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ORIGINAL ARTICLE

Assessment of Orthodontic Treatment on Salivary Flow and pH- A Clinical Research

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***ABSTRACT*:**
Background: There is change in the saliva parameters such as decrease in pH, flow rate and buffering capacity of the saliva in orthodontic treatment. The present study was conducted to assess the effect of orthodontic treatment on salivary flow and pH.
Materials & Methods: The present study was conducted on of 64 patients of age range 14-26 years undergoing fixed orthodontic treatment. The volume of the saliva collected during this period was measured and divided by 10 to attain the flow rate in millimeters /minute. The pH of saliva was measured with portable pH meter strips. **Results:** Out of 64 patients, males were 40 and females were 24. Before treatment salivary flow was 1.12 mL/min and after treatment was 1.34 mL/min. The difference was non- significant (P> 0.05). Before treatment pH was 7.88 and after treatment was 6.04. The difference was significant (P< 0.05). **Conclusion:** Author found increased salivary flow rate and decrease in pH value of saliva before and after treatment.
Key words: Fixed orthodontic, pH, Saliva.

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INTRODUCTION

Malocclusion is one of the most common dental disorders and is capable of increasing the risk of periodontal disease and dental caries. Orthodontic treatment of malocclusions can often resolve them, or at least prevent their progression. However, complex design of fixed orthodontic appliances can affect the oral hygiene by influencing several parameters including the saliva properties and microbial count. Changes in the saliva parameters such as decrease in pH, flow rate and buffering capacity of the saliva may contribute to enamel demineralization and increase the susceptibility to dental caries.[1]

It has been shown that orthodontic treatment induces changes in the oral environment, with an increase in the bacteria's concentration, and alterations in buffer capacity, pH acidity and salivary flow rate; however, little is known about periodontal inflammation that results in occult blood in saliva and the acidity of dental plaque. Placement of fixed orthodontic appliances compromises the patients' oral hygiene not only by impeding oral hygiene procedures, but also by changing the saliva properties and microbial count.[2] All these salivary properties become of utmost importance during orthodontic treatment with fixed appliances, when an increased chance of plaque retention and a greater difficulty in optimal oral hygiene maintenance are thought to predispose to enamel demineralization and white spot formation.[3] The present study was conducted to assess the effect of orthodontic treatment on salivary flow and pH.

MATERIALS & METHODS

The present study was conducted in the department of Orthodontics. It comprised of 64 patients of age range 14-26 years undergoing fixed orthodontic treatment. Ethical clearance was taken prior to the study from institutional ethical committee. All subjects were informed regarding the study and written consent was obtained.

General information such as name, age, gender etc was recorded. Salivary flow rate was assessed before the start of orthodontic treatment and after six weeks of treatment. The whole saliva was collected by spitting into a sterile test tube for 10 minutes. The volume of the saliva collected during this period wasmeasured and divided by 10 to attain the flowrate in millimeters /minute. The pH of saliva was measured with portable pH meter strips. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 64		
Gender	**Males**	**Females**
Number	40	24

Table I shows that out of 64 patients, males were 40 and females were 24.

Table II Comparison of salivary flow rate

Treatment	Salivary flow (mL/mim)	P value
Before treatment	1.12	0.07
After treatment	1.34	

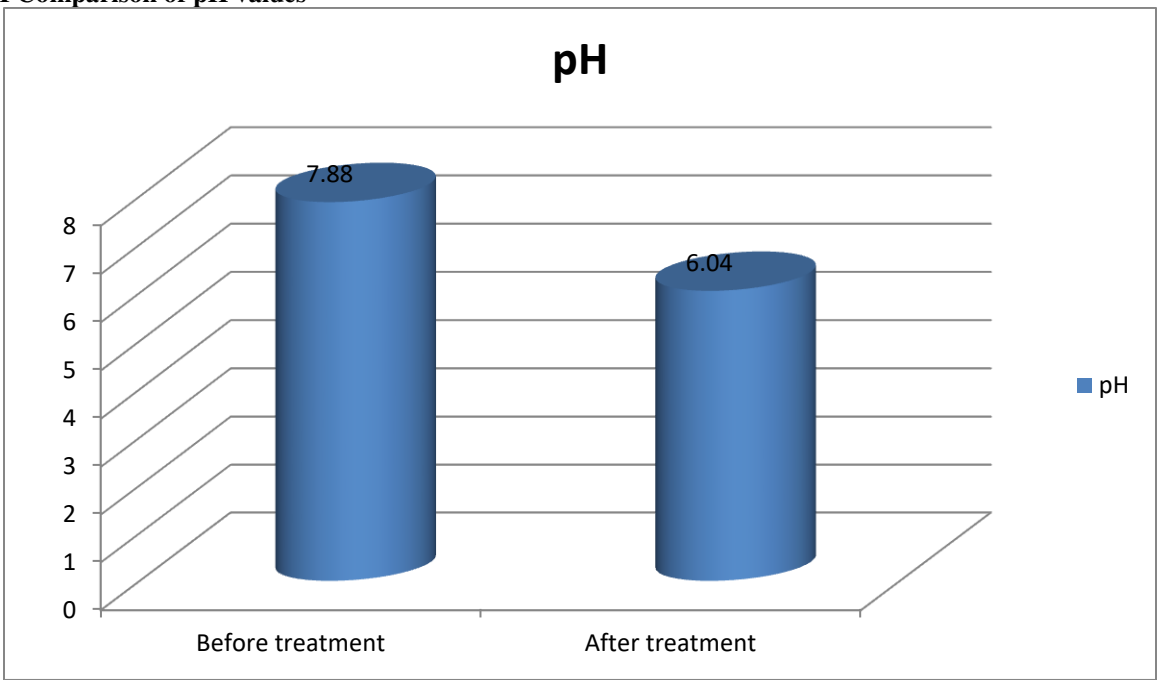
Table II shows that before treatment salivary flow was 1.12 mL/min and after treatment was 1.34 mL/min. The difference was non- significant (P> 0.05).

Table III Comparison of pH values

Treatment	pH	P value
Before treatment	7.88	0.03
After treatment	6.04	

Table III, graph I shows that before treatment pH was 7.88 and after treatment was 6.04. The difference was significant (P< 0.05).

Graph I Comparison of pH values



DISCUSSION

Oral environment has the capacity of adjustment to the presence of a foreign body, increasing the salivary flow which contributes to the autolysis and modifying the salivary composition to raise the pH and buffer capacity, it prevents colonization by potentially pathogenic microorganisms by denying them optimization of environmental conditions. There is still no consensus on the way the quality and the quantity of saliva change during orthodontic treatment. So far, investigations have been confined to the first 6 months from the placement of fixed appliances, and no data are yet available in the long term.[4]The present study was conducted to assess the effect of orthodontic treatment on salivary flow and pH.

In present study, out of 64 patients, males were 40 and females were 24. It was found that before treatment salivary flow was 1.12 mL/min and after treatment was 1.34 mL/min.

Changet al[5] assessed salivary and bacterial risk markers in 34 patients (mean age, 16.7 ± 5.2 years), 14 males and 20 females; before starting orthodontic treatment and 1 month after. Salivary markers (unstimulated and stimulated saliva flow rate, buffer capacity, pH and occult blood in saliva) was assessed. This study showed that orthodontic appliances increased the stimulated salivary flow rate (p=0.0001), buffer capacity (p=0.0359), salivary pH (p=0.0246) and occult blood in saliva (p=0.0305). Bacterial levels increased slightly after 1 month of treatment, without statistical significance. Between genders, initially we observed differences in: stimulated saliva (p=0.0019), buffer capacity (p=0.0381) and plaque pH (p=0.0430); after

treatment the unstimulated saliva (p=0.0026) showed differences.

We found that before treatment pH was 7.88 and after treatment was 6.04. Liet al[6] in their studynon- statistically significant differences were found between males and females, data were combined for sex. No statistically significant difference existed between T0 and T1 for the nonmicrobial salivary properties examined in this study, except for a tendency to decrease between the two time points for buffer capacity.

Boneti et al[7] found that salivary flow rate increased significantly after 12 and 18 weeks of fixed orthodontic treatment. But it should be mentioned that stimulated saliva was evaluated in their study.The salivary flow rate as an important saliva property plays a critical role in oral health. An increase in flow rate promotes the physical cleansing action of the saliva, increases its antimicrobial activities, and accelerates clearance of substrates. On the other hand, low saliva secretion rate adversely affects oral health. The change in salivary flow rate can be considered as a physiological response to presence of fixed orthodontic appliances. The introduction of these appliances into the oral environment appears to alter the oral homeostasis. Evaluation of pH, another important saliva parameter showed a significant decrease after the beginning of orthodontic.[8]

CONCLUSION

Author found increased salivary flow rate and decrease in pH value of saliva before and after treatment.

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