SALVADORA PERSICA (MISWAK) MOUTHWASH: A PROMISING HOME CARE AGENT

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ABSTRACT

Aim: - The aim of the study was to determine clinical outcomes of *Salvadora persica* as a mouth wash.

Materials and Methods: - A total of 60 patient both male and female who showed clinical signs of gingivitis with gingival score of 2 and above were included in double blind clinical trail. The participants were divided into two groups, 30 participants in each group.

1. Test Group: These patients were instructed to rinse with *S. persica* alcoholic extract at 10% concentration. The instructions were to rinse 3 times daily with 10 ml of solution for 1.5 minutes.
2. Control Group: These patients were instructed to use distilled water 10 ml 3 times daily for 1.5 minutes.

The following indices were recorded at baseline and 21st day. Gingival index (Loe and Sillness 1963), Plaque index (Sillness and Loe 1964)

Result: - The results obtained from the study showed that there was statistically significant decrease in mean gingival and plaque score for the case group as compared to the control group respectively.

Conclusion: - *Salvadora persica* (Miswak) mouthwash is an effective chemical plaque control agent.

Key Words: - Gingivitis, Oral Rinse, Salvadora persica, Subgingival Plaque.

Introduction

Good oral health has a major influence on one's general quality of life and wellbeing. Several chronic and systemic disease has been attributed to poor oral health. With increasing incidences of oral diseases, the global need for alternative prevention and treatment method, with safe, effective and economical products has expanded the maintenance of oral health.[1]

Gingivitis may be defined as an inflammatory lesion mediated by host parasite interaction that is confined to the gingival tissue. The major cause of gingivitis is accumulation of microbial plaque in and around the dentogingival complex, which when removed results in complete resolution of inflammatory lesion.[2] Mechanical plaque control is an indispensible phase of periodontal therapy but there are factors such as accessibility or presence of plaque retentive areas that can limit the clinical and microbiological response.[3] Also mechanical cleaning alone by a considerable proportion of individual is insufficient to maintain gingival health and in susceptible individual, to prevent periodontal disease occurrence, progression or recurrence. This support the concept of employing agents to control plaque and require minimum cooperation and skill in their use. This concept underlies chemical supragingival plaque control. A various number of chemical agents which have antiseptic or antimicrobial action have been used. Among these are phenolic compound, Bisbiguanidaes, Pyrimidines, Quaternary ammonium compound, oxygenating agents, halogens, heavy metals etc (mandel 1988). Chlorhexidine is the most studied and an effective antiseptic for plaque inhibition and for prevention of gingivitis when used twice daily as mouth rinse (Ribeiro *et al* 2007). But in oral use as a mouth rinse chlorhexidine has been reported to have a number of side effects including brown discoloration, bitter taste and sometimes sloughing of the oral mucosa which restricts its general use. Rare cases of parotid gland swelling and anaphylactic reactions have also been noted with the use of chlorhexidine.

In order to overcome such side effects the world health organization (WHO) advice researchers to investigate the possible use of natural products such as herbs and plant extracts.

Salvadora persica, the plant most commonly used in middle East contains a number of indentified antimicrobial and other prophylactic components including flourides, alkaloids, sulphur compounds, glucosinolates and volatile oils such as benzylisothiocynate.[4]

Extracts of *S persica* have been included as ingredients in commercial oral hygiene products, but there is little evidence of their efficacy. *S persica* is produced as a mouth wash containing an alcoholic extract of *S persica* as the principal antimicrobial agent.[5]

The World health organization has recommended and encouraged the use of these sticks as an effective tool for oral hygiene (WHO 1987), it cleans the dental structures and prevents problems in two ways:

1. By mechanical action of the soft wood fibers.
2. By therapeutic action of a chemical constituents of the chewing sticks itself (Almas, 2001)[4]

It has been demonstracted that extracts of *S persica* improved gingival health and inhibited growth of cariogenic bacteria, (Khalessietal 2004). Another study showed that Streptococcus mutants was more susceptible to miswaks antimicrobial activity than lactobacilli (Almas & Al-Zeid, 2004).

Hence our study aimed to determine clinically the effect of the *S persica* extract on dental plaque formation and ginigival inflammation when used as a mouth wash.

Materials and Methods

Preparation of Miswak Mouthwash

Two hundred grams of *salvodorapersica* chewing sticks were cut using a sharp knife then it was grounded to powder using a food blender. The powder was extracted with one litre of 60% ethanol, the mixture was left for 24 hrs. Then it was filtered using whatman no. 1 filter paper. The extract was autoclaved 40% until it became dry.

Source of Data

Out-patients reporting to the department of periodontics K.L.E. V.K. Institute of dental sciences who showed clinical signs of gingivitis with score of 2 and above (Loe and Sillness 1963) were enrolled for the double blind clinical trial.

Inclusion Criteria

1. Patient with clinical signs of gingivitis with gingival score of 2 and above.
2. Age between 20-40 years.

Exclusion Criteria

1. Systemic disease that would contraindicate periodontal procedures.
2. Patient allergic to the *S. persica*
3. Pregnant and lactating mother.

Procedure

Ethical clearance was obtained Institutional review Board K.L.E. V.K. Institute of dental sciences, K.L.E.University, Belgaum. An informed consent was obtained from all the participants. The study was carried out for a period of 21 days with a total of 60 participants. All the participants were trained to use modified bass method of brushing. The subjects were randomly allotted to test and control groups based on a coin toss with 30 participants in each group.

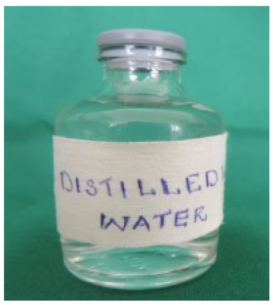

Figure 1: Control Group – Distilled Water

Control Group: Subjects were instructed to use distilled water 10 ml 3 times daily for 1.5 minutes and continue it for 21 days.

The Test Group: Subjects were instructed to rinse with *S. persica* alcoholic extract at 10% concentration 3 times daily with 10 ml of solution for 1.5 minutes.

No dietary limitations were imposed during the study time. Normal oral hygiene procedures were permitted except for the use of chemotherapeutic mouth rinse.

Figure 2: Test Group – Miswak Mouthwash

The following indices were recorded at baseline and 21st day.

1. Gingival index (Loe and Sillness 1963)
2. Plaque index (Sillness and Loe 1964)

Statistical analysis

The gingival and plaque score from baseline and 21st day were subjected to unpaired "t" statistical analysis test.

Results

The present study was conducted to determine the clinical efficacy of *S. persica (Meswak)* mouth wash in gingivitis subjects. There was no significant difference in the mean gingival index and plaque index scores at baseline for test and control groups On intragroup comparison, both control and test group showed significant improvements in the clinical parameters (Gingival and plaque scores) from baseline to 21st day. On inter-group comparison the test group showed improvement in the plaque and gingival sores compared to control group.

Gingival indices: The mean gingival index score for control and test groups at baseline are 1.67 ± 0.12, 1.65 ± 0.26 and at 21st day are 1.30 ± 0.06 and 0.33 ± 0.08 respectively. There was a gradual decrease in gingival index scores in both test and control group. However, the reduction in the gingival index score seen in test group ***S. persica (Meswak)*** was better than control (distilled water) and the difference was statistically significant. (t value 0.322 , p value <0.001. (Table I)

Plaque indices: The mean plaque score for control and test groups at baseline and 21st day are 1.67 ± 0.12 and 1.67 ± 0.31, 1.28 ± 0.04 and 0.37 ± 0.18 respectively. The mean reduction in plaque score for the test group ***S. persica (Meswak)*** was twice as compared to the control group (mean difference for control = 0.39 ± 1.06, case = 1.24 ± 0.30). A statically significant decrease in mean plaque scores was observed for the case group as compared to the control (t 14.427 p value = <0.001).

Discussion

Bacterial plaque is the primary etiological agent in periodontal disease. Experimental gingivitis studies have proved the role of plaque in the etiology of periodontal infection and have demonstrated a direct relationship between plaque levels and the development of gingivitis. Mechanical plaque control is an indispensible phase of periodontal therapy but there are factors such as accessibility or the presence of plaque retentive areas that can limit the clinical and microbial response. This support the concept of employing chemical supragingival plaque control agents. A number of chemical agents which have antiseptic or antimicrobial action have been used with variable success to inhibit plaque and development of gingivitis. These agents have a number of side effects. In order to overcome these side effects the world health organization advice researches to investigate the use of natural products such as herbal and plant extract. *Salavdora persica* a very popular plant in middle east contains a number of identified antimicrobial and other prophylactic components including Fluoride, Alkaloids, Sulphur compounds, glucosinolates and volatile oil such as benzyl isothiocyanate. With the above details in mind this study was done to evaluate over a 21 day observation the effect of herbal mouth wash *Salvadora persica* extract on dental plaque formation. In the study a total of 60 participitants who showed clinical sign of gingivitis with gingival score of 2 and above were included. Gingival and Plaque index were recorded at baseline and 21st day. The results of this study showed a statically significant reduction in the mean plaque scores for the case group as compared to the control group (mean reduction = 1.32 ± 0.19, 0.36 ± 0.08). (Table 1)

Groups	***Baseline***	***21st Day***	***Mean Reduction***
Control	1.66 ± 0.12	1.30 ± 0.06	0.36 ± 0.08
Case	1.65 ± 0.26	0.33 ± 0.08	1.32 ± 0.19
T	0.322	52.670	25.005
DF	58	58	58
p value	> 0.49	< 0.001	< 0.001

Table 1: - Gingival Indiex Scores at baseline and 21st Day

It was observed that there was almost twice the mean plaque reduction for the case group group as compared to the control group. This change could be attributed to the effect of different therapeutic components reported in the extract of Miswak. Mentioned therapeutic components have been shown to beneficially influence the gingival health and plaque inhibition in various *in vitro* and *in vivo* studies. Silica in Miswak acts as an abrasive material to remove plaques and stains. Tannins (tannic acid) exert an astringent effect on the mucous membrane, thus reducing the clinically detectable gingivitis. Alkaloids exert a bactericidal effect and stimulatory action on the gingiva. Essential (volatile) oils possess characteristic aroma and exert carminative, antiseptic action. The sulphur compounds have a bactericidal effect. Vitamin C helps in the healing and repair of tissues. Sodium bicarbonate (baking soda), $NaHCO_3$, has mild abrasive properties and has a mild germicidal action, high concentrations of chloride inhibit calculus formation. These therapeutic findings of previous studies could be the reason for improved gingival health in the present study. Bleeding on probing is widely used by clinicians and epidemiologist to measure disease prevalence and progression as it is easily detected clinically. It is an objective sign of inflammation.

This study also showed a significant reduction in gingival bleeding score for the case group as compared to the control group. (mean reduction = 1.34 ± 0.30, 0.39 ± 1.06). (Table 2)

Groups	***Baseline***	***21st Day***	***Mean Difference***
Control	1.67 ± 0.12	1.28 ± 0.04	0.39 ± 1.06
Case	1.67 ± 0.31	0.37 ± 0.18	1.24 ± 0.30
T	1.038	26.355	14.427
Df	58	38	58
P value	0.303	< 0.001	< 0.001

Table 2: Plaque Indiex Scores at baseline and 21st Day

The antibacterial effect of *S persica* on cariogenic bacteria such as *Streptococcus mutans* and on periodontal pathogen particularly bacteriodes species. This antimicrobial activity may have been responsible for significant improvement in gingival health in participitants using *S persica* mouth wash. The result of the study are in aggrement with (Khalessi *et al* 2004) who demonstrated that extract of *S persica* improved gingival health and inhibited growth of cariogenic bacteria. Almas *et al* 2005 compared antimicrobial activity of eight commercially available mouth rinse and 50% Miswak extract against several micro organism. They found that mouth rinse with *S persica* improved gingival health. Sofrata *et al* 2007 showed that mouth rinse with *S persica* extract compared with water rinsing resulted in protracted elevation in plaque pH and the difference between the two group was statically significant at 30 minutes. In summary this pilot study provides evidence of beneficial oral health effects from extract of *S persica* when incoperated in a mouth wash. Significant improvement in gingival bleeding and in gingival health occurred. These findings provides support to justify a larger, long term clinical trial to assess further the potential oral health benefits of herbal preparation such as *S persica*.

Conclusion

The results of our clinical study revealed that the use of *S persica* Miswak as an oral hygiene was better than distilled water. Thus *S persica* (Miswak) can be recommended for regular use, giving its favourable effects on oral health, low cost, ready availability and simplicity of use. Since the present study was a short term trial, long term follow up studies with microbiological evaluation is required.

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