

## ORIGINAL RESEARCH

### Evaluation of Salivary *Streptococcus Mutans* Levels in patients Undergoing Fixed Orthodontic Treatment- A Research Study

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#### ABSTRACT:

**Background:** Fixed orthodontic appliances have been found to induce specific changes such as raised *Streptococcus mutans* colonization. The present study was conducted to assess the salivary streptococcus mutans levels in patients undergoing fixed orthodontic treatment. **Materials & Methods:** The present study was conducted on 82 patients of age range 16-24 years. In all subjects, stimulated saliva samples were obtained from the patients by asking them to chew paraffin wax until 2 ml of saliva had been collected. The level of *Streptococcus mutans* were determined using Dentocult SM strips. **Results:** Out of 82 patients, males were 52 and females were 30. There was significant increase in *Streptococcus mutans* levels (CFU/mL) from  $10^4$  to  $10^7$ . **Conclusion:** Author found significant increase in *Streptococcus* counts during fixed orthodontic treatment.

**Key words:** Fixed orthodontic, Streptococcus, Stimulated saliva.

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#### INTRODUCTION

Orthodontic treatment consists of the placing of orthodontic appliances to correct the bite and thus achieve long-lasting balanced occlusion. The prevalence of orthodontic treatment in developed countries ranges from 10% to 35%. Fixed orthodontic appliances have been found to induce specific changes in the oral environment, such as increased plaque accumulation, raised *Streptococcus mutans* colonization and increases in *Lactobacillus* spp, which are closely associated with dental caries. The pH of saliva and its buffer capacity contribute to its ability to counter the acid produced locally in the oral cavity.<sup>1</sup>

Some studies investigating interactions between orthodontic material, microorganisms, and saliva have not detected specific associations between orthodontic appliances and clinical or microbial outcomes. These changes in the oral environment can be worsened by the use of attachments such as elastic chains, loops, and springs. Nevertheless, the best way to minimize this problem is plaque control. Some studies recommend scrupulous oral cleanliness, suggesting the use of irrigators, electrical or ultrasonic brushes, rinsings, and varnish, but one of the most important requirements for oral health is the motivation of the patient.<sup>2</sup>

The following markers emerged as protective factors: patients without active caries injuries increased

significantly stimulated salivary flow, buffer capacity, and salivary pH, after placement orthodontic appliances. In contrast, the following markers were negative risk factors to the oral environment: slightly increase in the infection levels of SM and *Lactobacillus*, and of occult blood in saliva.<sup>3</sup> The present study was conducted to assess the salivary streptococcus mutans levels in patients undergoing fixed orthodontic treatment.

#### MATERIALS & METHODS

The present study was conducted in the department of Orthodontics. It comprised of 82 patients of age range 16-24 years undergoing fixed orthodontic treatment. All subjects were informed regarding the study and written consent was obtained. Ethical clearance was taken prior to the study from institutional ethical committee.

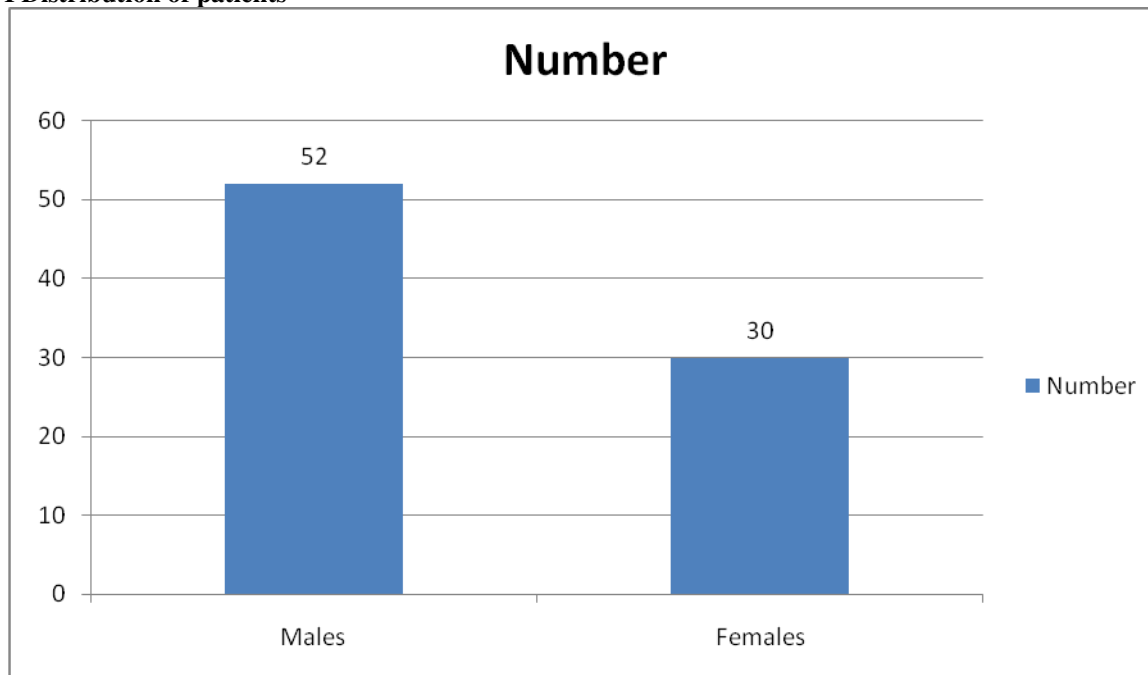
General information such as name, age, gender etc was recorded. In all subjects, stimulated saliva samples were obtained from the patients by asking them to chew paraffin wax until 2 ml of saliva had been collected. The level of *Streptococcus mutans* were determined using Dentocult SM strips according to the manufacturer's instructions. The number of colony-forming units (CFU) of each sample was counted and scored (CFU/ml of saliva). Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

#### RESULTS

Table I Distribution of patients

Total- 82		
Gender	Males	Females
Number	52	30

Table I shows that out of 82 patients, males were 52 and females were 30.

**Graph I Distribution of patients****Table II *Streptococcus mutans* levels before and during orthodontic treatment**

Treatment	<i>Streptococcus mutans</i> levels (CFU/mL)	P value
Before treatment	$10^4$	0.01
During treatment	$10^7$	

Table II shows that there was significant increase in *Streptococcus mutans* levels (CFU/mL) from  $10^4$  to  $10^7$ .

## DISCUSSION

Oral *Streptococcus* is isolated in 50–80% of orthodontic patients as a common cause of decalcification due to the accumulation of cariogenic plaque around the brackets and its progression into carious lesions in such patients. The placement of fixed orthodontic appliances on teeth results in iatrogenic side effects. During the treatment, dental lesions become difficult to access, resting pH decreases, the volume of dental plaque is higher, and bacterial flora undergoes qualitative change. All of these factors increase caries risk. Several investigations have shown that changes in the dental flora appear after the initiation of orthodontic treatment, such as a higher prevalence of oral streptococci specially *Streptococcus mutans* and *Streptococcus mitis*, which are part of the normal bacterial flora of the oral cavity.<sup>4</sup> The present study was conducted to assess the salivary streptococcus mutans levels in patients undergoing fixed orthodontic treatment. We observed that out of 82 patients, males were 52 and females were 30. In this study there was significant increase in *Streptococcus mutans* levels (CFU/mL) from  $10^4$  to  $10^7$ . Peros, et al.<sup>5</sup> presented new data on the salivary microbial changes with time caused by the placement of fixed orthodontic appliances. As in some other investigations, a significant increase in *Streptococcus*

*mutans* and *Lactobacillus* spp. insaliva was found after the start of fixed orthodontic therapy. However, the first significant increase was only detected 6 weeks after the fixed orthodontic appliances were placed, and the highest levels were registered at the 12<sup>th</sup> week of therapy.

According to Chang et al.<sup>6</sup>, the increase in oral *Streptococcus* following placement of orthodontic appliances can be explained by the irregular nature of their surfaces, which promotes the growth of acidogenic bacteria that prefer to grow on hard surfaces. It was observed that orthodontic treatment caused a modification in the oral flora and was associated with elevated counts of cariogenic bacteria in both the dental plaque and saliva.

Forsberg et al.<sup>7</sup> found that after three months of orthodontic treatment, the increase in the frequency of *Streptococcus sobrinus* and *Streptococcus mitis* were significant as well as for *Lactobacillus*. No significant difference was recorded for other bacterial species. There is a significant qualitative change in oral microorganisms after three months of orthodontic treatment, especially for bacteria that are incriminated in caries formation.

According to Payant et al.<sup>8</sup>, long-term utilization of orthodontic appliances may have a negative effect on microbial flora and increase the risk of new carious lesions. It would be interesting to evaluate the evolution of these

microbial parameters until the end of the orthodontic treatment. Preventive measures should continue until the removal of the orthodontic appliances. Thus, it seems necessary to take action in favour of this population at risk.

## CONCLUSION

Author found significant increase in *Streptococcus* counts during fixed orthodontic treatment.

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