Document heading doi: 10.21276/apjhs.2019.6.1.6 **Research Article**

Periodontal evaluation of tooth brushing technique with and without miswak in orthodontic patients with fixed orthodontic appliances- a clinical study

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Abstract

Aim: This study was conducted to find whether the use of miswak along with tooth brushing affect the oral hygiene of orthodontic patients- a clinical study.Material & Methods: Forty orthodontic patients were selected and they were guided to change the tooth brushing habit throughout the orthodontic treatment. The participants were divided into two groups A- tooth brushing only and B tooth brushing with miswak. The participants were observed over a period of 6 months after every three months. The data were analyzed using SPSS version 21. One sample "t" test was used at a level of significance p less than 0.05. Results: At the end of 6 months, there was a statistically significant reduction of both plaque and gingival index in both the groups. At the end of study reduction for plaque index and gingival index was more for group B. In plaque index a statistically significant difference was noticed between group A and group B at the second, third and fourth exam whereas in gingival index significant difference was noticed at the second and fourth examination.Conclusion: Miswak has an additional advantage on the maintenance of periodontal health in orthodontic patients over a period of 6 months.

Keywords: gingival, miswak, oral hygiene, orthodontic, periodontal.

Introduction

Caries and periodontal diseases can be prevent in orthodontic patients by appropriate plaque control. Orthodontic patients has molar bands, brackets, archwires, elastics, springs or other attachments have a greater tendency for accumulation of dental plaque, hence they require enhanced oral hygiene programs and regular professional prophyl
axis.[1]
Ramfjord's method, modified Stillman and Bass method is commonly used tooth brushing techniques in patients undergoing orthodontic treatment.[2]

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Bass technique is the most recommended brushing technique because it recommends placement of the bristles at the sulcus.[3]A study conducted for periodontal evaluation of scrubbing technique; modified Stillman technique and Bass technique showed greater reduction in plaque index and gingival index score in patients using Bass technique.[4]

In many parts of Asia, Africa, and the Middle East the chewing sticks are traditionally used as toothbrushes. [5, 6] They are inexpensive and easily available. Studies show the efficiency of dental plaque removal with chewing sticks is at least at the same level as that of conventional toothbrushes.[7 -11] It has been stated in many studies that chewing stick users have a healthy gingival and periodontal status as compared with toothbrush users.[7, 9, 10, 12, 13] In vitro, the extract from chewing sticks has been shown to have anti-bacterial effects [14, 15]and it reduces bacterial levels in human subgingival pockets [16] and saliva.[17] Hence chewing sticks are recommended as appropriate tooth-cleaning tools. In Saudi Arabia, many reports

have shown that caries and periodontal disease are prevalent amongst various age groups. [18]
Hence this study was designed for periodontal evaluation of tooth brushing with and without miswak in orthodontic patients through Plaque and Gingival index score.

Materials and methods

Forty patients were included in the study that was undergoing orthodontic treatment by fixed appliances at college of Dentistry, Zulfi, Majmaah University. The ethical approval was taken by ethical committee college of dentistry, Majmaah University, Saudi Arabia. Only those patients were included who were not taken any periodontal treatment previously. Exclusion criteria were patient's undergone orthodontic treatment by extraction of teeth, orthognathic surgical patients and physically challenged patients who cannot maintain oral prophylaxis by himself. The patients were divided into two groups comprised of twenty patients in each group. Group A includes patients who brush their teeth by bass technique and in group B patients use miswak along with bass technique (Table 1). In the Bass method: The head of the brush is placed in an oblique direction towards the apex of root in order to introduce the bristles on the gingival sulcus. The brush is then moved in an anteroposterior direction, using short rhythmic movements. ([9]Salvadorapersica (S. persica) a member of the Salvadoraceae family is a source of ''Miswak,". The wood of this small tree is soft, whitish; yellow has been used in Africa, South America, the Middle East and Asia as a commonly used oral hygiene tool. [20, 21] Miswak in Saudi Arabia and other parts of the Middle East has been commonly used for oral hygiene is obtained from Arak tree. [22]

Table 1:Patients group according to the toothbrushing habit

Brushing habit	Number of patients
Group A- bass method	20
Group B – bass method and miswak	20

After performing basic periodontal treatment the initial clinical examination was performed on all the surfaces of teeth by a previously trained examiner, using a Williams #23 periodontal probe, who determined:
1) Silness and Löe Plaque Index.
2) Löe and Silness Gingival Index.
Patients were randomly divided into two groups with twenty patients each group (Table 1). They were evaluated over a period of 6 months and the clinical examination were performed on 0, 2, 4 and 6 months periods and during all examinations, patients were again instructed and received maintenance therapy. The brush and tooth paste advised in study was standardized as it should have soft and horizontal bristles of equal size with small brush head. The tooth paste should not have any antiplaque component.
The data were analyzed and evaluated through independent sample's "t" test by using SPSS version 21.

Results

The results of our study showed in Table 2 and Table 3. Mean percentages of Plaque Index and mean percentages of Gingival Index were shown for the four exams (at 0, 2, 4 and 6 months) in Table 2 and 3.

Table 2: Plaque Index values for all groups in the periods of 0, 2, 4 and 6 months (mean ± S.D.). Independent sample's "t" test was used to evaluate the difference between group A and B

	Group A		Group B		p value
	Mean	SD	Mean	SD	
First exam (0months)	71.30	2.05	68.70	2.89	0.074
Second exam(2 months)	43.75	2.34	31.55	1.57	0.011*
Third exam(4 months)	36.65	2.56	33.20	1.77	0.027*
Fourth exam(6 months)	21.30	1.30	19.65	2.30	0.022*

*Statistically significant

There was a non-significant difference ($p > 0.05$) in plaque (71.30) and gingival index (68.70) score at the beginning of the study (Table 2 and 3). At 2 months examination the plaque index in group A was 43.75 and in the group, B was 31.55. There was less plaque index score in group B at the end of two months. The difference in plaque index was statistically significant ($p < 0.05$). The statistically significant difference ($p < 0.05$) was found at 4 and 6 months examination (Table 2).

Table 3 : Gingival index values for all groups in the periods of 0, 2, 4 and 6 months (mean ± S.D). Independent sample's "t" test was used to evaluate the difference between group A and B

	Group A		Group B		P value
	Mean	SD	Mean	SD	
First exam (0months)	10.90	1.17	11.05	1.64	0.086
Second exam(2 months)	8.05	0.69	6.60	0.94	0.035*
Third exam(4 months)	7.00	0.73	7.05	1.15	0.074
Fourth exam(6 months)	5.25	0.52	4.60	0.68	0.009*

* Statistically significant

The gingival index was high for group B at first and third examination (0and 6 months) but the difference in gingival index score is ($p > 0.05$). At 2 months and 4 months examination group B showed less gingival index score as compared to group A and this difference was statistically significant ($p<0.05$).

Discussion

In orthodontic patients with fixed appliances maintenance of oral hygiene is difficult due to the presence of various attachments or components of the fixed orthodontic appliance. It results in subsequent plaque accumulation. Hence proper oral hygiene instructions for home care and professional oral prophylaxis is required for these patients. [23]

In Asia, Africa, South America, and the Middle East chewing sticks are obtained from a different plant species and are traditionally used for cleaning teeth. [24] Western travelers and explorers mentioned that the inhabitants of the Sahara region and Sudan use chewing sticks to clean teeth at any time even during social gathering. Chewing sticks had been given various names in different cultures: ‘‘arak’’ or ‘‘miswak’’ in Arabic, ‘‘koyoji’’ in Japanese, ‘qesam’’ in Hebrew, ‘‘qisa’’ in Aramaic, and ‘‘mastic’’ in Latin. [25]

In this study, we were evaluating the effect of miswak along with brushing teeth by bass technique on periodontium in Saudi origin orthodontic patients. In Saudi Arabia miswak is widely used to clean teeth. Studies on miswak shows different results in different population like a study on Saudi Arabia population shows no benefit of miswak on periodontal health [26] whereas another study on Sudan population shows similar or slightly better periodontal health in habitual miswak users as compared to toothbrush users. [12] Another study conducted on Kenya students reported effective dental plaque removal in the group that used toothpaste in combination with chewing sticks. [27]

Some studies reported disadvantages of miswak like persons using chewing sticks showed more plaque formation and thus there is a significantly higher prevalence of gingivitis in habitual users of miswak than did toothbrush users. [28, 29] Another study concluded that lingual surfaces and interproximal dental areas were less accessible by miswak hence cleaning is less effective at these surfaces as compared to toothbrush users.[7] A study reported time dependent cytotoxic effects of S. persica stated that freshly cut S. persica does not have cytotoxic effects whereas same plants shows harmful components after one day. [30]

In our study both groups A and B there shows reduction in plaque and gingival index. At the beginning of the study both the groups had similar plaque and gingival index score. Overall greater reduction for both plaque and gingival index score was observed in group B as compared to group A. This showed the additional advantage of miswak in maintaining oral hygiene as compared to the only bass method. Our results are in agreement with previous studies which showed antimicrobial effect[17, 29 – 31] and reduction in dental plaque, gingivitis, periodontal diseases [11, 21, 32 – 35] and improvement in oral

hygiene. [7, 36] Few studies on Saudi Arabian subjects showed non- significant difference in plaque score on lingual/ buccal tooth surfaces between toothbrush and miswak users. [12, 37] In these studies, the comparison was done between only miswak and tooth brushing but in our study, we compare tooth brushing in group A with tooth brushing and miswak together in group B and it was found that in group B plaque index and gingival index was reduced. This shows the additional advantage of using miswak with regular tooth brushing. Though some researchers reported disadvantages of miswak use but those disadvantages can be overcome by proper instructions regarding the method and duration of miswak use. [38- 42]

Conclusion

Based on the plaque and gingival index score it is confirmed that both Bass technique alone and Bass technique along with miswak shows effectiveness on plaque control and gingival health in patients undergoing fixed orthodontic mechanotherapy. Based on statistically significant results it is concluded that miswak has an additional advantage on the maintenance of periodontal health in these patients for a period of 6 months.

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