Comparative study of Miswak and Toothbrush user's oral hygiene status using Simplified Oral Hygiene Index (OHI-S) as clinical measuring tool

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Abstract

Objective: To evaluate and compare status of Oral Hygiene maintenance of toothbrush and miswak users among teenage male madrassa students based on clinical indexes and questionnaires.

Method: There were 281 madrassa enrolled students examined and interviewed in accordance with inclusion and exclusion criterion already mentioned. Informed consent was taken. After having explained the questionnaire and clinical procedures, first a questionnaire (attached in annexure) was filled by the dentist based on answers provided by students. A trained dental hygienist performed clinical examination using mouth mirror, probe and WHO perio probe. Plaque and calculus score were recorded according to respective indexes.

Results: When miswak was used as cleaning tool, 41 (39.4%) fell in fair category of OHI –S, 35 (33.7%) fell in good category and 28 (26.9%) fell in excellent category of OHI –S with a significant (p-value<0.05). When tooth brush is used as cleaning tool, 23 (23.7%) were in fair category, 46 (47.4%) were in good and 28 (28.9%) were in excellent category of OHI –S. THE P value was again significant. When both miswak and brush are used, 8 (10%) were in fair, 32 (40%) were in good and 40 (50%) were in excellent category with p value being significant.

Conclusion: The obtained data clearly reflects the effectiveness of miswak at par with toothbrush even when it was used without a dentifrice. This efficacy of miswak should be highlighted as an alternate of tooth paste and brush in LMICs like Pakistan. The results also show a better OHI–S when miswak and tooth brush were used in conjunction.

Introduction importance of understanding traditional practices and Oral health maintenance contributes imperatively in beliefs related to oral health.³ Aeeza S, malik and highlighting an individual's general attitude towards colleagues in 2017 concluded that miswak offered health maintenance. Attention given to good oral comparable if not superior results when both miswak hygiene maintenance is crucial as it helps keep the and brush were applied for teeth and soft tissue mouth and teeth clean while preventing various health cleaning. It also demonstrated anti plaque effectiveness. Keeping in mind the World Health This suggests that miswak may serve as a viable issues. Organizations (WHO) recent broadening of health substitute for toothbrushes.³ definition with inclusion of social well-being, oral line role Miswak, taken from the branches of different plants, is in use since ages in regions of Arabia, Babylon, ancient Furthermore, while evaluating social integration Greece, and Rome for cleaning teeth. Later on, its determinants, communication and creativity, eating, efficacy has been further proven by chemical analysis, talking, smiling, oral health takes a pivotal role. Consequently, the general consensus is recognition of overall perception of a healthy mind and body.¹

oral hygiene maintenance as a significant part of found in nature which have a positive role in oral hygiene maintenance. A new era of preventive dental health delivery can be envisaged by re inducting Maintaining a healthy mouth not only enables a person miswak in daily cleaning habits and shedding light on to look and feel better; it is also crucial for proper oral the various benefits of its natural ingredients.³ A functions. The effects of poor oral health on the chewing stick is cost effective and accessible in both overall health and social life are well documented. urban and rural areas of developing countries. In Numerous long term and general systemic ailments Pakistan, the main factor attributed to the selection of have been documented to be related to poor chewing sticks against toothbrush is its affordability to maintenance of oral hygiene. A vast number of more than half of its population living in rural areas.⁴ affecting diverse body systems like In developing countries where dental services and diseases cardiovascular, digestive and mental health and cleaning tools are relatively inaccessible and or too endocrine have recently been associated with the expensive for a vast number of populations, miswak maintenance of poor oral hygiene and health. Poor remains a crucial tool for oral hygiene. The oral hygiene leads to persistent infections and affordability and availability of miswak in both rural inflammations in mouth, caries in hard tissues and and urban areas projects it as a practical choice. Cost periodontal diseases in soft tissues of mouth. This effectiveness, traditions and particularly religious that periodic and regular beliefs highlights its potential for enhancing hygiene clearly establishes debridement of teeth for plaque and food debris habits, an endeavor that requires authentic and regional removal is a vital link in maintaining a healthy mouth data. Since miswak is a significant part of hygiene and prevention of infections.² routine of a vast population, its significance can be

harnessed for dental health education.⁵

An individual's oral cavity represents his attitude towards overall wellbeing. Maintaining adequate Oral Available literature also supports the role of miswak in Hygiene (OH) is considered a vital aspect of a reducing plaque. Decreased gingival bleeding has been person's overall health. Good OH improves the overall shown when soft tissues of oral cavity were probed on Quality of Life (QOL). Different cultures and regions those individuals who were using regular miswak have invented and reinforced different means for this compared with those who were not. Ethiopian purpose. Whatever the means employed the end schoolchildren were the subjects of a study relating expected result is a clean and healthy oral miswak and tooth cleaning brush. It was deduced that environment. This prevents unpleasant mouth odor, comparable teeth and gum cleaning was achieved by tooth decay, and deposit built up on teeth. As oral both when miswak was utilized in an effective manner.⁶ diseases continue to rise, the growing global demand of effective and economical preventive and treatment

of effective and economical preventive and treatment regarded as a key attribute to its importance. This products has intensified. This situation underscores the

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mechanical action reduces the chances of food efficient removal of plaque deposits. In addition to the accumulation which can lead to plaque buildup and antimicrobial properties, the miswak extract paste also consequently soft tissue inflammation. Moreover, the retarded further accumulation of plaque. Thus miswak long duration of keeping miswak in the mouth or its extract may replace brush without any negative compared to a brush, typically increases its efficacy by consequences. Furthermore, both miswak and brush can both mechanical and chemical action.⁷ be incorporated in cleaning routine to achieve the

movement should start from near the gums and routine and prescribed technique is advocated.¹¹ directed towards the occlusal and incisal edges this miswak serves a dual purpose of tongue cleaner in sciences.¹²

addition to a tooth cleaning brush. It is of utmost However, this study takes a dual approach by cleaning and healing properties.⁸

A study by Ismail A. Darout reaffirmed and miswak utilization. Based on previous studies, it is highlighted the fact that dental healthcare access is expected that both groups will have comparable data. limited for residents of low and middle income First, a questionnaire will collect information on oral countries. World Health Organization supports the health habits, types and frequency of aids used, and exploration of inexpensive and readily available demographic data. Next, clinical assessment tools will traditional preventive tools. The statement issued after measure hygiene standards. Simplified Oral Hygiene consensus in this regard states "chewing sticks may Index (OHI-S), Calculus Index (CI), and Plaque Index contribute to promote oral hygiene" and that (PI). The OHI-S is a widely recognized scoring system "evaluation of their effectiveness warrants further that evaluates OH status quantitatively, thus providing a research".⁶ This study also found that periodontal more sensitive measure. It calculates the OHI using two health status of miswak users was comparable to clinically observed values from CI and PI. toothbrush users, indicating similar effectiveness in

maintaining a clean oral cavity.⁹

miswak or both. It concluded that miswak users had research initiative studies for local community. lower plaque levels compared to the other OHMs.

This result could be owed to the fact that the miswak Material & Method has chemical plaque control properties in addition to its mechanical cleansing properties.¹⁰

&Gulnoza Dustmurodova stated that

In order for miswak to clean teeth properly, its miswak to be an efficient cleaning tool, consistent

direction should be followed on buccal and lingual A randomized control trial by Baeshen in 2017 stated surfaces. An anterior to posterior motion is best suited that when measuring the amount of plaque reduction, to clean occlusal surfaces. Care should be taken when both miswak and brush produced near identical scores. performing cleaning so as not to damage the gingiva. In addition, this study also concluded that miswak with Adequate tooth cleaning is achieved by setting a fluoride released fluoride in a more effective manner routine of at least three to five minutes. Additionally, than a paste containing fluoride. A double blind tongue cleaning should be added to this routine as bad randomized control trial published by Malik et al in breath is usually a result of deposition of food 2014 concluded more thorough plaque removal by particles onto its surface. When used in this way, miswak when compared to a brush in students of dental

> implementing both questionnaires and clinical evaluation methods to assess oral hygiene (OH) and

This research stands out because it combines subjective and objective assessments for the same patients being

Additionally, study by Abdul rehmaan Ramadan in examined, resulting in more reliable findings that may 2020 examined 3 groups, those using toothbrushes, further broaden the field for data collection and

This cross-sectional study was conducted over three months in two male madrassas in Lahore. The study A scientific study By Nazwa Munia, Gulnara Rzayeva population included children aged 12 to 16 years. A paste simple random sampling technique was used. A total of incorporating miswak extracts resulted in more 281 students were enrolled based on inclusion criteria: those using only miswak (group 1), both miswak and students, good in 113 (40.2%) of students, fair in 72 toothbrush (group 2), or only toothbrush for oral (25.6%) of students.

Exclusion criteria included children hvgiene. Out of 281, 80 used both miswak and toothbrush as undergoing orthodontic treatment, having oral disease, physical disability, recent tooth cleaning (within 3 months), or unwillingness to disclose hygiene habits. Data collection was done after ethical approval, with from participants. informed consent taken questionnaire was filled by the dentist, followed by clinical oral examination by a trained dental hygienist. Plaque and calculus scores were recorded. Data was analyzed using SPSS 20.0, with frequencies, means, chi-square test, and t-test applied for statistical analysis.

Result

The primary objective of this study was to assess the tool and level of oral hygiene among young local that both tooth brush and miswak are equally effective in maintaining oral hygiene. Furthermore this study indicates that when both tooth brush and miswak are used simultaneously by a person, oral hygiene status is improved considerably.

This study was conducted in two male madrassas of the whole group was 18.01 ± 2.939 . Out of 281, 110 were ≤ 17 (39.9%) and 169 were ≥ 17 (60.1%). 104 and calculus index (CI). The value obtained by plaque (39.4%). and calculus index were added and oral hygiene index

score was obtained. Based on the obtained scores, When miswak was employed as cleaning tool, the mean excellent, good , fair and poor rating was given to calculated age was 19 ± 2 years .The mean score for scores. For score of oral hygiene index of (0), rating (PI –S) was 0.75 ± 0.66 , mean score for (CI –S) was was given as excellent. For a score between $(0.1) - 0.3 \pm 0.43$ and mean score for (OH – I) was 1.05 \pm (1.2), rating was good. For score between (1.3) - (0.91). 3.0), rating was fair and score greater than (3) was

rated as poor.

With tooth brush employed as cleaning tool, the mean calculated age was 17 ± 3 years. The mean (PI -S)

The mean PI – S score was 0.518932 ± 0.5605351 . score was 0.5 ± 0.46 , mean (CI – S) score was $0.236\pm0.236\pm0.236$ Mean CI –S score was 0.21732 \mp 0 .36918. Mean 0.345 and mean calculated (OHI – S) score was 0.72 OHI – S was 0 .738754 \pm 0.8048. The overall rating \pm 0.714. score of the group was excellent in 96 (34.2 %) of

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cleaning tool. The frequency of using both in age group < 17 was 29 (36.3%) and in age group > 17, it was 51 (63.8%). Out of these 80, 22 (27.5%) cleaned once a day and 40 (50%) cleaned twice a day and 18 (22.5%) were infrequent in cleaning. Horizontal technique was used by 23 (28.8%), vertical was used by 57 (71.3%). All used five finger grasp and more than one day was brush used .The OHI –S rating was excellent in 40 (50 %), good in 32 (40%) and fair in 8 (10%). Out of 281, 97 were tooth brush users. The frequency

of using tooth brush in age group <17 was 54 (55.7%) and in age group ≥ 17 , it was 43 (44.3%), 25 (25.8%) used brush once a day, 54 (55.7%) used it twice a day dependence and relation between choice of cleaning and 18 (18.6%) were infrequent in brushing. 45 (46.4%) used a horizontal brushing technique and 52 population. Results obtained from this study indicate (53.6%) used a vertical brushing technique. The brush grasping technique was five fingers grasp in all. The OHI -S rating was excellent in 28 (28.9 %), good in 46 (47.4%) and fair in 23 (23.7%).

Out of 281, 104 were miswak users. The frequency of using miswak as cleaning tool in age group <17 was 29 (27.9%). While in age group ≥ 17 , it was 75 (72.1%). Lahore. A total of 281 madrassa students were 12 (11.5%) students used it once in day, 33 (31.7%) examined for the study. The mean calculated age of used it twice daily and 59 (56.7%) used it infrequently. The direction of miswak use was horizontal in 37 (35.6%) and vertical in 67 (64.4%). The grasping (37 %) students were miswak users, 97 (34.5 %) were technique was five finger grasp in 85 (81.7%) and two tooth brush users and 80 (28.5)% students used both finger grasp in 19 (18.3%). All students used miswak miswak and tooth brush. The OHI-S index was for more than one day. The OHI-S rating was excellent calculated after measuring values of plaque index (PI) in 28 (26.9%), good in 35 (33.7%) and fair in 41

Whit both miswak and tooth brush used as cleaning Discussion

tools, the mean calculated age was 18.5 ± 3 years. The This research sheds light on future prospects of was 0.4 ± 0.6 .

cleaning)

Method of cleaning	Rating			Total	n- value
	Fair	Good	Excellent	Total	p- value
Miswak	41	35	28	104	
	39.4 %	33.7%	26.9%	100%	<0.0001
Tooth brush	23	46	28	97	
	23.7%	47.4%	28.9%	100%	
Both	8	32	40	80	
	10%	40%	50%	100%	
Total	72	113	96	281	
	25.6%	40.2%	34.2%	100%	

is used as cleaning tool, 23 (23.7%) were in fair from 49.5% to 55.2%. 13 category, 46 (47.4%) were in good and 28 (28.9%) were in excellent category of OHI -S. The p-value Research indicates that the effective use of miswak was again significant. When both miswak and brush helps decrease dental biofilm on teeth, which is a key are used, 8 (10%) were in fair, 32 (40%) were in good contributor to plaque and calculus buildup. ¹⁴ In a 2016 and 40 (50%) were in excellent category. p value is case study by Ismail, a patient who only used significant.

Table 2: Age wise rating of Oral Health St
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4.70	Rating			T-4-1	
Age	Fair	Good	Excellent	Total	p- value
< 17	24	57	31	112	
	21.4 %	50.9%	27.7%	100%	0.012
> 17	48	56	65	169	
	28.4%	33.1%	38.5%	100%	
Total	72	113	96	281	
	25.6%	40.2%	34.2%	100%	

In age category of younger than 17, 24 (21.4%) were in in fair category, 57 (50.9%) were in good and 31 (27.7%) were in excellent category. In older than 17, 48 (28.4%) were in fair category, 56 (33.1%) and 65 (38.5%) were in good and excellent category. The P value is significant.

mean (PI–S) score was 0.3 ± 0.4 , mean (CI – S) score incorporating miswak recommendations in dental was 0.09 ± 0.26 and mean calculated (OHI –S) score public health education programs. The findings clearly reflect the effectiveness of miswak at par with toothbrush even when it is used without a dentifrice. This efficacy of miswak should be highlighted as an Table 1: Choice of cleaning tool (Method of alternate of tooth paste and brush in LMICs like Pakistan. The results also show a better OHI-S when miswak and tooth brush are used in conjunction. For those communities where oral hygiene is neglected because of lack of resources, miswak use should be encouraged.

> A double blind randomized control trial published by Malik et al in 2014 concluded more thorough plaque removal by miswak when compared to a brush in students of dental sciences.¹²

A study by Khalid Almas conducted in Pakistan stated When miswak is used as cleaning tool, 41 (39.4%) fell that 53.1% of male students used miswak more than in fair category of OHI -S, 35 (33.7%) fell in good three times a day in an intermediate school, and by category and 28 (26.9%) fell in excellent category of 55.8% in secondary school levels. Once daily use of OHI -S with a significant P value. When tooth brush miswak was common among female students ranging

> miswak-without any toothpaste, mouthwash, or flossing-was assessed before starting orthodontic treatment. The patient's initial plaque score was 1.0, indicating a low level of dental biofilm, as determined by the Silness-Loe Plaque Index method, which involved addition of individual score for each tooth and afterwards division of the total score by the total teeth number that were examined. In this way total biofilm index was calculated. The study found that the biofilm levels on teeth did not change over six months of miswak use.¹⁴

> Similarly, Darout and colleagues utilized the Community Periodontal Index (CPI) for comparison of health of the periodontal tissues of brush and miswak users. CPI suggests to evaluate calculus present supragingival and depth of probing for each tooth. The results obtained showed that when used with effective technique, miswak produced better results of plaque

reduction and gingival inflammation compared to brush. The use of meticulously taught technique for miswak cleaning was pivotal in achieving these results.¹⁴

Most studies referenced in this research relied solely on questionnaires to assess miswak's effectiveness. ^{15,16,17} In addition further refined and elaborate studies are needed for collection of community data for policy recommendations.

Conclusion

The obtained data clearly reflects the effectiveness of miswak at par with toothbrush even when it was used without a dentifrice. This efficacy of miswak should be highlighted as an alternate of tooth paste and brush in LMICs like Pakistan. The results also show a better OHI–S when miswak and tooth brush were used in conjunction.

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