

Original Article

Comparative Analysis of Efficacy of Two Commonly Available Dentifrices in Controlling Supragingival Plaque

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ABSTRACT:

Background: The use of dentifrices containing anti-plaque agents has been found to be effective in preventing periodontal diseases. Today, toothpastes represent the most commonly manufactured product intended to be used, along with the toothbrush, to prevent the accumulation, removal, and the metabolic activities of dental plaque. **Aim of study:** To compare the efficacy of two commonly available dentifrices to control supragingival plaque. **Materials and method:** The present study was conducted in the Department of Community Dentistry of the dental institution. A total of 135 subjects were included in the study. The examination was conducted inside local school classroom using artificial light. The patients were randomly grouped into two groups, Group A and Group B. Group A patients were given Herbal toothpaste and Group B patients were given Colgate Sensitive toothpaste. Patients were advised to brush their teeth twice daily for 2 min each. The Turesky modification of the Quigley and Hein Plaque index was used for the indexing of plaque in patient's oral cavity. The plaque score of patients at baseline, 3 weeks and 6 weeks were evaluated by examining their oral cavities and tabulated for further evaluation. **Results:** A total of 130 subjects were included in the study. 72 subjects were males and 63 subjects were females. The mean age of the subjects was 23.32 ± 5.9 years. On comparing the results, we observed statistically non-significant difference between two groups. **Conclusion:** Within the limitations of the present study both the dentifrices significantly effective in controlling supragingival plaque. Both the dentifrices are equally effective in controlling supragingival plaque.

Keywords: Dentifrice, Periodontitis, Plaque, Toothpaste

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INTRODUCTION:

Mechanical and chemical plaque inhibitors are the most important approaches to control dental plaque at supragingival and subgingival levels. Most products in current use for plaque control are antiseptics. Vehicles for delivery of chemical agents with anti-plaque/anti-gingivitis action are toothpastes, mouthwashes; spray, irrigators, chewing gum, and varnishes.^{1, 2} However, toothpastes are widely accepted method to deliver the anti-microbial agent which can be used by the patient as an oral hygiene aid. Majority of the Indian population resides in rural areas and the high prevalence of dental diseases are primarily attributed to lack of knowledge on oral health, inadequate use of fluorides and infrastructure deficiencies leading to inadequate dental care. Besides, the prevalence of oral diseases is especially high among the population in lower socio-economic status group.^{3, 4}

Plaque removal by way of a daily home care regimen has long been emphasized by the dental professionals and is considered as an important element of oral health. Currently, many products are designed and promoted to achieve improved oral health. The most common being the use of toothbrushes, rinses, floss, and dentifrices.^{5, 6} Throughout the ages, dentifrices have been used as a major oral cleansing device. It had been used in ancient Greek and Roman civilizations as a powder formulation for esthetics, removing objectionable odors from the mouth, strengthening the teeth, relieving the dental pain and as a prophylactic paste.⁷ The use of dentifrices containing anti-plaque agents has been found to be effective in preventing periodontal diseases.⁸ Today, toothpastes represent the most commonly manufactured product intended to be used, along with the toothbrush, to prevent the accumulation, removal, and the metabolic activities of dental plaque. Realizing the importance of dentifrices in oral health care, toothpaste

quality has been improvised on a regular basis by refining, substituting, and reformulating the toothpaste ingredients.⁹ The effectiveness and functionality of toothpaste is enhanced by adding a variety of safe and compatible ingredients that may reduce demineralization, interfere with bacterial adhesion, provide antibacterial action, prevent the formation of supragingival calculus, promote remineralization, and reduce dentinal hypersensitivity.¹⁰ Hence, the present study was planned to compare the efficacy of two commonly available dentifrices to control supragingival plaque.

MATERIALS AND METHOD:

The present study was conducted in the Department of Community Dentistry of the dental institution. For the ethical approval of the protocol of the study, the protocol was submitted to the ethical committee and approval obtained before commencing the study. An informed written consent was obtained from each patient after explaining them the protocol of the study. A total of 130 subjects were included in the study. The inclusion criteria of the study were: subjects not using any orthodontic appliances, subjects having baseline plaque score (Turesky modification) of more than 1.5, subjects having more than 20 teeth that could be scored.

The examination was conducted inside local school classroom using artificial light. The subject was made to sit on a chair in upright position for examination of patient’s oral cavity. Each subject was given about 8-10 min for examination. The patients were randomly grouped into two groups, Group A and Group B with 65 subjects in each

group. Group A patients was given Herbal toothpaste and Group B patients were given Colgate Sensitive toothpaste. Patients were advised to brush their teeth twice daily for 2 min each. The examination of the plaque index was done at baseline, 3 weeks and 6 weeks. The evaluation of all subjects was done by a single clinician to avoid any clinical bias. The Turesky modification of the Quigley and Hein Plaque index was used for the indexing of plaque in patient’s oral cavity. The plaque score of patients at baseline, 3 weeks and 6 weeks were evaluated by examining their oral cavities and tabulated for further evaluation. The statistical analysis of the data was done using SPSS program for windows. Student’s t-test and Chi-square test were used to check the significance of the data. A p-value <0.05 was predefined as statistically significant.

RESULTS:

A total of 130 subjects were included in the study. 72 subjects were males and 63 subjects were females. The mean age of the subjects was 23.32 ± 5.9 years. **Table 1** shows the mean PI score of two groups, Group A and Group B. Group A subjects were given Herbal toothpaste while Group B subjects were given Colgate sensitive toothpaste. The mean PI score for Group A subjects at Baseline was 1.92 ± 0.48 ; at 3 weeks was 1.66 ± 0.33 and at 6 weeks was 1.41 ± 0.31 . The mean PI score for Group B subjects at baseline was 1.95 ± 0.51 ; at 3 weeks was 1.51 ± 0.42 ; and at 6 weeks was 1.32 ± 0.39 [Fig 1]. On comparing the results, we observed statistically non-significant difference between two groups ($p > 0.05$).

Table 1: Mean PI score for two groups

	Group A (mean+SD)	Group B(mean+SD)	p-value
At Baseline (Day 0)	1.92 ± 0.48	1.95 ± 0.51	0.23
At 3 weeks	1.66 ± 0.33	1.51 ± 0.42	
At 6 weeks	1.41 ± 0.31	1.32 ± 0.39	

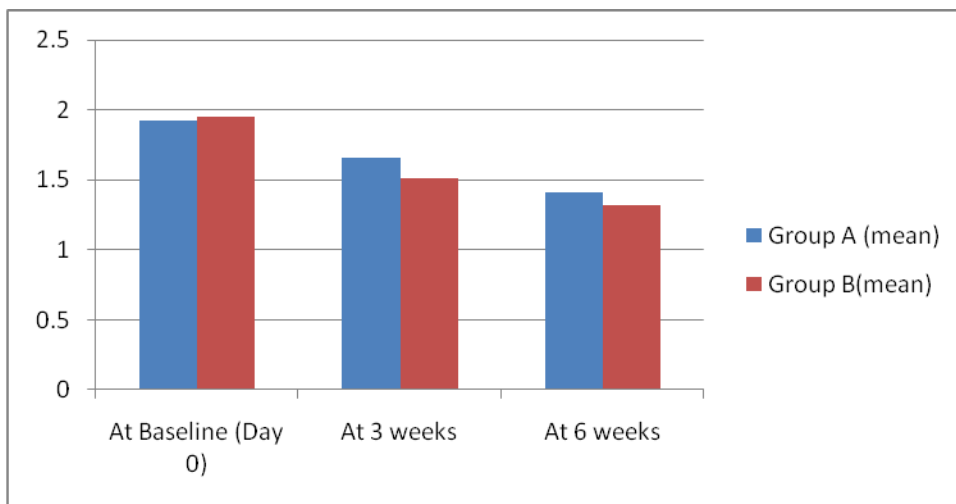


Figure 1: Showing Mean PI score for two groups

DISCUSSION:

Oral hygiene maintenance is the key to prevention of dental diseases. Dental plaque remains the primary etiological factor for most of the dental diseases. Among all the methods of plaque removal, the most accepted method of oral hygiene maintenance is brushing of teeth. For proper brushing, a safe and effective cream is required to help the removal of dental plaque.^{7,8} There is a wide variety of toothpastes which are marketed such as anti-cavity, extra-whitening and toothpaste for sensitive teeth, toothpastes with stripes or clear toothpastes.[18] Most of the dentifrices uses words such as “protects,” “cleans,” “freshens breath,” “fights bacteria,” “whitens” or “fights tartar” for their promotion.^{5,6} The present study aimed to comparatively evaluate the efficacy of two commonly available dentifrices in controlling supragingival plaque. We observed that mean PI score of both the groups was seen to decrease significantly at 6 weeks. But, on comparing the results we observed non-statistical significance difference. This can be concluded that both the toothpastes are equally effective in controlling the supragingival plaque. The results were compared with other studies in the literature. Mateu FA et al assessed the efficacy of a dentifrice containing 0.3% triclosan/2.0% polyvinylmethyl ether/maleic acid (PVM/MA) copolymer/0.243% sodium fluoride in a 17% dual silica base (Colgate Total Advanced Toothpaste-Test Dentifrice) for controlling established supragingival plaque and gingivitis, relative to that of a commercially available dentifrice containing 0.243% sodium fluoride in a silica base (Crest Cavity Protection Toothpaste-Control Dentifrice). Following a baseline examination for supragingival plaque and gingivitis, qualifying adult male and female subjects from the Barcelona, Spain area were randomized into two treatment groups. Subjects were given a complete oral prophylaxis and instructed to brush their teeth twice daily (morning and evening) for one minute with their assigned dentifrice and a soft-bristled toothbrush. Examinations for supragingival plaque and gingivitis were repeated after three months and six months of product use. Ninety-four (94) subjects complied with the protocol and completed the study. Relative to the Control Dentifrice group, the Test Dentifrice group presented statistically significantly lower whole-mouth plaque index and gingival index scores (18.6% and 15.8%, respectively) after three months of product use. Similarly, relative to the Control Dentifrice group, the Test Dentifrice group exhibited statistically significant reductions in plaque index and gingival index scores measured on proximal sites (17.0% and 16.3%, respectively), and statistically significant reductions in plaque severity index and gingivitis severity index scores (22.2% and 46.9%, respectively) after three months of product use. Relative to the Control Dentifrice group, the Test Dentifrice group presented statistically significantly lower whole-mouth plaque index and gingival index scores (23.4% and 21.3%, respectively) after six months of product use. Similarly, relative to the Control

Dentifrice group, the Test Dentifrice group exhibited statistically significant reductions in plaque index and gingival index scores measured on proximal sites (21.1% and 23.0%, respectively), and statistically significant reductions in plaque severity index and gingival severity index scores (27.1% and 64.5%, respectively) after six months of product use. The overall results of this double-blind clinical study, conducted in accordance with the quantitative criteria established by the American Dental Association, support the conclusion that a dentifrice containing 0.3% triclosan/2.0% PVM/MA copolymer/0.243% sodium fluoride in a 17% dual silica base is efficacious for the control of established supragingival plaque and gingivitis. Boneta AE et al conducted a double-blind clinical study at the University of Puerto Rico, San Juan, Puerto Rico, designed to compare the efficacy of two commercially available dentifrices for the control of supragingival plaque and gingivitis. Qualifying adult male and female subjects from the San Juan, Puerto Rico area were randomly assigned to one of two treatment groups: 1) a commercially available dentifrice containing 0.3% triclosan, 2.0% PVM/MA copolymer, and 0.243% sodium fluoride (Colgate Total); and 2) a commercially available dentifrice containing 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate (Crest Pro-Health). All subjects received an oral soft and hard tissue examination, and were dispensed their assigned dentifrice product, along with a soft-bristled adult toothbrush for home use. Subjects were instructed to brush their teeth for one minute, twice daily (morning and evening), using only the dentifrice provided. Examinations for supragingival plaque and gingivitis, and oral soft and hard tissue assessments were repeated after six weeks, three months, and six months of product use. One-hundred and nine (109) subjects complied with the protocol and completed the six-month examinations. At the six-month examination, both treatment groups exhibited statistically significant reductions from baseline with respect to supragingival plaque and gingivitis scores. Relative to the Crest Pro-Health Toothpaste group, the Colgate Total Toothpaste group exhibited statistically significant reductions in supragingival plaque index scores of 18.5%, 20.7%, and 25.8% after six weeks, three months, and six months of product use, respectively. For gingival index scores, statistically significant reductions of 20.5%, 18.9%, and 17.1% were exhibited after six weeks, three months, and six months of product use, respectively. The results of this double-blind clinical study support the conclusion that a dentifrice containing 0.3% triclosan, 2.0% PVM/MA copolymer, and 0.243% sodium fluoride provides a significant reduction in established supragingival plaque and gingivitis, as compared to a dentifrice containing 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate when used over a period of six months.^{11, 12} Slot DE et al conducted a study to evaluate the efficacy of chlorhexidiene dentifrice or gel on plaque, clinical

parameters of gingival inflammation and tooth discoloration. MEDLINE, EMBASE and Cochrane Central Register of Controlled Trials were searched up to July 2013 to identify eligible studies. Included were (randomized) controlled clinical trials, regarding self-performed brushing by adults without periodontitis with a minimum duration of 4 weeks. Independent screening of 389 unique titles and abstracts resulted in 16 comparisons. All studies assessing gingival bleeding as parameter for gingivitis observed a significant reduction in favour of CHX dentifrice over placebo dentifrice. Tooth surface discoloration was more pronounced with CHX dentifrice. The combined data concerning parameters of interest for CHX gel compared with a placebo did not show a trend towards a beneficial effect on plaque and bleeding scores. It was concluded that toothbrushing with a CHX gel does not provide conclusive evidence. Brushing with a CHX dentifrice can be effective with regard to the control of plaque and gingivitis. Singh S et al assessed the efficacy of a dentifrice containing 0.3% triclosan/2.0% PVM/MA copolymer/0.243% sodium fluoride for controlling established gingivitis and supragingival plaque relative to that of a dentifrice containing 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate, and a dentifrice containing 0.243% sodium fluoride as a negative control. Subjects were instructed to brush their teeth twice daily (morning and evening) for one minute with their assigned dentifrice and a soft-bristled toothbrush. Examinations for gingivitis and supragingival plaque were repeated after six weeks of product use. One-hundred and seventy-one (171) subjects complied with the protocol and completed the study. Relative to the group using the dentifrice with 0.243% sodium fluoride alone, the 0.3% triclosan/2.0% PVM/MA copolymer/0.243% sodium fluoride group exhibited statistically significant reductions in gingival index and supragingival plaque index scores of 25.3% and 33.0%, respectively, after six weeks of product use. Similarly, relative to the group using the 0.243% sodium fluoride dentifrice, the 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate dentifrice group exhibited statistically significant reductions in gingival index and plaque index scores of 8.1% and 14.1% after six weeks of product use. Further, relative to the 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate dentifrice group, the 0.3% triclosan/2.0% PVM/MA copolymer/0.243% sodium fluoride dentifrice group exhibited statistically significant reductions in gingival index and plaque index scores of 18.7% and 22%, respectively. The study concluded that a dentifrice containing 0.3% triclosan/2.0% PVM/MA copolymer/0.243% sodium fluoride is efficacious for the control of established gingivitis and supragingival plaque as compared to a regular fluoride dentifrice, and that it provides a greater level of efficacy for the control of gingivitis and supragingival plaque than does a dentifrice

containing 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate.^{13, 14}

CONCLUSION:

From the results, this can be concluded that within the limitations of the present study both the dentifrices significantly effective in controlling supragingival plaque. Both the dentifrices are equally effective in controlling supragingival plaque.

REFERENCES:

1. Barnes VM, Richter R, DeVizio W. Comparison of the short-term antiplaque/antibacterial efficacy of two commercial dentifrices. *J Clin Dent.* 2010;21:101–4.
2. Fischman SL. The history of oral hygiene products: How far have we come in 6000 years? *Periodontol.* 2000;1997(15):7–14.
3. Garcia RI. Mouthrinses and dentifrices are effective antigingivitis and antiplaque agents. *J Evid Based Dent Pract.* 2008;8:13–4.
4. Stamm JW. Multi-function toothpastes for better oral health: A behavioural perspective. *Int Dent J.* 2007;57:351–363.
5. Cugini M, Thompson M, Warren PR. Correlations between two plaque indices in assessment of toothbrush effectiveness. *J Contemp Dent Pract.* 2006;7:1–9.
6. Benamghar L, Penaud J, Kaminsky P, Abt F, Martin J. Comparison of gingival index and sulcus bleeding index as indicators of periodontal status. *Bull World Health Organ.* 1982;60:147–51.
7. Bhambal A, Kothari S, Saxena S, Jain M. Comparative effect of neemstick and toothbrush on plaque removal and gingival health – A clinical trial. *J Adv Oral Res.* 2011;2:51–5
8. Prasad KV, Sohani R, Tikare S, Yelamalli M, Rajesh G, Javali SB. Anti-plaque efficacy of two commercially available dentifrices. *J Indian Assoc Public Health Dent.* 2009;1:12–7.
9. Jin LJ, Armitage GC, Klinge B, Lang NP, Tonetti M, Williams RC. Global oral health inequalities: Task group - Periodontal disease. *Adv Dent Res.* 2011;23:221–6.
10. Shaju JP, Zade RM, Das M. Prevalence of periodontitis in the Indian population: A literature review. *J Indian Soc Periodontol.* 2011;15:29–34.
11. Mateu FA, Boneta AE, DeVizio W, Stewart B, Proskin HM. A clinical investigation of the efficacy of two dentifrices for controlling established supragingival plaque and gingivitis. *J Clin Dent.* 2008;19(3):85–94.
12. Boneta AE, Aguilar MM, Romeu FL, Stewart B, DeVizio W, Proskin HM. Comparative investigation of the efficacy of triclosan/copolymer/sodium fluoride and stannous fluoride/sodium hexametaphosphate/zinc lactate dentifrices for the control of established supragingival plaque and gingivitis in a six-month clinical study. *J Clin Dent.* 2010;21(4):117–23.
13. Slot DE, Berchier CE, Addy M, Van der Velden U, Van der Weijden GA. The efficacy of chlorhexidine dentifrice or gel on plaque, clinical parameters of gingival inflammation and tooth discoloration: a systematic review. *Int J Dent Hyg.* 2014 Feb;12(1):25–35. doi: 10.1111/idh.12050. Epub 2013 Aug 29.
14. Singh S, Chaknis P, DeVizio W, Petrone M, Panagakos FS, Proskin HM. A clinical investigation of the efficacy of three commercially available dentifrices for controlling established gingivitis and supragingival plaque. *J Clin Dent.* 2010;21(4):105–10.