

## PROPOLIS: THE NATURAL HEALER –A CLINICAL STUDY

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### ABSTRACT

**Background:** Propolis is a naturally-occurring bee product which is made up of flavones, flavanones, and flavanols. Propolis has been found beneficial in dentistry. Aim of the present study was to investigate the effectiveness of a propolis-containing mouth rinse in inhibition of plaque formation. **Material and Methods:** This study was carried out for a period of two years in patients undergoing fixed orthodontic treatment at a tertiary care dental hospital. A total of 100 subjects were randomly divided into 2 groups of 50 subjects each. Subjects in Group A (Study Group) were advised to swish and spit 10 ml of Propolis mouthwash two times in a day. Similarly, subjects in Group-B(Control Group) were advised CHX mouthwash and were given the same instructions.%. Plaque index and gingival index were assessed on Ramfjord teeth at baseline and at a three-day interval. Indicators of plaque, gingival, and periodontal status(PI,GI) were determined by the University of North Carolina-15 Probe. **Results:** The average age of patients in both groups A and group B were  $34.3 \pm 11.3$  and  $33.8 \pm 12.5$  respectively. Mean values of Plaque index(PI) and Gingival index(GI) before and after using Propolis(group-A) were 1.3&0.8 and 1.6&1.4 respectively and before and after using Chlorhexidine(group-B) were 1.4&0.8 and 1.7&1.3 respectively. Differences in PI and GI indices between both groups were statistically significant. **Conclusion:** It appears that using Propolis mouthwash has a required effect on gingival health of patients. The propolis extract might be used as an alternate to CHX in the prevention of periodontal and gingival problems.

**Keywords:** gingivitis; Propolis mouthwash; Chlorhexidine mouthwash;

### INTRODUCTION

Dental plaque is the important etiological factor responsible for periodontal as well as gingival diseases, (1,2). Gingivitis is a common inflammatory disorder of the gingiva, affecting a large section of the residents (1); hence, gingivitis is normally come across in daily dental practice (3). Gingivitis is a preventable and reoccurring condition. Though, if left without treatment, gingivitis can growth into periodontitis and finally tooth loss and edentulism (3). Hence, dental plaque must be controlled via appropriate oral hygiene measures. (1,2). Adequate and appropriate plaque control measures have to be applied frequently (2). However, mechanical methods might not be possible, and/or enough Further, chemical arrangements like antimicrobial mouthwashes have been recommended either as an

adjunctive or as a substitute for mechanical plaque control (4). For the reason that owing their ease of practice and obtainability over the counter, the public extremely appreciate mouthwashes. Chlorhexidine mouthwash (CHX) is measured as the gold standard antiplaque agent (4). CHX is used in varied medical fields, primarily due to its antibacterial nature (4). CHX appears to exert a prompt bactericidal effect followed by anprotracted bacteriostatic effect (4). However, long term-use of CHX has been connected with many contrary effects including altered taste perception, staining of tongue and teeth, burning sensation, and genotoxicity of buccal epithelial cells (5,6). Therefore, pharmaceutical companies have long been trying to formulate natural-derived oral care products (7,8,9).

Out of these, propolis -a natural viscous material produced by honey bee- has newly been proposed as a substitute of anti-plaque mouthwash (8,10). Chemical mixture of propolis includes thirty percent wax, fifty percent resin, ten percent aromatic and essential oils, five percent pollen, and five percent other constituents (10,11,12). The flavonoids are the chief biologically dynamic constituents of propolis extracts, signifying homogeneity of propolis arrangements, making their use inoffensive as compared to various other synthetic products (13). Thus, more than three hundred organic compounds of dissimilar groups primarily phenolic such as stableness, flavonoids, phenolic acids, and its esters have been identified from propolis. Propolis possess a variability of pharmacological and biological properties viz, antimicrobial/anti-inflammatory, antiparasitic, antiviral, antitumor, antioxidant. Propolis has a distinct compound called pinocembrin, a flavonoid that acts as an antifungal. Hereafter anti-inflammatory and antimicrobial properties make propolis supportive in wound healing (14,15). Hence the aim of the present study was to assess the effectiveness of a propolis-containing mouth rinse in inhibition of plaque formation and improvement of gingival health.

## MATERIALS AND METHODS

### Source of data

Subjects were had been randomly selected for clinical study. Permission was taken from Institutional Ethical Committee in A total of 100 randomly selected patients (lottery method) between the age group of 21-50 years were selected for the study and were grouped as follows:

- Group A: 50 patients received a propolis-containing mouth rinse
- Group B: 50 patients were treated with, positive control (Chlorhexidine 0.2%) mouth wash-controlled group.

### Inclusion criteria

- Patients ready to undergo treatment
- Patients with chronic generalized gingivitis
- Patients with age group of 21 to 50 years
- Patient free from systemic illness

### Exclusion criteria

- Patients allergic to propolis mouth wash
- Patients unwilling to participate in the study

- Patients undergoing treatment for chronic generalized gingivitis
- Pregnant and nursing patients
- Systemic conditions those are etiologic or predisposing to chronic gingivitis
- Patients receiving concurrent antibiotic treatment for any other purpose
- Inability to comply with the follow-up visit requirements

### Procedure

In the subsequent step, the demographic data including gender, age, etc. were obtained using a structured questionnaire. Subjects in Group A (Study Group) were advised to swish and spit 10 ml of Propolis mouthwash two times in a day, first in the morning and second before going to bed. Similarly subjects in Group B (Control Group) were advised CHX mouthwash and were given the same instructions.). Plaque index and gingival index were assessed on Ramjford teeth at baseline and at a three-day interval. Indicators of plaque, gingival and periodontal status (PI, GI) were determined by University of Noprh Carolina-15 (UNC-15 Probe)  $p<0.5$  was considered statistically significant. Then the results were analyzed statistically.

For plaque and gingival indices, the Silness and Loe criterion were used. (16) Scores were taken from all subjects by the same investigator at baseline and 3rd day. Comparative photographs of the two group patients are shown in figures. (Figures 1-3)

Figure 1: Group A (propolis-containing mouthwash)



Figure 2: Group B (positive control mouthwash - chlorhexidine)



Figure 3: Final Prepared Extract which was used a using a 30% dilution of available propolis extract available in market



### Statistical analysis

Microsoft Excel was used to perform data entry and statistical analyses. Descriptive analysis of was done using frequency and proportions for categorical variables, whereas in Mean and SD for continuous variables. Fisher's exact test, Independent t-test, and Paired t-Test was used to compare mean Plaque and Gingival Index scores between baseline and 3rd day period in each study group. The level of significance was  $P<0.05$ .

### RESULTS

Hundred patients were included in the present study. The number of patients were divided in two groups i.e., propolis and chlorhexidine, respectively. Among these, 60 were men (60.0%) and 40 women (40.0%). A significant difference was observed for group A and group B between genders. The average age of patients in both groups A and group B were  $34.3 \pm 11.3$  and  $33.8 \pm 12.5$  respectively. (Table 1)

**Table 1: Distribution of demographic characteristics of the study subjects scores between groups at baseline period.**

Variables	Group A (mean ±SD)	Group B (mean ±SD)	P-value
<b>Age (year)</b>	$34.3 \pm 11.3$	$33.8 \pm 12.5$	0.45 <sup>#</sup>
<b>Gender</b>	<b>N(%)</b>	<b>N(%)</b>	
<b>Male</b>	24(48.0)	36(72.0)	0.01 <sup>@</sup>
<b>Female</b>	26(52.0)	14(28.0)	
<b>Total</b>	50 (100.0)	50 (100.0)	

# Independent t-test, @Fisher's test

**Table 2: Distribution mean plaque and gingival index values before and after using mouthwashes.**

Parameters	Group A (mean ±SD)	Group B (mean ±SD)	P-value
<b>Plaque index (PI)</b>			
<b>Before</b>	$1.3 \pm 0.5$	$1.4 \pm 0.7$	<0.05*
<b>After</b>	$0.8 \pm 0.4$	$0.8 \pm 0.5$	
<b>Gingival index (GI)</b>			
<b>Before</b>	$1.6 \pm 0.4$	$1.7 \pm 0.6$	<0.05*
<b>After</b>	$1.4 \pm 0.5$	$1.3 \pm 0.6$	

\*Paired T-test

Table 2 illustrates that the observed differences in PI and GI indices before and after using propolis mouth wash were statistically significant. Similarly, a significant difference was also observed for the PI and GI indices before and after using chlorhexidine mouthwash, and the mean values of Plaque index (PI) and Gingival Index (GI) before and after using Propolis (group A) were 1.3 & 0.8 and 1.6 & 1.4 respectively and mean values of Plaque index (PI) and Gingival Index (GI) before and after using Chlorhexidine (group B) were 1.4 & 0.8 and 1.7 & 1.3 respectively. (Table 2)

Similarly, a significant difference was also observed for the PI and GI indices before and after using chlorhexidine mouthwash. (table 2) and Figure Figure1 shows the Mean values of Plaque index (PI) and Gingival Index (GI) before and after using Propolis (group A) and Chlorhexidine (group B) mouth wash. (Table 2)

## DISCUSSION

The present study considered the effect of Propolis mouthwash on the gingival health of study subjects. The outcome showed that both Propolis and chlorhexidine mouthwashes showed significant enhancement of two examined gingival health indices. The results of the present study are similar with other of previous studies. Anauate-Neotto et al. observed the effect of Propolis and chlorhexidine mouthwashes on the gingival health. Outcomes showed that Propolis mouthwash reduces the Papillary Bleeding Index. Also, comparing the young adult's subjects with a higher age group showed that the Propolis is more effective in young adult subjects (17). Tanasiewicz et al. reported in their study that the effect of toothpaste and a gel comprising 3 percent Propolis on the position of tooth cavities, similarly results in the present study. Their findings showed that using hygiene products comprising Propolis, either in healthy person or persons with gingivitis is effective and eradicate the plaques and recover from the marginal periodontium (18). The finding of a study to examine the effectiveness of a propolis comprising mouthwash in the inhibition of de novo plaque development are presented. The chlorhexidine mouthwash was significantly better in comparison to the others in plaque inhibition. The propolis comprising rinse was slightly better in comparison to the negative control, but this difference was not statistically significant (19). Koo et al. conducted a study to evaluate the effect of a mouth rinse comprising propolis on three-day dental plaque growth. Six volunteers comprised in a randomized control trial in 2 phases of three days. In every phase, the volunteers abstained from all oral hygiene and washed with twenty percent sucrose solution five times a day to enhance dental plaque development and with mouth rinse twice a day. At day four, PI of the volunteers was documented and the supragingival dental plaque was observed for insoluble polysaccharide (IP). Experimental mouth rinse including propolis was thus effective in reducing supragingival plaque growth and IP growth under conditions of high plaque accumulation (20). The current study assessed the effect of propolis mouthwash on plaque accumulation and gingivitis. Relating the plaque and gingival indices at baseline and three day time duration, and the mouthwash was associated with both positive and negative controls. It seems from the data that propolis is not better in comparison to chlorhexidine in reducing plaque development nonetheless may be slightly better for the reduction

of gingival inflammation. These findings were similar with studies (19, 20).

## CONCLUSION

It may be concluded from the above study that the propolis extract tested possesses anti-plaque activity and improves gingival health also but it does not possess any extraordinary activity as it is an herbal product in comparison to the synthetic products. The extract might be used as an substitute to avoid periodontal and gingival health problems.

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