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The Anti-plaque Effect of Miswak and Myrrh Mouthwashes versus Chlorhexidine in the Treatment of Chronic Gingivitis; A Comparative Clinical Trial

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ABSTRACT

In the present study the effect of Myrrh and Miswak mouthwashes (MWs) on plaque accumulation and gingival inflammation were compared with chlorhexidine gluconate MW 0.2%. This study was blind randomized clinical trial. Thirty female patients with chronic gingivitis participated in this study and were divided into three groups. Gingival and plaque indices were recorded at baseline and after 3 weeks. Subjects of each group were asked to rinse one of the mouthwashes (Chlorhexidine, Miswak, or Myrrh) twice a day for 3 weeks. Supra and subgingival Scaling were performed and oral hygiene instructions were given for all participants. The mean of gingival and plaque indices have showed an improvement after rinsing with the mouthwashes. The greatest improvement was within the Myrrh group among all three groups for both plaque (mean=.0800) and gingival index (mean= 0.190). Present data indicates that the use of mouthwashes of any kind alone is not regarded substitute of mechanical tooth brushing. The effect of Myrrh and Miswak MWs in controlling plaque accumulation and reducing gingival inflammation was found to be comparable to that of CHX. However Myrrh has proven to be more effective than Miswak.

Keywords: Gingivitis, Plaque Control, Chemical Plaque Control, Mouthwashes, Chlorhexidine, Miswak, Myrrh

1. INTRODUCTION

Periodontal disease PD is recognized as a major public health problem throughout the world. It is the most common cause of tooth loss in adults. Periodontal disease is a general term used to describe several pathological conditions

that affect the supporting tissues of teeth and generally refers to gingivitis and periodontitis (Xiong et al., 2006). Gingivitis is an inflammatory condition of the soft tissues surrounding the teeth and periodontitis is a chronic inflammatory disease characterized by destruction of tooth-supporting tissues. PD involves both direct tissue damage caused by bacterial plaque, accumulated due to a poor oral hygiene, and indirect damage through host inflammatory and immune responses (Kinane, 2000). Dental plaque has been proved by extensive research to be the main factor of gingival and periodontal diseases. There is a direct relationship between plaque levels and the severity of gingivitis (Fine, 2000). Regular effective removal by the personal oral hygiene protocol is the most rational methodology towards the prevention of periodontal diseases. Procedures for plaque control include mechanical and chemical means. Mechanical means include brushing, flossing, use of interdental cleansing aids, and oral prophylaxis (Mali et al., 2012). However, the effectiveness of these methods depends on skills and technique of the individual carrying out these procedures. Thus, chemical plaque control can be used as an adjunct to mechanical plaque control procedures (Fine, 2000). Current therapies are directed toward using both mechanical and chemical plaque controls (Cianco., 1997). Systemic and topical chemotherapeutic agents have been used as adjunctive methods with mechanical plaque control (Goodman et al., 1990). Chlorhexidine gluconate (CHX) has been identified as an appropriate chemotherapeutic agent when used as a mouthwash at a concentration of 0.2% (Chapple et al., 1992). It is accepted as an efficient plaque reducer and an agent for prevention of gingivitis (Gazi et al., 1987). CHX has been used as antiseptic for many years (Gjermo, 1989). Loe and schist presented their observation that CHX mouth wash completely inhibit formation of soft deposition on teeth when used twice daily (Massoud et al., 2001). Other studies reported that CHX mouth rinses are effective in reducing the supra gingival flora (Gazi et al., 1987), and exerting a bactericidal action by shorter exposure (Chapple et al., 1992). In addition to the better-known chemotherapeutics, there are number of substances belong to herbal therapeutic agents have gain special interest, and at the same time, have the potential to augment results of periodontal therapy (Peter et al., 1998). The key issue of herbal therapy is the use of healing plants' features in the treatment of various diseases (Szyszkowska et al., 2010). The rational of the scientific examination of the use of herbal agents is elaboration of a drug of a specific composition and dose, in a modern form which is easy to administer (Bent, 2008). Among these products, Wood sticks and Myrrh have introduced and gain special interest.

Wood sticks have been traditionally used for cleaning the teeth in several countries in the middle east, Asia and Africa (Darout et al., 2000). They are known as Miswak or "siwak" in the Middle East, and there is a strong belief that its use reduces plaque and gingivitis. Miswak is widely used among Muslims and that's attributed to Prophet Mohammed (PBUH), who recommended its use for tooth cleaning before each of the five daily prayer rituals (Gazi et al., 1987). The plant used for Miswak is Salvadora Persica, it grows wild with very wide geographical distribution (Mali et al., 2012). Chewing sticks have shown to have a therapeutic effect on gingiva and surrounding structures. The therapeutic effect could be due to certain chemical contents such as fluorides, silicones, alkaloids essentials, tannis, resins, gum and anthraquinones (Gazi et al., 1987). Myrrh is oleo-gum resin exudates obtained from several species in the genus Commiphora. It contains 57–61% water-soluble gum, 7–17% volatile oils, and 25–40% alcohol-soluble resins and3–4% impurities (Massoud et al., 2001). The oleo-gum resin of Commiphora myrrha locally called 'mur' or 'myrrh' is widely reputed and commonly used in Arab medicines for the treatments of some inflammatory conditions, as an antipyretic, anti-septic, anti-infections, and for bronchial complaints (Chopera et al.,1958; Karnick, 1994). Myrrh is used in India to treat, pharyngitis and respiratory catarrh (Nadkarni, 1977). It is also used as an astringent topical application for oral ulcers (Wichtl MaB, 1994). In the United States, myrrh was formerly official in the United States Pharmacopeia and National Formulary (Thomas, 1997). It was utilized as an aromatic astringent mouthwash (Tyler et al., 1981). Myrrh in tincture form, gargles and mouthwashes is useful in treating sore throats or other oral mucosal or gingival irritations (Blumenthal et al., 1998). The approved modern therapeutic applications for myrrh are based on its long history of use in well established systems of traditional and conventional medicine, case studies, in vitro studies, pharmacological studies in animals, and on phytochemical studies of its volatile oil, gum and resin fractions (Blumenthal et al., 1998). However, the antiplaque value of Miswak and Myrrh extracts has not been fully substantiated clinically. The aim of this study was to evaluate the effect of myrrh and miswak mouthwashes on reducing plaque accumulation and gingival inflammation in comparison to chlorhexidine gluconate 0.2% mouth wash.

2. MATERIALS AND METHODS

This study was a blind, randomized, controlled clinical trial. Thirty female patients aged between 20 and 40 years, with generalized chronic gingivitis were participated in this study. They were selected from those attending the dental clinics in Qassim University KSA, from September 2013 to March 2014. Ethical approval #EA\29\2013 was obtained from research ethics committee in college of Dentistry, Qassim University, KSA. The nature of the clinical trial was explained and informed consent was obtained from all patients. The following inclusion exclusion criteria were used in patient selection: having at least 6 sites with chronic gingivitis according to (Armitage, 1999) with bleeding on

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probing, no pockets more than 3 mm, no loss of attachment and receiving no periodontal treatment during past 3 months. No relevant medical history, no pregnancy, not receiving any medication or antibiotics during the previous six months.

Mouthwashes preparation

Mouthwashes were prepared at laboratories of college of pharmacy Qassim University, KSA, as follow:

Preparation of myrrh mouthwash 1%

50 g of Myrrh (the oleogum resin obtained from the stems and branches of *Commiphora molmol*) were washed with cold water and dried, then were macerated in 5 liters of warm water (45°C) for 24 hours, followed by ultra sonic shaking for 4 hours. Finally, the solution was left over night, then filtered and stored in well-closed bottle till use (Ehab, 2009).

Preparation of Miswak mouthwash 1%

350 g of the air-dried powdered miswak (*Silvadora persica*) were extracted by maceration in 70 % MeOH (1.5 L) at room temperature. After 48 hours the alcohol extract was filtered and concentrated under reduced pressure; maceration of the residue in 70 % MeOH was repeated till exhaustion. The combined extract was concentrated under reduced pressure to afford a brownish residue (52.5 g). 50 g of the dried extract were macerated in 5 liters of warm water (45 °C) for 24 hours, followed by ultra sonic shaking for 4 hours. Finally, the solution was left over night, then filtered and stored in well-closed bottle till use (Ehab, 2009).

Experimental design

All selected subjects that fulfill the inclusion exclusion criteria were invited to participate in this study. Supra and subgingival scaling was performed for all participants. Subjects were randomly divided into 3 groups of 10s:
Group A: 10 patients were asked to rinse with CHX 0.2% twice a day until 3 weeks.
Group B: 10 patients were asked to rinse in the same protocol with myrrh mouthwash.
Group C: 10 patients rinsed in the same manner with Miswak mouthwash.

Baseline measurement

The gingival index and plaque index (Lo ¨e H., 1967) as clinical indices of improvement were recorded at baseline and after 3 weeks after each mouth wash consumption.

Statistical analysis

All data were presented as mean ±SE. SPSS 20 for Mac, SPSS Inc., Chicago, USA) was used. Parametric data were analyzed by ANOVA. The comparison between treating groups was carried out by Independent T test. All statistical analysis were carried out at a significance level of P <0.05.

3. RESULTS

The mean of the gingival and plaque indices have showed an improvement after rinsing with the mouthwashes. The greatest improvement was within the Myrrh group among all three groups (Table 1; Figure 1). Both the CHX and the Myrrh groups showed greater reductions in the Gingival and Plaque Indices than that of Miswak group at the 3rd week. However, the Myrrh group showed better results in Gingival Index than CHX group with no statistically significant difference ρ0.53.While the reduction in Gingival Index in CHX group was greater than those of Miswak group with no statistically significant difference ρ0.64.At the third week of the study, the reduction in the Gingival index was greater in Myrrh group than in Miswak group with no statistically difference ρ0.28 (Table 2). The Plaque Index showed less plaque accumulation, thus better improvement among Myrrh group than CHX group with a significant difference ρ0.01. No significant difference was exist between CHX and Miswak groups ρ0.26.A greater reduction among Myrrh group than Miswak group in Plaque Index with a statistically significant difference ρ0.006 (Table 3).

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Table 1

Mean of Gingival Index and Plaque Index before and after each Mouthwash Application

Mouthwash		Gingival index before	Gingival index after	Plaque index before	Plaque index after
chlorhexidine	Mean± Std. Deviation	1.03±.29	.24±.18	1.11±.41	.24±.15
Myrrh	Mean± Std. Deviation	.92±.40	.19±.17	.93±.52	.08±.09
Miswak	Mean± Std. Deviation	.96±.45	.28±.19	1.07±.52	.35±.25

Table 2

Mean Gingival Index after consumption of each mouthwash

Gingival index	Chlorhexidine	Myrrh	ρValue
	0.24±0.18	0.19± 0.17	0.53
	Chlorhexidine	Miswak	ρValue
	0.24±0.18	0.28±0.19	0.64
	Myrrh	Miswak	ρValue
	0.19± 0.17	0.28±0.19	0.28

Table 3

Mean Plaque Index after consumption of each mouthwash

Plaque index	Chlorhexidine	Myrrh	ρValue
	0.24±0.15	0.08± 0.09	0.01
	Chlorhexidine	Miswak	ρValue
	0.24±0.15	0.35± 0.25	0.26
	Myrrh	Miswak	ρValue
	0.08±0.09	0.35± 0.25	0.006

4. DISCUSSION

Microbial dental plaque is the main cause of both dental and periodontal diseases (Kinane, 2000). Reduction and elimination of plaque is best achieved by mechanical plaque control. However, chemical means can be used as adjunctive to mechanical plaque control (Fine, 2000). CHX is the most effective mouthwash in controlling plaque. However, herbal therapy has emerged and attracts attention by using the healing plants' features in the treatment of various diseases (Szyszkowska et al., 2010). The aim of this study was to investigate the effect of Myrrh and Miswak mouthwashes in comparison to CHX % 0.2 in reducing plaque accumulation and gingival inflammation.

The clinical results revealed that the use of CHX along with supra and subgingival scaling together with oral hygiene instructions showed an improvement in gingival inflammation and reduction in plaque accumulation. This is coinciding to the studies conducted by other investigators who demonstrated that CHX rinse might reduce plaque up to 30% to 40% in gingivitis patients (Brownstein et al., 1990). Moreover our results indicated that the use of CHX mouthwash has an advantage over miswak mouthwash regarding both reduction of plaque accumulation and gingival

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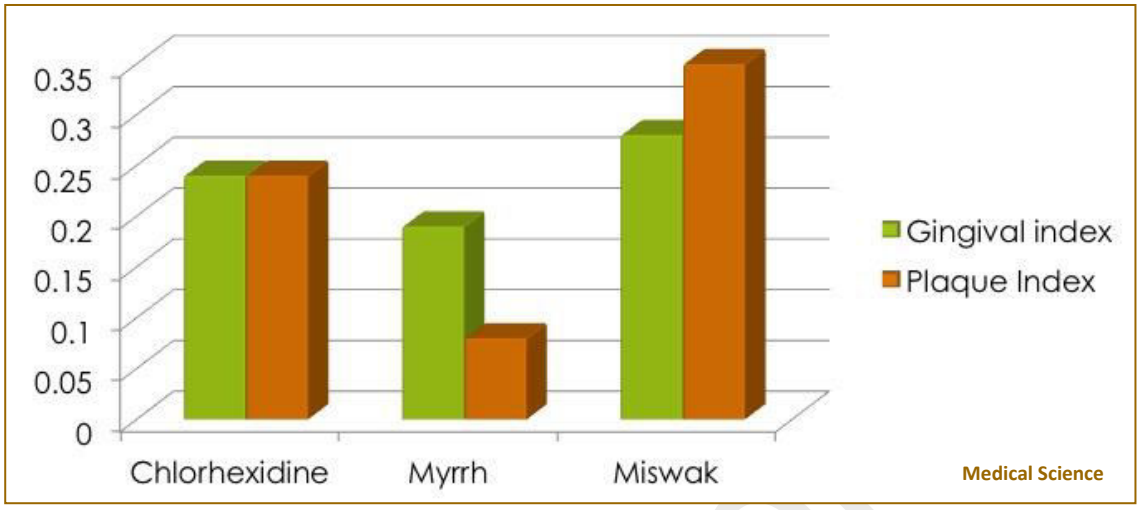

Figure 1
Mean gingival index and plaque index after application of each mouthwash

inflammation. These findings are in consistent with the study done by Gazi et al., in 1987 (Gazi et al., 1987) who compared Miswak and CHX 0.2% rinse, as adjuncts to mechanical plaque control. Both mouth rinses produced a significant reduction in Gingival and plaque index. However, they found superiority of CHX over Miswak mouthwash. *Furthermore, Moghaddas and Mahdavi* were documented that Miswak mouthwash is helpful in reducing the plaque accumulation in patients with chronic gingivitis (Moghaddass et al., 1999). Finally, in 2000, Darout et al., in another study concluded that periodontal status of Miswak users in Sudanese population is better that tooth brush users (Darout et al., 2002).

On the other hand, few if any studies have been conducted to evaluate the antiplaque effect of myrrh as a mouthwash. Our findings revealed that rinsing with Myrrh mouthwash along with supra and subgingival scaling together with oral hygiene instructions have considerable improvements on Plaque and Gingival indices. In the current research, Myrrh mouthwash showed superior results over CHX regarding reduction of inflammation and plaque accumulation, although no statistically significant difference was found. Moreover, our findings revealed that Myrrh mouthwash showed a statistically significant improvement over Miswak mouthwash in relation to both gingival and plaque indices. Present study indicates that the use of mouthwashes of any kind alone is not regarded substitute of mechanical tooth brushing. Myrrh and Miswak extract mouthwashes were efficient when used along with mechanical cleaning in controlling plaque and gingivitis. Furthermore, the effect of Myrrh and Miswak MWs in controlling plaque accumulation and reducing gingival inflammation was found to be comparable to that of CHX. However Myrrh has proven to be more effective than Miswak in this regard. Further researches should be conducted on Myrrh and Miswak mouthwashes.

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REFERENCES

1. Armitage CG. Development of a classification system for periodontal diseases and conditions. *Ann. Periodontal*. 1999, 4(1), 1–6 [PMID: 10863370]
2. Bent S. Herbal medicine in the United States: review of efficacy, safety, and regulation: grand rounds at University of California, San Francisco Medical Center. *J Gen Intern Med*, 2008, 23(6), 854-9 [PMID: 18415652]
3. Blumenthal M, Busse WR, Goldberg A (eds). Klein S, Rister RS (trans). The Complete Commission E Monographs: Therapeutic Guide to Herbal Medicines. American Botanical Council, Austin; Integrative Medicine Communications, Boston, 1998, pp. 173–174
4. Brownstein CN, Briggs SD, Schweitzer KL, Briner WW, Kornman KS. Irrigation with chlorhexidine to resolve naturally occurring gingivitis. A methodologic study. *Journal of clinical periodontology*, 1990, 17(8), 588-93 [PMID: 2212090]

5. Chapple IL, Walmsley AD, Saxby MS, Moscrop H. Effect of subgingival irrigation with chlorhexidine during ultrasonic scaling. *Journal of periodontology*, 1992, 63(10), 812-6 [PMID: 1403587]
6. Chopera RN, Handa KL, Kapoor D. Indigenous Drugs of India. Dhar & Sons. 1958 (2nd ed).
7. Cianco SG. Current dental chemotherapeutics, Part 2. *Dentistry today*. 1997, 16(3), 48-50 [PMID: 9560638]
8. Darout IA, Albandar JM, Skaug N. Periodontal status of adult Sudanese habitual users of miswak chewing sticks or toothbrushes. *Acta odontologica Scandinavica,* 2000, 58(1), 25-30 [PMID: 10809396]
9. Ehab S. Elkhayat. Cytotoxic and Antibacterial Constituents from the Roots of Sonchus oleraceus L., Growing in Egypt. *Pharmacognosy Magazine*, 2009, 5(20), 324-328
10. Fine DH. Chemical agents to prevent and regulate plaque development. *Periodontology*, 2000, 8, 87-107 [PMID: 9567948]
11. Gazi MI, Lambourne A, Chagla AH. The antiplaque effect of toothpaste containing salvadora persica compared with chlorhexidine gluconate. *Clinical preventive dentistry*, 1987, 9(6), 3-8 [PMID: 3505835]
12. Gjermo P. Chlorhexidine and related coumpounds. *J Dent Res*. 1989, 68, 1602-7
13. Goodman CH, Robinson PJ. Periodontal therapy: reviewing subgingival irrigations and future considerations. *Journal of the American Dental Association,* 1990, 121(4), 541-3 [PMID: 2212347]
14. Karnick CR. Pharmacopoeial Standards of Herbal Plants. Sri Satguru Publications, 1994, 1, 103-4
15. Kinane DF. Causation and pathogenesis of periodontal disease. *Periodontology*, 2000, 25(1), 8-20 [PMID: 11155179]
16. Szyszkowska A, Koper J, Szczerba J, Puławska D Zajdel. The use of medicinal plants in dental treatment. *Herba Polonica*. 2010, 56(1), 24-32
17. Loe H. The gingival index, the plaque index and the retention index systems. *J Periodontol*., 1967, 38(Suppl.), 610-616 [PMID: 5237684]
18. Mali AM, Behal R, Gilda SS. Comparative evaluation of 0.1% turmeric mouthwash with 0.2% chlorhexidine gluconate in prevention of plaque and gingivitis: A clinical and microbiological study. *Journal of Indian Society of Periodontology*, 2012, 16(3), 386-91 [PMID: 23162334]
19. Massoud A, El Sisi S, Salama O, Massoud A. Preliminary study of therapeutic efficacy of a new fasciolicidal drug derived from Commiphora molmol (myrrh). *The American journal of tropical medicine and hygiene*, 2001, 65(2), 96-9 [PMID: 11508399]
20. Massoud AM, Labib IM, Rady M. Biochemical changes of Culex pipiens larvae treated with oil and oleo-resin extracts of Myrrh Commiphora molmol. *Journal of the Egyptian Society of Parasitology*, 2001, 31(2), 517-29 [PMID: 11478451]
21. Moghaddass H, Mahdavi SO. The effects of persica mouthwash on dental plaque and gigival bleeding with and without supra gingival scaling and polishing in gingivitis. *Besheshti Univ. Dent. J.*, 1999, 16, 289-296
22. Nadkarni KM. Indian Materia Medica. Popular Prakashan, 1977 (Bombay), 170-1
23. Peter l Jacobsen, Richard P Cohan. Alternative dental products. *Journal of the california dental association*, 1998, 62, 101-10
24. Thomas CL. Taber's Cyclopedic Medical Dictionary. Philadelphia: MA; 1997
25. Tyler VE, Brady LR, Robbers JE. Pharmacognosy. Lea & febiger. 1981; 8th eds: 157-8
26. Wichtl MaB NG. Herbal Drugsand Phytopharmaceuticals. Medpharm Scientific Publishers. 1994
27. Xiong X, Buekens P, Fraser WD, Beck J, Offenbacher S. Periodontal disease and adverse pregnancy outcomes: a systematic review. *BJOG: An International Journal of Obstetrics & Gynaecology*, 2006, 113(2), 135-43 [PMID: 16411989]