

Is Tooth Brushing Alone Sufficient? A Clinical Study Evaluating How Oral Hygiene is Improved with the Usage of Oral Rinse and Dental Flossing Along Conventional Tooth Brushing

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ABSTRACT

Aim: To determine whether tooth brushing alone is sufficient or not beside the additional usage of CHX oral rinse and dental flossing to obtain maximum OHI scoring.

Study Design: Descriptive study

Place and Duration of Study: Nishtar Institute of Dentistry, Multan from 1st October 2017 to 31st March 2018.

Methods: A total of 360 patients were included. These patients were divided in three major groups, A, B, and C. Each group was divided into 12 sub groups with each sub group having 10 patients. Complete history was taken of every patient. Group A was directed about the manual tooth brushing technique to continue it for four months. The group B was instructed tooth brushing along the oral rinse chlorhexidine gluconate 0.2% twice daily for four months. The third group C was given the instructions of tooth cleaning with manual tooth brushing, oral rinse and use of dental floss. First follow up was observed after two months and the second was at the end of fourth month. The oral hygiene index (OHI) was measured by Debris index and Calculus Index.

Results: ANOVA shows the $p < 0.05$. Tukey HSD equation gives the value of 0.6884. It connotes that any two means that are more than 0.6884 are significantly different. F statistic obtained is more than 3.46. So the null hypothesis is rejected describing the variance among the groups.

Conclusion: It is evident that all three modes of applications contribute much oral hygiene. The patients in the community should be guided and made aware of all these oral hygiene measures in order to get the optimum results in the good oral hygiene.

Keywords: Chlorhexidine gluconate (CHX), Dental floss, S mutans, Oral hygiene Index (OHI)

INTRODUCTION

Indeed whosoever purifies himself shall achieve success. (Al-A'la 87:14). Of course who obeyed the message of Holy Prophet (ﷺ) performed the prayers and praised the Allah (SWT) is candidate for *Jannah*. Islam emphasize on the cleanliness, both physical and spiritual. It has been an essential part of our faith. Being clean is a guarantee for good health. While we think of our body systems, the nature has created a unique system of cleaning in a beautiful harmony. The oral cavity is part of body that requires special attention to be paid for cleaning and perfectly hygienic. Our beloved Prophet Muhammad had a regular practice of using *miswak* for his blessed teeth before every *salah*.

When the oral cavity is clean, the teeth would have less chances of caries and other associated diseases. In order to improve the oral health status it is necessary that proper oral hygiene methods and measurements should be the primary concern. Brushing the teeth is a common practice to keep the teeth health and clean and it plays an important role in the oral hygiene. No matter what the technique is applied while brushing, a key aspect is to keep the teeth clean and free of caries. Tooth brushing has been an object of research since long. Over the past few decades there has been a dramatic increase in the junk food leading to increased demand for tooth cleaning habits.

It is known that a proper and recommended brushing technique is necessary for cleaning the teeth. Even the patients with regular brushing are usually found querulous lacking oral hygiene maintenance. Most of the people are unaware of the brushing method and they just do this by their own understandings and cacoethes making this practice is dime a dozen. Therefore, the patients and people of community should be advised the technique of tooth brushing that is recommended by the clinician. There are a number of brushing techniques that may be adopted according to the desire and need. These include Bass technique, Charter's technique, vibratory technique, Stallman's technique etc and many more. The objective is to make the teeth and gingiva clean. A good executed technique is beneficial. It helps cleaning all faces of teeth and gingiva. These faces include buccal, lingual, occlusal and the approximal surfaces. All these surfaces are required to be free of plaque and calculus. It is important to remember that there are some areas in the oral cavity which are difficult to clean and are in a difficult approach to the tooth brush. These are the approximal surfaces and also pits and fissures to some extent. Interdental brushes have been specially designed to overcome the problem and cleaning of the approximal parts. Moreover, dental floss has been devised to clean the interdental surfaces. It reduces the plaque and gingivitis or both efficiently more as compared to brushing alone.¹ These floss threads are available in different forms like threaded, untwisted, waxed and non waxed. The purpose is same for all the materials. Various oral rinses have also been formulated to be used in

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conjunction with the brushing. The dental floss and oral rinse are usually not used commonly by the patients but their beneficial effects can't be disregarded. They add much in good oral hygiene. The problem do exists in the malformed and mal aligned teeth where not only a particular tooth brushing technique is required but also the approach of adopting the brush in a gentle manner. For example the patients during orthodontic treatment may require special attention. The Propolis mouth may add beneficial effects in these patients².

The adjunctive therapies in addition to mechanical cleaning like anti plaque agents prevent plaque accumulation³. Clinical significance of essential oil mouth wash (Listerine) has also been reported as a positive adjunct to mechanical cleaning⁴. The dental plaque is bacterial colony. It is considered as major cause of gum inflammation i.e., gingivitis and periodontitis⁵. Therefore, plaque and calculus free teeth may contribute to improved oral hygiene.

MATERIALS AND METHODS

This study was conducted at Nishtar Institute of Dentistry, Multan from 1st October 2017 to 31st March 2018. A total of 360 patients were included. These patients were divided in three major groups, A, B, and C. Each group was divided into 12 sub groups with each sub group having 10 patients. Complete history was taken of every patient. At the beginning, complete scaling and polishing was done in order make a baseline start of the oral hygiene assessment. This procedure was performed in group segments on daily basis. After the completion of scaling and polishing, all the groups were instructed in simple words about the manual tooth brushing technique (Charter's technique) and to continue it for four months. The group B was also instructed tooth brushing along the oral rinse chlorhexidine gluconate 0.2% twice daily for four months. The third group C was given the instructions of tooth cleaning with manual tooth brushing, oral rinse and use of dental floss. All the patients in three groups were given instructions about their respective cleansing mode. These instructions were including the brushing techniques and the use of dental floss. First follow up was after two months and the second was at the end of fourth month. The oral hygiene index (OHI) was measured by Debris index and Calculus Index. The mean of oral hygiene index was taken for each sub group in all three categories. After the expiry of four months the data was tabulated using SPSS 16 giving some interesting values.

RESULTS

The value of q is determined from the Tukey chart. The Df is 35 (within group) with 3 groups of treatments. It finds to be 3.4696 with alpha 0.05 in the Chart. By employing the values in Tukey HSD equation we get the value of 0.6884. It connotes that any two means that are more than 0.6884 are significantly different. F statistic obtained is greater than 3.46. So the null hypothesis is rejected suggesting that one or more treatments are significantly different. Further analysis of Tukey HSD test denotes the difference between the three sets of applications. The group C had the most favorable findings from the get-go.

Table 1: Data obtained statistics

Treatment	Tooth brushing	Tooth brushing with oral rinse (CHX gluconate)	Tooth brushing with oral rinse plus flossing	Grand Total
Number	12	12	12	36
Sum $\sum x_i$	50.7300	44.3400	30.6200	125.6900
Mean \bar{x}	4.2275	3.6950	2.5517	3.4914
Sum of squares $\sum x_i^2$	221.6373	168.4836	81.9014	472.0223
Sample variance s^2	0.6524	0.4225	0.3427	0.9483
Sample dev. S	Std. 0.8077	0.6500	0.5854	0.9738
Std. dev. of mean $SE\bar{x}$	0.2332	0.1876	0.1690	0.1623

Analysis of Variance (ANOVA)

Groups	Sum of squares	Df	Mean square	F statistic	P Value
Between	17.5967	2	8.7984	18.6204	< 0.00001
Within	15.5929	33	0.4725		
Total	33.1896	35			

Tukey HSD

$$3.4696 - 0.4725 \sqrt{12} = 0.6884$$

$$\bar{x}_A - \bar{x}_B = 4.2275 - 3.6950 = 0.5325$$

$$\bar{x}_A - \bar{x}_C = 4.2275 - 2.5517 = 1.6758$$

$$\bar{x}_B - \bar{x}_C = 3.6950 - 2.5517 = 1.1433$$

DISCUSSION

Tooth brushing with proper recommended technique is necessary for the clean oral cavity. This cleaning will be achieved when we employ the brushing in a prescribed way. The brushing of teeth includes cleaning of the teeth, gingiva, palate, tongue and associated soft tissues. All these are needed to be clean through tooth brushing. There are however, some adjunctive have been developed that add much contribution in the cleaning of the teeth. Traditionally, it has been argued that application of the dental floss, certain types of anti plaque agents and the oral rinses are of positive value. It has also been observed that the conventional brushing technique may sometimes not be appropriate for what it is meant for. Sometimes there might be an unambiguous relationship between the brushing and flossing or the use of oral rinse. The patient needs certain awareness about the application of the required techniques that are meant healthy cleaning of teeth. Inter dental areas are usually thought to be difficult to clean by the tooth brushing. This is especially because the approach of the tooth brush sometimes while cleaning is not applied in a correct way by the patient. It needs a little attention by the patient as well as by the dentist to create awareness and make patients learn the proper way of cleaning. The stagnation of food is more in the interdental areas, pits and fissures and certain morphologic variations that make the catch points on the tooth surface. While tooth brushing, every aspect of the tooth surface is considered. Chlorhexidine is considered the most effective in reducing the *S-mutans* as well as plaque.⁶ Other herbal formulations of mouthwashes can also be used effectively as an alternate to chlorhexidine mouth wash⁷.

Chlorhexidine mouth rinse has the anti bacterial effect which can last for three to four hours. The results obtained by Naiktari et al⁸ were statistically significant. Though the contradictory results were observed by Garcia et al⁹

demonstrating that stannous fluoride dentifrices and peroxide gel are superior to the chlorhexidine mouth rinse in reducing the gingivitis. The antibiotic resistance is also a challenge for the prevention of certain diseases. Like its beneficial effects in other systemic diseases, it has also a major role in the oral cavity. Povidone Iodine (PVP-I) at concentration of 0.23% has shown to provide the protection against oropharyngeal infections in patients having high risk to oral and respiratory infections¹⁰. Other side of the coin is the adverse effect of the CHX gluconate is the increase mineral uptake in the biofilm in oral cavity. Thus it leads to the increase calculus formation. It has been observed and proved by the researchers. According to Sakayue et al¹¹ the removal of the biofilm is necessary before CHX use in order to minimize the increase calculus formation as a adverse effect of the chlorhexidine mouthwash.

A considerable amount of the literatures have been published that reflect different author's investigations. Another study revealed anti plaque activity with CHX and herbal mouthwashes.¹²Luisset al¹³ reviewed that even the essential oil mouth rinses are more effective in reducing the inter-proximal plaque. Flossing 2-4 days a week is as beneficial as frequently employed flossing technique. The higher cases of periodontitis are due to old age, smoking and lack of regular dental checkups. In fact the dental floss is of much help in reducing the periodontitis, a preliminary work undertaken by Cepeda et al¹⁴.

The correct tooth cleaning is necessary and the results of certain investigators are in accordance to those engaged by our study. A number of people have the faulty tooth cleaning techniques. Thus it should be emphasized that a proper awareness is mandatory for the good oral hygiene as pointed out by Naseem¹⁵.

A dental floss impregnated with 2% chlorhexidine has more effectiveness in reducing the inter-proximal biofilms as compared to the conventional floss.¹⁶ Tooth brushing is essential for the oral health and thus preventing from caries and gingivitis. It may be recommended twice daily for two minutes regularly. Bain et al¹⁷ argues that both mechanical as well as manual tooth brushes are far better and advantageous.

It has also been known that there are some damaging effects of the tooth brushing. Though it is necessary to clean the teeth but it is not uncommon to observe the damage done to the teeth due to excessive brushing especially in the old age. The abrasive material present in the tooth paste may result in the cervical abrasion and chipping of the enamel. It is therefore necessary that patient should be advised the correct brushing technique and the required frequency. Too much cleaning is harmful for the tooth structure¹⁸.

CONCLUSION

Tooth brushing is considered as an echt and integral part of good oral hygiene. It depends upon the technique of the brushing employed to get the optimum results. Meanwhile, the addition of the chlorhexidine (CHX) gluconate rinse adds much in reducing the plaque. A proper flossing technique also suits much to the patients improving their oral hygiene without a hitch. Thus, it evident from our study that all these three classic paradigms of oral hygiene

improvement contribute bendigedig. Though in our study CHX exhibited remarkable results but it is not the only pebble on the beach. Further investigation with different oral rinses might show different OHI scoring. The patients in the community should be instructed and made aware of all these oral hygiene measures in order to get insouciant results on good oral hygiene.

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