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Research paper

Clinical efficacy of an herbal mouth wash composed of *Salix alba*, *Malva sylvestrais* and *Althaea officinalis* in chronic periodontitis patients

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ABSTRACT

Background: The aim of this pilot study was to evaluate the adjunctive use of a herbal mouthwash consisting of *Salix alba*, *Malva sylvestris* and *Althaea officinalis* with scaling and root planing, compared with chlorhexidine (CHX) as a standard chemical mouthwash in the treatment of chronic periodontitis and gingivitis.

Materials and methods: In the first part of this trial (study No 1) the clinical efficacy of a prepared herbal mouthwash was assessed in chronic periodontitis patients; in study No 2, the same mouthwash was assessed in gingivitis patients. In study No 1, 30 periodontitis patients were randomly selected and divided into three groups. Along with their scaling and root planing, group A received CHX as their mouthwash, group B received a herbal mouthwash and group C received a placebo mouthwash. Each of the groups were assessed for bleeding on probing, probing depth and clinical attachment level at baseline and 6 weeks after scaling and root planing plus 4 weeks usage of their bottle of mouthwash. In study No 2, 34 gingivitis patients were divided into the same three groups. For 2 weeks patients rinsed with their mouthwash twice daily. Each of the groups were assessed for bleeding on probing, gingival index and plaque index at baseline and 2 weeks after using mouthwashes.

Results: In study No 1 the results showed greater reduction in indices in the CHX group than the herbal mouthwash group and the herbal mouthwash compared to the placebo group. However, the differences in indices between the three groups were not statistically significant. No adverse reaction was seen in the herbal mouthwash group. In study No 2, the CHX and herbal mouthwash groups produced greater reduction in bleeding on probing and gingival indices than the placebo group, but the difference between groups A and B was not statistically significant. Furthermore, the reduction in plaque index in all three groups was statistically significant, but differences between the groups were not significant.

Conclusion: Within the limitation of this small pilot investigation, an herbal mouthwash consisting of *Salix alba*, *Malva sylvestris* and *Althaea officinalis*, provided a clinical benefit comparable to that of CHX if used as an adjunct to scaling and root planing, especially in gingivitis patients, however, further large-scale studies are warranted.

1. Introduction

Periodontal disease is considered to be one of the most widespread dental diseases (Bral and Brownstein, 1988). Dental plaque is a microbial ecosystem consisting of bacterial toxin and carbohydrate matrices which adhere to each other and to dental surfaces (Lindhe, 2003). Dental plaque has been implicated as an aetiological factor for the initiation and progression of periodontal disease (Caranza and Newman, 2006). Conventional treatments for plaque control are mainly based on mechanical techniques and oral hygiene procedures (Mousques et al., 1980; Koch and Lindhe, 1967). Although mechanical techniques are considered quite

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effective, achieving an adequate level of oral hygiene requires patients' motivation, skill and cooperation (Koch and Lindhe, 1967). Rinsing with chemical agents is an effective complementary plaque-control technique, particularly for patients with limitations in the use of mechanical approaches and in the initial phase of periodontal therapy (Deasy, 1990; Kalaga et al., 1989). Chlorhexidine (CHX) has been presented as the most efficacious chemical plaque-control agent (Deasy, 1990; Jones, 1997). It has broad-spectrum antiseptic and antimicrobial effects, mainly on gram positive bacteria, but also on gram negative organisms (Epstein et al., 1994). The most common reported side effects are notably staining of teeth and other oral surfaces, an increase in supra-gingival calculus formation and less commonly, an alteration in taste perception (Addy et al., 2008; Pizzo et al., 2008).

Interest in herbal medicines has risen rapidly with improvements in analysis and quality control, in addition to advances in clinical research demonstrating side effects from chemical agents and the value of herbal medicine in treating and preventing disease. The major strength of the herbs used in dentistry is that no side effects have been reported following their use (Amruthesh, 2007). Furthermore, herbal mouthwashes do not contain alcohol and/or sugar, unlike most chemical products. Microorganisms responsible for bad breath and halitosis feed on these ingredients, and release by-products that cause halitosis. Avoiding these ingredients is one step towards better oral hygiene.

Salix alba (white willow) mostly consists of phenolic glycosides, tannins, catechins, flavonoids and aromatic aldehydes. It has anti-inflammatory, analgesic and astringent properties (Rahmani and Radvar, 2005). *Malva sylvestris* (common mallow) is a wound cleanser and has anti-inflammatory and many other properties. It mainly consists of mucilage and anthocyanins (Rahmani and Radvar, 2005). *Althaea officinalis* (marshmallow) is used for relief of symptoms of arthritis, fever, gastritis, cystisis, as an analgesic and an anti-inflammatory. *A. officinalis* mainly consists of amidon, sucrose, asparagine, tannin and mucilage (Moran et al., 1997). All of these herbs are widely available and have been used in traditional medicine for their therapeutic effects.

The aim of the study was to compare the outcomes from using a herbal mouthwash composed of *S. alba*, *M. sylvestris* and *A. officinalis* or CHX as a standard chemical mouthwash in gingivitis and chronic periodontitis patients.

2. Materials and methods

The study population consisted of the outpatients who were referred to The Periodontology Department of Mashhad Dental School, Iran during 2013. The structure of the study and oral prescriptions were explained to the patients who had met all of the inclusion and exclusion criteria as outlined below and from whom informed consent was obtained.

2.1. Study No 1

In study No 1, 30 chronic periodontitis patients with pocketing and attachment loss in all quadrants (over 45 years old) were selected. Patients on antibiotic therapy or anti-inflammatory drugs, those with any history of systemic disease or allergy to components of the mouthwash, those who had undergone any form of non-surgical or surgical periodontal therapy in the last 6 months, pregnant and lactating mothers and smokers were excluded.

Scaling and root planing was accomplished in two visits for all the patients and local anaesthesia was used when required. Selected patients were randomly assigned to group A (CHX), B (herbal mouth wash) or C (placebo). They were instructed to rinse for 4 weeks twice daily with 10 ml of the allocated mouthwash (undiluted) for 60 s, after which they could expectorate. Subsequent rinsing with water was not allowed. Normal saline was used as placebo.

Each of the three groups were assessed for probing depth (PD), bleeding on probing (BOP), and clinical attachment level (CAL), which were all examined in the buccal and lingual/palatal surfaces at four points (midbuccal, mesiobuccal, distobuccal and lingual) using a periodontal probe, once at baseline and then 6 weeks after completion of the treatment.

2.2. Study no 2

In study No 2, 34 gingivitis patients with signs of gum inflammation, but no attachment loss or bone recession (age range 27–76), were selected. Exclusion criteria were the same as in study No 1. Selected patients were randomly allocated to three groups as in study No 1: group A (CHX), B (herbal mouthwash) or C (placebo). They were instructed to rinse for 2 weeks twice daily with 10 ml of the allocated mouthwash (undiluted) for 60 s, after which they could spit. Subsequent rinsing with water was not allowed. Normal saline was used for the placebo mouthwash.

Each of the three groups were assessed for plaque index, BOP, and gingival index, which were examined at four sites per tooth (buccal, mesiobuccal, distobuccal and distal) using a periodontal probe, once at baseline and then 2 weeks after completion of mouthwash treatment. For ethical reasons, all patients received scaling and root planing after completion of mouthwash treatment in two visits and local anaesthesia was used when required.

In both studies, indices were assessed by an independent investigator who was unaware of the allocated treatments. The patients were also 'blinded' with respect to the treatments. The data were statistically analysed by analysis of variance, *T* test and Tukey test using a statistical package (SPSS, version 16.0).

The herbal mouthwash was prepared as follows: the mixture of *A. officinalis*, *S. alba* and *M. silvestris* leaves that were collected by the authors and washed and then chopped into pieces, was soaked in 100% ethanol in the ratios of 5 parts *A. officinalis*; 1.25 parts *S. alba* and 1 part *M. sylvestris* for 24 h. This mixture was then placed in the oven for 24 h at a temperature of 100 degrees centigrade. The percentage of dried mass was calculated and then diluted by 5% weight/volume with cooled distilled water to obtain a solution of 0.31% g in 2cc.

3. Results

3.1. Results study No 1

3.1.1. BOP (bleeding on probing) index

The mean BOP scores for the test and control groups at the end of the experimental period are summarized in Table 1. The mean BOP index at baseline was 66.80% ± 14.85 for the CHX group, 71.08% ± 10.23 for the herbal mouthwash group and 57.18% ± 19.47 for the placebo group at baseline and 33.61% ± 10.71, 44.79% ± 8.74 and 32.64% ± 8.87, respectively, after completion of the treatment. The results showed statistically significant differences in BOP index in all three groups after the treatment period. The difference in BOP index was more significant

Table 1
The mean bleeding on probing score for the test and control groups before and at the end of the experimental period—study No 1 (*P* value <0.05).

	Before treatment	After treatment	*P* value
Chlorhexidine	66.80 ± 14.85	33.61 ± 10.71	0.005
Herbal mouth wash	71.08 ± 10.23	44.79 ± 8.74	0.010
Placebo	57.18 ± 19.47	32.64 ± 8.87	0.040