



## Clinical Research

## Effect of Ayurvedic herbs on control of plaque and gingivitis: A randomized controlled 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 UDM, 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 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 UDM 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 UDM groups, respectively. No significant difference was seen in both the parameters between the two groups.

**Key words:** Ayurveda, gingivitis, oral hygiene, periodontal diseases

### 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<sup>[1]</sup> 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<sup>[2]</sup> demonstrated that a 0.1% SnF<sub>2</sub> 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<sup>[3]</sup> the plaque-inhibiting effect of an SnF<sub>2</sub> solution was equivalent to that of chlorhexidine, when each was used twice daily. Tinanoff *et al.*<sup>[4]</sup> showed almost total inhibition of plaque and bacteria with a twice-daily rinse of 0.1% SnF<sub>2</sub>. In a separate study, Shern *et al.* demonstrated the plaque-inhibiting effect of fluoride rinse.<sup>[5]</sup> No agent utilized to date has been entirely satisfactory.<sup>[6]</sup>

*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

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*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 fingers) 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 *kriminashakajantughana* (antiseptic), *vranaropaka* (heals wounds), and *raktashodhaka* (blood purifier). The herbs used in UDM 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.

The present study was conducted on one of such proprietary herbal tooth powders named "UDM," manufactured by KLE Ayurveda pharmacy, Belgaum.

The formulation composition is placed at Table 1.

The study was conducted to evaluate the efficacy of a UDM Ayurvedic tooth powder in the control of plaque and to check the efficacy of a UDM Ayurvedic tooth powder in the reduction of gingival inflammation in patient with moderate gingivitis.<sup>[7]</sup>

## Materials and Methods

Study was conducted at KLE society's V. K. Institute of Dental Sciences, Belgaum. Thirty patients reporting at the outpatient department of Periodontics and diagnosed clinically as case of moderate gingivitis with probing depth of  $\leq 3$  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.

**Table 1: Composition of UDM tooth powder per 10 g**

| Name              | Quantity |
|-------------------|----------|
| Haritaki Churna   | 1.70 g   |
| Bibhitaki Churna  | 1.70 g   |
| Amalaki Churna    | 1.70 g   |
| Bakula Churna     | 1.02 g   |
| Babbula Churna    | 1.02 g   |
| Khadira Churna    | 1.02 g   |
| Kutaja Churna     | 1.02 g   |
| Nimba Twak Churna | 0.57 g   |
| Sanidhava Lavana  | 0.15 g   |
| Karpoora          | 0.05 g   |
| Peppermint        | 0.05 g   |

The two groups were test group (UDM tooth powder) and positive control group (well-established brand 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 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 William's 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 two-tone disclosing agent (Alpha Plac®). 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. William's 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 15.0, SSPS Inc, Chicago, IL, USA).

## 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 2, Figure 1].

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 3, Figure 2].

## 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 UDM with a standard control. Both the tooth powders were found to be useful in effectively reducing the scores of plaque index and gingival

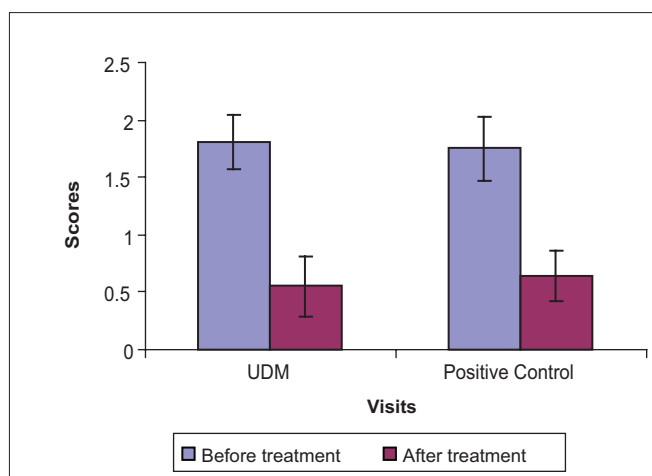


Figure 1: Changes in gingival index

Table 2: Scores 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) | UDM gingival index score Mean (±SD mean) | P value            |
|------------------|---|--|--------------------|
| Before treatment | 1.7573 (±0.276)                                       | 1.8193 (±0.241)                          |                    |
| After treatment  | 0.6420 (±0.221)                                       | 0.5587 (±0.269)                          | >0.05 <sup>†</sup> |
| P value          | <0.05*  | <0.05*                                   |                    |

<sup>†</sup>P value using unpaired t test, \*P value using paired t test

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 UDM 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 UDM 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

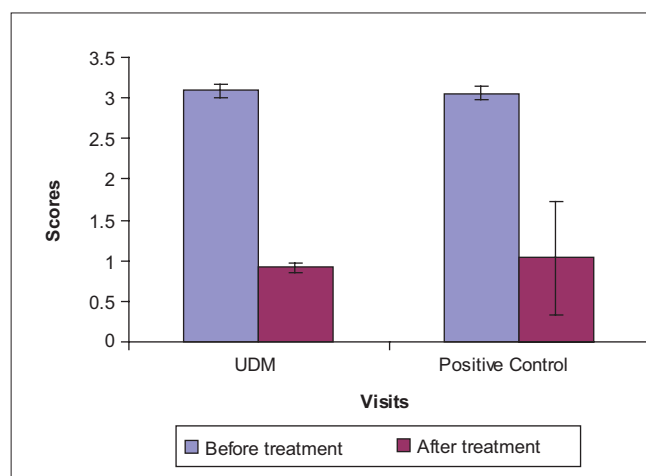


Figure 2: Change in score of plaque index in UDM and positive control group

Table 3: 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) | UDM gingival 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)                          | $P>0.05^{\dagger}$ |
| P value          | $P<0.05^*$  | $P<0.05^*$                               |                    |

<sup>†</sup>P value using unpaired t test, \*P value using paired t test

the development of evidence based plaque-and-caries-control regimens by the use of Ayurvedic herbs.

## Conclusion

The following conclusions can be drawn from the present study:

- Both UDM 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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## हिन्दी सारांश

# दन्तशर्करा एवं शीताद के नियंत्रण में आयुर्वेदिक दन्तमंजन के प्रभाव का अध्ययन

अविनाश कदम, वी. एस. प्रसाद, दिलेश बागडिया, वी. आर. हिरेमठ

आयुर्वेद में मुखगुहा की स्वच्छता बनाए रखने हेतु विभिन्न प्रक्रियाओं का उल्लेख किया गया है। यथा गंडूष, कवलधारण, दन्तधावन और जिह्वा लेखन (जीभ की सफाई)। इन विधियों के उपयोगार्थ विविध प्रकार की जड़ीबूटियों का आयुर्वेद में सविस्तार वर्णन उपलब्ध है। इन्हीं जड़ीबूटियों से निर्मित विभिन्न आयुर्वेदिक दन्त योग; पावडर और पेस्ट के रूप में बाजार में उपलब्ध हैं। वर्तमान अध्ययन में ऐसे ही एक आयुर्वेदिक पावडर का मसूड़ों की सूजन के रोगियों में परीक्षण किया गया। प्रभाव की तुलना पारंपरिक चिकित्सा पद्धति में प्रयोग हि ये जानेवाले सिद्ध दवा युक्त पावडर के साथ की गई। रोगियों को मुखगुहा की स्वच्छता के निर्देश देने के अलावा दिन में दो बार उपरोक्त पावडर से दातों की सफाई करने के निर्देश भी दिए गये। सभी रोगियों की पुनः जाँच दो सप्ताह के बाद की गई। इस जाँच, प्लेक इन्डेक्स और जिन्जायव्हल इन्डेक्स को नापा गया। जाँच के परिणामों में ऐसा पाया गया कि दोनों ही पावडर, प्लेक और जिन्जायव्हल इन्डेक्स कम करने में समान रूप से लाभकारी हैं। इस अध्ययन से यह निष्कर्ष निकाला जा सकता है कि आयुर्वेद में वर्णित दन्तोपयोगी जड़ीबूटियाँ मसूड़ों के सूजन की चिकित्सा में परम लाभकारी हैं।