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A CLINICAL STUDY TO EVALUATE THE EFFECTIVENESS OF INSTRUCTIONS AND DEMONSTRATION OF CORRECT TOOTH BRUSHING TECHNIQUE AFTER ORAL PROPHYLACTIC PROCEDURES

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ABSTRACT:

Introduction: An oral prophylaxis procedure is performed for each patient suffering from periodontitis. Complete oral health can only be achieved for a periodontitis patient after proper plaque control measures and maintenance. Dental plaque is the prime factor in causation of caries & periodontal diseases. Dental plaque can be defined as the soft deposits that form the biofilm adhering to the tooth surface or other hard surfaces in the oral cavity including removable & fixed restorations. Modified bass technique is a routinely prescribed tooth brushing technique. However, the effectiveness of the instruction and demonstration of this technique and patient acceptance is not routinely evaluated. This study aims at judging the effectiveness of oral hygiene instructions after oral prophylaxis procedures.

Materials and Methods: The study was carried out on patients from outpatient department of Periodontics, Nair Hospital Dental college. Informed written consent was obtained from patients prior to the commencement of study. A total of 960 patients comprising of 640 males and 320 females were included in the study. Patients were evaluated using a disclosing agent (Erythrosine) and scores for the plaque index (Turesky, Gillmore and Glickman modification of Quiegly and Hein) were recorded. A comparison was made about the effectiveness of the patient's own brushing technique against the modified bass technique after proper oral hygiene maintenance instructions. The study also made a note of what all areas of the oral cavity are skipped by the patient while performing toothbrushing using modified bass technique. The data obtained was subjected to statistical evaluation to come to a conclusion.

Results: The comparison of mean plaque index scores revealed there the difference in plaque index scores was statistically significant ($p=0.0147$) where $p<0.05$. From the statistical data it was clear that there was a definite decrease in plaque index scores after following the instructions & demonstration of modified bass technique & appropriate interdental cleansing aids by the patients.

Conclusion: The technique of tooth brushing was compared with the presence of extent of plaque and it was found that there is a positive correlation between brushing technique & plaque scores. Modified bass technique is found to be effective in reducing plaque scores by 44 %. However, the mandibular posterior lingual areas were skipped by the patients even after utilizing the modified bass technique in 36% of patients . Female patients were found to be more competent in following the oral hygiene instructions.

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Keywords: Chronic periodontitis, Oral hygiene maintenance, Plaque control, Tooth brushing technique.

INTRODUCTION:

Periodontal disease is a dental plaque-induced disease affecting the supporting tissue of the tooth (periodontium). [1] It ranges from mild reversible form (gingivitis) to a more severe and irreversible form (periodontitis). Oral prophylactic procedures are performed for each patient suffering from periodontitis. Complete oral health can only be achieved for a periodontitis patient after proper plaque control measures and maintenance. The bacterial biofilm consists of an organized community of bacterial cells incorporated in a polymeric matrix produced by bacteria adhering to a living or inert surface. [2]

Dental plaque or Biofilm formation is colonization of tooth surfaces by bacteria which is recognized as the key etiologic factor in dental caries, gingivitis and periodontitis. This explains why combinations of different nonspecific plaque control programs have been so effective in the control of these diseases [3] [4]

Plaque formation:

- Within 2 hours, initial plaque formation begins as a series of isolated bacterial colonies confined to tooth surface irregularities
- In about 2 days, the plaque double in mass and bacterial colonies coalesce
- In the first 4-5 days of plaque formation, the number of bacteria increase significantly
- After approximately 21 days, bacterial replication slows so that plaque accumulation becomes relatively stable. Bacteria in the deeper portion of the developing plaque are either facultative or obligate anaerobes

It has been demonstrated that subjects with healthy gingiva developed clinical signs of gingivitis within two to three weeks of refraining from all oral hygiene practices due to undisturbed accumulation of dental plaque. [5] On resumption of adequate oral hygiene, the gingival tissue inflammation subsided within a week. It has been established that an initial gingival lesion develops within about four days of undisturbed plaque growth [6], and subclinical signs of gingival inflammation appear in the form of an exudate from the gingival sulcus. [7]

The great majority of early colonizers consist of streptococci, representing between 47% and 85% of cultivable species found during the first four hours after professional teeth cleaning. [8] Most of early colonizers recognize the components of the acquired pellicle, a thin layer that coats the freshly

cleaned dental surface and consists mainly of glycoproteins, mucins and salivary enzymes. Within 12 hours after teeth are cleaned, the microbial population diversifies and includes *Actinomyces, Capnocytophagae, Haemophili, Prevotellae, Propionibacteria* and *Veillonellae*. [9]

Aims and objectives:

1. To evaluate the effectiveness of instructions and demonstration of correct tooth brushing technique after oral prophylactic procedures.

2. To make a note of what all areas of the oral cavity are skipped by the patient while performing toothbrushing using modified bass technique.

MATERIAL AND METHODS:

Patients for this study were selected from the outpatient Department of Periodontics, Nair Hospital Dental College, whose written informed consent was taken prior to the study.

Inclusion criteria:

Patients were selected using the following selection criteria:

1) Any patient above the age of 18 years
2) Male or Female
3) Patients with periodontal pocket depth less than or equal to 5mm

Exclusion criteria:

1) Smokers.

Experiment Design: A total of 960 patients comprising of 640 males and 320 females were included in the study. Patients were selected using above criteria. They were subjected to treatment of thorough scaling and root planning procedure. After oral prophylactic procedures, the patients were instructed to continue with oral hygiene measures. After 5 days, Patients were evaluated using a disclosing agent (Erythrosine) and scores for the plaque index (Turesky, Gillmore and Glickman modification of Quiegly and Hein) [10] were recorded. At this appointment, the patients were provided with details of instructions for oral hygiene measures using modified bass technique supplemented with appropriate interdental cleansing aids like dental floss, interdental proxa brushes and unitufted brushes as per requirements. After 10 days, Patients were again evaluated using a disclosing agent (Erythrosine) and scores for the plaque index (Turesky, Gillmore and Glickman modification of Quiegly and Hein) were recorded. A comparison was made about the effectiveness of the patient's own brushing technique (after 5 days) against the modified bass technique after proper oral hygiene maintenance instructions (after 10 days). During the study period of 10 days, all the patients were restricted from using any chemical plaque control measures. The study also made a note of what all areas of the oral cavity are skipped by the patients while performing toothbrushing using modified bass technique. The data obtained was subjected to statistical evaluation to come to a conclusion.

RESULTS:

Plaque index scores at 5 days and at 10 days were recorded for each patient. The data so obtained was subjected to

statistical analysis using paired t test. The mean plaque index score before Instructions was 3.5 whereas the mean plaque index score after Instructions was 1.3. The comparison of mean plaque index scores revealed there the difference in plaque index scores was statistically significant ($p=0.0147$) where $p<0.05$.

DISCUSSION:

The statistical data states that there is a definite decrease in plaque index scores of patients after following the instructions & demonstration of modified bass technique supplemented with appropriate interdental cleansing aids. Dental plaque formation is a continuous process and once formed it is not removed by autocleaning or during rinsing of the oral cavity. Its deposition begins soon after finishing hygienic procedures of the oral cavity. Plaque Control is mandatory for the maintenance of oral health and to prevent of dental caries, gingivitis and periodontitis. However, oral biofilms are not easily controlled by mechanical means and represent difficult targets for chemical control. [11] Hence, repeated and regular plaque control measures should be inculcated in patient's routine habits.

As a part of oral hygiene remedy tooth brushing provides good plaque removal, but it also causes harm to hard and soft tissues if not utilised precisely. The patient should be cautioned about damage that may be caused by vigorously scrubbing the teeth with any toothbrush. Over time this may cause abrasion of the cervical tooth structure and exposure of the root surface inviting dental sensitivity and eventually dental caries. Gingival recession could be a possibility due to improper brushing but still inconclusive as per research studies. [12]

With the Bass method of tooth brushing, the head of a soft-to-medium toothbrush is placed with the occlusal plane with the "tip" of the brush distal to the last molar. The bristles are placed at the gingival margin with an apical angle of 45° to the long axis of the teeth. A gentle vibratory motion is then exerted in the long axis of the bristles and the bristles are forced into the gingival sulcus as well as into the interproximal embrasures. This action should produce perceptible blanching of the gingiva. The brush is activated with a short back-and – forth motion without dislodging the tips of the bristles, completing 20 such strokes in the same position. Lift the brush, move it anteriorly and the repeat the process. For the palatal aspect of the maxillary anteriors and the lingual of the mandibular anteriors, the toothbrush is held in a vertical position. This technique may be used on the buccal, facial, palatal and lingual surfaces of all the teeth. [13] With the modified Bass technique, an additional step is included. Following the vibratory motion, the bristles are swept towards the occlusal surface of the tooth, cleaning the remaining facial or lingual surface.

Modified Bass technique is a sulcular technique which cleanses all the plaque in proximity to the gingiva to avoid

gingivitis. But if the technique is not properly followed, it may lead to incomplete removal of plaque. The present study noticed that at least 36% of patients skipped the mandibular lingual posterior areas while performing the modified bass technique. All these patients were instructed to emphasize on the skipped areas. Interdental cleansing aids like dental floss when used regularly and correctly along with toothbrushing reduces gingivitis compared to toothbrushing alone. [14] Patients unable to use tooth brushing techniques properly due to physical or mental disability may use powered toothbrushes. Powered toothbrushes also achieve a modest reduction in plaque and gingivitis compared to manual toothbrushing. [15] Although recent research shows powered toothbrushes can be comparably good over manual tooth brushing but are not cost effective. [16]

There are several factors which influence plaque build-up and help in further plaque retention. Dental plaque is difficult to substantiate to cause inflammation if it is regularly disturbed. Perhaps, this will reduce plaque mineralization and stop formation of dental calculus. Dental calculus provides irregular surface where plaque is easily formed. Hence, intermittent professional oral prophylactic procedures are equally important as related to plaque control. Refined and sticky diet will cause more retention of plaque. Intermittent fibrous food helps in cleansing the oral cavity. Overhangs of restorations are often located on the proximal surfaces of teeth, and mostly subgingivally. Several studies have shown a close relationship between the size of restoration overhangs and local loss of periodontal support as a result of plaque retention [3]. To prevent and control periodontitis through mechanical gingival plaque control, it is imperative that subgingival proximal restorations be optimally finished and repeatedly polished. Carious teeth, deep pits and fissures, enamel roughness and cracks, all can be corrected to reduce plaque retention. Root surface grooves like palatogingival grooves cause plaque retention. These can be corrected by reflecting a periodontal flap with the concerned tooth (maxillary lateral incisors commonly involved) and eliminating the groove by restorative materials like Mineral Trioxide Aggregate or Biodentine™ and platelet-rich fibrin membrane. [17] [18] Furcation involvements make a challenge for plaque removal procedures and persistently retain plaque forming dental calculus. Furcation involvements can be corrected by performing regenerative bone grafting procedures. The combination of barrier membranes and grafting materials may result in histological evidence of periodontal regeneration, predominantly bone repair. [19] [20] If furcation defect is not maintainable even after therapy, furcation elimination by performing bicuspidisation can be done to achieve plaque maintenance in the area.

CONCLUSION:

Plaque control measure for oral hygiene maintenance remains the

primary and essential goal to help patients to achieve a disease free healthy oral environment. Inspite of successful and promising treatment modalities rendered to the patients, the mere treatment won't suffice the needful and complete oral health can only be achieved after proper plaque control measures and maintainance. Modified bass technique is found to be effective in reducing plaque scores by 44 %. However, the mandibular posterior lingual areas were skipped by 36% of patients even after utilizing the modified bass technique. Female patients were found to be more competent in following the oral hygiene instructions.

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FIGURES:

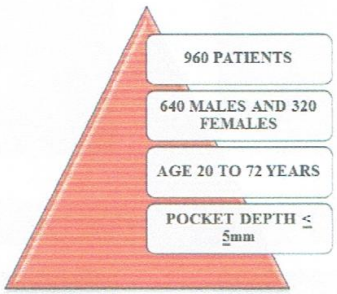


Figure 1 Description of sample included in the study

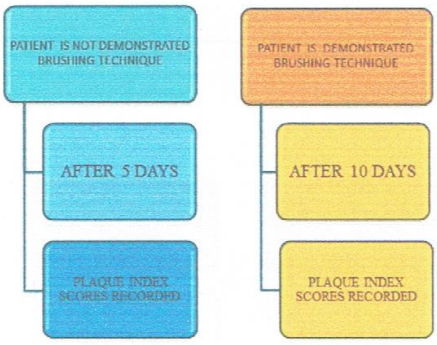


Figure 2 Experiment design

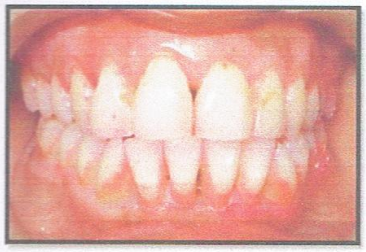


Figure 3 Frontal view of patient after disclosing plaque after 5 days (Female representative case)

Figure 4 Frontal view of patient after disclosing plaque after 5 days (Female Representative case)

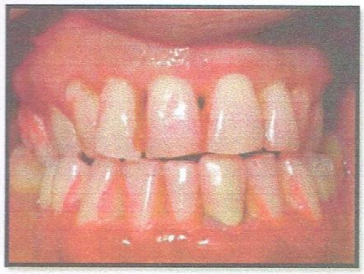


Figure 5 Frontal view of patient after disclosing plaque after 10 days (Male representative case)

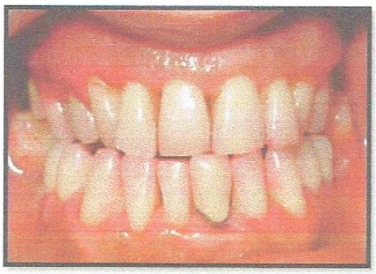
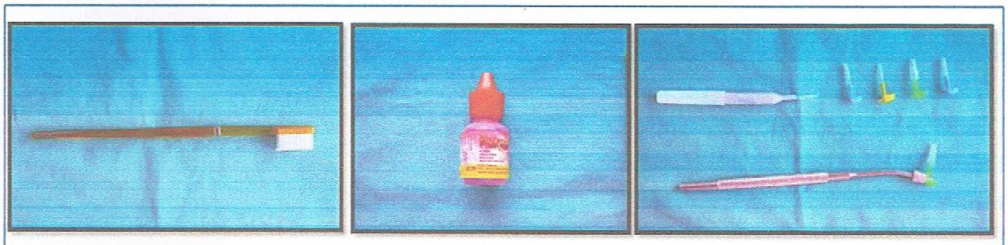


Figure 6 Frontal view of patient after disclosing plaque after 10 days (Male Representative case)

Figure 7 Mean plaque index scores at 5 days and 10 days



TOOTHBRUSH DISCLOSING AGENT INTERDENTAL BRUSHES

DENTAL MODEL DENTAL FLOSS

Figure 8 Armamentarium used in the study