A STUDY OF PROPORTION OF MICROFLORA IN AN ORTHODONTIC CLINIC

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Abstract
Oral hygiene is a significant factor when one considers delivering good orthodontic treatment. Evaluation of proportion of microflora both aerobic and anaerobic was done in the orthodontic department with patients at various stages of the treatment. After evaluating both aerobic and anaerobic microflora it was seen that there was an increase in trend towards pathogenic microflora as the treatment progressed. The results of the study highlight the need for faster, effective, cleaner, and proper periodontal monitoring.

INTRODUCTION
One of the major goals of performing orthodontic treatment is to promote the health of periodontium thereby enhancing longevity of the dentition. As decalcification, caries, and inflammatory diseases are commonly recognized consequences of the failure to maintain good oral hygiene during the orthodontic treatment, so it becomes imperative to take care of oral hygiene.

Although reports concerning the microbial flora of the oral cavity are voluminous, information relating to the oral flora to orthodontic therapy is practically not enough and is restricted to only a limited number of microorganisms making up the total oral flora in this respect.

At birth the mouth is sterile but within a few hours microorganisms appear which are mainly streptococcus salivarius. By the time the deciduous teeth erupt a complex flora is present. Bacteria are present in saliva, the tongue and cheeks, tooth surfaces especially in fissures and in the gingival crevice. The number of bacteria in saliva can be measured in thousands of millions per millimeter but the largest population of the bacteria is found on the dorsum of the tongue. Even the healthy gingival crevice is consisting of different ecosystems in which the different varieties of bacteria are found in balance with one another and with the tissues.

The present study is undertaken to determine whether the fixed appliances that are used in orthodontic therapy can alter the oral environment, to cause a concurrent quantitative change in its general microbial population so it was decided to analyze the proportion of microflora in the orthodontic clinic to evaluate the presence of microfloral organisms in subgroup of population in orthodontic patients.

MATERIAL AND METHODS
To evaluate proportion of microflora study was done among 80 patients comprising of 39 males and 41 females of above 16 yrs of age with mean average of 22.4 yrs.

CRITERIA OF SELECTION
- All the patients were undergoing fixed orthodontic therapy.
- The patients were selected from the Out patient Department of Orthodontics and Dentofacial Orthopaedics institute of Sri Ramchandra Dental College, Porur, Chennai.
- The patients were divided into subgroups based on time and stage of treatment, the stages included 3-6 months of leveling and aligning, 8-10 months of retraction, 12-15 months of finishing and detailing compared with persons who have normal occlusion which were taken as controls.
The patients had no history of systemic diseases or undergoing course of antibiotic therapy. The patients had routine oral prophylactic instructions before start of the treatment.

**Sampling Methods**

**Media Used**
- (a) Macokey Agar
- (b) Muller Hidon Agar

**Gram Staining Solutions**

**Gas Pak (Anaerobic Jar)**

It was made sure that recording of sample was done within the timing of outpatient department. All patients were screened by a single examiner i.e. postgraduate in the department. All patients had mild to moderate plaque which was determined by using Williams periodontal probe the patients had index of 2 or less (using shick ash modification for plaque index) and DMFT index 3 or less than that.

**METHOD OF COLLECTION**

Samples were collected using test tubes one with swab culture and other containing 0.16 stainless steel wire. Swabs was passed especially on molar bands and crowded areas. The other sample was collected in 0.16 stainless steel wire, the tip 31 was smoothened and 45 degree bend placed from tip to facilitate insertion to the crevice. The tip was gently passed through the gingival crevice of one of the sampling sites.

The swabs were then inoculated on blood agar, chocolate agar and macokey medium and direct smear for gram staining was done from the specimen.

Aerobic inoculation was done using nichrome inoculating wire. Further subspeciation was done using certain bio-chemical reaction like fermentation of sugar. The sugar used were sorbitol, mannitol, raffinose, trehalose, esculin hydrolysis was done including vogus proschel reaction and arginine hydrolysis.

For anaerobic gas pak jar was used. 0.016 stainless steel wire was inoculated into glycolate medium which was incubated at 37 degree C. for one day. On the next day after 24 hours it was inoculated on to brucella blood agar and macokey medium and kept in macintosh jar anerobically for identification of anaerobic growth.
After inoculating jar was to be kept in incubation for 48-72 hours. After the jar was opened the plates were taken out and examined for the presence of anaerobes.

RESULTS
Mean, standard deviation and one way anova variance was done to evaluate any significant difference between variable age, plaque index, dmft were taken into account, in other table distribution of different characteristic within different study groups were evaluated. Proportion of microflora was examined within different groups.

Groups which were taken into account were of the following order:
Group1: Controls
Group2: Levelling and aligning
Group3: Retraction stage
Group4: Finishing and Detailing
Inference—There was no significant difference in mean age between different study groups. Mean Plaque Index in group IV (2.0 ± 0.2) is significantly higher than the mean Plaque Index in group I (1.3 ± 0.5), group II (1.1 ± 0.4) and in group III (1.3 ± 0.6) (P < 0.08). Mean DMFT in Group IV (1.4 ± 0.5) is significantly higher than the mean DMFT in group I (0.7 ± 0.8) (P < 0.05). However no other contrast are statistically significant (p > 0.05). There was significant increase in trend for proportion of Gram Negative Bacilli in control group I to group IV.

DISCUSSION
Oral hygiene is a significant prophylactic programme in receiving good orthodontic treatment. This evidence based health care should be our focus of attention in attaining our goals of function, esthetic and stability.

Association of microflora has been implicated with fixed orthodontic appliances provided with bonded retentive areas for plaque retention and harbouring pathogenic microflora.

Study of proportion of microflora demonstrated the increase in trend of pathogenic flora with increase in duration of treatment time suggesting the need for faster treatment and customized bacteriological monitoring.
of oral prophylaxis required. The study revealed increase in population of streptococcus mutans, gram negative bacilli, peptostreptococcus (anaerobic) species from leveling, aligning to finishing details. The result in studies was in accordance with earlier studies where increase of pathogenic microflora was observed.

With bonded and non bonded patients by Dr. J.A. Corbett et al in 1901, Actinobacillus, actinomycete comitans and capnocytophages microbial population was significantly associated with patients of juvenile periodontitis undergoing orthodontic therapy was highlighted by Dr. Folio et al in 1985. Peter M Sinclair et al in 1997 showed increase of streptococcus and spirochaetes in change of microflora within one year of treatment.

Study design was chosen to be cross-sectional to consider various variables however it was felt sample size should have been considerable higher. Mean age was 22yrs which confirms sample size of population undergoing orthodontic treatment in India.

Dental hospital was chosen to include all kind of ethnic groups. The groups were of different sex, socioeconomic strata, had different method of brushing and different type of tooth brands which they were using.

CONCLUSION

The study of proportion of microflora demonstrated the increase in trend of pathogenic microflora with increase in duration of treatment time, suggesting the need for faster treatment and customized bacteriological monitoring of oral prophylaxis. Dr. Donald J. Rinchuse et al in 1981 have suggested the need for additional antibiotic prophylaxis but should be used cautiously in certain orthodontic procedures such as tooth metal separators, banding and while placing implants. Use of bonding molars especially patients on periodontal maintenance, removal of excess of composites around brackets, avoidance of lingual appliances wherever possible, certain measures should be taken for care of the oral hygiene.

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