

EVALUATION OF METHODS DEMONSTRATING ORAL HYGIENE TECHNIQUES AMONG PATIENTS WITH GINGIVAL DISEASE

Sooreesha Shivani Arangkulavan* and Jaiganesh Ramamurthy

Saveetha Dental College, 162, Poonamalee High Road, Vellappan Chavadi, Chennai 600077.

Article Received on
08 July 2015,

Revised on 31 July 2015,
Accepted on 24 Aug 2015

***Correspondence for
Author**

Sooreesha Shivani

Arangkulavan

Saveetha Dental College,
162, Poonamalee High
Road, Vellappan Chavadi,
Chennai 600077.

ABSTRACT

OBJECTIVE: To evaluate whether proper demonstration of oral hygiene techniques can help improve in the oral hygiene status and the health of the gingiva. **MATERIALS AND METHODS:** A total of 30 gingivitis patients were randomly assigned and divided into 3 different groups (10 each). Patients were educated on Modified Bass technique by verbal instructions to group A, by model representations to group B and via audio visual aids to group C. All the patients were re-called and re-examined after 30 days. A post intervention of plaque index (PI) and gingival index (GI) was measured and statistical analysis was done and compared with the baseline data using paired t-test and for the multivariate analysis the one-way ANOVA with Tukey's Post-Hoc test

was used. **RESULTS:** Statistically significant reduction in (PI) and (GI) was seen in group C followed by group B and the least effectiveness was seen in group A. **CONCLUSION:** This study showed that audio-visual was the most effective demonstration in conveying the Modified Bass technique followed by model demonstration and the least effective was verbal demonstration.

KEYWORDS: dental plaque, tooth brushing technique, verbal, audio-visual aids, plaque index.

INTRODUCTION

Periodontal disease is the most common oral disease among adults due to poor oral hygiene. This disease is very much preventable yet remains the major cause for tooth loss among elderly adults.^[1,2] Dental plaque is the major etiology of dental caries and periodontal disease. In a classic study by Loe et al. in 1965, it was demonstrated that plaque is the primary etiologic agent for gingivitis. Stopping oral hygiene practices for a few days lead to the develop-

ment of gingivitis. Poor oral hygiene leads to the shift to gram-negative plaque flora, but it can be brought back to normal when patients recommence their oral hygiene practices. Hence, daily plaque removal is important to sustain a healthy gingiva and periodontium.^[3] Despite the established causal relationship between tooth brushing and gingivitis many people in Chennai are unaware of the correct tooth brushing technique. This partly reflects the ignorance of the beneficial effects of oral hygiene and the correct method of performing it. This study was undertaken to evaluate the respective effectiveness of educating gingivitis patients on the correct tooth brushing techniques via verbal instructions, model representation and audio visual aids. Aim of the study: This study is conducted to evaluate and assess the oral health status after educating patients on the correct tooth brushing technique.

MATERIALS AND METHODS

In a randomized controlled clinical trial, a total of 30 gingivitis patients were the subjects, were randomly assigned and divided into 3 different groups (10 each), verbal instructions being the control group (A), model representations (B) and audio visual aids(C) groups.

The following criteria were used to select the sample for the study:

Inclusion criteria

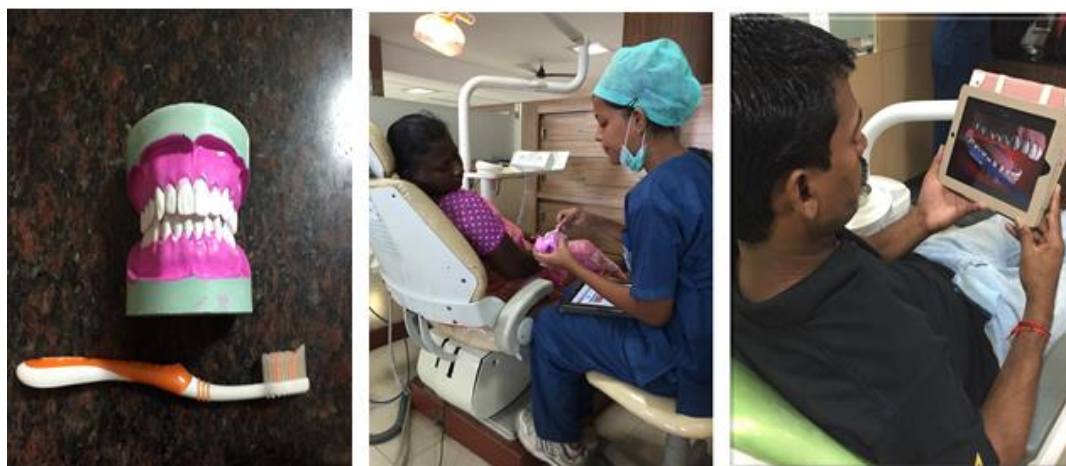
- i) Healthy adults between the age of 20 to 50
- ii) Adults who were co-operative with no mental or physical disability
- iii) Adults who were ready to participate in the study
- iv) Adults with the presence of more than 25 natural teeth
- v) Adults who brush once a day

Exclusion criteria

- i) Adults with orthodontic or prosthodontic appliance
- ii) Adults with periodontal disease, oral infections or lesions and multiple carious teeth.
- iii) Pregnant and lactating females
- iv) Adults underwent oral prophylaxis one month back
- v) Adults taking antibiotic, insulin or Ayurveda medications

The following clinical guidelines were recorded.

- Plaque index (Silness and Loe)
- Gingival index (Loe and Silness)



At the beginning of the study, a detailed questionnaire was made to collect information regarding personal details, oral hygiene practices, plaque index (PI) and gingival index (GI). The procedure was fully explained to the patient and their informed consent was obtained before the commencement of the study. Oral examination was performed visually using natural daylight, mouth mirror and explorer. The teeth were dried and isolated with cotton rolls and disclosing agent was applied. Patients were asked to rinse their mouth before assessment to disclose plaque. Assessment of plaque was done and recorded using Silness and Loe plaque index. Gingival index was performed to assess the severity of gingivitis based on color, consistency and bleeding on probing. Teeth and gingiva were dried and examined under adequate light, using a mouth mirror and probe. The probe was used to press on the gingiva to determine the degree of firmness and to run along the soft tissue wall near the entrance to the gingival sulcus to evaluate bleeding. Gingival index was performed first because the application of disclosing agent masks the gingival characteristics. Statistical analysis was done. The values were measured before oral prophylaxis was carried out. Once the oral prophylaxis was done, patients were educated on the correct tooth brushing technique, which is Modified Bass technique in three different modes of demonstration. The first 10 patients were given verbal instructions, the following 10 patients were given model demonstration and the remaining 10 patients were demonstrated via audio-visual aids. The patients were instructed to brush twice a day. All the patients were re-called and re-examined after 30 days. A post intervention of (PI) and (GI) was measured and statistical analysis was done and compared.

RESULTS

Plaque scores and gingival scores at baseline and after 30 days were compared. The collected data was analyzed with SPSS 16.0 version. To describe about the data descriptive statistics

mean and standard deviation were used. To find the significant difference between the bivariate samples in Paired groups (Pre & Post) Paired sample t-test was used. For the multivariate analysis (Verbal, Model & Audio-Visual) the one-way ANOVA with Tukey's Post-Hoc test was used. In both the above statistical tools the probability value 0.05 is considered as significant level. The following are the tabulated results.

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
(GI) POST	Between Groups	.631	2	.315	9.264	.001
	Within Groups	.919	27	.034		
	Total	1.550	29			
(PI) POST	Between Groups	1.625	2	.812	7.147	.003
	Within Groups	3.069	27	.114		
	Total	4.694	29			

There is statistical significance difference in the mean GI post treatment scores between the groups ($P= 0.001$). There is statistical significant difference in the mean PI post treatment values between the groups ($P= 0.003$).

Post Hoc Test

Multiple Comparisons							
Tukey HSD							
Dependent Variable	(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
(GI) POST	Verbal	Model	.25400	.08251	.013	.0494	.4586
		Audio Visual	.34200	.08251	.001	.1374	.5466
	Model	Verbal	-.25400	.08251	.013	-.4586	-.0494
		Audio Visual	.08800	.08251	.543	-.1166	.2926
	Audio Visual	Verbal	-.34200	.08251	.001	-.5466	-.1374
		Model	-.08800	.08251	.543	-.2926	.1166
(PI) POST	Verbal	Model	.19300	.15077	.418	-.1808	.5668
		Audio Visual	.56100	.15077	.003	.1872	.9348
	Model	Verbal	-.19300	.15077	.418	-.5668	.1808
		Audio Visual	.36800	.15077	.054	-.0058	.7418
	Audio Visual	Verbal	-.56100	.15077	.003	-.9348	-.1872
		Model	-.36800	.15077	.054	-.7418	.0058

Audio-visual aids showed statistical significance in GI compared to verbal and model ($P= 0.001$) and Audio-visual aids showed statistical significant reduction in PI compared to verbal and model ($P= 0.003$)

T-Test Values

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. De- viation	Std. Er- ror Mean	95% Confidence Interval of the Dif- ference				
					Lower	Upper			
Pair 1	(GI) PRE - (GI) POST	.23500	.19580	.06192	.09493	.37507	3.795	9	.004
Pair 2	(PI) PRE - (PI) POST	.42400	.47120	.14901	.08693	.76107	2.846	9	.019

The paired difference for PI in-group A is (mean=0.424) which was statistically significant (P= 0.019) and the paired difference for GI in-group A is (mean= 0.235) which was statistically significant (P=0.004).

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. De- viation	Std. Er- ror Mean	95% Confidence Interval of the Dif- ference				
					Lower	Upper			
Pair 1	(GI) PRE - (GI) POST	.53300	.20000	.06325	.38993	.67607	8.427	9	.000
Pair 2	(PI) PRE - (PI) POST	.62200	.32331	.10224	.39072	.85328	6.084	9	.000

The paired difference for PI in-group B is (mean=0.622) which was statistically highly significant (P=0.00) and the paired difference for GI in-group B is (mean=0.533) which was highly significant (P=0.00).

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. De- viation	Std. Er- ror Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	(GI) PRE - (GI) POST	.63800	.17119	.05414	.51554	.76046	11.785	9	.000
Pair 2	(PI) PRE - (PI) POST	1.00800	.22394	.07082	.84780	1.16820	14.234	9	.000

The paired difference for PI in-group C is (mean=1.008) which was statistically highly significant (P=0.00) and the paired difference for GI in-group C is (mean=0.638) which was also statistically highly significant (P=0.00).

Baseline plaque scores of the entire three groups were comparable, and it showed no significant intergroup differences. Though, statistically significant reduction in (PI) and (GI) was seen in-group C followed by group B and the least effectiveness was seen in-group A.

DISCUSSION

Good standard of oral hygiene is achieved not only by preventive interventions offered by dentists but also by appropriate mechanical cleaning.^[4] It has been widely accepted that plaque removal is best done by tooth brushing on a daily basis and it can be affordable by everyone.^[5,6] However, despite giving oral hygiene instructions and one-to-one oral health education, patients' compliance and efficiency to instructions are poor.^[4] Hence, this study was carried out to see whether patients' compliance towards Modified Bass technique increased with just verbal instructions or model demonstration or by audio-visual demonstration.

The Bass technique gives priority on the removal of plaque from the area above and just below the gingival sulcus.^[7] It was later modified where the bristle position and the horizontal brush movements were retained, but vertical and sweeping motions to create circles were added, thus it was named Modified Bass technique.^[8] Modified Bass technique is a highly recommended technique, in terms of improving plaque control and reducing gingival inflammation. There are many reasons which justifies this technique is better than other techniques.^[9]

Verbal instructions were given where the patients were thought how to hold the toothbrush and the kind of strokes and movement they should do during brushing. Patients were told to hold the toothbrush sideways against the teeth with some bristles touching the gums. The brush should be tilted 45-degree angle pointing towards the gum line. Once the toothbrush is in position, the brush should move back and forth, using short strokes with the tip of the bristles in one place. Tiny circles can be made with the brush. Roughly 20 strokes for every tooth, on the insides and outsides should be carried out. After the vibratory motion has been completed in each area, the bristles should be swept over the crown of the tooth, towards the occlusal surface.

Model demonstration was done using dentulous upper and lower cast model and a toothbrush. Similar verbal instructions were given with added model demonstration where the toothbrush was placed over the model and demonstrated. Audio-visual demonstration was done by showing a 2-dimensional video of tooth brushing technique. Here the patient is given a 2 minutes video demonstrating Modified Bass technique.

Out of the 30 subjects in the study, 18 were males and 12 were females. To assess the efficacy of plaque removal (PI) and the gingival status (GI) after 30 days between the groups, Tuk-

ey's Post Hoc test was used and it showed that audio-visual demonstration showed a statistical significant reduction ($P=0.003$) and ($P=0.001$) compared to verbal and model. Based on the t-test values verbal instructions brought about a significant improvement in the oral hygiene ($PI=0.019$) and ($GI=0.004$), whereas model and audio-visual ($PI=0.00$) and ($GI=0.00$) was superior to verbal which brought about a highly significant improvement on comparison.

In our study, audio-visual demonstration was found to be the most effective followed by model demonstration and the least effective was through verbal instructions. Similarly, a study conducted by Goyal and co-authors have proven that videos have the potential to pass health messages to target audiences and it helps them understand better and thus help them exchange their new ideas to others.^[8] Even in a study conducted by Sallam and co-authors have proven that video modeling of tooth brushing techniques among autistic children has indeed improve their oral hygiene status compared to model or pictures because it helps in improving motivation and helps the child grasp better.^[9]

CONCLUSION

This study showed that audio-visual was the most effective demonstration in conveying the Modified Bass technique followed by model demonstration and the least effective was verbal instructions among people in Chennai. Technology- based interventions such as video modeling have the capacity to convey messages better and help patient understand better on the proper tooth brushing technique. Besides that, it also motivates patients in a positive manner.

REFERENCES

1. Papapanou PN. Epidemiology of periodontal diseases: an update. *J Int Acad Periodontol.*, 1999; 13: 110–116.
2. Vellore Kannan Gopinath, Betul Rahman, and Manal A. Awad. Assessment of gingival health among school children in Sharjah, United Arab Emirates. *Eur J Dent.*, 2015 Jan-Mar; 9(1): 36–40.
3. Smita P. Patil, Prashant B. Patil, and Meena V. Kashetty. Effectiveness of different tooth brushing techniques on the removal of dental plaque in 6–8 year old children of Gulbarga. *J Int Soc Prev Community Dent.*, 2014 May-Aug; 4(2): 113–116.
4. N. Schlueter, J. Klimek, G. Saleschke, C. Ganss. Adoption of a toothbrushing technique: a controlled, randomised clinical trial. *Clinical Oral Investigations*, 2010; 14: 99–106.
5. Frensdenh A: Mechanical oral hygiene practices. In Loe H, Kleinman D.V. (eds) *Dental plaque control measures and oral hygiene practices*. WashingtonDC, IRLPress, 1986-93.

6. J Deshmukh, KL Vandana, KT Chandrashekar, B Savitha. Clinical evaluation of an ionic tooth brush on oral hygiene status, gingival status, and microbial parameter. *IJDR.*, 2006; 17(2): 74-7.
7. Bass C C. The optimum characteristics of toothbrushes for personal oral hygiene. *Dental Items Interest.*, 1948; 70: 921–934.
8. Ganss C, Schlueter N, Preiss S, Klimek J. Tooth brushing habits in uninstructed adults-frequency, technique, duration and force. *Clin Oral Investig.*, 2009; 13: 203–208.
9. Poyato-Ferrera M, Segura-Egea J J, Bullón-Fernández P. Comparison of modified Bass technique with normal toothbrushing practices for efficacy in supragingival plaque removal. *International Int J Dent Hyg.*, 2003; 1: 110–114.
10. Sachin Goyal, Betsy S. Thomas, Khandige Mahalinga Bhat , G. Subraya Bhat. Manual toothbrushing reinforced with audiovisual instruction versus powered toothbrushing among institutionalized mentally challenged subjects-A randomized cross-over clinical trial. *Med Oral Patol Oral Cir Bucal.*, 2011 May 1; 16(3): e359-64.
11. Asma'a M. Sallam, Sherine B.Y. Badr, Mervat A. Rashed. Effectiveness of audiovisual modeling on the behavioral change toward oral and dental care in children with autism. *IJDR.*, December 2013; 4(4): 184–190