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RESEARCH ARTICLE

COMPARISON OF ALCOHOLIC AND NON-ALCOHOLIC ORAL RINSE DURING FIXED APPLIANCE THERAPY

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ABSTRACT

Gingival inflammation is often associated with the use of fixed orthodontic appliances which leads to elevated gingival inflammation level during orthodontic treatment. Aims and objectives of this study was to compare and evaluate the efficacy of two mouthwashes in reducing the bacterial activity. Non-alcoholic mouthwash (Colgate Plax Complete Care) and Alcoholic (Original Listerine) were tested in our study. Oral hygiene were evaluated using Loe and Silness gingival index, Silness and Loe plaque index and Muhlemann and Son sulcular bleeding index. Quantification of Streptococcus mutans from the saliva sample was taken from the orthodontic patients undergoing fixed orthodontic appliance. The study outcome indicated that Non-alcoholic mouthwash showed maximum efficacy in bringing about a reduction in bacterial activity.

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INTRODUCTION

Patients who undergo fixed mechanotherapy have oral ecological changes such as Increased retentive sites for food particles, low pH environment, colonization of bacteria and increased plaque accumulation on brackets and resins This has been shown to occur even in subjects practicing good oral hygiene The junction between enamel and resin can be a potential site for enamel demineralization because of the increased formation of plaque (Keijsers, 2003). Gingival inflammation is often associated with the use of orthodontic appliances, which leads to elevated infection level during active orthodontic treatment. Mouthwashes are an antiseptic solution intended to reduce the microbial load in the oral cavity. There has been concern that the use of alcohol-containing mouthwash such as Listerine may increase the risk of developing oral cancer. As of now there is no evidence to support a connection between oral cancer and alcohol-containing mouthrinse (Brecx, 2005). In this study an Alcoholic mouthwash and a Non-Alcoholic mouthwash were tested for their antibacterial efficiency during orthodontic treatment. Original Listerine was the Alcoholic mouth wash and Colgate Plax Complete Care was the Non-

Alcoholic mouth wash which were tested. Chlorhexidine, which is a proven antiplaque and antibacterial mouthwash was not selected for this study due to its disadvantages such as side effects Staining, Taste Disturbances, Desquamation, Soreness and Increased Calculus Formation (Keijsers, 2003; Quirynen, 2001; Bishara, 1998). Oral hygiene were evaluated using the Loe & Silness gingival index, Silness and Loe plaque index, Muhlemann & Son sulcular bleeding index and quantification of Streptococcus mutans from the saliva sample taken from the orthodontic patients undergoing fixed orthodontic appliance.

MATERIALS AND METHODS

Twenty four healthy orthodontic subjects were screened and included in the study. The study were assigned to 2 groups, each of which consisted of 12 subjects. Subjects were patients under active orthodontic treatment at the Department of Orthodontics.

The inclusion criteria of patient selection includes:

- 20 permanent teeth that were either banded or bonded.
- The subjects were free of oral and systemic diseases.
- Had periodontal pockets not greater than 5mm.

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- Had not been on a regimen of antibiotic therapy for at least 3 months before the commencement of the study.

The exclusion criteria of patient selection includes:

- Missing Permanent teeth
- Proneness to dental diseases such as gingival recession, periodontal disease, dental caries and bone loss.
- Temporomandibular Disorders.
- Psychological Disturbances.

The subjects were willing to use the tooth paste, the oral rinses provided by us & agreed to follow the oral hygiene programme prescribed for them.

Mouthwashes used were:

- Colgate Complete Plax Care – Non Alcoholic
- Original Listerine – Alcoholic

The Composition of the mouth rinse are

Colgate plax complete care (non-alcoholic)

Water - Solvent
 Glycerin – Sweet Taste
 Propylene Glycol – Faint sweet taste, Miscible to solvent
 Sorbitol - Sweetener
 Poloxamer 407 – Dissolvant
 Flavor
 Cetylpyridinium Chloride - Antiseptic
 Pottasium Sorbate - Preservative
 Sodium Fluoride - Anticariogenic
 Sodium Saccharine - Sweetener
 Menthol – Local anaesthetic, Counter irritant
 Contain 225 ppm of available Fluoride - Anticariogenic

Dose: Rinse 10 ml solution twice daily

Original Listerine (Alcoholic):

Purified Water - Solvent
 Alcohol - Antiseptic
 Benzoic Acid – Aroma, Preservative
 Poloxamer 407 - Dissolvant
 Eucalyptol – Flavour and Aroma
 Methyl Salicylate - Antiseptic
 Thymol – Antiseptic and Flavour
 Sodium Benzoate - Preservative
 Menthol – Local Anaesthetic and Counter irritant
 Caramel - Flavour

Dose: Rinse 10 ml solution twice daily

Plaque index⁴ was scored based on the criteria put forward by Silness P & Loe H in 1964. The thickness of the plaque at the gingival area of the distofacial, facial, mesiofacial & lingual surfaces of the index teeth are considered. The index teeth are dried and the probe is passed through the cervical third and entrance of the sulcus.

Gingival index⁴ was scored based on the criteria put forward by Loe H & Silness J in 1963, the index teeth selected were

16,12,24,36,32,44. The surfaces considered were Distal facial papillae, Facial margin, Mesial facial papillae and Entire lingual gingival margin. Totaling all scores per tooth and dividing by the number of teeth examined gives the gingival score per person.

Sulcular bleeding index⁵ was scored according to the criteria developed by Muhlemann H.R. and Son S in 1971 for the assessment of gingival bleeding. Gingival bleeding on probing gingival contour & gingival color changes were evaluated. The microbial samples were obtained after the subjects had chewed a piece of paraffin wax for one minute to stimulate the salivary flow. After collection of each sample 1 ml of saliva was transferred to a screw tube that contained 4ml of reduced transport media.

The transport media was carried in a carbon dioxide rich candle jar. In the laboratory, the sample was vortexed for one minute to disperse the bacteria and serially diluted. For determination of the number of *S.mutans* a selective medium consisted of Mitis salivarius agar which consisted of 20% sucrose and was supplemented with 0.2 micro gram/ ml bacitracin was used⁷. For the determination of the total number of aerobic bacteria, a nonselective media containing 10% sheep blood agar was used. Both plates were incubated at carbon dioxide rich environment for 24-48 hours. A loopful of diluted saliva was transferred to the Mitis salivarius sucrose bacitracin agar media using a standard calibrated loop (26 SWG, 4mm diameter which can hold 0.01 ml of the sample). The plates were streaked in 4 quadrants without heating in to facilitate a rough quantification as 1+,2+,3+&4+, according to Wadsworth lab manual. The plates that had from 20-100 colony forming units were counted at a magnification of x 20. Only those colonies with morphologic characteristics of *S.mutans* were counted. *Streptococcus mutans* appeared as small or minute blue colonies. The total salivary CFU obtained from the blood agar plates were used in the denominator to determine the percentage of *S.mutans* colonies.

Colonies were calculated as:
$$\frac{S.mutans\ CFU \times 100}{Total\ salivary\ CFU}$$

RESULTS

Gingival index: On the day one Gingival index of all two groups were not showing significant difference. But after 15th, 30th and 45th days, group one did not show any significant decrease in Gingival index when compared to the other groups of which group two showed marked decrease in GI.

Plaque index (PI): When Plaque Index was taken in to consideration, on day one there was not much significant difference whereas on 15th day onwards it was observed that group two showed a decrease of about half of the mean plaque index of the first day and as the study progressed there was not much decrease in the PI of group two whereas group three and four showed only minimal decrease in PI at the end of the study when compared to group two.

Sulcular Bleeding index (SBI): Throughout the study there was no change in the sulcular bleeding index in all the groups other than the group two showed a slight reduction from the 30th day onwards.

Quantification of Streptococcus mutans: From the first day to the last day of the study none of the groups showed a significant reduction although groups two and three showed a comparatively lesser number of S.mutans in them.

Conclusion

The study outcome indicates that Colgate Plax Complete Care mouth wash showed maximum efficacy in bringing about a reduction in bacterial activity. We orthodontists must reinforce and motivate oral hygiene procedures for the better treatment outcome.

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