

Tooth brushing techniques among students attending King Solomon College, Gboko, Benue State, Nigeria

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ABSTRACT

Introduction

Oral diseases constitute a major public health problem and poor oral hygiene practices contribute to the global burden of oral diseases. The most effective way to prevent oral diseases like dental caries, gingivitis, and periodontitis is the removal of dental plaque from oral tissues. Self oral hygiene maintenance is by tooth brushing, mouth rinsing, and dental flossing

Purpose

The purpose of this study was to assess the techniques used for tooth-brushing among students attending King Solomon College, Gboko, Benue State, Nigeria to enrich oral health education messages in the context.

Materials and methods

A sample of 135 students was selected from the school population, using the simple random sampling technique. Data was obtained using personal interviews and observation. Data obtained were analyzed using the Statistical Package for Social Sciences (SPSS) version 20 (IBM Corporation). The Chi-square test was used to determine the statistical significance of observed differences in the cross-tabulated variables. The significance level was set at 5% ($p < 0.05$).

Results

The results of the study showed that none of the participants (0.0%) adopted the correct technique of tooth brushing (the roll technique). The majority of the participants (92.6%) used the horizontal technique while 4.4% and 3.0% represented the vertical and random techniques, respectively. Age ($p = 0.969$) and gender ($p = 0.128$) were not significantly related to tooth brushing techniques ($p > 0.05$).

Conclusion

There is a need to organize oral hygiene awareness programmes to help educate people on the need to adopt the roll technique of tooth brushing to promote effective dental plaque removal and, by extension, the prevention of oral diseases.

INTRODUCTION

Oral diseases constitute a major public health problem and the burden of oral diseases is significantly more on the underdeveloped and disadvantaged population groups in developed and developing countries (Mohammed & Gheena, 2015). Among oral diseases, dental caries and periodontal disease are the two most prevalent dental problems globally (Tobin & Ajayi, 2017). Poor oral hygiene practice is a leading contributor to the burden of oral

disease alongside poverty, illiteracy, and lack of access to affordable oral health services (Ibrahim et al., 2021). In addition, many developed and developing countries have weak national oral health programmes, greater inequitable distribution of dental professionals, and public dental health facilities that are poorly managed with inadequate dental materials and equipment (Bashiru & Omotunde, 2014).

The main method of preventing various oral diseases like dental caries, gingivitis, and periodontitis is by effective plaque removal (Folayan et al., 2014). Self oral hygiene maintenance is mainly by tooth brushing, mouth rinsing, and flossing (Patil et al., 2014). Tooth brushing is the main method of self-removal of plaque and debris by an individual (Suhagini & Valiathan, 2020). An individual must be aware of the proper brushing technique that they have to follow to maintain oral hygiene and for adequate plaque removal. Assuming that tooth brushing plays a vital role in effective plaque control, good oral hygiene would be dependent upon the effectiveness of the particular method and the ease with which the procedure is carried out (Patil et al., 2014).

Several tooth brushing techniques (Bass, Stillman's, Fones', Charter's, horizontal, vertical, scrub, and roll) have been developed, over the years (Asadoorian, 2006; Claydon, 2008). The most common technique used by uninstructed individuals is the horizontal scrubbing motion (Hayasaki et al, 2014).

The Bass technique emphasizes the removal of plaque from the area above and just below the gingival margin and provides good gingival stimulation. However, it causes injury to the gingival margin (Suhagini & Valiathan, 2020). Stillman's method was originally developed to provide gingival stimulation. (Weinwright & Sheiham, 2014; Baruah et al, 2017). The Charter's method is specifically indicated in patients with orthodontic and prosthodontic appliances and is effective in plaque removal and suitable after periodontal surgeries (Claydon, 2008; Suhagini & Valiathan, 2020).

In the roll method, the toothbrush bristles are positioned parallel to and against the attached gingiva, with the toothbrush head level with the occlusal plane. The wrist is then turned to flex the toothbrush bristles first against the gingiva and then the facial surface. A sweeping motion is continued until the occlusal or incisal surface is reached. The press roll action is repeated at least five times before proceeding to the next site (Baruah et al., 2017).

The Bass and roll methods are the most commonly recommended techniques of tooth brushing. It has been estimated that over 90% of people employ their "personal tooth-brushing method," which is generally the "scrub" method using vigorous horizontal, vertical, and/or

circular movements. While this method will remove plaque from smooth outer and inner surfaces of the teeth, it has been considered detrimental because it can encourage gingival recession and areas of tooth abrasion (Asadoorian, 2006).

This study was aimed at evaluating the various tooth brushing techniques adopted by the study population, to enrich oral health education messages in the context.

MATERIALS AND METHODS

Research design

A cross-sectional survey research design was adopted to study the tooth brushing techniques adopted by students attending King Solomon College, Gboko, Benue State, Nigeria.

Description of the Study Area

The study area was King Solomon College, Gboko, Benue State, Nigeria. The school is located on Anjie Gyenger Close off Ayilla Yough Road, Gboko LGA, and it is a private secondary school established in September 2018. The College comprises five classes (JSS1 - SS2), one staff room, and an office, each, for the principal, the vice-principal, and the dean of studies. The College has a population of 306 students. (Mr. Vershima Mnenge, Dean of Studies: Personal Communication)

Sample Size and Sampling Technique

The sample size used for the study was 135 students, which was computed using Taro Yamane's formula.

The students that participated in the study were selected randomly from the student population.

Data Collection

Demographic data for this study was collected using personal interviews and tooth brushing data was obtained using observation. A full-mouth model and demonstration brush were used by the researchers to demonstrate the different tooth brushing techniques and the students were permitted to demonstrate how they brushed their teeth on an individual basis, using the model and the brush. All the data collected were recorded on a data sheet.

Data Analysis

Data obtained from the survey were analyzed using the Statistical Package for Social Sciences (SPSS) version 20 (IBM Corporation). The results were presented in tables as

frequencies and percentages. The Chi-square test was used to determine the statistical significance of observed differences in the cross-tabulated variables. The significance level was set at 5% ($p < 0.05$).

RESULTS

The majority of the participants were in the age group, 11-13 years (38.5%) and in JSS 1 (30.4%). 56.3% of the participants were female while 43.7% were male (Table 1).

Table 1:
Demographic characteristics of students

Variables Categories	Frequency	Percentage	
Age (years)	11-13	35	25.9
	14-16	52	38.5
	17-19	33	24.4
	20+	15	11.1
	Total	135	100
Gender	Male	59	43.7
	Female	76	56.3
	Total	135	100
Class	JSS1	41	30.4
	JSS2	15	11.1
	JSS3	33	24.4
	SS1	16	11.9
	SS2	30	22.2
	Total	135	100

Almost all the participants adopted the horizontal technique of tooth brushing (92.6%). The roll technique was not adopted for tooth brushing by any of the participants (0.0%) (Table 2).

Table 2:
Frequency and tooth brushing techniques of participants

Tooth brushing techniques	Frequency N=135	Percentage (%)
Vertical	6	4.4
Horizontal	125	92.6
Random	4	3.0
Roll	0	0.0
Total	135	100

Results also indicated that the respondent's age ($p = 0.969$) and gender ($p = 0.128$) were not significantly associated with tooth brushing techniques ($p > 0.05$). Across all the age groups, the horizontal technique was the most adopted

tooth brushing technique. A similar trend was observed with gender (Table 3).

Table 3:
Age and gender distribution of tooth brushing techniques

Variable	Tooth brushing techniques				Total	Chi-Square	df	p-value
	Vertical N (%)	Horizontal N (%)	Random N (%)	Roll N (%)				
Age group								
11-13	1 (0.7)	33 (24.4)	1 (0.8)	0 (0)	35 (25.9)	1.348	6	0.969
14-16	3 (2.2)	47 (34.8)	2 (1.5)	0 (0)	52 (38.5)			
17-19	1 (0.7)	31 (23.0)	1 (0.7)	0 (0)	33 (24.4)			
20+	1 (0.7)	14 (10.4)	0 (0)	0 (0)	15 (11.1)			
Total	6 (4.4)	125 (92.6)	4 (3.0)	0 (0)	135			
Gender								
Male	5 (3.7)	52 (38.5)	2 (1.5)	0	59 (43.7)	4.119	2	0.128
Female	1 (0.7)	73 (54.1)	2 (1.5)	0	76 (56.3)			
Total	6 (4.4)	125 (92.6)	4 (3.0)	0 (0)	135			

Statistical significance was set at $p < 0.05$

DISCUSSION

The study investigated the tooth brushing techniques adopted by the students surveyed. Results from this study showed that most of the students adopted the horizontal technique (92.6%) followed by the vertical technique (4.4%), and the random technique (3.0%). The roll technique (0.0%) was a technique that was not adopted for tooth brushing by any of the participants. These findings were similar to the findings of Adamu et al. (2020), who in a similar study among pupils attending a Nigerian unity basic school inferred that the horizontal tooth brushing technique was the most adopted technique of tooth brushing among the pupils (85.83%), circular (5.83%), vertical (8.33%) and roll (0.00%). This result also agrees with the results obtained by Hayasaki et al. (2014) who inferred that the most common technique used by uninstructed individuals is the horizontal scrubbing motion that engages the occlusal and buccal/lingual surfaces.

The right technique of tooth brushing is the roll method (Asadoorian, 2006), but it was not adopted by any of the participants. This could be associated with the lack of awareness on the right tooth brushing technique to adopt for daily oral hygiene and could equally be traced to the fact that children are imitators who might have copied the wrong techniques from their parents, guardians, or elders within their community over the years and have come to believe that it is the right way to brush teeth.

This is further evidence of the lack of information on good oral hygiene practices in the community.

CONCLUSIONS

All our findings pointed to the fact that sufficient information, awareness, and education on oral hygiene practices are lacking in the study population. Should this trend be allowed to continue, the effects will be devastating. Wrong tooth brushing techniques can lead to gum recession, abrasion, dental diseases, and the subtle accumulation of oral deposits. There is the need to organize oral hygiene awareness programmes to help educate people on the need to adopt the roll technique of tooth brushing to promote effective dental plaque removal and, by extension, the prevention of oral diseases

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Ethical Approval: Ethical approval for this work was obtained from the Dental Health Department, NKST College of Health Technology, Mkar, Gboko, Nigeria.

Conflict of Interest: The authors declare no conflict of interest.

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