

Essential Oils and Periodontal Disease

JA von Fraunhofer^{1*} and L Massa²

¹Professor Emeritus, School of Dentistry, University of Maryland, Baltimore, MD, USA

²Premier Dental Centers, Boerne, TX, USA

***Corresponding Author:** JA von Fraunhofer, Professor Emeritus, School of Dentistry, University of Maryland, Baltimore, MD, USA.

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Abstract

A limited study with 8 patients was undertaken to assess the efficacy of an essential oil-based mouthwash on the progression of periodontal disease as evaluated by sulcus probing depths. A pocket depth of ≥ 3 mm was taken to be an indication of the presence of periodontal disease.

After a comprehensive periodontal evaluation, scaling and root planning, patients rinsed their mouths daily with Young Living Thieves Mouthwash® for 30 - 60 seconds. Periodontal evaluations were performed at the end of 6 months and the change in probing depth was determined. In evaluating the patients, no significant ($p > 0.05$) difference was found between the maxillary and mandibular teeth in the number pockets per tooth.

The data showed that the use of Thieves Mouthwash decreased the average pocket depth by ≥ 1 mm for $59.4 \pm 29.4\%$ of the periodontal pockets with pocket depth reductions of 2 mm for deeper pockets. No significant difference ($p > 0.05$) was found between maxillary and mandibular teeth in the % decreases in pocket depth. Two patients in the study who were non-compliant with regard to oral rinsing showed no change in pocket depth over 6 months.

The data indicate that daily rinsing with Thieves Mouthwash achieved a decrease in pocket depth of at least 1 mm for pockets that were ≥ 3 mm in depth at the start of the study.

It was noted that users of the mouthwash experienced reduced halitosis and an absence of "morning breath" when rinsing was performed at bedtime.

Keywords: *Essential Oils; Periodontal Disease*

Introduction

A mainstay of modern dentistry is that control of dental plaque is essential to oral health since plaque with its complex microbiological composition is recognized as the primary cause of dental caries, gingivitis, periodontal disease and halitosis. Accordingly, both mechanical aids such as toothbrushes, dental floss and water irrigation devices as well as chemical interventions such as dentifrices and mouthrinses/ mouthwashes are used worldwide to control or remove plaque.

The effectiveness of fluoride-containing dentifrices and mouthwashes as well as fluoridation of potable water in controlling dental caries is so well-established that it need not be discussed further here. The evidence for the effectiveness of dentifrices as antiplaque and anti-gingivitis agents, however, is less clear. A systematic review of the literature [1] revealed that stannous fluoride-containing dentifrices had a statistically significant but marginal clinically significant effect on gingivitis. Likewise, studies of the effects of herbal toothpastes on plaque and gingivitis [2-4] indicated little difference in their antiplaque effectiveness compared to that of conventional

dentifrices. Nevertheless, despite the lack of validating data on the antiplaque and anti-gingivitis effectiveness of plant-based dentifrice ingredients, the literature indicates that many mouthwashes in combination with mechanical plaque control are effective in this regard.

Antimicrobial oral care formulations containing biocides such as chlorhexidine (CHX), triclosan, cetylpyridinium chloride (CPC) and Delmopinol are recognized as effective antiplaque and anti-gingivitis mouthwashes [1,5,6]. Further, an interesting development in recent years is the growing interest in the use of essential oil-containing mouthwashes for plaque and gingivitis control, as demonstrated by several research studies and meta-analyses [1,5-12]. This use of essential oils (EOs) for antiplaque and anti-gingivitis control is an obvious application of the well-established antibacterial properties of essential oils [13,14].

The literature indicates that whereas 0.2% chlorhexidine mouthwashes are the “gold standard” with regard to antiplaque effects, essential oils (EOs) do possess high antiplaque efficacy with high, and similar, antibacterial activity to CHX [12]. Interestingly, essential oil mouthwashes are considered to be reliable alternatives to CHX in cases where anti-inflammatory oral care is deemed necessary [11]. Certainly, EOs in combination with mechanical plaque control (i.e. brushing and flossing or MPC) have been found to be more effective in lowering clinical levels of plaque and gingivitis than CPC+MPC [7,8,10]. Other work, however, suggests that CHX may be more effective than EOs with regard to plaque and biofilm control [11,12].

Aim of the Study

The present limited study was undertaken to evaluate the effectiveness of Young Living’s Thieves Mouthwash®, a recently introduced mouthwash containing essential oils and colloidal silver, as an adjunct to MPC for control of gingival inflammation and periodontal problems.

Materials and Methods

Eight patients volunteered to participate in the study. All patients were provided with a comprehensive periodontal evaluation followed by thorough prophylaxis, scaling and root planning as necessary. Probe depth measurement were taken at three points (mesial, central and distal) on the facial and lingual surfaces of each tooth. A pocket depth of ≥ 3 mm was taken to be an indication of the presence of periodontal disease. Any gingival inflammation was noted on the patient charts. Periodontal probe depths were recorded for all teeth. Thereafter, six patients (patients P1 through P6) rinsed their mouths daily with commercially available Thieves Mouthwash for 30 - 60 seconds daily for six months followed by a detailed periodontal evaluation and measurement of sulcus probe depths. Two patients (patients C1 and C2), following the initial periodontal examination and measurement of probe depths, were very intermittent in their use of Thieves and were deemed to be controls.

The principal active ingredients of Thieves Mouthwash are indicated in table 1.

<p><i>Mentha piperita</i> (peppermint) oil</p> <p><i>Syzygium aromaticum</i> (Clove) flower bud oil</p> <p><i>Mentha spicata</i> (spearmint) leaf oil</p> <p><i>Citrus limon</i> (lemon) peel oil</p> <p><i>Cinnamomum verum</i> (cinnamon) bark oil</p> <p><i>Vetiveria Zizanioides</i> (vetiver) root oil</p> <p><i>Eucalyptus radiata</i> leaf oil</p> <p>Alpha-tocopheryl (Vitamin E)</p> <p>Colloidal silver</p> <p>Citric acid</p>
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Table 1

The working “dosage” of the mouthwash is 1 tablespoon or 15 ml and, as indicated above, the recommended rinse time is 30 - 60 seconds. Bottles of mouthwash were provided free of charge to the participants in the study.

Results

All patients were found to have a satisfactory periodontal condition with minimal gingival inflammation and complete absence of dental caries at the start of the trial. At the 6-month re-evaluation, no dental caries was observed with any of the study patients and there was no evidence of gingival inflammation.

The findings of the periodontal probe depths are summarized in tables 2 and 3.

Patient	P1	P2	P3	P4	P5	P6
Maxilla						
Initial status						
No. of teeth	13	11	14	14	4	11
No. of pockets ≥ 3 mm	56	48	67	74	22	45
No. of pockets/tooth	4.3	4.4	4.8	5.3	5.5	4.1
Final status						
No. of pockets ≥ 3 mm	54	43	35	74	22	45
No. of pockets/tooth	4.2	3.9	2.5	5.3	5.5	4.1
Outcome						
No. of decreases ≥ 1 mm	16	30	66	53	3	3
% of decreases	28.6	62.5	98.5	71.6	13.6	6.7
No. of decreases ≥ 2 mm	0	2	38	16	3	0
Mandible						
Initial status						
No. of teeth	14	14	14	14	13	12
No. of pockets ≥ 3 mm	59	57	62	68	49	49
No. of pockets/tooth	4.2	4.1	4.4	4.9	3.8	4.1
Final status						
No. of pockets ≥ 3 mm	56	52	41	53	49	48
No. of pockets/tooth	4.0	3.7	2.9	3.8	3.8	4.0
Outcome						
No. of decreases ≥ 1 mm	28	28	58	52	5	16
% of decreases	47.5	49.1	93.5	76.5	10.2	32.7
No. of decreases ≥ 2 mm	2	5	19	20	0	0

Table 2: Summary data on periodontal probe depths for study participants.

Controls	C1	C2
Maxilla		
Initial status		
No. of teeth	14	14
No. of pockets \geq 3 mm	52	32
Pockets/tooth	3.7	2.3
Final status		
No. of pockets \geq 3 mm	52	31
Pockets/tooth	3.7	2.2
Outcome		
No. of decreases \geq 1 mm	0	0
% of decreases	0	0
No. of decreases \geq 2 mm	0	0
Mandible		
Initial status		
No. of teeth	15	14
No. of pockets \geq 3 mm	69	33
Pockets/tooth	4.6	2.4
Final status		
No. of pockets \geq 3 mm	49	33
Pockets/tooth	3.3	2.4
Outcome		
No. of decreases \geq 1 mm	0	5
% of decreases	0	15.2
No. of decreases \geq 2 mm	0	1

Table 3: Summary data on periodontal probe depths for controls.

No statistically significant differences ($p > 0.05$) were found between the number of pockets \geq 3 mm in depth for the maxillae or mandibles of any of the test subjects or the controls. Likewise, there were no significant differences ($p > 0.05$) between the number of pockets \geq 3 mm for the maxillae or the mandibles of any study participants from the initial status to 6 months' of mouthwash usage.

It was found, however, that the average number of probe depth decreases of \geq 1 mm was 46.9 ± 36.3 for the maxillae and 51.6 ± 29.9 for the mandibles although this difference was not statistically significant. It was noted that two subjects (patients P5 and P6) had markedly fewer pocket depth decreases than the other test subjects. If these two subjects are considered to be outliers, then the percentage number of decreases rise to 65.3 ± 28.9 and 66.6 ± 22.3 respectively, again the difference was not statistically significant. In other words, approximately $\frac{2}{3}$ rds of all pocket depths decreased by at least 1 mm over the evaluation period and a significant number showed pocket depth decreases of 2 mm or more. In contrast, only 5 pockets in one of the controls (C2) showed a decrease in probe depth over the 6-month evaluation period.

It was also noted that deeper pockets (\geq 5 mm) usually showed a decrease in pocket depth of 2 mm at the 6-month evaluation period.

No patients showed any dental caries or the presence of gingival inflammation. It was noted that the patients that used Thieves mouthwash showed a reduced degree of plaque build-up although quantifying this effect is almost impossible in a general practice setting other than noting the visual observations of the hygienists performing the prophylaxes and periodontal evaluations. Further, it was noted by the majority of patients that there was a noticeable reduction in halitosis and, especially, an absence of "morning breath" when mouth rinsing was performed at bedtime.

There was no evidence of staining or discoloration of the teeth of patients using the mouthwash.

Discussion

The literature clearly indicates that essential oils have a place in the armamentarium directed at controlling plaque, gingivitis and periodontal health. The present study using a commercially available EO-based mouthwash confirms the beneficial effects of EOs on periodontal health. Although the observed decrease in probe depth *per se* was not large in most cases, namely 1 mm for initial pocket depths of 3+ mm, there were many pockets that showed greater reductions in depth, i.e. ≥ 2 mm, most notably for deeper pockets. The reduced halitosis and elimination of morning breath was a notable advantage and benefit for the trial participants.

Although determining which mouthwash ingredient had the greatest influence on the observed effects cannot be decided at this stage, it is clear that the EO mixture is effective and the presence of a small amount of colloidal silver undoubtedly assists in plaque reduction and elimination of dental caries. It is likely that the mouthwash not only influenced the tooth sulci but also helped reduced and possibly eliminate bacterial and viral proliferation on the hard and soft palates as well as in the nasopharyngeal region. This effect would account for the beneficial action regarding halitosis and morning breath.

The absence of staining with Thieves Mouthwash is an added benefit compared to the familiar staining effects observed with chlorhexidine rinses despite their effectiveness in treating periodontal problems.

Conclusions

The recently introduced Thieves Mouthwash has been shown to reduced periodontal probe depths for all patients using the product on a daily basis. Further, the reduction in halitosis and elimination of morning breath are distinct advantages and benefits from using this oral care formulation. A further benefit was the absence of tooth staining with regular usage of the product.

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