

Effect Of Prosthodontic And Orthodontic Appliances On Salivary PH : Prospective Study

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Abstract

The present study plan to assess the salivary pH at the commencing of prosthodontic or orthodontic treatment and after two weeks, six weeks , and fourteen weeks. It was hypothesized that the PH values between the starting time and these follow up intervals was not significant.

30 patients were included in this study who are already attend to commence prosthodontic and fixed orthodontic treatment. 20 patients were stating to wear orthodontic appliance while the remaining patients comenced to be rehabilitated by prosthodontic treatment. All the subjects based on inclusion and exclusion criteria. Saliva specimen were got from all subjects, instantly previous to the insertion of aplince or denture (T0; baseline evaluation), after two weeks (T1), six weeks (T2), and fourteen weeks (T3) from the baseline assessment. The pH values were measured with the GC Saliva-Check Kit (GC Corp., Leuven, Belgium). Univariate (ONE WAY ANOVA) test was used, and differences within groups were inspected by using multiple comparison method (L.S.D.). The salivary samples at different time intervals present a signfigant difference of the PH value, between each succeeding time periods, and also from the base line time T0. In conclusion, when the results of the present study is displayed, the hypothesis is rejected due to a significant difference was observed in PH value between the baseline salivary PH and the succeeding follow up periods.

Keywords: Effect Of Prosthodontic, Orthodontic Appliances, On Salivary PH : Prospective Study

INTRODUCTION

The quality and the quantity of saliva affect directly on the balance of minerals gain and loss of dental enamel under carious ambience [1]. unambiguous transition may commit for reducing the perceptivity of caries , like elevated pH, buffering capacity ,and salivary flow rate.(2,3)

The normal PH of saliva is ranging from 6 to 7. it is considered slightly acidic (4). Salivary PH is thought to be an important factor which involved in demineralization and remineralization processes (1). Oral hygiene and PH value are important factors in commencing prosthodontic and orthodontic treatment(5). The liability of plaque retention and the dilemma of preservation good oral hygiene are contemplated a predisposing factors to enamel demineralization and white spot lesion (6).

The present study plan to assess the salivary pH at the commencing of prosthodontic or orthodontic treatment and after two weeks, six weeks , and fourteen weeks. It was hypothesized that the PH values between the starting time and these follow up intervals was not significant.

METHODS

This study was performed in accordance with the Declaration of Helsinki, and informed consent was obtained

from all participant. 30 patients were included in this study who are already attend to commence prosthodontic and fixed orthodontic treatment. 20 patients were stating to wear orthodontic appliance while the remaining patients comenced to be rehabilitated by prosthodontic treatment. All the subjects based on inclusion and exclusion criteria as dipicated in table1.

Fixed orthodontic treatment with Straight wire 0.022 inch-slot brackets (Orthotechnology, co, USA) were selected for all orthodontic patients . The same wire sequences were used for all patients and bonding process was performed with the same adhesive for all patients (Transbond XT, 3M Unitek, Monrovia, CA, USA). Treatment was started with NiTi 0.0014-inch wire and continued with NiTi 0.0016-inch, NiTi 0.0018-inch and NiTi 0.0019×0.0025-inch wire.

On the other hand, impression where taken for all prosthodontic patients. Laboratory fabrication of removable appliances and insertion of these appliances where done. Then, appointments for follow up were given.

In order to minimize possible changes in the salivary composition, all the patients were asked to clean up their teeth early before coming to their appointment and they are asked not eat, drink ,or do any oral hygiene procedure for somewhat two hours before saliva collection. Saliva was

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collected between 10 and 12 a.m.(7).

Table 1. the inclusion and exclusion criteria for selecting patients

inclusion criteria	exclusion criteria
Age 12-18	patients had severe skeletal malocclusion
good oral health	antibiotics intake.
All treatment plans were nonsurgical orthodontic and prosthodontic treatments	history of any systemic diseases.
Permanent dentition stage	Smokers
	Active caries or periodontal problems
	Previous prosthodontic or orthodontic appliances.

The pH values were measured with the GC Saliva-Check Kit (GC Corp., Leuven, Belgium). The whole saliva was collected inside a container by asking the patients to pool and spit their saliva. Then, the pH measuring strip was immersed for 10 s inside the container of saliva. After that, the changes in color was adopted to determinate the pH value using a kit scale as reported by the manufacturer.

Saliva specimen were got from all subjects instantly previous to the insertion of appliance or denture (T0; baseline evaluation), after two weeks (T1), six weeks (T2), and fourteen weeks (T3) from the baseline assessment.

Statistical Analysis

Data was analyzed using SPSS version 21. Univariate (ONE WAY ANOVA) test was used, and differences within groups were inspected by using multiple comparison method (L.S.D.). PH comparison in respect to gender and oral hygiene was evaluated by using Independent sample t-test. Graph Pad Prism 5 was used to draw graphs with ($\pm 2SD$) pars. Differences between variables were setting as significant at 5% ($P \leq 0.05$) and highly significant at 1% ($P \leq 0.01$).

RESULT

When the variables of the study were described there is no significance, between the age of patients ,and also between males and females. The percent of good oral hygiene patients was 60% an it was significant comparing to fair oral hygiene patients as shown in Table 2.

Table 2. Mean and standard deviation of the study variables

Variables	Mean \pm SD	Min.	Max.	P value
Age	15.27 \pm 2.227	12	18	
Gender	No (%)			
Male	14(46.7%)			0.207 ns
Female	16(53.3%)			
Oral Hygiene				
Fair	12(40%)			<0.01**
Good	18(60%)			

ns= non-significant, **=significant at 1%

Table 3. Univariate test of patient PH.

Time periods	Mean of PH \pm SD	P value
T0	7.229 \pm 0.252	$\leq 0.01^{**}$
T1	7.082 \pm 0.243a	
T2	6.969 \pm 0.194ab	
T3	6.884 \pm 0.229abc	

**Overall significant differences ($P \leq 0.01$) were observed between time periods, however letter (a) referred to significant differences from T0, letter (b) referred to significant differences from T1, letter (c) referred to significant differences from T2.

Univariate test of patient PH at different time interval present a significant difference of the PH value, between each succeeding time periods, and also from the base line time T0 as depicted in Table 3.

Figure 1 showing a comparison concerning the oral hygiene status; a significant difference was found between Good and Fair Oral Hygiene at all time periods.

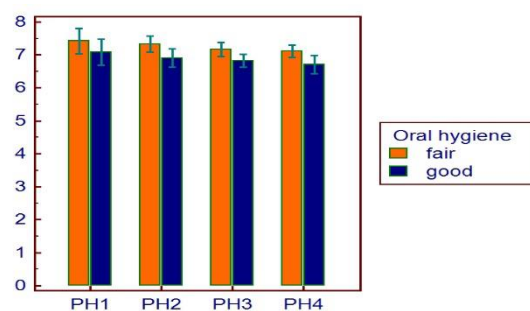


Figure 1. PH value in respect to oral hygiene. Pars represented as ($\pm 2SD$)

DISCUSSION

The effect of fixed orthodontic and prosthodontics appliances was displayed in many previous studies which were focusing on the changing of microbial environment due to these appliances [8-14]. In different circumstances, the appliances effect on nonmicrobial salivary properties have been investigated by earlier researchers, on the whole they present contra versed results in short time assessment [15-19].

Chang et al. (16) found that pH value and the buffering capacity significantly elevated thereafter active orthodontic intervention for a three months period. The same outcomes were displayed by other author after one month from the starting of treatment (18). Another study conducted that salivary pH significantly increased after 12 and 18 weeks of fixed orthodontic treatment (15). On the other hand, other studies conducted that when there is high liability of plaque retention and dilemma of preservation good oral hygiene, the susceptibility of enamel demineralization and white spot lesion will be increased due to decrease in PH value (5,6).

In the present study, significant decreases were noticed in pH value after, after two weeks (T1), six weeks (T2), and fourteen weeks (T3) from stating of treatment (T0). These findings are in contrast with some earlier results describing an increase PH value (15,16,18) but they are in agree with other studies (5,6).

The oral hygiene of the patient is a crucial factor that affecting the changes in PH value. It was noted that the PH decrease in fair oral hygiene patients is more than that in good hygiene group as shown in Figure 1. In general, the

significant decrease in PH might be due to the effect of orthodontic or prosthodontics appliances on the properties of saliva. In addition, the patient ability for oral home care may be disturbed after the insertion of appliance. The patients may take more time to be familiar with their appliance care. As a result the patient should be encouraged and motivated to spend extra effort to control oral hygiene when they are wearing their appliances for decreasing the possibility of caries progress.

In conclusion, when the results of the present study is displayed, the hypothesis is rejected due to a significant difference was observed in PH value between the baseline salivary PH and the succeeding follow up periods. These finding are in correlation with oral hygiene status of the patients.

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