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Assessing tongue cleaning efficiency of tongue scraper, tooth brush, back side of tooth brush head and neem stick

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Abstract

This study is to evaluate and compare tongue-cleaning efficiency of Tongue scraper, tooth brush, back side of toothbrush head and Neem stick. This study was carried out between January 2020 to March 2020. A total of 210 subjects (Para medical students) of the Government Medical College, Jammu were considered and invited for the study and screened with proper inclusion and exclusion criteria. A total of 120 subjects fulfilled the study criteria were randomly allocated to different tongue cleaning material groups. The results showed that the tongue cleaning efficiency was most in Tongue scraper group followed by Toothbrush group, Neem stick group and least was in Back side of toothbrush group. The cleaning efficiency of tongue scraper was the best followed by toothbrush then Neem stick and least in back side of toothbrush group. Clinical research is necessary to determine the optimum number of times per day for tongue cleaning.

Keywords: toothbrush, neem, tongue, malodor

Introduction

Mouth is the most important gateway to the body and should be the first part of the body one tends to every morning. Oral malodor, a large-scale social problem, can be caused by a number of etiologic factors both intraoral (Periodontal disease, chronic sinusitis etc.) and extra oral Reflex Oesophagitis, Diabetes mellitus, Liver insufficiency etc) [1]. The principal component of oral malodor are volatile sulphur compounds especially Hydrogen sulphide, Methyl mercaptan and Dimethyl sulphide [2].

These compounds results from the proteolytic degradation by predominantly anaerobic gram negative oral microbes on various sulphur containing substrates found in the mouth such as food debris, saliva, blood and epithelial cells. Studies have shown in approximately 80 to 90% of cases of bad breath originates with oral cavity especially from coating on dorsal surface (rear) of the tongue. The degree of tongue coating also plays a significant role in breath odor formation [3].

To prevent putrefaction on the dorsum of the tongue, tongue cleaning has been advocated to reduce the amount of coating and bacterial load. However, there is equivocal evidence linking tongue cleaning and subsequent reduction in bacterial load on its surface [1, 2]. Tongue scraper and toothbrush are some of the commonly used tongue cleaners worldwide. Recently the backside of toothbrush head has been specially modified to aid in tongue cleaning. In India, people from ancient times are using datun (neem stick) for cleaning of teeth, which is as well used for tongue cleaning. Hence, the present study intended to assess and compare the tongue cleaning efficiency of commonly used tongue-cleaning devices.

Methodology

This study was carried out between January 2020 to March 2020. A total of 210 subjects (Para medical students) of the Government Medical College Jammu (GMC) were considered and invited for the study and screened with the following criteria.

Inclusion Criteria

Subjects with good general and oral health between 18 to 23 years of age group.
Subjects with at least 24 intact teeth.

Exclusion Criteria

This study exclude patients with any systemic disease, any tongue abnormality, uses of antibiotics or antibiotic mouth wash with in at least 3 months, any fixed and removable denture, periodontitis, frank carious cavities, any orthodontic appliances, any oral mucosal lesion, smoking habit.

A total of 120 subjects with 67 males and 53 females fulfilling the study criteria were randomly allocated to different tongue cleaning material groups. All the subjects were explained about the study purpose and procedure and written consent was obtained. Ethical clearance was obtained from the institutional ethical committee of Government Medical College, Jammu (J&K).

The Four different tongue cleaning material groups were:

- Tongue scraper (TS) group
- Tooth brush (TB) group
- Back side of the tooth brush head (BTB) group
- Neem stick (NS) group

Lee Tongue Coating (LTC) index introduced by the SAN. S. LEE in (2007) was used to assess the degree of tongue coating [3].

This index divides the tongue into different parts (2,4,6 parts) and sequentially designated as- LTC₂, LTC₄ and LTC₆. To check the efficiency of tongue cleaning for this study we used LTC₄. This index records tongue coating in two segments and extent of tongue coating recorded.

- First it records the presence or absence of tongue coating.
- Second it records the thickness of the coating on different parts of the tongue.

The Index measures according to the given scores

Scoring criteria of each zone	Score for the primary coating	Thickness of the coating
No tongue coating visible	0	0
Less than 1/3 tongue coating in each zone	1	1
More than 1/3 but less than 2/3 of tongue coating in each zone	2	2
More than 2/3 tongue coating in each zone	3	3

Single examiner, who was trained and calibrated, conducted the study. The kappa value for the intra examiner reproducibility was 0.80.

On the first day of the study all the subjects were brought to the base line by supervised cleaning of the tongue then Lee tongue coating index was recorded. Subjects were asked to come after 7 days (wash out period) and advised usual oral hygiene practices at home including tongue cleaning. They were instructed not to clean the tongue the day before the appointment. Each group was recalled on a separate day to ensure each group should not know what cleaning materials the other groups were using. On the day of appointment subjects were given their allocated material to clean the tongue under supervision with 10 vertical strokes on the each half of the tongue. The tongue coating was recorded pre and post tongue cleaning with the help of index.

Statistical Analysis

Statistical analysis was done using SPSS software version

12.0. T- Test was used to determine the significant difference between the means of following groups and to compare the efficiency of different material of tongue cleaning, ANOVA test was applied.

Results

A total of 120 subjects, 67 males and 53 females participated in the study. Subjects were randomly allocated equally into 4 different material groups and the efficiency of each group was assessed and intergroup comparison was done. Table 1 showed that the Tongue scraper was the most efficient means of tongue cleaning as compared to back side of toothbrush head, neemstick and toothbrush. The pre score in the tongue scraper was 13.00 and post score was 4.00. The pre score in the back side toothbrush head was 13.43 and post score was 8.30. The pre score in the neem stick was 16.27 and post score was 6.23. The pre score in the toothbrush was 8.40 and post score was 5.87. P value was found to be highly significant (0.001)

Table 1: Distribution of subjects in each material group with pre and post tongue cleaning efficiency

Tongue cleaning method	Pre score			Post score		
	N	Mean	SD	N	Mean	SD
Tongue scrapper group	30	13.00	3.27	30	4.00	1.29
Back side of tooth brush head group	30	13.43	3.36	30	8.30	1.76
Neem stick group	30	16.27	2.08	30	6.23	1.74
Tooth brush group	30	18.40	3.38	30	5.87	2.22
Total	120	15.28	3.75	120	6.10	2.33
p-value	<0.001*					

Table 2: In between comparisons of the post scores among all the groups

Post score	Tongue cleaning method				
	Tongue cleaning method	Tongue cleaner group	Back side of tooth brush head	Neem stick	Tooth brush
	Tongue scrapper	-	0.000	0.000	0.001
	Back side of tooth brush head	-	-	0.000	0.000
	Neem stick	-	-	-	0.856*
	Tooth brush	-	-	-	-

Discussion

Bad breath/ halitosis may be a result of a specific spectrum of bacteria, poor oral hygiene, or by some underlying systemic diseases. Debris collected on the dorsal surface of the tongue is putrefied and contributes to physiological halitosis. Although it is difficult to prove from a scientific orientation, it has been considered that the many pathogenic organisms on the tongue can contribute significantly to oral health problems (like dental caries and periodontal disease etc ^[5]).

Oral malodor can be controlled by properly cleaning the tongue with different materials. There is various tongue cleaning materials available in the market. To choose between them of which is sufficient and acceptable is a difficult job.¹ Their effectiveness varies widely depending on the shape, dimensions, configuration and quality of the contact surfaces and materials used.

Tongue scraping and brushing have been practiced for centuries in Europe, Africa, India, and South America. Recently, tongue cleaning has received more attention because of the development of so called “bad breath” or “clean breath” clinics, which emphasize the various reasons why people have oral malodor and the ways to prevent this disagreeable phenomenon ^[5].

Recently, tongue cleaning has received more attention because of the development of so called “bad breath” or “clean breath” clinics, which emphasize the various reasons why people have oral malodor and the ways to prevent this disagreeable phenomenon ^[5]. Hence, this study has been taken to assess the tongue cleaning efficiency of different commonly used tongue cleaning materials. The results showed that the tongue cleaning efficiency was most in Tongue scraper group followed by Toothbrush group, Neem stick group and least was in Back side of toothbrush group. Inter group comparison showed that there was no significant difference between the post scores of Toothbrush group and Neem stick group. This finding is in accordance with M.V. Menon *et al.* ^[4] The lower efficiency of the toothbrush in this study might be explained by the fact that the width of the toothbrush was slightly smaller than the width of the tongue scraper, or the toothbrush simply might be less effective in removing loosened debris from the tongue ^[2]. The use of the tongue cleaner is recommended before eating, and not after. This prevents the toxic build-up on the tongue from getting swallowed along with food and liquids ^[5].

Conclusion

All the materials used in this study to clean the tongue were removing the tongue coating significantly and so helpful in reducing oral malodor. The cleaning efficiency of tongue scraper was the best followed by toothbrush then Neem stick and least in back side of toothbrush group. Clinical research is necessary to determine the optimum number of times per day for tongue cleaning.

Suggestions/ Recommendations

People with halitosis should be advised to repeat the tongue-cleaning procedure several times during the day. Dentists should consider patients’ oral characteristics and needs when advising them about tongue cleaning frequency.

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