Research Article

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2019;9:2s:52-57.

Comparative Evaluation Between Herbal Toothpaste and Non Herbal Toothpaste in Patients with Chronic Generalized Gingivitis

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ABSTRACT

Background: Periodontal disease is mostly caused due to accumulation of plaque. The approach is to make use of naturally available herbs such as Akarkara (*Anacyclus pyrethrum*), Babool (*Acacia arabica*), Haldi (*Curcuma longa*) Neem (*Azadirachta indica*), etc to make herbal paste. These herbal mixture acts as antimicrobial agents and at the same time protects us from the ill effects of certain chemicals present in non herbal toothpaste.

Materials and Method: The present study is a short term clinical study in which total 20 patients diagnosed with chronic generalized gingivitis are selected and divided into 2 groups. Group A patients were prescribed herbal toothpaste (Dantkanti™) whereas, group B patients were prescribed non herbal toothpaste (Colgate Total™). All patients received oral hygiene instructions. Clinical parameters including plaque index by Turesky et al modification of Quigley Hein Plaque Index (1970), Gingival index by Loe H and Silness P(1963) and Macpherson et al modification of Lobene stain index were assessed at base line and on 2 & 6 week.

Results: This study showed that at base line there was no significant difference *(P<0.05)* between both the groups regarding all the 3 clinical parameters, which states that subjects were randomly distributed in both the groups. Over a period of 6 weeks, both the Herbal and the Non herbal toothpastes resulted in a statistically significant reduction in all parameters. (Table 1) The Herbal toothpaste resulted in a statistically significant improvement in all parameters except plaque index when compared with the Non herbal toothpaste at the end of 6 weeks.

Conclusion: The findings of the present study would imply that the herbal based test toothpaste may confer some additional gingivitis and extrinsic stain reduction properties beyond that of the nonherbal control toothpaste. However further long term studies with larger sample size are suggested to test the herbal based product as an efficacious alternative to conventional dentifrice formulations.

Keywords: Gingivitis, herbal, plaque, stain, toothpaste.

INTRODUCTION

Dental plaque deposit on teeth is a concern for both cosmetic and its pathogenic nature. Presence of plaque may be the culprit for dental caries, gingivitis, periodontal problems, and halitosis. Many mechanical aids are used worldwide to remove or control plaque, including tooth brushes, dental floss, mouth rinses, and dentifrices.[1] Dental plaque is a thin film of bacteria that sticks to teeth yellow in

Received: Dec. 3, 2018: Accepted: Jan. 27, 2019
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pISSN 2278-0076
eISSN 2321-9270

color can't be rinsed off, removed only by brushing & flossing. If plaque is not removed regularly by tooth brushing and flossing, it hardens to create calculus. Calculus absorbs so much bacterial toxins that irritate the soft tissue, gingival edema and cause bleeding gums.[1] There has been closer relationship between calculus and periodontal diseases. Calculus can provide a good place for plaque attaching and bacteria growth.[5]Mechanical plaque removal is the most effective methods of controlling plaque and gingivitis. Several chemical preventive agents have beneficial effects in the control of plaque and to reduce or prevent oral disease. Hence, various chemical formulations were tried in dentifrices.[2] Mechanical plaque control is time consuming and some individuals may lack motivation for these procedures.[3] Chemicals, mainly triclosan and chlorhexidine have been added in mouth rinses and dentifrices to prevent plaque and gingivitis. But, some of these substances show undesirable side effects such as tooth staining and altered taste.[1, 4] This led to paying an increased attention on using natural ingredients in herbal dentifrices. A wide range of toothpastes are commercially available. Recently interest in naturally based products has increased. Certain plants used in folk medicine serve as a source of therapeutic agents having multipotential effects in addition to their antimicrobial activity. Herbal formulations can provide an option for a safe and long term use. The herbal toothpaste (Dantkanti™) a product of (Patanjali Ayurved Limited Haridwar,U.P.) contains Akarkara (*Anacyclus pyrethrum*), Babool (*Acacia arabica*), Haldi (*Curcuma longa*), Neem (*Azadirachta indica*) Pudina(*Menthe spicata*), Longbud (*Syzygiumaromaticam*), Tomar (*Xanthoxylumalatum*),Pilu (*Salvadora persica*),Bakul (*Mimusopselengi*), Vidang (*Embelia ribes*) etc[5]. Therefore, an attempt was made to compare the efficacy of herbal toothpaste (Dantkanti™) and a triclosan based non herbal toothpaste (Colgate Total™) a product of (Colgate-Palmolive Limited, Solan, H.P.) which is one of the toothpaste available in the market, in reduction of plaque, gingivitis and stain.The hypothesis of study was stated as herbal toothpaste is more efficient in maintenance of oral hygiene and gum bleeding as compared to the non-herbal toothpaste.

AIM

The aim of this study is to evaluate the effect of Herbal tooth paste (Dantkanti™) over Non herbal toothpaste (Colgate Total™) in chronic generalized gingivitis patients.

MATERIALS AND METHODS

In this clinical trial 20 subjects in the age range of 35-43 years were selected from the outpatient of the Department of Periodontics, Karnavati school of dentistry college, Gandhinagar, Gujarat were selected for the study. Ethical approval was obtained from the institutional review board and written consent from the participant subjects (control and test groups).

Inclusion criteria:

- Subjects of both gender aged 18 years or older and having a minimum of 20 teeth including all anterior teeth.
- Each subject had to have gingivitis as defined by bleeding on gentle probing at more than 30 %. At baseline all subjects also have a plaque index > 2 as measured by the Turesky et al. modification of Quigley and Hein plaque index.[6,7]
- Willing to follow the schedule and has not participated in a similar investigation in past 4 weeks.
- Free from all systemic diseases.

Exclusion criteria:

- Presence of periodontitis. (According to AAP 1999 classification).
- Subjects under antimicrobial therapy, smokers, pregnant women, using orthodontic appliances, or any kind of fixed or removable appliances having used mouth rinse containing chemical agents in previous 3 months, and having a history of allergy dental products or their ingredients.

The subjects were divided into two groups each having 10 subjects. Group A(Case) consisted of patients who were prescribed herbal toothpaste (Dantkanti™) and, Group B (Control) with non herbal toothpaste (Colgate Total™). Subjects were

instructed to brush their teeth twice a day with the toothpaste and using bass method. All the procedures were explained to patients and written consent were obtained. No prophylaxis was undertaken prior to commencement of the study. The same clinician conducted all the examination and scorings to reduce inter examiner bias.

The test group used commercial herbal dentifrice Dantkanti™ dental cream. The control group used Colgate Total™ containing Saccharin sodium, Fluorid, Triclosan , Glycerin, Sorbitol, Sodium Lauryl Sulfate, Cellulose Gum, Flavor, Sodium Hydroxide, Carrageenan, Propylene Glycol, Sodium Saccharin, and Titanium Dioxide.

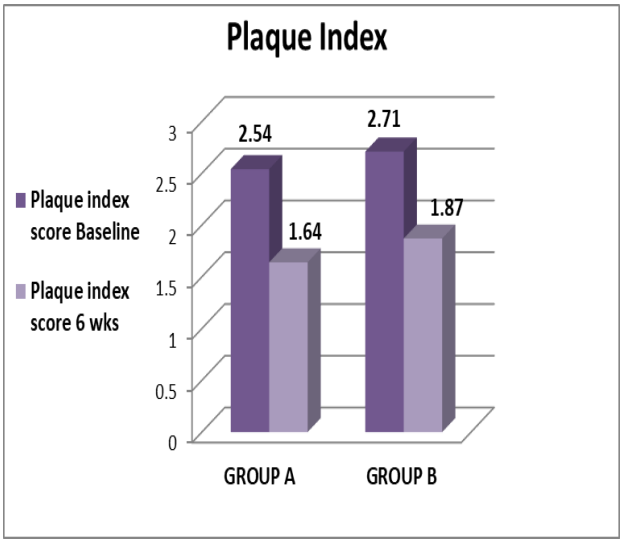
Trained examiner was instructed to record plaque index, gingival index and stain index in the same dental unit under identical conditions at baseline and 6 weeks. The amount of plaque was scored using plaque disclosing solution and assessed at the midbuccal, mesiobuccal, midpalatal/lingual and distopalatal/lingual surfaces of each index tooth using the Turesky's (1970)[6] modification of the Quigley, Hein (1962)[7] index (PI).The mean of these values was calculated as the plaque score for each subject. From the individual scores, mean group plaque index was calculated. Gingival index scoring (GI) by Silness and Loe (1963)[8] criteria was assessed at the midbuccal, mesiobuccal, midpalatal/lingual and distopalatal/lingual surfaces of each index tooth and the mean of these values calculated for each subject. From the individual scores mean group gingival index scores were calculate. Using the Macpherson et al. modification of Lobene stain index[9, 10] involved visual stain assessment of the buccal/labial and lingual/palatal aspect of index teeth intensity of stain on the gingival, body and approximal surfaces of the tooth on the buccal and lingual surfaces of each incisor teeth were observed and scored using four point scales. The area (extent) of the stain (A) was recorded only if intensity score of 2 or 3 given. An average stain score was calculated for each patient by the adding the product of stain intensity and area scores of labial and lingual surfaces and then dividing by total number of sites examined. From the individual scores, mean group stain index was calculated.

Oral cavity was examined for adverse reaction on hard and soft tissues by the same examiner. Immediately after completion of 6 weeks, subjects received a professional prophylaxis. Parameters were summarized as mean and standard deviation. Parameters were compared from baseline values in each group using paired t-test. Mean change in parameters from baseline to 6 week interval were compared between group A and B using paired t-test. $P < 0.05$ was considered as the level of significance.

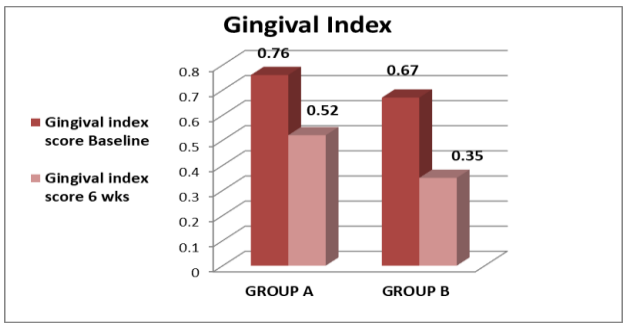
RESULTS

All twenty subjects completed the study. No adverse reactions to dentifrices products were observed during the study period. Three parameters Plaque index, Gingival index and Stain index were compared at the period of 6 weeks from baseline values in each group. (Graph 1, 2, 3) The results of this study showed that at base line there was no significant difference *(P<0.05)* between both the groups regarding all the 3 clinical parameters. Over a period of 6 weeks, both the Herbal and the Non herbal toothpastes resulted in a statistically significant reduction in plaque index, gingival index and stain index. (Table 1) The Herbal toothpaste resulted in a statistically significant improvement in all parameters.

Graph 1: Comparison of Plaque index at the period of 6 weeks from baseline value in both groups.



Graph 2: Comparison of Gingival index at the period of 6 weeks from baseline value in both groups.



Graph 3: Comparison of Stain index at the period of 6 weeks from baseline value in both groups.

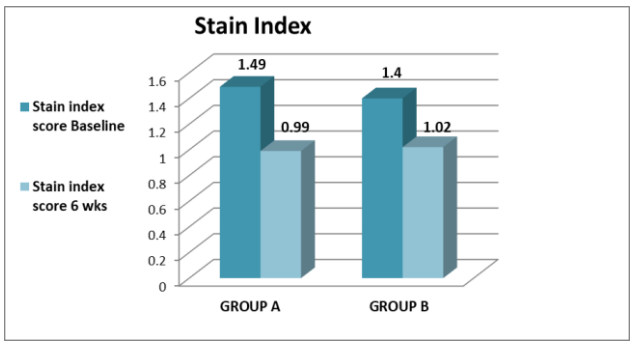


Table 1: Intra group comparison Parameters were compared from baseline values in each group using paired t-test.

Intra group comparison							
Parameters	Visits	Group A Herbal toothpaste			Group B Non herbal toothpaste		
		Mean difference + SD	t value	P value	Mean difference + SD	t value	P value
Plaque index	6 wks	0.88+0.07	12.26	<0.001*	0.83+0.07	11.4	<0.001*
Gingival index	6 wks	0.23+0.03	7.66	<0.001*	0.31+0.03	9.90	<0.001*
Stain index	6 wks	0.5+1.34	5.38	<0.001*	0.55+1.43	2.97	0.005*

Table 2: Inter group comparison Mean change in parameters from baseline to 6 weeks were compared between group-A Herbal toothpaste and Group- B Non Herbal toothpaste using paired t-test.

Inter group comparison						
Parameter	Visits	Mean change from baseline values		Mean difference + SD	t value	P value
		Test	Control			
Plaque index	6 wks	0.8	0.82	0.06+0.11	0.60	0.543
Gingival index	6 wks	0.23	0.31	0.07+0.04	2.16	0.038*
Stain index	6 wks	0.5	0.55	0.05+1.47	2.28	0.033*

P < 0.05 was considered as the level of significance.

DISCUSSION

Dental plaque is the primary reason for gingival inflammation and dental caries. Chronic gingival inflammation may lead to tissue destruction, and if left untreated, may progress into the more destructive stages of periodontitis.[1] Colgate Total™ toothpaste contains triclosan and fluoride. Triclosan has antibacterial property and is well effective against plaque and gingivitis.[11] Fluoride has anti caries properties. But, at the same time they are well-known for staining the teeth Therefore, herbal products may be advised to use, which are also equally effective[11]. The herbal ingredients have the known effect of antibacterial, anti inflammatory and anti cariogenic properties.[5] Plaque and gingivitis control, helps in maintenance of healthy oral cavity. The herbal content of toothpaste have antibacterial effect and hence reduces the inflammation of gingiva and bleeding of gums.[5] The data presented

in a study support the hypothesis that water soluble extracts of the Neem (*Azadirrachta indica*) stick affect some antibacterial properties which may alter bacterial adhesion and the ability of some streptococci to colonize tooth surfaces. The Neem plant contains components like tannins which can inhibit some oral streptococci virulence factors which influence plaque formation.[12] Studies suggest several additional properties of miswak extracts from the Salvador persica tree including haemostatic, analgesic, anti-inflammatory antimicrobial and anticaries effects.[13] Bitterness of the test toothpaste reported could be attributed to nimbin, a bitter compound isolated from neem. It proves that the herbal toothpaste is more efficient in maintenance of oral hygiene and gum bleeding as compared to the non-herbal toothpaste[5]. Several studies have proven the anti-plaque and anti-gingival effects of herbal toothpaste, which were comparable to those of conventional toothpastes.[2, 11,12,13,14] No adverse reactions to dentifrices products were observed in the present study. This is in agreement with reports by (Ozaki F et al).[4,12] The present study has proved that herbal dentifrices do not cause any adverse effects on the oral cavity and are effective in maintenance of oral hygiene and gingivitis, as that of fluoridated non – herbal dentifrice. Several studies have proven the medicinal values of herbal products.[15] Hence medicated herbal toothpaste can be safely used to control plaque and gingivitis

Although in this 30 days period no adverse reactions were noticed in the non herbal toothpaste group, but studies have shown that conventional toothpastes have some undesirable side effects like staining of teeth, altered taste sensation with a long term usage.[1] The present study emphasizes that herbal dentifrices has minimal chances of any adverse effects on the oral cavity and are equally effective in reduction of plaque and gingivitis, as that of fluoridated non-herbal dentifrice. In addition several studies have shown the medicinal values of herbal products.[16] Hence medicated herbal toothpastes can be safely and effectively used to control plaque, gingivitis, and stains. Further long-term studies are required to prove their effectiveness.

CONFLICT OF INTEREST

No potential academic conflict of interest relevant to the above article was reported.

CONCLUSION

The findings of the present study would imply that the herbal –based test toothpaste (Dantkanti™) may confer some additional gingivitis and extrinsic stain reduction properties beyond that of the nonherbal toothpaste (Colgate Total™). However further long term studies with larger sample size are suggested to test the herbal based product as an efficacious alternative to conventional dentifrice formulations.

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