plaque list between 0 to 21st day and 0 to 28th day was 1.27 ± 1.86 and 2.05 ± 0.48 separately, which was measurably huge ($p < 0.01$). The statistically significant difference in mean gingival index between the 0th and 28th days was 0.90 ± 0.12 and 1.1 ± 0.11, respectively.

The difference between the mean reduction of total bacterial count from day 0 to day 28 in groups A and B was statistically non significant ($p > 0.01$) at 126.87 ± 51.6 and 178.68 ± 28.92, respectively.

From 0 to 21 days and from 0 to 28 days, both groups had significantly lower plaque scores in intragroup observations for the gingival index ($p < 0.01$).

Discussion: **G**ingivitis is directly correlated with the presence of dental plaque, which plays a significant part in the pathogenesis of periodontal disease.

Nonsurgical and surgical periodontal treatment goals to reduce or eliminate supra and subgingival plaque and establish conditions that will allow effective self-performed plaque control because disturbing plaque accumulation is important.

The majority of people may not be able to adequately remove plaque using mechanical means, or they may not have the dexterity, skill, or drive to do so. As a result, antimicrobial mouthwashes that are used in conjunction with regular home care may be able to effectively remove or control bacterial plaque, limiting the development of gingivitis and periodontitis.

In dentistry, CHX has been considered as the "gold standard" for preventing gingivitis and plaque. Even though CHX mouthwash is effective, it can cause brown discoloration of the teeth, erosion of the oral mucosa, and a bitter taste.

In the above study, comparison results of CHX mouthwash showed that the mean plaque score decreased significantly from baseline. This could be due to the antiplaque properties of CHX, whose 0.2% concentration was used in our study and was also recommended for routine oral hygiene.

The difference of mean PI for group A and B between 0 to 21 and 0 to 28 days was statistically significant ($p < 0.01$).

However autonomously turmeric showed antiplaque impact, in contrast with CHX it was seen to be less viable. This could be because of the turmeric in this study were diluted.

Inflammation was significantly reduced (p < 0.01) in the results. Our review results are like them. This proves that turmeric has anti-inflammatory properties, which were also found in studies of Srimal, Ghatak and Basu, and Srivastava and Srimal in the year 1971 and 1972 respectively.

Due to its strong stabilizing effect on lysosomal membranes and inhibitory effect on prostaglandin synthesis, turmeric's potential mechanism of action as an anti-inflammatory agent could be evaluated. Taking into account the results of our study, it is abundantly clear that both mouthwashes reduce gingival inflammation equally well. There were no such significant difference between group A and group B in the percentage of total bacterial count reduction, which was 89.94 and 88.15, respectively.

Plaque Index

Interval	Chlorhexidine (group A)				Turmeric (group B)			
	Mean PI ± SD	Difference from baseline	t-value	p-value	Mean PI ± SD	Difference from baseline	t-value	p-value
0 day	3.31±0.36	--	--	--	3.27±0.47	--	--	--
21 day	1.72±0.38	1.59±0.33	26.68	p<0.01	2.00±0.46	1.27±1.86	39.37	p<0.01
28 day	0.83±0.27	2.48±0.48	28.62	p<0.01	1.22±0.13	2.05±0.48	24.54	p<0.01

Gingival Index

Interval	Chlorhexidine (group A)				Turmeric (group B)			
	Mean GI ± SD	Difference from baseline	t-value	p-value	Mean GI ± SD	Difference from baseline	t-value	p-value
0 day	1.77±0.19	--	--	--	1.81±0.13	--	--	--
21 day	0.87±0.12	0.90±0.15	32.50	p<0.01	0.91±0.09	0.90±0.12	42.39	p<0.01
28 day	0.73±0.52	1.04±0.67	8.64	p<0.01	0.71±0.12	1.1±0.11	57.15	p<0.01

Total Microbial Count

	0 Day	28TH Day	Difference from baseline	t-value	p-value
CHX (A)	139.15 ± 51.92	12.28 ± 2.78	126.87 ± 51.6	1.96	0.086
Turmeric (B)	203.02 ± 34.03	24.34 ± 11.84	178.68 ± 28.92	–	–

Conclusion: The CHX mouthwash scored higher on the plaque index, but both mouthwashes were effective in reducing inflammation and plaque count. The authors suggest that "its inhibitory action on prostaglandin synthesis and a strong stabilizing action on the lysosomal membranes" could be the turmeric mouthwash's mechanism of action. They come to the conclusion that turmeric mouthwash may be an effective supplement to mechanical plaque control. The optimal concentration for antiplaque activity and individual periodontopathogen sensitivity should be the subject of additional research.

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