

Influence of subgingival irrigation with soy oil on periodontitis

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Abstract

Previous studies have shown that silicone oil (dimethylsiloxane) and organic oils have a plaque-inhibiting activity, when they are used for oral rinsing. To determine whether organic oils would also influence the inflammatory reaction in periodontitis, we performed a double blind clinical study using soy oil for subgingival irrigation prior to scaling. Twenty patients with at least 3 teeth (test-teeth) in the upper jaw with probing pocket depth ≥ 5 mm were randomly divided into 2 groups. The following clinical parameters were assessed: A modified plaque index (PLI) at 4 sites/tooth, pocket depth (PD), attachment level (AL) and bleeding upon probing (BOP) at 6 sites/tooth. All measurements were performed with an electronic probe (Florida Probe®). Prefabricated acrylic stents were used for AL measurements. Two weeks after repeated supragingival prophylaxis, patients were analyzed at baseline, days 1, 3, 15, 28 and 90. All teeth with PD ≥ 5 mm were irrigated with either 1 ml soy oil (99%) (Test group = Tg) or NaCl (Control group = Cg). Our preliminary results showed a reduction in BOP at the test teeth after day 15 in the two groups (BOP=from 38.3% to 28.8% at Tg, and from 41.6% to 27.2% at Cg). This is probably due to the reduction in PLI from approximate 40% before baseline to almost 15% in both groups and indicates the therapeutic effect of subgingival irrigation irrespective of the solution used. PD and AL showed a (non-significant) reduction in both groups. We conclude that the use of soy oil for subgingival irrigation prior to root planing, doesn't markedly influence clinical signs of inflammation.

Introduction

Some essential oils have been used for mouth rinsing since the past century, for example Listerine®, a combination of thymol, eucalyptol, menthol and methylsalicylate. Triclosan is another substance used in different products, that in combination with a copolymer PVM/MA (methoxyethylene and maleic acid) resulted in moderate plaque inhibition [1]. Non-polar mouth rinses show less side effects than products on an alcoholic basis. Chlorhexidine formulations are prepared in an alcoholic solution with concentrations varying from 11.6% to 18%. Reversible side effects include staining of hard tissues and some dental materials, supragingival calculus accumulations, altered taste sensation and less commonly, a burning sensation and a mild mucositis.

Previous studies have shown, that a two phase system mouthrinse (one phase of water soluble antibacterial substances and the other phase with an oily composition) binds bacteria due to its lipophilic characteristics and eliminates them from the oral cavity [4]. The hydrophobic surface of bacteria binds to the hydrophobic phase of an hydrophobic/hydrophilic substance.

Organic oils have a low surface tension and hydrophobic characteristics, therefore they can be used as a reservoir for lipid soluble substances [5]. Kjaerheim et al. reported in 1993 about the plaque inhibitory effect of different solutions and organic oils used as mouthrinses during 4 days. Soy oil provided a better plaque inhibitory effect than the other oils used [3]. In these studies, solutions were used as a mouthrinse but during mouthrinsing only ~4% of the inner surface of deeper pockets are getting in contact with the agent. In contrast, subgingival irrigation achieves a penetration of 75 to 93% [2].

Objective

To determine whether organic oils would also influence the inflammatory reaction in periodontitis, we performed a double blind clinical study using soy oil for subgingival irrigation prior to scaling.

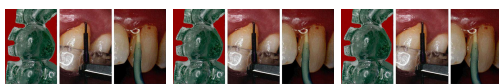


Fig. 1a: Plastic stent with reference marks
Fig. 1b: Florida-Probe®
Fig. 1c: Subgingival Irrigation with Perioflex®

Material and Methods

Twenty patients (mean age: 41.6 years) were included in this randomized double blind study. They were radiologically and clinically evaluated and after obtaining informed consent, all of them were randomly distributed into a test group (Tg, n = 10) or a control group (Cg, n = 10). All patients had a minimum of 3 teeth in the upper jaw (from premolar to premolar) with at least one site with probing pocket depth ≥ 5 mm. These were considered as test teeth.

The following clinical parameters were assessed: probing pocket depth (PD), clinical attachment level (AL), bleeding upon probing (BOP) were recorded at 6 sites/tooth; a modified plaque index (PLI) at 4 sites/tooth. All clinical parameters were recorded with the Florida Probe®. In addition, prefabricated acrylic stents with references were used for measurements of AL (Fig. 1). After the initial examination, a supragingival professional prophylaxis was performed twice in all teeth with an interval of one week. Patients were advised not to use any kind of mouthrinse at home.

The treatment phase started 2 weeks later at baseline and days 1, 3, 15, 28 and 90. On these days all teeth with PD ≥ 5 mm were subgingivally irrigated with a Perioflex® syringe (Oral B, Frankfurt, Germany) either with 1 ml soy oil/tooth (Tg) or 1 ml physiologic saline/tooth (Cg). At baseline and days 15, 28 and 90, all clinical parameters were recorded again.

Results

Our preliminary results showed a reduction in BOP at the test teeth after day 15 in both groups (BOP= from 38.3% to 28.8% at Tg, and from 41.6% to 27.2% at Cg). This is probably due to the reduction in PLI from approximately 40% before baseline to almost 15% in both groups and indicates the therapeutic effect of subgingival irrigation irrespective of the solution used (Fig. 2). In the Tg, mean BOP of all teeth was on day 28 lower (9%) than at baseline (Fig. 3). Also in the Tg, mean BOP of the test teeth (PD < 5 mm) was on days 28 and 90 about 14.4% lower than at baseline (Fig 4). The Tg showed an 18.3% lower mean BOP, when only the deepest pocket depths were included (PD ≥ 5 mm) (Fig. 5). No significant difference (Mann-Whitney-Test) was observed between the 2 groups. PLI from the test teeth showed a similar reduction from baseline to day 15 in both groups (Fig 6). PD and AL were non-significantly reduced in both groups (Figs. 7, 8).

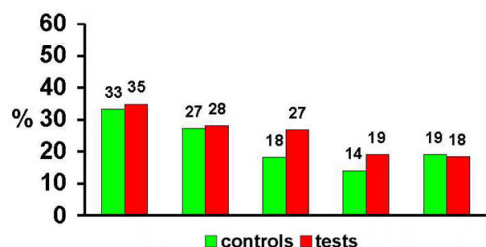


Fig. 2: Mean bleeding on probing (all teeth)

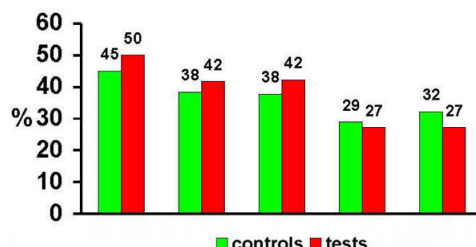


Fig. 3: Mean bleeding on probing (test teeth) (PD < 5 mm are included)

Fig. 2: Mean bleeding on probing (all teeth)

Fig. 3: Mean bleeding on probing (test teeth) (PD < 5 mm are included)

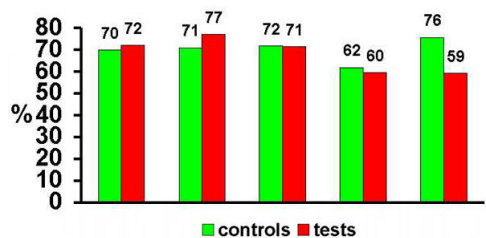


Fig. 4: Mean bleeding on probing (test teeth) (Pocket depth ≥ 5 mm only)

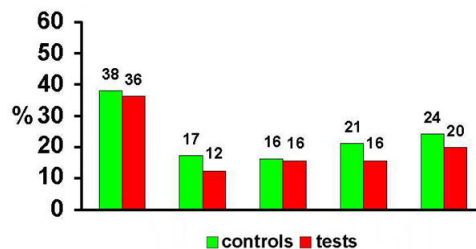


Fig. 5: Mean plaque index (all teeth)

Fig. 4: Mean bleeding on probing (test teeth) (Pocket depth ≥ 5 mm only)

Fig. 5: Mean plaque index (all teeth)

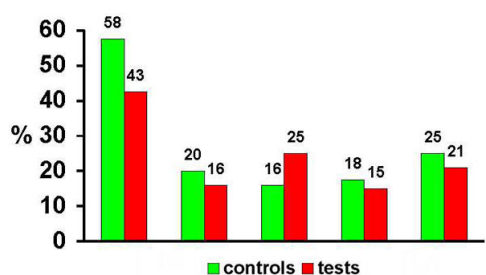


Fig. 6: Mean plaque index (test teeth)

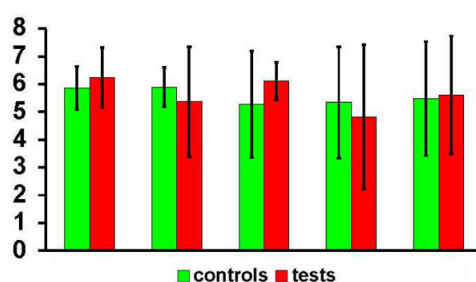


Fig. 7: Mean pocket depth with standard deviation

Fig. 6: Mean plaque index (test teeth)

Fig. 7: Mean pocket depth with standard deviation

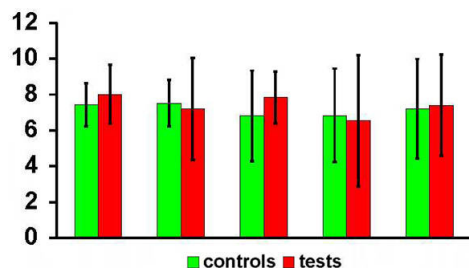


Fig. 8: Mean attachment level with standard deviation

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Conclusions

Subgingival irrigation prior to root planing with soy oil, resulted in a reduction of total BOP in patients with AP, but without significant differences between tests and controls. We conclude that the use of soy oil for subgingival irrigation prior to root planing, doesn't markedly influence clinical signs of inflammation, but irrigation by itself, as demonstrated by Nylund & Egelberg [6], Schlagenhaut et al. [7], Fine et al. [8], has a marked influence on local inflammation. This irrigation may be an effective adjunctive treatment of severely affected individuals with deep pockets.

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2596 Influence of Subgingival Irrigation with Soy Oil on Periodontitis

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Abstract

Previous studies have shown that silicone oil (dimethylsiloxane) and organic oils have a plaque-inhibiting activity when they are used for root coating. To determine whether organic oils would also influence the inflammatory reaction in periodontitis, we performed a double-blind clinical study using soy oil for subgingival irrigation prior to scaling. Twenty patients with at least 3 teeth (test-teeth) in the upper jaw with probing pocket depth ≥ 5 mm were randomly divided into 2 groups. The following clinical parameters were assessed: A modified plaque index (PI*) at 4 sites/teeth, pocket depth (PD), attachment level (AL) and bleeding upon probing (BOP) at 5 sites/teeth. All measurements were performed with an electronic probe (Florida Probe®). The laboratory control syringe were used for AL measurements. Two weeks after repeated supragingival prophylaxis, patients were analyzed at baseline, days 1, 3, 15, 28 and 90. All teeth with PD ≥ 5 mm were irrigated with either 1 ml soy oil (Tg) or 1 ml saline (Cg) (Control group = Cg). Our preliminary results showed a reduction in BOP at the test teeth after day 15 in the two groups (BOP* was 38.3% to 28.8% at Tg and from 41.6% to 27.2% at Cg). This is probably due to the reduction in PLI from approximately 40% before baseline to almost 15% in both groups and indicates the therapeutic effect of subgingival irrigation irrespective of the solution used (Fig. 2). In the Tg, mean BOP of all teeth was on day 28 lower (9%) than at baseline (Fig. 3). Also in the Tg, mean BOP of the test teeth (PD ≥ 5 mm) was on days 28 and 90 about 14.4% lower than at baseline (Fig. 4). The Tg showed an 18.3% lower mean BOP* when only the deepest pocket depths were included (PD ≥ 5 mm) (Fig. 5). No significant difference (Mann-Whitney-Test) was observed between the 2 groups. PLI from the test teeth showed a similar reduction from baseline to day 15 in both groups (Fig. 6). PD and AL were not significantly reduced in both groups (Figs. 7, 8).

Introduction

Some essential oils have been used for mouth rinsing since the past century, for example Listerine® a combination of thymol, eucalyptol, menthol and methylsalicylate. Triclosan is another substance used in different products, but in combination with a copolymer Poly(MA-methacrylate) and maleic acid) resulted in moderate plaque inhibitor [1]. Non-polar mouth rinses show less side effects than products on an alcoholic base. Cholinefree formulations are preferred in an alcoholic solution with concentrations varying from 11.8% to 16%. Reversible side effects include staining of hard tissues and some dental materials, supragingival calculus accumulations, altered taste sensation and teeth commonly a burning sensation and a mild mucositis. Previous studies have shown that a two-phase system mouthrinse (one phase of water soluble antibacterial substances and the other phase with an oily composition) binds bacteria due to its lipophilic character and eliminates them from the oral cavity [4]. The hydrophobic surface of bacteria binds to the hydrophobic phase of an hydrophobic/hydrophilic substance. Organic oils have a low surface tension and hydrophobic characteristics, therefore they can be used as a reservoir for lipid soluble substances [5]. Hjertqvist et al. reported in 1993 about the plaque-inhibitory effect of different solutions and organic oils used as mouthrinses during 4 days. Soy oil provided a better plaque-inhibitory effect than the other oils used [5]. In these studies, solutions were used as a mouthrinse but during mouthrinsing only ~4% of the inner surface of deeper pockets are getting in contact with the agent. In contrast, subgingival irrigation achieves a penetration of 75 to 92% [2].

Objective

The aim of the present study was to determine the influence of a subgingival irrigation with soy oil on the inflammatory reaction in patients with severe adult periodontitis (AP).



Fig. 1: a) Plaque assess with reference mirror b) subgingival irrigation with Florida Probe®

Material and Methods

Twenty patients (mean age: 41.8 years) were included in this randomized double-blind study. They were radiologically and clinically evaluated and after obtaining informed consent, all of them were randomly distributed into a test group (Tg, n = 10) or a control group (Cg, n = 10). All patients had a minimum of 3 teeth in the upper jaw (from premolar to premolar) with at least one site with probing pocket depth ≥ 5 mm. These were considered as test-teeth. The following clinical parameters were assessed: probing pocket depth (PPD), clinical attachment level (AL), bleeding upon probing (BOP) were recorded at 5 sites/teeth; a modified plaque index (PI*) at 4 sites/teeth. All clinical parameters were recorded with the Florida Probe®. In addition, prefabricated acrylic stents with reference were used for measurements of AL (Fig. 1). After the initial examination, a supragingival professional prophylaxis was performed twice in all teeth with an interval of one week. Patients were advised not to use any kind of mouthrinse at home. The treatment phase started 2 weeks later at baseline and days 1, 3, 15, 28 and 90. On these days all teeth with PD ≥ 5 mm were subgingivally irrigated with a Florida Probe® syringe (Dral B, Frankfurt, Germany) either with 1 ml soy oil (Tg) or 1 ml physiologic saline (Cg). At baseline and days 15, 28 and 90, all clinical parameters were recorded again.



Fig. 2: Mean bleeding on probing (all teeth)

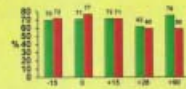


Fig. 3: Mean bleeding on probing (all teeth)



Fig. 4: Mean plaque index (test teeth)

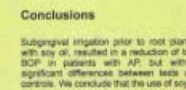


Fig. 5: Mean plaque index (test teeth)



Fig. 6: Mean attachment level (test teeth)



Fig. 7: Mean pocket depth with standard deviation



Fig. 8: Mean plaque index (test teeth)

Results

Our preliminary results showed a reduction in BOP at the test teeth after day 15 in both groups (BOP* from 38.3% to 28.8% at Tg and from 41.6% to 27.2% at Cg). This is probably due to the reduction in PLI from approximately 40% before baseline to almost 15% in both groups and indicates the therapeutic effect of subgingival irrigation irrespective of the solution used (Fig. 2). In the Tg, mean BOP of all teeth was on day 28 lower (9%) than at baseline (Fig. 3). Also in the Tg, mean BOP of the test teeth (PD ≥ 5 mm) was on days 28 and 90 about 14.4% lower than at baseline (Fig. 4). The Tg showed an 18.3% lower mean BOP* when only the deepest pocket depths were included (PD ≥ 5 mm) (Fig. 5). No significant difference (Mann-Whitney-Test) was observed between the 2 groups. PLI from the test teeth showed a similar reduction from baseline to day 15 in both groups (Fig. 6). PD and AL were not significantly reduced in both groups (Figs. 7, 8).



Fig. 9: Mean bleeding on probing (test teeth)



Fig. 10: Mean plaque index (test teeth)



Fig. 11: Mean attachment level (test teeth)



Fig. 12: Mean pocket depth with standard deviation

Conclusions

Subgingival irrigation prior to root planing with soy oil resulted in a reduction of total BOP in patients with AP, but without significant differences between tests and controls. We conclude that the use of soy oil for subgingival irrigation prior to root planing doesn't markedly influence clinical signs of inflammation, but improves by itself as demonstrated by Hylund & Egelberg [6]. Schraggenhauf et al. [7] find that soy oil has a marked influence on local inflammation. This irrigation may be an effective adjunctive treatment of severely affected individuals with deep pockets.

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