

Original article

The Effect of Verbal and Videotape Oral Hygiene Instruction on Plaque control for Patients with Fixed Orthodontic Appliance.

Ramit Chaddha¹, Amitabh Kallury², Ankur Chaukse³, Trilok Shrivastava⁴

¹ PG Student, Department of Orthodontics, Peoples Dental Academy, Bhopal
² Professor & HOD, Department of Orthodontics, Peoples Dental Academy, Bhopal
^{3,4} Reader, Department of Orthodontics, Peoples Dental Academy, Bhopal

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ABSTRACT

INTRODUCTION-Maintaining oral hygiene is thus more difficult in orthodontic patients as compared to non-orthodontic individuals. The orthodontic appliances encourage the accumulation of dental plaque and the proliferation of cariogenic and periodontopathic microorganisms, increasing the risk of caries and periodontitis. Thus, orthodontic treatment represents a serious invasion of the oral environment.

METHODOLOGY- The present study is a longitudinal interventional study design. The study subject comprised of total 30 patients with fixed Orthodontic appliance. At the base line plaque index had recorded and given verbal intervention and demonstrated on a model. Patients were recalled after 3 weeks and plaque index was recorded. Then video of maintaining oral hygiene was shown to patients and after 3 months plaque index was recorded.

RESULT- After verbal intervention the mean plaque score was increased 2.76 ± 72 in labial surface and decreased 2.43 ± 62 in lingual surface and after videotape intervention was decreased 1.86 ± 345 in labial surface and lingual surface 1.6 ± 54 which was highly significant.

CONCLUSION- This study found that general oral hygiene care, convenient cleaning instruments, demonstration of oral hygiene technique and video tape can produce a better effect, and so clinical practitioners should not ignore the importance of oral hygiene instructions.

Introduction

Good oral hygiene is vital to guarantee effective orthodontic treatment and avoid iatrogenic problems.¹ Maintaining good oral hygiene in orthodontics is one of the components identified with compliance.²

Certain malocclusions are associated with an increase in the plaque retention sites. In addition, bonding attachments to teeth introduces retention sites on surfaces generally not susceptible to plaque accumulation.³ Maintaining oral hygiene is thus more difficult in orthodontic patients as compared to non-

orthodontic individuals.³ The orthodontic appliances encourage the accumulation of dental plaque and the proliferation of cariogenic and periodontopathic microorganisms, increasing the risk of caries and periodontitis. Thus, orthodontic treatment represents a serious invasion of the oral environment. Plaque build-up during orthodontic treatment may lead to chronic hyperplastic gingivitis with increased pocket depths (Alexander, 1991) and slight, but significant loss of periodontal attachment.¹ Increased plaque formation also give rise to more prolonged acid challenges to the enamel surface, which can lead formation to white

* Corresponding author: Dr. Ramit Chaddha, Address- G-35, Abhinav Kakada Homes near SIRT college, Ayodhya Bypass Road, Bhopal.
Email- drramitchaddha@gmail.com.

spot lesions (Gorelick et al, 1982) or, in more severe cases, widespread decalcification and cavity formation (Zachrisson & Zachrisson, 1971; Mitchell, 1992).¹ Clearly, the orthodontist's need to take responsibility for the risk for plaque accumulation and play a proactive role in taking precautions to avoid or limit their development. Plaque control can be achieved through mechanical aids (toothbrush, dental floss, and bury dental brush) or chemotherapeutic measures (mouth washes and dentifrices).³ In addition to the inefficient brushing practices, there are other factors that can affect the plaque accumulation. Some of these factors are related to the clinical practices such as the type of brackets, type of ligation, duration of orthodontic treatment and frequency of patient appointments.

The objectives of orthodontic therapy are to establish a good occlusion, enhance the health of the periodontium, and improve dental and facial esthetics. Both the patient as well as the orthodontist should accept a dynamic role in controlling the plaque accumulation by keeping up excellent oral hygiene. Keeping in mind the end goal to lessen these clinical issues, we designed a study to know the effects of different oral hygiene instructions given to the orthodontic patients. We endeavoured to figure out if oral hygiene instruction will affect the oral hygiene status of patients and test the viability of such directions by taking plaque index.

MATERIALS AND METHODS

The present study is a longitudinal interventional study design. The study subject comprised of total 30 patients with fixed Orthodontic appliance. The ethical clearance approved from the Research Approval Committee (RAC) of Peoples Dental Academy,

[(DGCI Registration no: 2014/006/RAC/08)]. The informed written consent was obtained from the patients after verbally explaining the protocol in their native language prior to the sample collection for the study

Final Sample Size (Rounded) = 90 patient. The total sample size required was 30 in each visit.

The informed written consent and verbal ascent was obtained from the parents as well as from their patients respectively prior to the study. At the base line plaque index had recorded and given verbal intervention and demonstrated on a model. Patients were recalled after 3 weeks and plaque index was recorded. Then video of maintaining oral hygiene was shown to patients and after 3 months plaque index was recorded once again. Plaque index was taken by using disclosing agent (Alphaplac).

INCLUSION CRITERIA

All patients fitted with fixed Orthodontic appliances.

All teeth present up to permanent second molars.

Age group of 14yrs-22yrs

EXCLUSION CRITERIA:

- Patients undergoing myo-functional appliance therapy.
- Missing/Impacted teeth.
- Diabetic Patient
- Pregnancy
- Presence of any debilitating diseases.
- History of any drug like cocaine or antiepileptic drugs.

The survey was systematically scheduled to spread over a period of 3 months. The first stage in data collection work was to set up a central survey unit at the department of Orthodontics & Dentofacial Orthopaedics to coordinate all the activities related to the survey. The central survey unit comprised of an

experienced and senior dental health surgeons, the Principal Investigator and a full time statistician. The survey unit decided for intervention of the study participants and examination i.e. orthodontic patient. At the base line plaque index was recorded and given verbal intervention with model demonstration and recalled patients after 3 weeks and recorded plaque index then videotape on how to maintain oral hygiene was shown to patients and after 3 months plaque index was recorded. The plaque index was recorded starting from the first quadrant to the fourth. Then intervention was given to every patient in each visit. Information regarding the oral hygiene aids used by study participants. Method of brushing and frequency of the brushing were recorded and asked about mouth rinsing.

RESULT

At the base line 30 patients were treated and plaque index was taken, out of the 30 patient 9 patient was male and 21 patients was female and the mean age of the study participants were 18.6 ± 2.14 years. 13 study participants were 14-16 years of age, 7 participants were 17-19 years of age and 10 participants were more than 20 years of age (table no 1) At the base line mean plaque index was 2.4667 ± 0.628 in labial surface and 3.1000 ± 0.661 in lingual surface. After verbal intervention the mean plaque score was increased (2.7667 ± 0.727) in labial surface and decreased (2.4333 ± 0.626) in lingual surface and after videotape intervention was decreased (1.8667 ± 0.345) in labial

17-19 Years	7
More Than 20 Years	10

Table No. 1 Distribution Of Patients According To Gender

Intervention	Labial Surface		Lingual Surface	
	Mean	Sd	Mean	Sd
At Base Line	2.466	0.628	3.10	0.661
After 3 Week	2.766	0.727	2.4333	0.626
After 3 Months	1.866	0.345	1.6000	0.542
Anova 'F' Value	31.601		17.02	
P-Value	0.03(S)		0.01(Hs)	

Table No. 2 Comparison Of Mean Plaque Index Score After Different Intervention.

surface and lingual surface (1.6000 ± 0.542) which was highly significant (table no 2). After the verbal intervention mean plaque score was 2.7667 ± 0.727 in labial surface and 2.4333 ± 0.626 in lingual surface after videotape intervention the mean plaque score was decreased in labial surface and lingual surface. Mean plaque score of labial surface was 1.8667 ± 0.345 , which was statistically significant (p-value ± 0.001). Mean plaque score of lingual surface was 1.6000 ± 0.542 , which was highly significant (p-value ± 0.001). (Table no 4). score was 2.5238 ± 0.679 in labial surface and 3.2381 ± 0.624 in lingual surface after verbal intervention increased 2.9048 ± 0.700 in labial surface and decreased 2.4762 ± 0.67 in lingual surface.. After the videotape intervention was 1.9048 ± 0.300 in labial surface and 1.6190 ± 0.589 in lingual surface. There was Statistically significant different in after different intervention. (Table no 5)

Gender	No Of Patients
Male	9
Female	21
Age(In Years)	No Of Patients
14-16 Years	13

Intervention	Labial Surface	Lingual Surface
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	Mean	Sd	Mean	Sd
At Base Line	2.466	0.628	3.10	0.661
After 3 Week	2.766	0.727	2.4333	0.626
Paired 'T' Value	3.07		4.55	
P -Value	0.05(S)		0.01(Hs)	
At Base Line	2.466	0.628	3.10	0.661
After 3 Month	1.866	0.345	1.6000	0.542
Paired 'T' Value	5.83	8.43		
P -Value	0.04(S)		0.001(Hs)	
After 3 Week	2.766	0.727	2.4333	0.626
After 3 Month	1.866	0.345	1.6000	0.542
Paired 'T' Value	6.90	5.22		
P -Value	0.03(S)		0.001(Hs)	

Table No. 3 Comparison Of Mean Plaque Index Score After Different Verbal Intervention.

Intervention	Labial Surface		Lingual Surface	
	Mean	Sd	Mean	Sd
In Male Patients				
At Base Line	2.5238	0.679	3.23	624
After 3 Week	2.9048	0.70	2.47	.589
After 3 Months	1.90	0.30	1.61	589
Anova 'F' Value	3.84			
P -Value	0.039(S)		0.042(S)	
In Female Patients	Mean	Sd	Mean	Sd
At Base Line	2.3333	0.50	2.7778	0.51
After 3 Week	2.4444	0.726	2.43	0.45
After 3 Months	1.7778	0.440	1.56	0.52
Anova 'F' Value	15.38		34.43	
P -Value	0.01(S)		0.001(Hs)	

Table No 4 Comparison Of Mean Plaque Index Score After Different Intervention In Male Patients.

Mean plaque index score was 2.3333 ± 0.50 in labial surface and 2.7500 ± 0.991 in lingual surface after verbal intervention the was increased in labial surface and decreased in lingual surface. In labial surface was 2.87 ± 0.462 , in lingual surface was 2.5000 ± 0.534 . After the videotape intervention was 1.75 ± 0.462 in labial surface and 1.375 ± 0.517 in lingual surface. There was

statistically significant different in after different intervention.

At the base line in age of 14-16 years patient's mean plaque index score was 2.25 ± 0.707 in labial surface and 2.7500 ± 0.991 in lingual surface after verbal intervention the was increased in labial surface and decreased in lingual surface. Mean plaque score of labial surface was 2.87 ± 0.462 , lingual surface was 2.5000 ± 0.534 . After the videotape intervention was 1.75 ± 0.462 in labial surface and 1.375 ± 0.517 in lingual surface. There was statistically significant different in after different intervention. At the base line in 17-20 years of age, patient's was 2.5833 ± 0.66856 in labial surface and 3.4167 ± 0.66856 in lingual surface after verbal intervention was increased in labial surface and decreased in lingual surface. Mean plaque score of

(Anova Test)	Mean	Sd	Mean	Sd
At Base Line	2.25	0.50	2.7778	0.666
After 3 Week	2.4444	0.726	2.3333	0.500
After 3 Months	2.22	0.44	1.5556	0.52

Anova 'F' Value	16.767		8.10	
P-Value	0.01(S)		0.02(S)	
	Mean	Sd	Mean	Sd
At Base Line	2.5833	0.668	3.4167	0.668
After 3 Week	2.6667	0.651	2.3333	0.651
After 3 Months	1.916	0.288	1.75	0.621
Anova 'F' Value	12.46		13.17	
P-Value	0.02(S)		0.001(Hs)	
	Mean	Sd	Mean	Sd
At Base Line	2.50	0.527	3.0	0.667
After 3 Week	2.80	0.632	2.5	0.707
After 3 Months	1.90	0.316	1.60	0.516
Anova 'F' Value	12.64		13.17	
P-Value	0.034(S)		0.002(Hs)	

labial surface was 2.6667 ± 0.65134 , in lingual surface was 2.3333 ± 0.65134 . After the videotape intervention was 1.916 ± 0.288 in labial surface and 1.75 ± 0.6215 in lingual surface. There was statistically significant different in after different intervention. In more than 20 years of age patient's mean plaque index score was 2.50 ± 0.527 in labial surface and 3.0 ± 0.667 in lingual surface after verbal intervention the mean plaque score was increased in labial surface and decreased in lingual surface, in labial surface was 2.80 ± 0.632 , in lingual surface was 2.5 ± 0.707 after the videotape intervention 1.90 ± 0.316 in labial surface and 1.60 ± 0.516 in lingual surface. There was statistically significant different in after different intervention.

DISCUSSION

The treatment of malocclusion with fixed orthodontic appliances changes the microbiological environment in the oral cavity. This is because the fixed orthodontic appliances introduce additional plaque retention sites

on tooth surfaces and encourage the accumulation of dental plaque and the proliferation of cariogenic and periodontopathic microorganisms. This results in an increase in periodontal pocket depth and bleeding on probing. Difficulty in maintaining the oral hygiene in orthodontic patients leads to chronic hyperplastic gingivitis with increased pocket depths, white spot lesions, decalcifications, and cavity formation etc. The orthodontist should educate and motivate the patients to maintain excellent oral hygiene protocol. The orthodontist can motivate the patients by utilizing different oral hygiene intervention aids such as written instructions, demonstration on a model or a video on the oral hygiene protocols to be followed during orthodontic therapy.

Boyd et al.¹⁹ found that even in patients with periodontal diseases before orthodontic treatment, their periodontal health condition was the same as general patients during and after treatment if they paid attention to oral hygiene care and followed oral hygiene instruction at regular times during orthodontic treatment. **Sava Matić et al.**¹⁸ found that children given oral instructions undergoing orthodontic treatment had a positive effect both on oral hygiene quality and gingival state. **Zafar-ul-Islam et al.**²³ found that plaque accumulation is significantly decreased in subjects who brush the teeth twice or more than twice a day and those who brush their teeth after breakfast. The use of interdental brush and stainless steel ligatures had significantly low plaque. Subjects presenting with more frequent appointments of short-period had significantly less plaque.

Yeung¹⁷ conducted an oral hygiene program consisting of four weekly sessions of oral health education, instruction of plaque control techniques, and reviews in the plaque removal performance. They

have found significantly lower bleeding on probing (BOP), gingival index (GI), and plaque index (PI) scores in the experimental group.

Boyd¹² evaluated the effectiveness of the self-monitoring plaque control. He determined that the plaque control instruction using a disclosing solution was more effective in plaque elimination when compared to the group receiving only plaque control instructions.

The present study was designed to check the efficacy of different oral hygiene interventions in patients undergoing orthodontic treatment. An oral hygiene regimen was recommended to the patients at the onset of the orthodontic treatment. The mean plaque Index scores of patients with fixed orthodontic appliances who received different types of oral hygiene instructions were evaluated. The null hypothesis of this study was that patients receiving verbal instructions demonstrated on models and shown videotape instructions to have no changes on the oral hygiene status of the patient. The results disproved the null hypothesis as there was a significant difference between the two methods. After three months patients receiving video tape instructions had lower mean plaque index scores as compared to those who received verbal instructions demonstrated on a model. The results were statistically significant ($p < 0.05$).

In the present study the mean age of the study participants were 18.6 ± 2.14 years. 13 study participants were 14-16 years of age, 7 participants were 17-19 years of age and 10 participants were 20-22 years of age.

At the base line mean plaque index was 2.4667 ± 0.628 in labial surface and 3.1000 ± 0.661 in lingual surface after verbal intervention demonstrated on a model the mean plaque score was increased in labial surface

(2.7667 ± 0.727) and decreased in lingual surface (2.4333 ± 0.626). The increase plaque index on the labial surface was due to the increase in the plaque accumulation sites after

the placement of the fixed orthodontic appliance. Our results agree with the findings of **SHU-YAO WANG** on the effect of an oral hygiene instruction intervention on plaque control by orthodontic patients, who found a statistically significant difference between the trial (3.91 ± 0.77) and control groups (1.47 ± 1.22) after verbal intervention recordings versus the baseline recording ($p < 0.001$). This shows that the oral hygiene instruction intervention significantly decreased the plaque and gingival index scores in the trial group. Same result was found in present study.

After videotape intervention, the mean plaque score decreased in both the labial surface and lingual surface. Mean plaque score of labial surface was 1.8667 ± 0.345 , which was statistically significant (p -value ± 0.04). Mean plaque score of lingual surface was 1.6000 ± 0.542 , which was highly significant (p -value ± 0.001). In males after the videotape intervention mean plaque index was 1.9048 ± 0.300 in labial surface and 1.6190 ± 0.589 in lingual surface. In females after the videotape intervention mean plaque index was 1.77 ± 0.044 in labial surface and 1.56 ± 0.52 in lingual surface. Mean plaque score was reduce after the videotape intervention when compared to base line readings. Our results agree with the findings of **Adele Lees et al**¹ on the comparison between written (2.62 ± 1.96) verbal (2.14 ± 1.58) and videotape (1.91 ± 2.2) oral hygiene instruction for patient with fixed appliances, who found the plaque index, was highly reduce after the video tape intervention (p -value ± 0.001).

CONCLUSION

A high standard of oral hygiene care is essential for patients undergoing orthodontic treatment. The oral health condition of patients with fixed orthodontic appliances can be improved by proper communication of the required information and repeated motivation and oral hygiene instructions. This study found that general oral hygiene care, convenient cleaning instruments, demonstration of oral hygiene technique and video tape can produce a better effect, and so clinical practitioners should not ignore the importance of oral hygiene instructions. Oral instructions alone, at the orthodontist's clinic, would not be sufficient to maintain excellent oral hygiene that is required during orthodontic treatment. Other methods for patients' education and motivation should also be employed. According to this study, and within the limitations of sample size, it could be stated that the orthodontists needs to emphasis more on the education and awareness in the field of oral hygiene instructions which must be given to the patients during any orthodontic treatment.

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