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Effect of Ayurvedic Tooth Powder on Control of Plaque and Gingivitis: A Randomized Controlled Clinical Trial

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Abstract: ***Ayurveda had mentioned various procedures for maintaining oral hygiene. These include procedures like gandusha, kavala, dantadhavana, and jivha lekhana (cleaning tongue). Various plants have been mentioned in Ayurveda for dantakashta. Various Ayurvedic dental formulations are available in market in the form of powders, paste, etc. Present study was conducted for evaluating the effect of one of such Ayurvedic toothpowder named*** *Divya Dant Manjan. It* ***is useful for treatment of the*** *teeth* ***and*** *gums****. This tooth powder is recommended for cavities, gingivitis and decayed tooth etc. It is recommended for old people who suffer from weak teeth and also recommended for children who get cavities in teeth due to excessive eating of sweets and chocolates may also use this natural tooth powder everyday to get relief from toothache. It helps in controlling plaque and reducing gum inflammation in patients of moderate gingivitis. Scaling, root planning, and polishing were done for all the patients participating in the study. Oral hygiene instructions were given that included brushing twice/day with assigned tooth powder Divya Dant Manjan using BASS method for tooth brushing and also massage over gum tissue with finger. All the patients were recalled after 15 days. Scores of plaque index and gingival index was recorded on day 1 and day 15 of treatment. Total of 15 patients were recruited in each group. The mean reduction in gingival index was 1.15 (P<0.05) and 1.26 (P<0.05) in positive control and treatment groups, respectively. However, the mean reduction in plaque indices were found to be 2.03 (P<0.05) and 2.16 (P<0.05) in positive control and Divya Dant Manjan groups, respectively. No significant difference was seen in both the parameters between the two groups.***

Keywords: *Ayurveda*, *gingivitis*, oral hygiene, periodontal diseases

1. Introduction

Periodontal diseases are universal and have been known to affect mankind since the beginning of the recorded history. This fact has been proved by many documentary and paleopathological studies. They also form a major global public problem. There is ample evidence to implicate dental plaque as the primary etiological agent responsible for periodontal diseases. It has been shown that early stages of gingivitis can be reversed by meticulous plaque removal through oral hygiene procedures. Prevention and control of dental plaque by daily rinsing with antibacterial agents have seemed to be attainable ideals since Le and Schiott[1] demonstrated the clinical effects of chlorhexidine rinses in human subjects.

The prevention and treatment of periodontal diseases involve control of plaque deposits mainly by mechanical plaque control methods such as scaling and root planning to achieve ideal plaque control. However, various homecare methods are developed such as tooth brushes, interdental aids, therapeutic dentifrices, etc.

Various studies have been conducted with various agents to study their effect in plaque control. Konig[2] demonstrated that a 0.1% SnF_2 solution, applied daily to rat molars, inhibited plaque and led to substantial caries reduction. This study first demonstrated the advantage of stannous fluoride rinses for the inhibition of plaque; Shern *et al*. substantiated those earlier findings. In one study[3] the plaque-inhibiting effect of an SnF_2 solution was equivalent to that of chlorhexidine, when each was used twice daily. Tinanoff *et al*.[4] showed almost total inhibition of plaque and bacteria with a twice-daily rinse of 0.1% SnF_2. In a separate study, Shern *et al*. demonstrated the plaque-inhibiting effect of fluoride rinse.[5] No agent utilized to date has been entirely satisfactory.[6]

Ayurveda is an ancient system of medicine and is a rich reservoir of resources even for the dental sciences. *Ayurveda* has mentioned various procedures for maintaining oral hygiene. These include procedures like *gandusha, kavala, dantadhavana*, and *jivha lekhana*.

In *Gandusha*, water processed with various medicinal herbs is held in mouth for certain duration. In *kavala*, water is moved in mouth. However, *danta dhavana* is cleaning of teeth. *Danta dhavana* is to be done with stem of certain plants (called as *dantakashta*) like *vata, asana, arka, khadira, karavira, amarga*, etc. It is told that the length of the *dantakashta* should be of 12 *anguli pramana* (length equal to that of width of 12 figures) and the thickness should be about the circumference of little finger. It should possess *kashaya* (Astringent), *tikta* (bitter), and *katu* (pungent) *rasas*. These drugs have properties like *kriminashaka/jantughana* (antiseptic), *vranaropaka* (heals wounds), and *raktashodhaka* (blood purifier). The herbs used in Divya Dant Manjan tooth powder are predominant in these *rasas* and *gunas*; hence, these can be used in treatment of gingivitis. Interest towards the use of herbal-based products is on the rise and it is true even for dentistry. There are various herbs which are proved to be having antiseptic effect. Even today, in India, many herbs are used for cleaning teeth. If herbs are found to be effective in plaque control, it will serve to be of great importance in the maintenance of oral health in treating the periodontal problems in a more economical and safer way.

Today, hundreds of dentifrices are available in the market, but it is necessary to verify the efficacy of these dentifrices by clinical trials instead of simply assuming that the product is efficient based on laboratory studies or advertisement made by manufacturers.

Ingredients of Divya Dant Manjan

Neem, Bakula (Maulasiri), Babbula,Tumburu, Pippali (of small size), Mayaphala (Majuphal), root of Akarakarabha (Akarakara), black-salt, Lavanga, rock-salt, Karpura or Camphor (native), Sphatika Bhasma, pepper-mint, etc.

Benefits Of Divya Dant Manjan:

Divya Dant Manjan is a mixture of natural ingredients that are useful for getting healthy and white teeth.
Divya Dant Manjan is also useful for preventing any type of tooth problems in adults as well as childresn.
Divya Dant Manjan removes foul smell of the mouth.
Divya Dant Manjan is an antibiotic which preventing bacterial infection.
Divya Dant Manjan makes salivary gland fit for doing its work properly.
Divya Dant Manjan takes out the food-particles from teeth.
Divya Dant Manjan improves the sense of taste in the tongue.
Divya Dant Manjan keeps the mouth fresh.
Divya Dant Manjan kills all the germs causing harmful odour.

The study was conducted to evaluate the efficacy of a Ayurvedic tooth powder Divya Dant Manjan in the control of plaque and to check the efficacy of a Divya Dant Manjan Ayurvedic tooth powder in the reduction of gingival inflammation in patient with moderate gingivitis.[7]

2. Materials and Methods

Study was conducted at Rama Dental College, Hospital & Research Center, U.P.. Thirty patients reporting at the outpatient department of Periodontics and diagnosed clinically as case of mild to moderate gingivitis with probing depth of ≤3 mm and a minimum of 15 teeth were included in the study. Moderate gingivitis was defined as extension of inflammation to form a continuous band along the marginal gingivae of more than three regions or teeth. These subjects were randomly assigned to one of the two study groups, after an informed consent process. The two groups were test group (Divya Dant Manjan tooth powder) and positive control group (colgate tooth powder). Study procedure was explained to patients participating in the study. Each of the treatment groups was consisting 15 subjects.

Patients with presence of advanced periodontal disease, use of orthodontic appliances, use of antibiotics in previous 3 months, continuous use of mouth rinses in previous 3 months, history of allergy to dentifrices, or history of any uncontrolled systemic diseases were excluded.

Scaling, root planning, and polishing were done for all the patients participating in the study. Oral hygiene instructions were also given to each subject, which included brushing twice a day with assigned tooth powder using modified BASS method for tooth brushing and also massage over gum tissue with finger. All the patients were reassessed after 15 days. Scores of plaque index and gingival index was recorded on day 1 and day 15 of treatment.

The examination was done by the investigator who was assisted by the recorder well trained with the procedure. Oral inspection was done using a mouth mirror and UNC 15 probe, in adequate illumination. Efficacy parameters were assessed by Plaque Index (Quigley and Hein, 1962 modified by Turesky-Gilmore-Glickman, 1970) and Gingival Index (Loe and Silness 1963).

Plaque was assessed on the labial, buccal, and lingual surfaces of all the teeth after using disclosing agent (Plaksee ICPA®). Gingival index was recorded on all surfaces of all the teeth and score was given for each surface from 0 to 3 according to the scoring criteria. UNC 15 probe was used to assess the bleeding potential of the tissue.

Statistical significance of mean changes between day 1 and day 15 in the above parameters were assessed using paired *t* tests. Difference in scores between the two groups was analyzed using unpaired *t* tests. Statistical analyses were performed with SPSS software for Windows (Statistical Product and Service Solutions, version 14.0, SSPS Inc, Chicago, IL, USA).

3. Results

Of the 30 patients enrolled in the study, all completed the entire study duration of 15 days.

There was a significant reduction between scores of gingival index on day 1 and day 15 in both the groups. No significant difference was seen in scores between the two groups at the end of treatment period [Table 1, Figure 1].

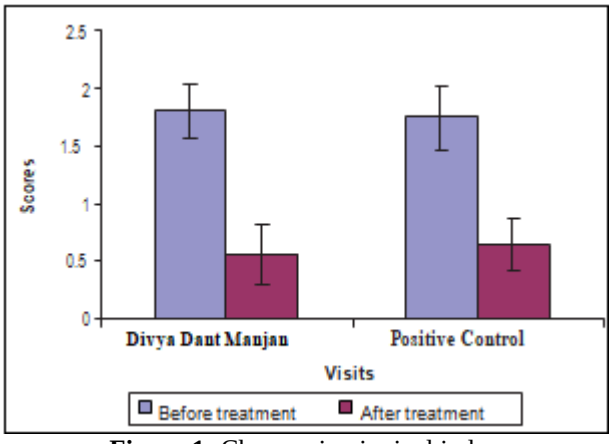

Figure 1: Changes in gingival index

Table 1: Score of gingival index on the starting day of treatment and that on day 15 in positive control group

	Positive control gingival index score mean(±SD mean)	Divya Dant Manjan gingival index score mean(±SD mean)	P value
Before treatment	1.7573(±0.276)	1.8293(±0.269)	
After treatment	0.6420(±0.221)	0.5587(±0.269)	>0.05
P value	<0.05	<0.05	

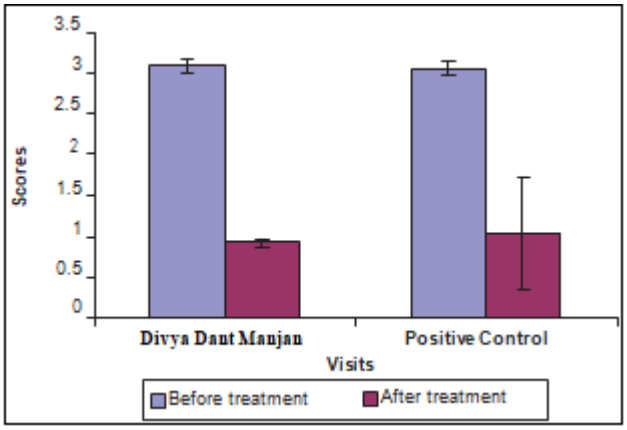

Figure 2: Change in score of plaque index in Divya Dant Manjan and positive control group

Table 2: Scores of plaque index on the starting day of treatment and that on day 15 in positive control group

	Positive control gingival index score mean(±SD mean)	Divya Dant Manjangingival index score mean(±SD mean)	P value
Before treatment	3.0693(±0.087)	3.0920(±0.082)	
After treatment	1.0380(±0.795)	0.9260(±0.063)	>0.05
P value	<0.05	<0.05	

Significant reduction was also observed between scores of plaque index on day 1 and day 15 in both the groups. There was no significant difference between the two groups at the end of treatment period [Table 2, Figure 2].

4. Discussion

Plaque and gingivitis are important diseases of oral cavity and comprises a major part of patients visiting dentists. Various herbs are mentioned in Ayurvedic classics, which can be used for plaque control and treatment of gingivitis.

The study compared herbal tooth powder Divya Dant Manjan with a standard control. Both the tooth powders were found to be useful in effectively reducing the scores of plaque index and gingival index after a treatment period of 15 days. The difference in pre and post scores of both the tooth powders was found to be statistically significant at 5% level of significance.

By comparing the change score between the two groups, it can be said that the difference in score of Divya Dant Manjan group was slightly more than that in positive control group, but the difference between the two groups was not statistically significant (P>0.05) and thus superiority cannot be claimed. However, it can be said that Divya Dant Manjan was as effective as that of positive control group in reducing score of plaque index and gingival index.

The strength of the study was its randomized controlled design. The drawback of the study was that it was done in relative small sample size and thus it was not powered to show a statistically significant difference between the two groups. Another drawback of the study was the open-labeled design. Despite the drawbacks, this study demonstrated the potential role of Ayurvedic herbs in management of periodontal diseases. More studies can be carried out in larger sample size to further evaluate these results.

Further studies are also required to determine how long the plaque-inhibiting effect of such herbal formulation lasts and what should be the optimal frequency of rinsing. Since herbal formulations act by synergy, it may not be possible to interpret the action of each individual ingredient based on findings of present study but various such experimentations can be carried out, which will help further to determine the therapeutic effect of each ingredient. Answers to these questions could lead to the development of evidence based plaque-and-caries-control regimens by the use of Ayurvedic herbs.

5. Conclusion

The following conclusions can be drawn from the present study:

- Both Divya Dant Manjan toothpowder and standard control treatment group shows statistically significant reduction in scores of gingival index and plaque.
- Both the groups showed a similar effect in treating gingivitis.
- A poly herbal combination of herbs mentioned in Ayurveda for oral hygiene has a potential for management of gingivitis.

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