

What's new for the clinician?

Summaries of and excerpts from recently published papers

SADJ August 2017, Vol 72 no 7 p339 - p341

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1. Effectiveness of a miswak extract-containing toothpaste on gingival inflammation: a randomized clinical trial

Azaripour A, Mahmoodi B, Habibi E, et al., *Int J Dent Hygiene* 2017; 15; 195-202.

The removal of dental plaque and food debris is necessary to maintain oral health and plays an important role in the prevention of caries and periodontal diseases. Oral hygiene has been practiced by different cultures for thousands of years. The chewing stick or miswak (meswak or siwak) which originates from trees of the family Salvadoraceae (*Salvadora persica*) is the first known tooth-cleaning tool in history, and its use dates back as early as 3500 BC.¹ Presently, chewing sticks are mainly used in Islamic countries where its use is sanctioned as a religious practice.¹

Recently, toothpastes with miswak extracts have become commercially available. The extract consists of essential ingredients for caries prevention such as fluorides, silicate, potassium sulphate, calcium sulphate, tannins, saponins, vitamin C and chlorides.¹ Several studies have reported an antibacterial effect of miswak extract which have been shown to be effective against various types of oral bacteria implicated in caries or periodontal disease.¹ Azaripour and colleagues¹ reported on a clinical trial that sought to compare the efficacy of a miswak extract-containing toothpaste to treat gingival inflammation with that of two other toothpastes. Since herbal components are essential ingredients of miswak, a herbal toothpaste (Parodontax) was selected for comparison along with Colgate Total which is a well-documented and effective conventional toothpaste and is recommended for oral hygiene.

MATERIALS AND METHODS

A randomized three-week prospective clinical trial with three parallel groups was designed with the following inclusion criteria: patients had to be greater than 18 years old; be willing to participate and willing to sign the informed consent; have a sulcus bleeding index (SBI) $\geq 25\%$; have no pocket depths >3 mm; have at least 20 teeth (with five teeth in each quadrant); and be systemically healthy. Patients were excluded if they had known hypersensitivity to ingredients of toothpastes used in this study; had carious cavities next to the marginal gingiva that could cause gingival bleeding; had taken antibiotic therapy <3 months before treatment and were smokers or were pregnant.

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ACRONYMS

API: Approximal Plaque Index
SBI: Sulcus Bleeding Index

Following the recruitment, the patients were randomly allocated to one of the following groups:

1. M-group (using miswak-containing toothpaste; Miswak Naturelle LLC, Dubai, UAE),
2. P-group (using a herbal toothpaste; Parodontax, GlaxoSmithKline, Bühl, Germany) and
3. C-group (using a conventional toothpaste; Colgate Total original, Colgate-Palmolive, Hamburg, Germany)

All patients received a new flat-trimmed manual toothbrush (Sensodyne) and were instructed to brush their teeth twice a day for two minutes over a period of 21 days. Furthermore, patients were instructed to use exclusively the assigned toothpaste and to report any irritation of gingiva, bad taste or other side effects.

To check the compliance, the subjects had to make a note of the date and the time they brushed their teeth.

At baseline, oral assessments were performed by a calibrated examiner and included periodontal parameters such as Sulcus Bleeding Index (SBI) and Approximal Plaque Index (API) using plaque-disclosing tablets for 30 seconds and subsequent rinsing with water. Third molars were excluded from the measurements and examination.

At the end of the study after 21 days, the same examiner performed a second dental assessment. The re-evaluation was performed in the morning and patients were not allowed to do any oral hygiene procedures (tooth brushing, mouth rinsing, etc.) to avoid any gingival irritation through tooth brushing before the oral examination. In this way, patients had to spend as little time as possible without oral hygiene and did not have to be concerned about halitosis. Patients were asked for the occurrence of any adverse effects, had to complete a questionnaire and provide information about the taste of the toothpaste used.

RESULTS

A total of 118 patients were assessed for eligibility and 66 (31 male, 35 female) met the inclusion and exclusion criteria and could be analysed. The participants were

randomized and equally allocated to one of the three groups (each group thus comprised of 22 participants).

The groups did not differ with respect to age (mean age 57.8 ± 10.2 years) and the gender distribution of participants (female: 53%, male: 47%). The periodontal pocket depth was comparable between the groups (Miswak-group: 2.8 ± 0.2 , Parodontax-group: 2.8 ± 0.3 , Colgate-group: 2.8 ± 0.2).

The analysis of the data showed a significant reduction in SBI and API in all groups after 21 days of brushing with the assigned toothpastes.

The Parodontax -group and the Miswak-group had a significantly stronger reduction in SBI than the Colgate-group. There was no significant difference between the Miswak-group and the Parodontax-group ($P = 0.466$). Furthermore, all groups showed a significant reduction in API that was not significantly different between the groups.

All patients ($n = 66$) were asked to return the forms containing details on the date and time of brushing. Furthermore, patients returned the questionnaire containing the subjective rating of the taste of toothpaste, subjective oral sensations and personal assessments. The majority of patients was satisfied with the taste of the toothpastes, and no adverse side effects were reported. All patients in the Miswak-group were satisfied with the taste of the toothpaste (100%), and most of the patients

reported improved oral hygiene (72.7%). Most patients (91%) liked to continue using it. The Parodontax-groups' toothpaste was often described as salty (41%) and a third of the patients considered it to be not pleasant to use (27%). Interestingly, 80% of the patients reported an improvement in oral hygiene and 91% of the patients liked to continue using it. No displeasing taste was reported in the Colgate-group, even though 41% experienced the toothpaste as being salty. Most of the patients (82%) reported a good overall sensation.

CONCLUSIONS

The use of each of the three tested toothpastes caused a significant reduction in gingival inflammation and amount of plaque.

IMPLICATIONS FOR PRACTICE

The finding in this trial imply that miswak extract-containing toothpaste can be recommended safely as alternative toothpaste. The miswak extract-containing toothpaste showed a similar effect as the herbal toothpaste and can be used for domestic oral hygiene in patients with gingivitis.

References

1. Azaripour A, Mahmoodi B, Habibi E, et al., Effectiveness of a miswak extract-containing toothpaste on gingival inflammation: a randomized clinical trial. *Int J Dent Hygiene* 2017; 15; 195-202.

2. The effectiveness of conically shaped compared with cylindrically shaped interdental brushes – a randomized controlled clinical trial.

Larsen HC, Slot DE, Van Zoelen C, Barendregt DS, Van der Weijden GA. *Int J Dent Hygiene* 2017; 15; 211–218

Recent high quality systematic reviews have shown that initial plaque scores are reduced by between 42% to 46% when using a manual or a powered toothbrush.¹ These reviews also concluded that there was room for improvement in self-performed plaque control, as toothbrushing failed to provide complete (100%) plaque removal. Additionally, it has also been shown in a number of published studies that plaque removal by toothbrushing alone was insufficient to reach the interproximal areas of teeth.¹ In response to this, several interdental oral hygiene devices, such as dental floss, wood sticks and interdental brushes (IDBs) have been introduced as adjuncts to mechanical tooth brushing as a means of plaque control and/or removal.¹

In a systematic review of the effect of IDBs on plaque scores, it was concluded that in combination with toothbrushing, IDB removed more plaque than toothbrushing alone. In addition, IDBs were more effective in removing interdental plaque than dental floss or wood sticks.² Consequently, for larger interdental spaces, especially those with gingival recession and root exposure, dental floss is not recommended. Instead, the use of an IDB is more appropriate.

ACRONYMS

BOP: bleeding upon probing
IDBs: interdental brushes
PMC: periodontal maintenance care programme
PS: plaque scores
PPD: probing pocket depth

Currently, the two most common forms of IDBs are cylindrical and conical in shape. Considering that the conically shaped IDB has a smaller volume at the outer end, it is possible that when used only from the buccal side, the lingual side of the approximal areas will receive less mechanical friction to remove the plaque. Few studies have compared these two basic IDB shapes on plaque removal efficacy. However, the outcome would be of substantial interest in everyday practice, where these interdental oral hygiene devices are recommended by the dental care professional.

While IDBs are frequently used by periodontal patients, no long-term studies that specifically evaluated the use of IDBs in individuals attending a supportive periodontal maintenance programme are available. Thus, Larsen and colleagues¹ reported on a trial that sought to test two basic IDB geometrical shapes (cylindrical or conical) for their plaque removal efficacy and control of periodontal

inflammation on buccal and lingual approximal surfaces in periodontal maintenance patients. The hypothesis was that the cylindrical-shaped IDB removes more plaque and better controls the periodontal condition on the buccal and lingual approximal surfaces than a conical-shaped IDB.

MATERIALS AND METHODS

Patients receiving supportive periodontal therapy at the clinic were invited to participate in this examiner blind parallel group randomized clinical trial, out of which 60 subjects volunteered. All had been initially treated for periodontitis and had been under a periodontal maintenance care programme (PMC) for at least 1 year. All subjects were ≥ 18 years old and systemically healthy.

The first appointment consisted of a regular PMC performed by a trained and experienced dental hygienist examiner. During this first appointment, a periodontal examination was performed, which included plaque scores (PS), probing pocket depth (PPD) and bleeding upon probing (BOP). All assessments were performed at six locations around each tooth: disto-vestibular, vestibular, mesio-vestibular, disto-lingual, lingual and mesio-lingual. In the upper and lower jaws separately, the vestibular surfaces were first probed and scored, followed by the lingual surface. Plaque was scored as either present or absent. For registration of the plaque score, disclosing solution was used on the teeth. The PPD was measured manually with a conventional Hu-Friedy® pqw probe with Williams markings. Additional individualized oral hygiene instructions were given if needed. All teeth received PMC sub- and supra-gingivally with hand instruments and an ultrasonic scaler (Satelec®).

After four weeks, the second appointment was scheduled, and the type of IDB (conical or cylindrical) was randomly assigned. All participants were instructed on the use of their assigned IDBs by the same experienced dental hygienist and were given a brochure explaining IDB use in detail. Based on the randomization, the appropriate size IDB was used from the buccal side. Proper use of the IDB was described as six backward and forward motions in each interdental space. Location and suitable size of IDBs were noted for individual instruction to each participant. The subjects were instructed to use the IDB for a maximum of five days and to replace them earlier if deemed necessary. All subjects received a sufficient number of IDBs to last for the study period.

As regards other mechanical oral hygiene measures, the subjects were instructed to continue these according to their regular toothbrushing habits. The additional use of antimicrobial mouth rinses was not allowed during the trial period. After the IDB instruction, the participants received a professional prophylaxis. Participants were instructed not to give any information on their assigned IDB (brushes ranged from 2.5 mm to 12 mm). After three months, the subjects returned for their scheduled recall. At this appointment, the same clinical assessments as those conducted during the first visit were repeated by the same blinded examiner, who was unaware of previous records.

RESULTS

Five of the 60 eligible participants failed to show up for their first appointment; subsequently 55 subjects were enrolled. In total, 54 participants completed the study. One subject had to prematurely end the trial after the second appointment due to the complications following a car

accident. Three subjects were excluded from the analysis because of protocol violations. Of these, one subject was excluded for using an essential oil mouth rinse and two for using chlorhexidine during the trial period. In terms of the demographics of the subjects ([Cylindrical IDB: n=26; mean age: 55.1 years; males 15; females 11; preferred hand: left=3; right=23; toothbrush: power=25; manual=1] [Conical IDB: n= 25; mean age: 55.7 years; males 15; females 10; preferred hand: left=5; right=20; toothbrush: power=25; manual=0], all variables were not significantly different between the groups.

The overall effect of the combined use of toothbrushes and interdental cleaning devices showed no significant difference between groups. This indicates that, on average, a comparable level of overall plaque control was performed by the participants in both groups. Focusing on the approximal surfaces that were suitable for the IDB, no difference between the two groups was found. However, for approximal lingual sites within the conically shaped IDB group, a significant increase was found from baseline to end. In contrast, in the cylindrically shaped IDB group, a significant reduction was found for the approximal lingual surfaces between the baseline and end assessments. Consequently, at the three-month assessment, there was a significant difference between the groups for the incremental change between baseline and the end of the trial at the approximal lingual sites ($P = 0.004$).

In terms of BOP, a significant change between baseline and end was found in approximal surfaces that were suitable for the IDB, and a significant increase of bleeding tendency was observed on approximal lingual sites. No such effect was found for the Cylindrical IDB group. This resulted in a significant difference between baseline and end assessments between the groups at the approximal lingual sites.

For PDD measurements, neither group exhibited a significant change in time nor were there any significant differences at the baseline and end assessments between the Conical IDB and Cylindrical IDB groups.

CONCLUSIONS

Within the limitations of this three-month study, the conical IDBs were less effective than cylindrical IDBs with respect to approximal lingual plaque removal. This resulted in an increase of periodontal inflammation as assessed by BOP and PPD. Thus, in patients receiving supportive periodontal therapy, the cylindrical form should be considered as the first choice of IDB to obtain and maintain gingival health around natural teeth.

IMPLICATIONS FOR PRACTICE

Advising and instructing patients on the use of cylindrical IDBs for daily self-care appears to be the best strategy for cleaning natural teeth in patients undergoing periodontal maintenance care.

References

1. Larsen HC, Slot DE, Van Zoelen C, Barendregt DS, Van der Weijden GA. The effectiveness of conically shaped compared with cylindrically shaped interdental brushes – a randomized controlled clinical trial. *Int J Dent Hygiene* 2017; 15: 211–218
2. Slot DE, Dörfer CE, Van der Weijden GA. The efficacy of interdental brushes on plaque and parameters of periodontal inflammation: a systematic review. *Int J Dent Hygiene* 2008; 6: 253–264.