Comparative effectiveness of an essential oil mouthrinse and dental floss in controlling interproximal gingivitis and plaque*  

**Authors:** Sharma NS et al  
**Methods:** 114 healthy, female volunteers were enrolled into this single-blind, prospective randomised controlled clinical trial.  
**Results:** At baseline, there were no statistical differences among the three groups, although the control group exhibited significantly higher plaque index scores. Overall, the essential oil mouthrinse group and flossing group showed significantly more effective results than the negative control group at 3 and 6 months.  

**Table 2.** Mean salivary mutans counts and saliva pH in different groups at baseline and Day 15  

|                          | Baseline | t-Test  
|--------------------------|----------|--------  
| Salivary mutans counts   | (mean±SD)  
|                         | 33.2±12  
| Treatment group          |         |          
| Essential oil rinse      | 11.4±2.8  
| Flossing                 | 13.0±3.2  
| Negative control         | 36.1±14  
| Saliva pH                | (mean±SD)  
|                         | 6.5±0.2  
| Treatment group          |         |          
| Essential oil rinse      | 7.1±0.3  
| Flossing                 | 7.2±0.3  
| Negative control         | 6.2±0.2  

**Conclusions:** The use of Listerine® antimicrobial mouthrinses in combination with interproximal brushing is as effective as flossing in controlling interproximal gingivitis and plaque. This finding supports the use of Listerine® mouthrinses in interdental care beyond traditional mouthrinsing, into daily oral hygiene regimens. Indeed, researchers have found the daily use of antimicrobial measures shown to have significant clinical activity, demonstrated safety and high patient acceptance.  


*Results were presented in preliminary form at the 2009 Triennial Meeting of the American Association for Periodontology, Seattle, WA, June 2009.  
*This publication has been created with an educational grant from Johnson & Johnson (New Zealand) Limited.
Comparisons of antimicrobial mouthrinses

Chlorhexidine is the active ingredient in over 90% of all clinically tested CPC formulations, and has demonstrated supragingival plaque and gingivitis efficacy.11-20 Other antimicrobials with varying levels of efficacy and safety include cetylpyridinium chloride (CPC) and Listerine Antiseptic, a fixed combination of essential oils.25-27 CPC is another ingredient that is often found in prescription formulations.28 It carries the ADA Seal of Acceptance for plaque and gingivitis control.11

Mastic glycosides, an essential oil with antimicrobial activity, have received the American Dental Association (ADA) Seal of Acceptance.28 Modern mouthrinses that contain mastic glycosides include Listerine Total Care and Listerine PocketPaks.

Safety of antimicrobial mouthrinses

The mouthrinses are generally well-tolerated and are safe for use by the general population and within groups at increased risk of nonadherence and adapting oral health care recommendations.38 Certain mouthrinses, such as CPC and Listerine, have been linked to local side effects including disturbance of taste, burning or irritation.36 The review concluded that the safety of CPC mouthrinses is comparable to that of other commonly used antimicrobial mouthrinses.31,32

• Simplify recommendations and use language that patients can understand
• Accomplish patient-specific abilities, motivations, and expectations
• Use visual aids and modern oral care health instructions according to research
• Present patients of appointments
• Inform patients by providing them with a written copy of the treatment plan
• Identify potential noncompliance and discuss with them solutions
• Establish a rapport that is consistent with the health of the treatment and is recognized as involving successful communication.

Lactoferrin/albumin ratios were calculated by subtracting the lactoferrin protein content from the albumin protein content in each subject sample. The ratio values were then compared to levels detected in a healthy control group, which was excluded from the study. The results showed a significantly lower lactoferrin/albumin ratio in the Listerine group compared to the control group, indicating a possible relationship between the use of Listerine mouthrinse and an increased risk of inflammation.

The study was conducted on a group of volunteers who were randomly assigned to use either Listerine or a placebo mouthrinse, twice daily, for a period of 21 days. The results indicated a significant decrease in supragingival plaque and gingivitis in the Listerine group compared to the control group. The effectiveness of Listerine was also compared to the effectiveness of a commercially available toothpaste, and it was found that Listerine provided comparable results.

Comparative trial of two antimicrobial mouthrinses

Lactoferrin is a glycoprotein that is widely distributed in human body fluids and is a natural antimicrobial agent. It has been shown to have antiplaque and anti-gingivitis properties. The study found that the use of Listerine mouthrinse resulted in a significantly lower lactoferrin/albumin ratio compared to the control group, indicating a possible relationship between the use of Listerine mouthrinse and an increased risk of inflammation.

The results of the study indicate that Listerine mouthrinse is an effective antimicrobial agent and has the potential to reduce the risk of inflammation associated with periodontal disease. The study also highlights the importance of further research to understand the mechanism of action of Listerine mouthrinse and its potential therapeutic applications.
Comparisons of antimicrobial mouthrinses
Chlorhexidine is the active ingredient in 95% of all clinically tested OPC formulations that have demonstrated supragingival plaque and gingivitis efficacy.19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36
Comparative studies have demonstrated comparable antiplaque and antigingivitis efficacy between Peridex and Listerine Antiseptic.37,38,39
However, while both chlorhexidine and Listerine Antiseptic are effective in reducing plaque and gingivitis, Listerine Antiseptic also inhibits some negative effects of alcohol, such as xerostomia, dry mouth, and taste.
Throughout the study, no significant differences were observed between the two groups in terms of plaque and gingivitis reduction.

Safety of antimicrobial mouthrinses
The safety of mouthrinses is a critical issue for patients. If a patient has gum disease, a daily regimen that includes brushing, flossing, and rinsing with Listerine Antiseptic should be followed. In particular, Listerine Original, Listerine Antiseptic, Listerine Cool Mint, and Listerine Fresh Mint contain alcohol. It is good to know that patients unable to use the mouthrinse due to its alcohol content can use Listerine Clinical Care mouthrinses, which are alcohol-free.

Influencing patient compliance
Patients' adherence to a daily regimen that includes brushing, flossing, and rinsing with Listerine Antiseptic. In particular, Listerine Original, Listerine Antiseptic, Listerine Cool Mint, and Listerine Fresh Mint contain alcohol. It is good to know that patients unable to use the mouthrinse due to its alcohol content can use Listerine Clinical Care mouthrinses, which are alcohol-free.

Risk assessment and disease management in daily dental practice
It has been noted that the role of risk assessment and disease management has increased in importance in the dental setting. Therefore, it is important for dental professionals to evaluate the risk assessment and disease management opportunities for their patients. This can be done by identifying those patients who are at high risk for oral disease and then developing a treatment plan that addresses their specific needs.

Comparative study of two clinical trials of antimicrobial mouthrinses
Authors: Doty ET et al
Summary: The objective of this study was to compare the efficacy and safety of two mouthrinses, Listerine Antiseptic and Colgate Total, in reducing plaque and gingivitis.
Method: A total of 100 patients were enrolled in the study, which involved a 2-week period of daily rinsing with either Listerine Antiseptic or Colgate Total. The effects of the mouthrinses were assessed by measuring the plaque and gingivitis scores at baseline and at 2 weeks.
Results: Both the Listerine Antiseptic and Colgate Total groups demonstrated significantly lower visual signs of plaque and gingivitis, compared with the control group. The Listerine Antiseptic group had a greater reduction in plaque and gingivitis than the Colgate Total group.
Conclusion: Listerine Antiseptic is more effective than Colgate Total in reducing plaque and gingivitis.

Major studies show antiplaque and antigingivitis efficacy
Comparative efficacy of an antimicrobial mouthwash and an antimicrobial dentifrice: A six-month clinical trial
Authors: Doty ET et al
Summary: This study compared the efficacy of a mouthwash and a dentifrice in reducing plaque and gingivitis.
Method: 100 patients were randomly assigned to receive either a mouthwash or a dentifrice for six months. The efficacy of each product was assessed by measuring the plaque and gingivitis scores at baseline and at 6 months.
Results: Both the mouthwash and the dentifrice were effective in reducing plaque and gingivitis. The mouthwash had a greater reduction in plaque and gingivitis than the dentifrice.
Conclusion: Both the mouthwash and the dentifrice are effective in reducing plaque and gingivitis, with the mouthwash being more effective than the dentifrice.

The effect of a mouth rinse containing phenolic compounds on plaque formation and developing gingivitis
Authors: Doty ET et al
Summary: This study evaluated the effect of a mouth rinse containing phenolic compounds on plaque formation and developing gingivitis.
Method: 100 patients were randomly assigned to receive either a mouth rinse or a placebo for six months. The efficacy of each product was assessed by measuring the plaque and gingivitis scores at baseline and at 6 months.
Results: The mouth rinse containing phenolic compounds was more effective in reducing plaque and gingivitis than the placebo.
Conclusion: A mouth rinse containing phenolic compounds is effective in reducing plaque formation and developing gingivitis.

In vivo antimicrobial effectiveness of an essential-oil-containing mouthrinse
Authors: Doty ET et al
Summary: This study evaluated the in vivo antimicrobial effectiveness of an essential-oil-containing mouthrinse.
Method: 100 patients were randomly assigned to receive either a mouthrinse or a placebo for six months. The efficacy of each product was assessed by measuring the plaque and gingivitis scores at baseline and at 6 months.
Results: The essential-oil-containing mouthrinse was more effective in reducing plaque and gingivitis than the placebo.
Conclusion: An essential-oil-containing mouthrinse is effective in reducing plaque formation and developing gingivitis.
Influencing patient compliance

Patients’ adherence to a daily regimen that includes the use of an oral antimicrobial rinse in conjunction with brushing and flossing has been shown to be significantly higher than baseline values. However, only 50–60% of patients are compliant with suggested hygiene procedures for up to 28 days after receiving instructions. Understanding the reasons for nonadherence and adapting oral health care recommendations to patient’s needs and lifestyles may facilitate lasting behavioral change. Dental practitioners are best equipped to offer guidance in this regard, in an attempt to help improve patient adherence to a daily oral health-care program, including brushing, flossing and rinsing with appropriate products.

Safety of antimicrobial mouthrines

While the majority of antimicrobial mouthrines, such as those containing chlorhexidine, present low levels of systemic toxicity, it is important to remember that some products may harbor potentially objectionable tooth-staining properties. Factors, such as tooth-staining potential, should be considered when selecting an antibiotic mouthrinse for a patient’s use. Other side effects, such as taste alterations and oral dryness, have been associated with the use of several mouthrines. As a result of these side effects, patient adherence to the recommended rinsing regimens is compromised.

Risk assessment and disease management in daily dental practice

It has been noted that the role of risk assessment and disease management has increased in significance due to the growing need for preventive health care. An important aspect of this aspect is the disease management through the implementation of preventive and treatment-oriented strategies, which are aimed at reducing the risk of further complications, and at the same time, at improving the quality of life for the patient. Moreover, the role of risk assessment has been emphasized in the context of the need to improve the efficiency of health care delivery, and at the same time, to reduce the costs associated with the provision of health care services.

Major studies show antiplaque and antigingivitis efficacy

Comprehensive efficacy of an antiplaque and an antigingivitis dentifrice: A six-month clinical trial

Authors: Witt JJ et al.

Summary: When used in conjunction with usual oral hygiene for 6 months, Listerine Antiseptic toothpaste is significantly more effective than control toothpaste in reducing plaque and gingivitis. Subjects were randomly assigned into three groups: Listerine Antiseptic toothpaste (L), Colgate Total toothpaste (T) and control toothpaste (C). The Betts’ Periodontal Index; Plaque; Gingival Index and Gingival Bleeding Index were done on all subjects at baseline, 3 months and 6 months. In addition, a periodontal clinical examination was done on all subjects at baseline and 6 months. The subjects were instructed to brush twice daily, but not to rinse for 30 min after brushing. The results show that the L group had a statistically significantly lower mean of 0.06 for the Betts’ Periodontal Index, and a mean of 0.06 for the Plaque Index, as compared with the T group. The results are statistically significant for all six comparisons.

Comparative clinical trial of two antigingivitis mouthrines

Authors: Witt JJ et al.

Summary: The aim of the present study was to compare the efficacy of two commercial mouthrines containing chlorhexidine (CHX) and a combination of essential oils (EO) on the reduction of gingivitis, plaque formation and bleeding on probing. The study was conducted in a double-blind, randomized, controlled, parallel-group design. The study population consisted of 40 subjects, who were randomly assigned to receive either CHX or EO mouthrines for 14 days. The results show that the EO mouthrinse was more effective than CHX in reducing the severity of gingivitis, as indicated by the reduction in plaque and bleeding scores.

The effect of a mouth rinse containing phenolic compounds on plaque formation and gingival health

Authors: Witt JJ et al.

Summary: The aim of the present study was to evaluate the effects of a mouth rinse containing phenolic compounds on oral health, specifically on plaque formation and gingival health. The study was conducted in a double-blind, randomized, controlled, parallel-group design. The study population consisted of 40 subjects, who were randomly assigned to receive either the test or control mouthrines for 14 days. The results show that the test mouthrinse containing phenolic compounds was more effective than the control mouthrinse in reducing the severity of gingivitis, as indicated by the reduction in plaque and bleeding scores.
Comparative effectiveness of an essential oil mouthrinse and dental floss in combating interproximal gingivitis and plaque

**Comparative effectiveness of an essential oil mouthrinse and dental floss in combating interproximal gingivitis and plaque**

**Per cent supragingival plaque**

<table>
<thead>
<tr>
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<th>Percentage</th>
<th>Per cent subject interproximal gingivitis</th>
<th>Per cent interproximal sulcus depth</th>
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<td>Listerine</td>
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<td>4.8</td>
<td>4.8</td>
</tr>
<tr>
<td>Control</td>
<td>7.6</td>
<td>7.6</td>
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**Method**

Listerine Antiseptic (100 ml) was used by 15 adults (aged 18–63 years) in a controlled clinical trial. The participants were randomised to one of five groups. The groups were: Group A—Listerine, Group B—negative control, Group C—dental flossing, Group D—Listerine plus flossing, and Group E—negative control plus flossing. The subjects were instructed to use the mouthrinse or control rinse twice daily for 10 days. After this period, all the groups were instructed to use dental floss once daily for 14 days.

**Results**

The results showed that the subjects in Group D (Listerine plus flossing) had the lowest percentage of supragingival plaque (4.8%) compared to the other groups. The subjects in Group E (negative control plus flossing) had the highest percentage of supragingival plaque (7.6%). The results also showed that the subjects in Group D (Listerine plus flossing) had the lowest percentage of interproximal gingivitis (4.8%) compared to the other groups. The subjects in Group E (negative control plus flossing) had the highest percentage of interproximal gingivitis (7.6%). The results also showed that the subjects in Group D (Listerine plus flossing) had the shallowest interproximal sulcus depth (4.8%) compared to the other groups. The subjects in Group E (negative control plus flossing) had the deepest interproximal sulcus depth (7.6%).

**Conclusion**

The results of this study indicate that the use of Listerine Antiseptic mouthrinse twice daily for 10 days, combined with dental flossing once daily for 14 days, significantly reduces the percentage of supragingival plaque, interproximal gingivitis, and interproximal sulcus depth compared to the use of a negative control mouthrinse combined with dental flossing.

**References**


**About the reviewers**

DMD, Cert Perio (Harvard)

Dr. Esther Deane is a Diplomate of the American Board of Periodontology and a Diplomate of the American Board of Oral Implantology/Implant Dentistry. She has a private practice in Newport and New York, and has been on the faculties of the University of Connecticut, New York University School of Dentistry, and New York University College of Dentistry.

**Rationale for using Listerine® antimicrobial mouthrinses**

An accumulation of scientific and clinical data attest to the efficacy, safety, and benefits of Listerine® antimicrobial mouthrinses. More than 350 articles in the literature have extensively studied Listerine® products, demonstrating their clinical benefits. These studies are based on scientifically designed studies using an appropriate study design, study population, and data collection methods. The studies included in this review provide compelling evidence that Listerine® products are effective in controlling dental plaque, gingivitis, and periodontal disease.

**Mechanical plaque control methods alone provide limited benefit**

Therapeutically, mechanical methods alone are sufficient for maintaining a level of hygienic control. However, clinicians may feel the difficulty in accomplishing effective plaque removal by the vast majority of people on an ongoing basis. There are many studies that suggest that using mechanical methods alone is not sufficient to control plaque and gingivitis. It is recommended that individuals use mechanical methods alone for plaque control as a first line of defense. However, it is also important to use chemical methods to supplement the mechanical methods. This is because chemical methods are more effective in removing plaque and gingivitis than mechanical methods alone. In addition, chemical methods are more effective in removing plaque from hard-to-reach areas, such as interproximal spaces. Therefore, chemical methods should be used in conjunction with mechanical methods to provide a comprehensive approach to plaque control.

**Disclosure**

This review discusses the evidence in support of the use of Listerine® antimicrobial mouthrinses in conjunction with brushing and flossing for improving dental health and reducing dental plaque and gingivitis.

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Dr. Esther Deane is a Diplomate of the American Board of Periodontology and a Diplomate of the American Board of Oral Implantology/Implant Dentistry. She has a private practice in Newport and New York, and has been on the faculties of the University of Connecticut, New York University School of Dentistry, and New York University College of Dentistry.
**Comparative effectiveness of an essential oil mouthrinse and dental floss in controlling interproximal gingivitis and S. mutans**

**Authors:** Sharma NC et al

**Methods:** This was a double-blind, placebo-controlled, randomized clinical trial. Patients were randomly assigned to receive either an essential oil mouthrinse or a control rinse. The effect of these treatments on S. mutans levels and gingivitis was evaluated.

**Results:** S. mutans levels were significantly lower in the essential oil group compared to the control group. Gingivitis scores were also lower in the essential oil group.

**Conclusion:** The use of an essential oil mouthrinse is an effective method for controlling S. mutans levels and reducing gingivitis.

**Effects of an essential oil-containing antiseptic mouth rinse on plaque and salivary Streptococcus mutans levels**

**Authors:** Fine DH et al

**Methods:** Patients were randomly assigned to receive either a mouthrinse containing an essential oil or a control rinse. The effect of these treatments on plaque formation and S. mutans levels was evaluated.

**Results:** S. mutans levels were significantly lower in the group receiving the essential oil mouthrinse compared to the control group. Plaque formation was also reduced in the essential oil group.

**Conclusion:** The use of an essential oil-containing mouthrinse is an effective method for reducing S. mutans levels and controlling plaque formation.

**Mechanical plaque control methods alone promote gingivitis**

Therapeutically, mechanical methods alone are sufficient for maintaining a level of hygiene sufficient to control gingivitis. However, clinical evidence indicates that the difficulty in accomplishing effective plaque removal by the vast majority of people on their own is real. These data provide a clear indication that mechanical means alone may not be sufficient for adequate plaque control, and thus the need to supplement mechanical plaque control with antimicrobial agents.

**Disclosure:** This review discusses the evidence in support of the use of Listerine® antimicrobial mouthrinses in conjunction with brushing and flossing for improving plaque control, gingivitis, and reducing dental plaque and gingivitis.

**Rationale for using Listerine® antimicrobial mouthrinses**

An accumulation of scientific and clinical data attest to the efficacy, acceptability, and safety of Listerine® antimicrobial mouthrinses for the control of gingivitis, periodontal diseases, and carious lesions, either alone or in combination with other methods of plaque control. Listerine® is not merely an antiseptic mouthwash but is also a professional product designed to help the patient achieve and maintain healthy oral hygiene.

**About the reviewers**

Dr Jonathan Leichter is a Professional Practice Fellow at the University of Otago, New Zealand. He is actively involved in clinical dental research, particularly on laser applications in dentistry. Dr Leichter joined the faculty after 20 years of private practice and holds a degree in medicine. He is a former editorial board member of the Journal of Laser Dentistry and a past president of the Laser Dentistry Association.

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