

# Principal motives for tooth brushing among children: implications for oral health promotion -An in vivo study

K. Srinivasan<sup>1</sup>, S. Chitra<sup>2</sup>

<sup>1</sup>Dr. K. Srinivasan, Senior lecturer, Department of Pedodontics and Preventive Dentistry, Adhiparasakthi Dental College and Hospital, Melmuruvathur (T.N.State), <sup>2</sup>Dr. S. Chitra. Associate Professor, Department of Anaesthesia, Chirstian Medical College, Vellore (T.N State)

**Address for Correspondence:** Dr. K. Srinivasan. 1/24, Kamaraj Street, Voc Nagar, Sankaranpalayam, Vellore (T.N State), E.mail ID: skskskpedo@gmail.com

## Abstract

**Aim and Objectives:** The aim of this study was to assess improvement in motivation for tooth-brushing, the timing of tooth-brushing and the understanding of oral hygiene in children using Tooth Brushing Technique Song as an oral health promotion tool. **Methods:** 5-8 year-old children from a tutorial were selected and divided in two groups. Group A was given Tooth Brushing Technique Song and Group B acted as a control. On day one, instructions were given to both groups regarding tooth-brushing, importance of oral hygiene. Two groups of children were assessed after 15 days. Results were analyzed and presented using tables, bar charts and pie charts. **Results:** Of the 50 children, who remained available for the analysis, 25 children were in group A and 25 were in group B. In group A, approximately 76 % children showed liking towards the song, 68 % could memorize and reproduce the song. Approximately 76% children were motivated to brush after listening to the tooth song. 80% of children always brushed twice daily in group A as compared to 76% in group B. **Conclusion:** The happy tooth song had a positive impact on motivation for, the frequency and time of tooth brushing and understanding the importance of healthy food habits and dental visits in children.

**Keywords:** Oral Health Promotion; Tooth Brushing; Motivation; Dental Health Education.

## Introduction

Toothbrushes have been the gold standard for cleaning plaque from teeth for generations. Since Prehistoric times, men have devised a variety of methods to clean and whiten teeth. Some of the earliest devices used as “toothbrushes” were similar to some wood stick devices currently in use. The development of toothbrushes and dentifrices accelerated in the latter half of the 20th century, in the search for products ideally suited to their purpose. Oral health is a part of the general health and influences it directly and indirectly. Therefore, maintenance of good oral hygiene is an important factor in the general health [1].

Today, toothbrushes are commonly used for cleaning the oral cavity and preventing dental diseases. Unfortunately, toothbrush care methods are often ignored [2].

Learning tooth brushing is necessary because oral health is one of the most important factors for not only prevention of oral cavity and periodontal diseases but also general health [1, 2]. Dental professionals need to perform appropriate instruction of tooth brushing to patients and clinically monitor their progress of brushing skills. Currently, a plaque staining agent is the only available method for assessing the effectiveness of plaque removal by tooth brushing. However, this does not allow the Dental professional to evaluate the brushing techniques used [3, 4] or offer guidance to improve tooth brushing. In case of children majority show non compliance towards brushing & they try to hide themselves from daily brushing task because they considered as tedious procedure and dislike the brushing. At the same time parents try to motivate the children for regularly brushing by using different methods like contingency management, gifts and even bribes at times. Still most of the parents fail to develop child’s interest in brushing. It is important to gain

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child's interest in brushing by introducing some device that child can enjoy the brushing. [5-8].

Recently musical talking tooth brush 'BRUSH BUDDIES', which used widely in U.S.A., is introduced in Indian market by Ashtel Dental, USA. In this brush music starts while child starts brushing, it continuous during the brushing & when this ends child should end the brushing. Till date no reported studies have been done to compare between musical & normal tooth brush [9, 10].

The Ottawa Charter defined 'Health promotion' as the "process of enabling people to increase control over and to improve their health" Prevention has become the corner stone of the modern Dental practice and effective plaque control is the basic password to the meaningful practice of Preventive Dentistry. Intraoral cleaning devices have been a part of human civilization since long and a strong correlation exists between the severity of gingivitis and Periodontitis and the accumulation of Dental plaque (Loe et al. 1965).

Keeping this thing in mind we have formulated a study. The study had following objectives

- a) To assess the level of acceptance of the tool among children.
- b) To assess the impact on motivation of the tool in children for brushing.
- c) To assess the improvement in frequency and time of brushing.
- d) To assess the improvement in the oral health knowledge.

The aim of this study was to assess improvement in motivation for tooth-brushing, the timing of tooth-brushing and the understanding of oral hygiene, healthy food habits and regular dental visits in children.

Toothbrush design, brushing duration, parental involvement, and the brushing method, manipulative skill, and manual dexterity of the child are the most cited determinants of the effectiveness of tooth brushing.

## Materials and Methods

**Study design:** It was an interventional kind of study that was examiner blind. 50 volunteers from the same age group (5 to 8 years) participated. The study was an *in-vivo* crossover type. Clinical trials were carried out at Vellore. Volunteers were selected fulfilling the inclusion and exclusion criteria.

All children were in good general health and agreed to comply with the study visits and procedures of the study. Informed consent was obtained from parents, and birth certificates were checked to confirm the dates of birth of the children. The study was carried out in a tuition centre at Vellore. Permission from the tuition centre authorities was taken before carrying out the study. Information sheet about the study and consent forms were given to the parents through the tuition authorities prior to the starting of the study. The sample consisted of 50 children, aged 5-8 years, divided in two equal groups of 25 each. Children of this age group were selected as the parents have a better control and command over the brushing methods of these children. Group A was provided with Happy Tooth Song and Group B acted as a control (without Happy Tooth Song). On day one, a presentation was given to the parents and children explaining the benefits of brushing and healthy dietary habits. After the demonstration Fone's method of brushing was taught to the parents and children. The parents were instructed to brush the teeth for their children in both the groups. Group A children were shown a video along with tooth song and the tooth song was given to the parents to play on the cell phones while brushing their child's teeth. Brushing was recommended to be performed as long as the song played.

The duration of this song was 2.15 minutes that included the brushing time of 2 minutes and 15 seconds for the preparation. The parents were asked to sing along with the song after the brushing cycle was completed. On day one, the group A was instructed about tooth-brushing, importance of oral hygiene, healthy food habits and regular dental visits and was provided with the tooth song to be used over next 15 days. The Group B (control) was given the same instruction as Group A regarding tooth-brushing, importance of oral hygiene, healthy food habits and regular Dental visits. Two groups of children were assessed for a period of 15 days.

**The Development of Tool:** A simple, novel, easy to understand and innovative tool i.e. the Happy Tooth Song used for motivation of children. At the end of 15 days the parents were asked to submit filled questionnaires. The questionnaire developed for the purpose of the study consisted of sixteen open and close ended multiple choice questions pre-validated by experts. The first three questions consisted questions pertaining to the tooth song and thus were not included

in the questionnaire provided to group B. Questions 13-15 were based on the feedback of the parents and were to be filled by them. Question 16 involved completion of a task i.e. categorization of food item as healthy and junk by children which was then scored by the parents. The questionnaire was collected by the class teacher on the subsequent day. The response rate of the study was 100 %.A pilot study helped in sample size determination and final designing of questionnaire.

**The survey design:** Questionnaire was designed in both in English and regional language (Tamil) and it included. General information: About their education, socio-economic status, etc.

Patterns of tooth brushing and toothpaste usage among children who were above five years of age and the level of parental knowledge on their children’s’ oral health care were assessed. The selection of the participants for this study was based on the following inclusion criteria:

**Inclusion criteria:**

- a) Agreed to comply with the study visits and procedures of the study.
- b) All children were in good general health
- c) Parents who had one or more children who were above five years of age.
- d) Parents who were able to give written consents.
- e) Parents who were able to understand the purposes, risks and benefits of this study.
- f) Parents who were able to give written consents if needed.
- g) Teeth were in normal healthy condition.
- h) Volunteers willing to participate in the study.

**Exclusion criteria:**

- a) Parents who had one or more children who were above eight years of age.
- b) Children were excluded if they had an underlying systemic condition
- c) Having Enamel defects.
- d) Not using a toothbrush to clean their teeth.
- e) Those with pathological periodontal pockets.

**Results**

Table 1, Graph.1 describes the study population. Of the 50 children who remained available for the analysis, 25 children were in group A and 25 were in group B. 29 boys and 21 girls took part in the study.

**Table-1: Characteristics of the study population**

S. No	Statistics	
1	Number of children	50
2	Age group of the children	5-8 years
3	Number of boys	29
4	Number of girls	21
5	Number of children in analysis	50
6	Number of children in Group A	25
7	Number of children in Group B	25

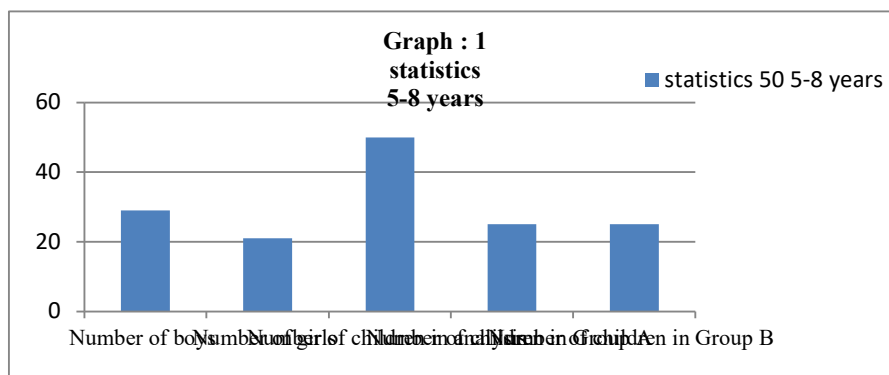
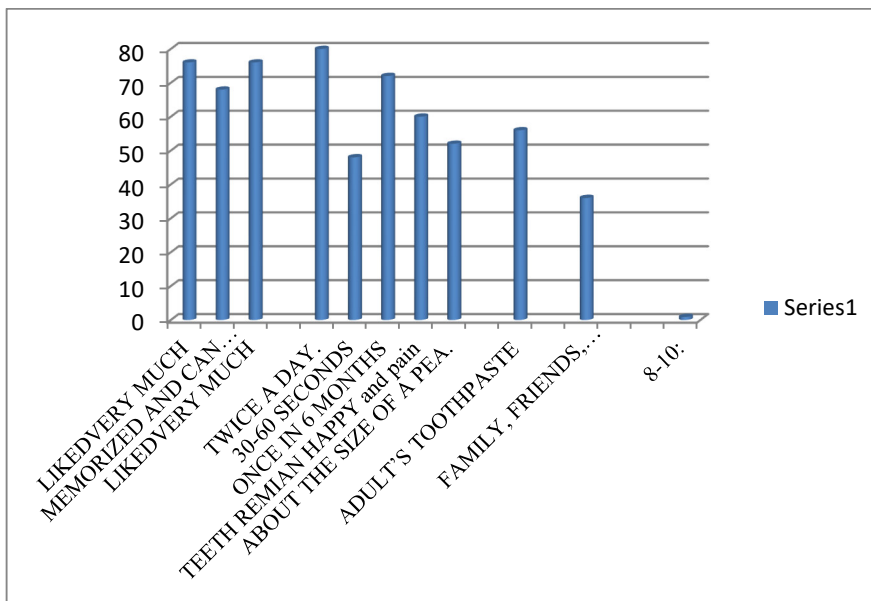


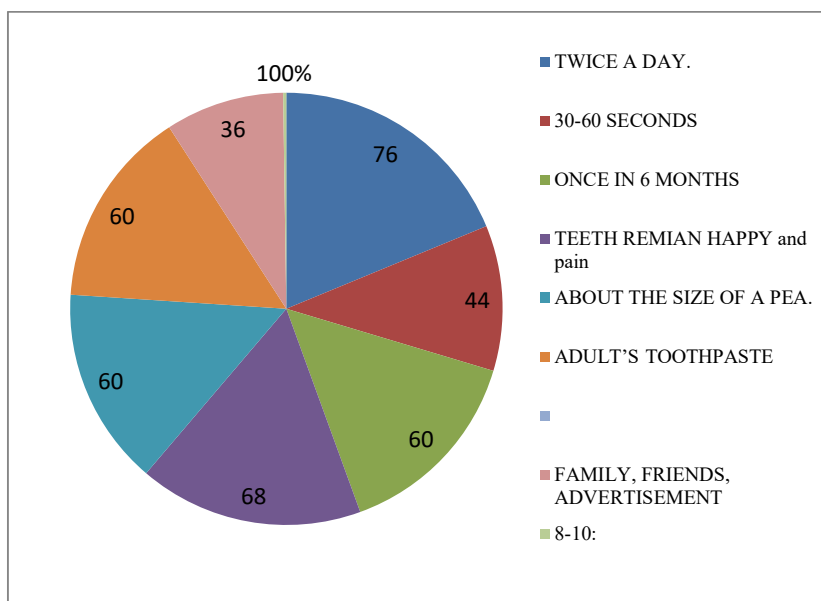
Table 2, Graph.2, 3 concludes the following. In group A, approximately 76 % children showed liking towards the song, 68 % could memorize and reproduce the song. Approximately 76% children were motivated to brush after listening to the tooth song. 80% of children always brushed twice daily in group A as compared to 76% in group B.

**Table 2: Results based on analysis of questionnaires related to both groups**

Sno	Questionnaires	Response Of Group A %	Response Of Group B %	
1	Liking The Song	Likedvery much	76	Not Applicable
		Good/OK	24	
		Not liked	0	
2	Memorizing The Song	Memorized and can reproduce	68	Not Applicable
		Not memorized	32	
3	Motivation to brush After listening to the song	Likedvery much	76	Not Applicable
		Good/Ok	16	
		Poor	8	
		Not liked	0	
4	Frequency of Brushing	Once a day	12	16
		Twice a day	80	76
		Three times/day	8	8
5	Average time taken for brushing	0-30 seconds	20	24
		30-60 seconds	48	44
		60-90 seconds	12	12
		90-120 seconds	12	16
		More	4	4
		I don't know.	4	0
6	Regular dental visit	Once in 3 months	0	8
		Once in 6 months	72	60
		Once in a year	16	12
		Not Sure	12	20
7	Importance of clean teeth	No Pain	12	8
		Teeth Remian Happy	28	24
		Both	60	68
8	Do you brush your teeth immediately after eating the main meal?	Yes	16	8
		No	84	92
9	How much toothpaste do you normally put on your toothbrush?	Full length of bristles	8	12
		Half-Length of bristles	28	20
		About the size of a pea	52	60
		I don't know	12	8
10	Earlier did you know the ideal tooth brushing technique?	Yes	20	28
		No	80	72
11	If yes, did you follow ideal tooth brushing technique?	Yes	16	12
		No	84	88
12	Type of toothpaste used	Children's Toothpaste	40	36
		Adult's toothpaste	56	60
		Herbal Or Other Toothpastes	4	4
13	Main criteria for selection of toothpaste and tooth brush for children by parents	Price	16	20
		Brand	16	16
		Taste	12	8
		Colourful packing	8	8
		Family, friends, advertisement	36	36
		Dentist's advice	12	12
14	Having own family dentist:	Yes	16	24
		NO	84	76
15	How often you change the tooth brush	0-3	76	72
		3-6	8	12
		Not Sure	16	16
16	Knowledge about junk and healthy food	Scores		
		0-3:	0%	0%
		4-7:	19%	0%
		8-10:	81%	100%



Graph 2: Response- A, Percentage %



Graph 3 Response- B, Percentage %

48% children brushed for less than 60 sec in group A as compared to 44% in group B. 72% children answered the Dental visit should be once a year as compared to 60% children in group B.

In group A, approximately the importance of tooth cleaning for both no pain and healthy teeth was answered by 60% children in group A as compared to 68% in group B.

In group A, the amount of toothpaste used was the size of a pea was approximately 52% when compared to 60% in group B.

In group A, type of toothpaste used was adult's toothpaste 56% when compared to 60% in group B.

The main criteria for selection of toothpaste and tooth brush for children by parent's family, friends, advertisement 36% for both the groups

All the children present in group B categorized the junk food and healthy food correctly as 100% compared to children in group A who categorized 8-10 items correctly as 81%.

## Discussion

The best way of motivating schoolers towards good oral health is through the parents. Children's preventive practices tend to be controlled by their parents' knowledge, attitudes and actions. For the implementation of preventive attitudes, knowledge on the existing standards of oral health and existing practices and attitudes of that particular population is essential. Since parents are usually the caretakers of children, it was precisely for this reason that parents of the children were included in this study. Parents of school children are the primary decision makers with regards to their children's health related behaviors and health care, who can shape children's behaviors by means of selectively encouraging and discouraging particular habits [11].

A low level of awareness on oral health among the parents will ultimately reflect on children's oral health.

The use of technology has dramatized health interventions and promotion. Technology has many applications in Dentistry. A study stated the use of YouTube videos for modeling dental procedures for reducing anxiety in children towards dentistry [12].

The oral health tool in the study was designed by the authors specifically for children in order to improve the knowledge and awareness of children and development, evaluation and testing of the tool in a suburban setting where the parents were well accustomed to the use of modern technology that was required to use this tool.

According to the recommendations of European Academy of Paediatric Dentistry (EAPD) [13] and American Academy of Pediatric Dentistry (AAPD) [14], children who are below the age of six should use toothpastes with low fluoride concentrations (less than 500 ppm).

Most of the mothers selected toothpastes which were based on others' likings or suggestions, like those of friends, family members, advertisements, etc. Most advertisements on toothpastes in India show toothbrushes with a full brush heads of toothpastes,

which is against dentists' instructions. [15]. The findings of this study showed that parents lacked knowledge regarding quantity of toothpaste that could be used or they may have been influenced by seeing the advertisements on toothpastes (36%).

Parents included in the present study were unaware regarding timing of brushing of their children's teeth. This was consistent with findings of other studies which were conducted by Nagarajan et al [16].

The reason might be that some children may not tolerate the presence of toothbrushes or toothpastes in their mouth. [13-15].

In the present study, most of the children used adult tooth pastes to brush their children's teeth, pea size tooth paste on toothbrushes which was in agreement with findings of other studies. Studies which were conducted by Nagarajan et al., [16] and Tay et al [18] and showed usage of child toothpastes.

Commonly, it is recommended that tooth brushing should be done twice daily, at least to maintain good oral health and also we should not ignore the fact that effectiveness of tooth brushing is much more important than frequency of tooth brushing. Young children lack complete mastery of the swallowing reflex [19-22] and children under the age of six years may ingest 25-65% of the dentrifice which is placed on the tooth brush [23]. Parents should be educated regarding total fluoride ingestion and its ill effects in children.

The current study focused on the education of parents and children regarding the children's oral health behaviors. The short term behavior change was noticeable and encouraging with respect to the Happy Tooth Song.

However, the tool may prove valuable in the introduction and reinforcement of tooth-brushing behavior on a periodic basis, and help in providing knowledge and its retention.

**Limitations of the study**

- a) The sample was conveniently chosen, and cannot be termed representative.
- b) This study may have limited scope in the current context due to technology being available to few; however, the use of technology has been spreading at an enormous pace which confirms the future acceptability of such a tool.
- c) Study period was too short. Hence, it may be necessary to confirm whether it helps over a period of time.

**Conclusion**

From the study we thus conclude

- a) The Happy tooth song was well accepted by children and it had a positive impact on motivation for tooth brushing.
- b) There was an improvement seen in the frequency and brushing time of children using the Happy Tooth Song.
- c) The Happy tooth song did have a significant role in the knowledge related to healthy Dental behaviors.

**Recommendations:** However we recommend that our findings need to be substantiated through a study using randomized control trial design and for a longer duration with possible addition of qualitative component. It could also be possible to include parameters related to oral hygiene improvement such as plaque index; the ultimate aim being effective plaque control.

A modification of the tool as a single device such as a “powered brush with Happy Tooth Song” (battery operated) can be recommended for the ease of use and acceptability.

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