

# Group A

## Consensus Paper

### Plaque Control - Home remedies practiced in developing countries

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#### Introduction

Maintenance of effective plaque control is the cornerstone of any attempt to prevent and control periodontal disease. Complete natural cleaning of the dentition is virtually non-existent. To be controlled, plaque must be removed frequently by active self-care methods. Hence, the dental community continues to encourage proper oral hygiene and more effective use of mechanical cleaning. This group addressed the aspect of oral hygiene practices carried out at home by patients as well as the general population and a primary objective was to find out the scientific rationale and efficacy of the vast variety of alternatives available for “home remedies” for plaque control. Even though in the past few years more and more systematic reviews on this subject have been published, there is a definite lack of such studies and subsequent publications coming from the developing countries.

There were three key questions that were ultimately addressed by the Working Group.

1. What is the current status of mechanical methods for the removal of bacterial biofilms in developing countries?
2. What is the current status of anti-plaque and anti-microbial mouthwashes and toothpastes?
3. What is the current status of mouthwashes and dentifrices containing herbal ingredients

The background for discussion was presented in the Initiators’ document prepared by Slot and Van der Weijden (*Journal of the International Academy of Periodontology* 2015; 17/1 Supplement). The fundamental question raised in the Initiators’ document, based on the data available in the systematic reviews was “What is the effect on plaque scores and oral health of self-care manual plaque control measures appropriate for developing countries?” As no systematic reviews for the same could be retrieved, a conclusion was drawn based on data on mechanical plaque control established in Western societies. The conclusion of the Initiators’ document, keeping in mind the lower economic status of the population, was that teeth should be brushed twice daily by means of a manual toothbrush in conjunction with a fluoride toothpaste. For interdental cleaning wood sticks seem the most appropriate regarding cost and effectiveness in this population.

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## Methods used during the deliberation

- Objective 1- “*The current status of mechanical methods for the removal of bacterial biofilms in developing countries.*” A synopsis of synthesis approach was used to quantify and assess all possible available published articles from the developing countries.
- Objective 2- “*The current status of anti-plaque and antimicrobial mouthwashes and toothpastes.*” A synopsis of synthesis.
- Objective 3- “*The current status of mouthwashes and toothpastes containing herbal ingredients.*” The “Studies” approach was the only possible approach and hence a narrative review of available literature was carried out.

### Objective 1. What is the current status of mechanical methods for the removal of bacterial biofilms in developing countries?

The objective was to carry out a “synopsis of synthesis” for arriving at the findings for this question. This synopsis was to be done from the literature available from the developing countries. However, a thorough search of the literature carried out by the Working Group could not find a single systematic review on mechanical plaque control from developing countries.

After extensive deliberation the group decided to use publications from Western countries and to extrapolate these findings to the developing nations. A total of four systematic reviews were identified as being eligible for this synopsis of synthesis. Of the four, one was on manual toothbrushes, one was on the usage of wood sticks and two were on dental floss.

These systematic reviews were evaluated for multiple parameters for each of the three groups. The aspects examined were the estimated quality, the consistency of the articles, the directness of the articles, the precision of reporting, publication bias, if any, and the entire body of evidence provided by the articles.

A summary of the findings is presented in *Table 1*. The studies selected for inclusion in the review were of a substantial quality, and for the review on floss the quality of papers selected was very high (a more than average standard and the data could be completely relied upon).

The data on the toothbrush and floss groups were very consistent and comparable, but the papers included in the wood sticks review were of poorer quality. This point was taken into very strong consideration when arriving at the conclusions of the efficacy and merits/demerits of wood sticks in plaque control.

Because brushes, floss and wood sticks are all commercial products it was essential to confirm if there was any commercial bias involved in the process. It was not possible to ascertain from any of the papers if there was a bias involved or not. Hence, it was concluded that the possibility of a commercial basis was possible in all of the three groups.

After a careful scrutiny of the papers included in the systematic review the Working Group concluded that the body of evidence available for the systematic review on floss was extremely strong. On the other hand the body of evidence available for wood sticks and tooth brushes could only be considered to be moderate, with the toothbrush reviews being marginally stronger than the wood stick review.

### Objective 2. What is the current status of anti-plaque and antimicrobial mouthwashes and toothpastes in developing countries?

This question was also approached using the synopsis of synthesis model. The objective was again to obtain all the data from publications arising out of developing countries. The task was not to limit the papers to any specific countries and the major objective was to analyze data that provided information on plaque/biofilm inhibition as well as improvement of the gingival health. All papers based on products that had herbal and/or traditional chemicals were excluded in the literature search relevant to this question.

Twelve systematic reviews were identified and found to be eligible for the synopsis of synthesis for this question. These reviews were then subjected to a detailed analysis and discussion by the Working Group. A paradigm accepted while doing the analysis was that mouthwashes and dentrifices serve as carriers for chemical agents that would be plaque-inhibiting and could potentially control gingival inflammation and thereby improve and enhance gingival health.

**Table 1.** Summary of findings from systematic reviews

	Toothbrush	Floss	Wood stick
<b>Estimated quality</b>	Substantial	Substantial to high	Substantial
<b>Consistency</b>	Fairly consistent	Fairly consistent	Inconsistent
<b>Directness</b>	Indirect	Indirect	Indirect
<b>Precision</b>	Moderate	Moderate	Moderate
<b>Publication bias</b>	Possible	Possible	Possible
<b>Body of evidence</b>	Moderate	Strong	Moderate

The different chemical agents that were researched and analysed as potentially effective agents were as follows:

### **Mouthwash ingredients**

- Chlorhexidine digluconate (CHX)
- Cetylperidium chloride (CPC)
- Essential oils (EO)
- Stannous fluoride ( $\text{SnF}_2$ )
- Hydrogen peroxide ( $\text{H}_2\text{O}_2$ )
- Hexitidine
- Delmopinol

### **Dentifrice Ingredients**

- Chlorhexidine digluconate
- Stannous fluoride
- Triclosan

There was a total of 9 systematic reviews that were available for mouthwashes and four systematic reviews available for the dentifrice group. A further four reviews were identified and retrieved that could be subjected to a head-to-head comparison on combined use of mouthwash and dentifrice or as a comparison to a vehicle.

It was concluded that there is a benefit of adding chemical agents to a mouthwash or a dentifrice for plaque/biofilm control and thereby improving the health of the gingiva. The magnitude of the benefit was dependent on the specific active chemical ingredient available.

For dentifrices, chlorhexidine and stannous fluoride as well as triclosan all have a positive effect towards improved plaque/biofilm control. Of these three the triclosan- and stannous fluoride-based toothpastes seem to have the most potential for reducing plaque scores and improving gingival health.

A summary of the findings is presented in *Table 2*. The studies selected for inclusion in the review were of a mixed quality. For the dentifrice and mouthwash reviews the quality of papers selected was generally very good. For mouthwashes all of the additives (CHX, CPC, EO,  $\text{H}_2\text{O}_2$ , hexetidine,  $\text{SnF}_2$ , delmopinol) demonstrated efficacy towards improved plaque control. The most effective products regarding reducing plaque scores and improving gingival health contained CHX, EO or CPC as an active ingredient.

### **Objective 3. Herbs – herbal dentifrices and mouthwashes**

The literature supporting the use of herbal-based anti-plaque and anti-gingivitis preparations is generally weak. No systematic reviews on this topic were identified. Only five products were directly assessed: green tea, neem, aloe vera, miswak and Paradontax™, because of their presence in the marketplace and available literature. Numerous other products, including cranberry extract preparations, triphala, juniper, salvia, chitosan and various other herbal combinations were not considered because of the lack of sufficient studies.

From the general scientific publications in this field, most of the products studied, with the notable exception of aloe vera, have some evidence of efficacy. However, most reports suffered from poor experimental design and lack of relevant controls and comparisons. It is important to note that head-to-head comparisons with existing products with known efficacy is not an adequate experimental design in the absence of a negative control.

Most of the studies also suffered from poor statistical analyses. For example, good statistical theory dictates that trials be designed to test the null hypothesis, i.e., equivalence of the test and control. Failure to reject the null hypothesis does NOT mean that the tested products are equivalent. Studies to test equivalence requires substantially more subjects than is practical in a clinical trial.

**Table 2:** Summary of findings of systematic reviews on dentifrices and mouthwashes

	<b>Dentifrices</b>	<b>Mouthrinses</b>
<b>Estimated quality</b>	Substantial	Substantial
<b>Consistency</b>	Fairly consistent	Fairly consistent
<b>Directness</b>	Indirect	Indirect
<b>Precision</b>	Moderate	Moderate
<b>Publication Bias</b>	Possible	Possible
<b>Body of Evidence</b>	Moderate	Moderate

## Conclusions

Overall, for all three objectives more studies are required with better study designs. Nonetheless, the final conclusions were derived as the major outcomes from the deliberations of Working Group A:

### *Objective 1*

- Based upon the available evidence, mechanical control of plaque (biofilm) is best achieved with (twice) daily toothbrushing using a manual toothbrush with a fluoride-based dentifrice.
- The body of evidence for this advice seems moderate.
- The World Health Organization (WHO) recommendation is based on consensus that chewing sticks such as miswaks are an affordable alternative.
- For interdental cleaning the wood sticks seem the most appropriate regarding cost effectiveness.
- Dental floss is a less effective tool that requires instructed skills for the user in order to be effective. There are weak scientific data to advocate flossing. It has to be a clinician's decision based on patient needs and dexterity
- The body of evidence is moderate to strong

### *Objective 2*

While mechanical plaque removal should be considered the first priority, there is moderate evidence that dentifrices and mouthwashes are efficacious for prevention/reduction of plaque-related gingivitis. In addition, chemical agents added to dentifrices (triclosan or SnF<sub>2</sub>) and mouthwashes (CHX, EO, CPC) can be of value and are recommended. It is recommended that mouthwashes and dentifrices be used as an adjunct to mechanical plaque removal.

### *Objective 3*

Recommendations regarding the use of herbal medicaments in plaque and gingivitis are currently not possible due to a lack of sufficient evidence supporting their use. Further studies are required to determine the anti-plaque and anti-gingivitis properties of herbal additives to dentifrices and mouth washes.

## Reference

- Slot DE and Van der Weijden FA. Plaque control. Home remedies practiced in developing countries - a synopsis of synthesis. *Journal of the International Academy of Periodontology* 2015; **17/1** (Supplement): 4-15