Original Article

Comparing the efficiency of Denture brush and Ordinary brush in complete Denture cleaning

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Abstract

Background & Objective: Denture cleansing is a key element in retaining mucosa free of any inflammation. However, many denture users usually ignore this important factor. This investigation was designed to compare the efficacy of a denture brush and an ordinary brush in cleansing process of complete dentures.

Materials & Methods: A group of 31 individuals aged 44-76 years were included in this study. Each patient was then instructed to use the denture brush for a period of 4 weeks while an ordinary brush was to be used for the following 4 weeks. Dentures were photographed and evaluated at every two week intervals using a computer photographic software assessment method. Pictures were compared using the image tool for plaque remaining on the denture surfaces. Student t-test was used to analyse data collected.

Results: Comparison of the brush type efficacy at 2 and 4 weeks did not show any significant difference ($P>0.05$), however , clinical evaluation indicated that denture brush leaves much less plaque bio-film compare to the ordinary one, with mean plaque traced at 6.88 to 9.24 in 4 weeks.

Conclusion: There were no significant differences found between the two brushes' efficacy, with clinical evaluation significantly in favor of denture brush.

Key Words: Denture, brush, denture hygiene, edentulous, cleansing

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Please cite this article as: Fayaz A, Shakerian M, Ansari GH. Comparing the Efficiency of Denture brush and Ordinary brush in complete Denture cleaning. Novel Biomed 2013;1(2):62-65.

Introduction

Hygiene control in complete denture has long been advocated as a critical element in maintaining the health of mucosal tissues along with the denture surface itself [1-6]. Poor hygiene control in denture has been reported as a major problem in denture wearers which leads to plaque accumulation on denture surface, bacterial and fungal activities, halitosis, denture induced stomatitis and gastrointestinal complications [1, 3, 5, 7].

Usually poor attention to essential regular denture irrigation leads to its poor hygiene; however surface characteristic and physical properties of denture may play an important role in denture hygiene. Reduced personal ability and knowledge to healthy use is key to such problem in denture wearers at their old age [1, 5, 8]. According to one study a positive relationship was observed between poor denture hygiene habits and occurrence of denture-related stomatitis. In that study, 48.4% of participants used toothbrush and toothpaste and 45.2% toothbrush only for cleaning their dentures

[9.] The use of appropriately designed brush is important both in handling and removal of organic and inorganic debris as well as stains from denture surfaces. In addition, only safe chemicals are allowed to be used for denture and underling mucosa while being economic [1, 3, 4].

Chemical methods are relatively effective in denture cleansing with superiority of mechanical effect of brushes use in addition to chemicals [7, 10].

Among the mechanical methods, brushing is believed to be the most effective way of cleaning denture [1, 2, 5, 7, 10.] It is easy, reliable and cheap [7, 11]. However brush cleaning requires a physical ability which is lacking in disabled and elderly. Abrasion effect of brush, is also of concern when applied to denture and reline materials [2, 7], however, the use of brush is still widely considered as the most effective way to clean the denture surfaces. Due to the surface characteristics of denture material including micro pits and microspore areas, microorganisms can easily grow and be trap in such areas making the cleaning process more difficult. In such circumstances the use of chemical cleaners are proved to be useful as they are capable of penetrating into such areas [12]. Regular brushes have limitation to access all corners and pits due to their designs [2].

Interesting denture brushes are designed with special handle for an easy handling by elderly users. In addition, their bristles are designed in shape and diameter capable of reaching deep surfaces. Denture brushes usually have a double head, enabling easier cleaning process. The larger head is designed for large surfaces with curves and the smaller head to remove debris from deep and narrow areas [2]. The aim of this investigation was to compare the efficacy and quality of a denture and an ordinary brush in cleaning denture.

Methods

A group of 31 individuals participated in this investigation from those full denture wearers who received their dentures at Shahid Beheshti and Azad University of Medical Sciences, Dental Schools. Patients were between 44 to 76 years with mean age of 60 years (6 female and 25 male). An informed consent was signed by each individual participant in this investigation. Attempts were made to include only those who have just received their dentures for this study. Patients were checked to have no functional deficiency and problem with their dentures. Dentures were all made of heat cured acrylic resin with acrylic teeth of no defects or fracture nature.

Written and oral instructions for brushing were given to all participants including twice denture brushing per day. This includes brushing after lunch and dinner with a liquid soap for 2 minutes. The use of tooth paste was to be stopped in addition to the use of bleaching materials or any other chemicals. A thorough rinsing was instructed under the tap water and storage in a water container over night. All participants were asked to avoid adding any extra detergent or whitening agents even vinegar to the denture container. Dentures were immersed in 1% neutral red plaque disclosing agent and cleaned using denture brush and liquid soap till they were totally clean besides a brush instruction.

Half of the participants were asked to use the ordinary brush (Pampers, Iran) for the 1st 4 weeks while the others were instructed to use denture brush (Seydou, China) (Figure 1).

Figure 1. **a**- denture brush, **b**- ordinary brush

Disclosing agents were used at the end of 4 weeks and scored; this was followed by an effective cleaning. A digital camera (Canon Power shot Sx 110 Is, Zoom 10×9.0 Mega pixels, Japan) was employed for the purpose of photographic records at each assessment episode. All photographs were taken under a normal

fluorescent light in a 45° Exposure angle to the interior denture surface at 30 cm distance with the same exposure time. Pictures were then imported into a UTHSC San Antonio image tool program, Version 3 (Texas, USA). Total denture surface area was measured in relation to the accumulated plaque surface area in pixel numbers (Figure 2).

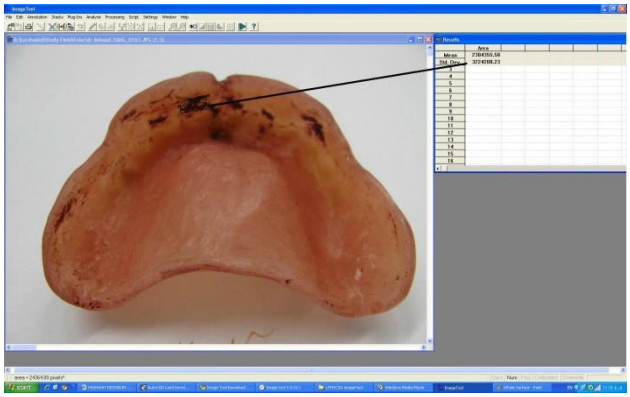

Figure 2. Accumulated plaque surface area in pixel numbers

The sum of the present biofilm surface was calculated in relation to the total denture surface area as index. A paired t-test was employed to analyse the data. Patients were also asked to fill in a questionnaire in relation to their level of satisfaction and preference towards any of the two brushes.

Results

Evaluation of the data showed that the mean plaque index as being at 5.59±4.99 after 2 weeks for denture brush group while this value was at 7.41±7.68 in regular brush group. There was no statistically significant differences (P=0.24) between the level of plaque remaining of two brushes (Table 1).

Table 1. Mean & SD of plaque index for two types of brush after two weeks

Brush type	Mean	SD	SE	P value –pair T test
Denture Brush	5.59	4.99	0.89	0.24
Conventional Brush	7.41	7.68	1.38	

Results also revealed that mean plaque index at 4 weeks as being at 6.88±6.62 for denture brush and 9.24±7.4 for regular brush. Paired t-test did not show any significant differences between two brushes for the remaining biofilm detection (P=0.09). However clinical evaluation showed some degrees of superiority over the denture brush (Table 2).

Table 2. Mean & SD of plaque index for two types of brush after four weeks

Brush type	Mean	SD	SE	P Value – pair T test
Denture Brush	6.88	6.62	1.19	0.09
Conventional Brush	9.24	7. 4	1.33	

Discussion

Poor denture hygiene is usually related to the lack of cleaning, denture material as well as lowered ability of care in elderly individuals [1, 5, 8]. Brushing denture is proved to be an easy and effective tool to achieve reasonable cleaning. A remaining concern has been also raised over the potential damage to denture by brush [1, 2, 9].

Several earlier studies indicated that chemical cleaning agents alone are not capable of total cleaning denture prosthesis and additional brushing has a great influence to improve the result [7, 9]. The use of regular brushes has also been advocated as insufficient due to poor ability to reach narrow areas [2].

The particular design and shape characteristic of denture brushes makes them more specific and more effective. These include their specially designed handle and a double headed bristle with a larger and a small head for better access to all corners of denture [6]. Lack of information on health products and poor marketing makes these brushes unfamiliar and unknown along with little knowledge of edentulous patients themselves.

Biofilm deposits are formed similarly over the internal and external surfaces of upper complete dentures [13]. Assessments made on the interior surfaces of upper dentures in the current investigation in order to allow an appropriate measurement on the most usual site for plaque accumulation and subsequent effective cleansing [2, 7, 14]. Liquid soap was used to avoid abrasiveness. According to Salles [3] and Androeciai [4], a

45° angle photography was used to see undercuts which are unclear in 90° exposures. Silva [15] stated that 1% neutral red plaque disclosing agent are used due to the easy cleaning potential, disclosing ability and absence of antimicrobial effect, as was the case in this current investigation.

To follow ethical conditions no wash out period was assigned between the two periods of brushing with 4 weeks period as being optimum to assess cleaning effect. The mean plaque remaining was 5.59% in denture brush and 7.41% in regular brush at the interior denture surface after two weeks with no significant difference between groups. Mean plaque remaining on upper denture surfaces was 6.88% when denture brush was used while this figure was at 9.24% when regular brush was employed. Silva et al [2] stated that the use of denture brush has a significantly higher plaque removal effect when compared to ordinary brushes. Variety in denture brush designs or in number of samples may also contribute to the differences in the outcome of such investigations.

Conclusion

1- Denture brushes are seen to be able to create a cleaner denture surface

2- No significant differences are found between microfilm plaques remaining on denture surface after using the two brushes (P>0.05).

Acknowledgements

This manuscript is based on a thesis submitted in partial fulfillment of the requirements for the degree of DDS in Shahid Beheshti University of Medical Sciences, Tehran, Iran and was granted by the Iran Center for Dental Research, Shahid Beheshti University of Medical Sciences Tehran, Iran.

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