Evaluation of Orthodontists Knowledge About Maintenance of Oral Hygiene in the Course of Active Orthodontic Management

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Abstract

Objective: To assess orthodontist's knowledge about maintenance of oral hygiene in the course of active management in the sub-population performed in Saudi Arabia.

Methods: The cross-sectional plan, performed in multiple dental treatment facilities including governmental hospitals and private dental clinics in Abha City, KSA, between November 10, 2019 and December 29, 2019. A total of 500 individuals were selected according to the following inclusion criteria which was male and female during orthodontic treatment patients wearing fixed orthodontic appliances for at least 6 months which aged between 10-30 years. Sample size was calculated through Rao soft software. Data was collected through non probability purposive sampling. The exclusion criteria were uncooperative and unresponsive patients. A structured questionnaire assessed demographic characteristics of patients (age, gender) and orthodontists' knowledge about maintenance of oral hygiene of patients in the course of active management. They evaluated frequency of tooth brushing, tooth paste selection, usage of several fluoride supplements etc. For categorical data, mean and standard deviation were used, descriptive statistics was described as frequency and percentage. For the evaluation of association among categorical variables, a Chi-square test was used. Statistically significant $p < 0.05$ was considered significant.

Results: About 500 patients participated in this study, 50% females and 50% males. 130 (26%) participants were treated in governmental facilities, while 370 (74%) were treated in private clinics. The association between orthodontists' awareness and orthodontist's age was found statistically significant "p=0.004". Statistically significant correlation among orthodontists' awareness and place of receiving orthodontic treatment "p=0.001" was also found.

Conclusion: The orthodontists' knowledge about maintenance of oral hygiene in the course of active management in subpopulation of Saudi Arabia is insufficient in patient's opinion and there is significant association between orthodontist's age and place of treatment.

Keywords: Orthodontists, Orthodontics, Awareness, Oral Hygiene, Patients

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Introduction

Orthodontics is the branch of dentistry which deals with the misaligned teeth[1]. Orthodontic treatment has many perceived advantages in upgrading aesthetics, function, and confidence in patients. Due to brackets, wires and other stuff it may cause undesirable effects such as enamel demineralization, tooth decay, and gingivitis[2]. Past studies have shown that, when compared to untreated control teeth, orthodontic treatment can lead to prompt increased demineralization or white spot lesions on buccal surfaces of teeth bonded with fixed appliances. Orthodontic braces can impede oral hygiene and promote halitosis. A study was conducted to investigate the effect of the oral probiotic Streptococcus salivarius M18 on oral hygiene indices and halitosis in patients wearing orthodontic braces. The results reported that Probiotic Oral S in patients with orthodontic braces, salivarius M18 decreased the level of halitosis, but had limited effects on PI, GI, and dental biofilm microflora[3].

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The most common problem associated with hygiene of these brackets is the accumulation of plaque around them. Plaque is a thin film of polysaccharides, microorganism and salivary pellicle on the tooth surface. Too much plaque retention around brackets and attachments is the reason for the white spot lesions[4]. These white spots may lead to the formation of tooth cavitation if left untreated. In addition, if formed around the cervical third of tooth adjacent to gingiva it may lead to the initiation of gingivitis and periodontal pockets. Moreover, plaque retention can result in excessive development of hyperplastic gingivitis and periodontal breakdown. Indeed, bad hygiene and ineffective cleaning during orthodontic treatment is related to more noteworthy occurrence of white spots lesions. Therefore, it is a necessary practice to keep adequate oral hygiene among patients undertaking fixed orthodontic treatment so as to avoid dental caries and gingival inflammation[5].

There are many methods available for the prevention of caries and plaque in and around the brackets. The most effective method is manual use of tooth brush with adequate time and frequency. Although there could be other methods which employ constant reminders and education to the patients during active treatment phase[6]. To test the effects of automated messages on oral hygiene, a blind, prospective, randomized controlled trial was planned. Subjects were recruited from patients receiving orthodontic treatment at the Department of Orthodontics, Texas A&M University College of Dentistry. The results shown that Daily text messages are more effective than weekly text messages at improving oral hygiene[7].

Similarly use of other mechanical devices for example dental water jet has also been studied which may help in effective plaque removal and prevention of dental diseases. Various researchers evaluate the influence of fixed orthodontic equipment in the deposition of supragingival plaque. Good management of oral hygiene is required in patients wearing fixed orthodontic appliances to prevent complications such as deterioration, enamel demineralization, gingivitis, gingival hyperplasia, and periodontitis. The purpose of this Randomized Controlled Trial (RCT) is to determine the effectiveness of Dental Water Jet in patients undergoing orthodontic care with a fixed multi-bracket unit. In orthodontic patients wearing a multi-bracket fixed appliance, the dental water jet does not greatly enhance the effectiveness of home oral hygiene. During the entire orthodontic therapy, patients did not demonstrate the typical deterioration[8].

Orthodontic students and postgraduates have been taught to advice oral hygiene practices during their training period and clinical practice[9]. The training and knowledge help them to guide patients about maintenance of their oral hygiene which may prevent the unfavourable consequences during active orthodontic treatment. The orthodontist has a dual task to prevent such issues, namely to advise the patient on plaque management measures during care, during regular visits, and to monitor the efficacy of the oral hygiene regimen. The three key methods of patient education used in medicine and dentistry are verbal, written documents, and videotapes[10]. The least successful seems to be written instructions. The advantages of video presentation have been defined as convenient and clear demonstration of relevant content, with the opportunity for self-learning in comfort and privacy. To the researcher's knowledge, there is lack of studies about orthodontist's knowledge and practice about maintenance of oral hygiene in the course of active management in subpopulation of Saudi Arabia. Therefore, this study aims to assess orthodontist's knowledge about maintenance of oral hygiene in the course of active management in subpopulation of Saudi Arabia.

Patients and Methods

The cross-sectional study design was done in multiple dental treatment facilities including government hospitals and private dental clinics in Abha City, KSA, during the period between November 10, 2019 and December 29, 2019.

A total of 500 individuals were selected according to the following inclusion criteria which was

male and female during orthodontic treatment patients wearing fixed orthodontic appliances for at least 6 months which aged between 10-30 years. The exclusion criteria were uncooperative and unresponsive patients. Patient's undergone complex orthodontics involving surgical procedure. Data was collected through non probability purposive sampling. The sample size was calculated using Rao soft software using 95% confidence interval, population size of 500[11], margin of error was 5% and response distribution of 50%. Sample of 218 was calculated. However, we selected 500 participants in order to make the results more representative of the population. The data was collected from patients on structured questionnaire which was designed to assess the attitudes and actions of orthodontists regarding performance about instructions given to patients about orthodontic treatment. The questionnaire assessed demographic characteristics of patients (age, gender) and details concerning instructions obtained by patients from their orthodontists related to tooth brushing habits, tooth paste selection, usage of several fluoride supplements etc.

Data was analysed on SPSS version 17.00. Responses scored on a 0-2 point scale. 0= low level, 2= optimal answer. For categorical data and mean and standard deviation was used, descriptive statistics were described as frequency and percentage. For the relation between categorical variables, a Chi-square test was used. Statistically meaningful $P < 0.05$ were considered.

Results

Table 1. revealed that 50% were females and males. Mostly fall in the age range of 21 to 25 years i.e., 171(34.2%). Majority patients were treated in private clinics i.e., 370(74%).

Table 2. shows response of patients regarding instructions given to patients for oral hygiene maintenance. Majority patients responded that the orthodontist remind the importance of tooth brushing on every visit 191(38.2%) with thrice a day brushing frequency 48.2%. Approximately 127(25%) patients responded that orthodontist instruct you on how to brush correctly your teeth but did not evaluate the performance.

Table 3. shows Orthodontists instructions to patients regarding brushing tools. About 66.2% participants agreed for the recommendation of type of toothbrushes used by their Orthodontist and 53.4% reported that they did not know the use of super floss by their Orthodontist during orthodontic treatment. Approximately 53.0% participants agreed for the lack of referral to dentist for routine dental treatment. About 59% patients reported that their orthodontist did not specifically recommend the use of fluoridated tooth paste during orthodontics treatment.

Table - 4 shows the distribution of awareness items regarding fluoride. Majority 51% patients responded that their orthodontists did not advise the use of fluoride oral rinses and 74.8 % reported that the orthodontist did not recommend to brush the teeth once a week with high concentrated fluoride gel (Elmex gel). along with recommendation of fluoridation at the dental office by a gel or varnish approximately 71.2% reported that he never discussed the use of gel or varnish fluoridation at the dental office.

Table 5. shows p- value of different variables with Orthodontists awareness of oral hygiene instruction to the patients. It shows statistically significant p-value for patient's age and place of treatment.

Discussion

Subjects undergone orthodontic treatment are increasingly vulnerable to gingivitis and enamel defects[11]. Proficient mechanical expulsion of salivary plaque was demonstrated during plaque removal[12]. Extra powerful preventive measures incorporate utilization of a few fluoride enhancements and referral of the patients to standard follow-up arrangements[13]. Incidentally, numerous patients experiencing orthodontic treatment still neglect to keep up a satisfactory standard of plaque control and experi-

Table 1. The distribution of demographic data in study group (n=500)

	N	%
Gender		
Female	250	50.0
Male	250	50.0
Age		
10-15.	12	2.4
16-20.	158	31.6
21-25.	171	34.2
26-30.	159	31.8
I treat on		
Public	130	26.0
Private	370	74.0

Table 2. Showing response of patients regarding instructions given to patients for oral hygiene maintenance. (n=500)

Did your orthodontists explained to you the importance of tooth brushings during the orthodontic treatment?	N	%
Yes, every visit	191	38.2
Only occasionally	181	36.2
Yes, only once	86	17.2
Never	42	8.4
What frequency your orthodontist recommended to brush your teeth?		
Three time a day	241	48.2
Twice a day	149	29.8
Once a day	31	6.2
Did not mention	79	15.8
Did your orthodontist educate you in what way to brush appropriately your teeth or refer you to a hygienist for this purpose?		
Yes, but did not assess enactment	127	25
Yes, and assess the enactment every visit	76	15
Yes, and evaluate performance occasionally	63	12
Yes, only once	75	15
No	159	31

Table 3. Showing Orthodontists instructions to patients regarding brushing tools. (n=500)

Did your orthodontist informed you which toothbrush is recommended to use during orthodontic treatment?	N	%
Yes	331	66.2
No	169	33.8
Did your orthodontist informed you about use super floss?		
Yes	233	46.6
No	267	53.4
Did your orthodontist refer you to your dentist for routine dental examination?		
Yes, once	132	26
Yes, and reminded me occasionally	103	20
He never mentioned it	265	53
Did your orthodontist instruct you on what is the recommended fluoride concentration in the tooth paste to use?		
Yes, once	86	17
Yes, and reminded me from time to time	61	12
Yes, when I asked about toothpaste	54	10
Did not mention	299	59

2**Table 4.** Showing orthodontists instructions to patients regarding fluoride use. (n=500)

	N	%
Did your orthodontist recommend you to perform fluoride oral rinses?		
Yes, once	111	22.2
Yes, and reminded me occasionally	77	15.4
Yes, when I asked about oral rinses	57	11.4
He never mentioned it	255	51.0
Did your orthodontist recommend you to brush your teeth once a week with high concentrated fluoride gel (Elmex gel?)		
Yes, once	76	15.2
Yes, and reminded me occasionally	50	10.0
He never discussed it	374	74.8
Has your orthodontist suggested that you perform gel or varnish fluoridation at the dental office?		
Yes, once in three months	88	17.6
Yes, and sometimes he reminded me,	56	11.2
He never discussed it, never said it,	356	71.2

Table 5. Showing p-value of different variables with Orthodontists awareness of oral hygiene measures. (n=500)

S.no	Variable	p-value
1	Gender	0.183
2	Age	0.004*
3	Place of treatment	0.001*

ence the ill effects of gingivitis and enamel defects. The purpose behind this may be either the clinicians don't emphasize on the importance of oral hygiene measures during and after orthodontic treatment, does not remind patients about regular follow up of instructions for oral hygiene along with lack of patient's compliance to follow the instructions and maintain frequency and time needed for effective plaque control[14].

Correspondingly, this study purposes to assess awareness of orthodontists through regards to oral hygiene maintenance of their patients as per patients' judgment.

It has been reported that hand tooth brush along with fluoridated tooth paste is an effective method for the removal of plaque and dental diseases[15]. In the current study, 92% reported that they were counselled for the importance of tooth brushing by their orthodontist and 40% reported to be asked for traditional tutoring for tooth brushing once in the course of orthodontic therapy. These findings are in concor-

dance with Berlin-Broner et al[14] where 94% stated that patients established description on the significance of tooth brushing and 85% them acknowledged education for tooth scrubbing at minimum once during the orthodontic treatment. Similar findings were reported by Hobson and Clark[15] where 100 percent of the orthodontists advised routine use of a toothbrush for oral hygiene.

In the present study 33.8% of the orthodontists did not recommend which type of toothbrush to use. This finding is in concordance with a number of studies. Berlin-Broner et al[14]. report 41% of orthodontists did not recommend the type of toothbrush to be used, while Hobson and Clark[15] report 20% of the orthodontists recommended manual toothbrushes and 8% recommended electric toothbrush. The explanation for this could be that it is primarily dental hygienists' duty to instruct the patients about oral hygiene measures during active orthodontic treatment. Albeit 32% of the patients in the current investigation stated that they were not referred to a hygienist and 53% were not referred by their orthodontist to routine dental assessment.

With regards to fluoride supplementations, current study results showed around 60% of the patients stated about the lack of instructions about the use of fluoridated toothpaste and its concentration during treatment. It should be noted that majority patients of orthodontics are generally children, they need extra fluoride for meticulous removal of plaque. This rate is lower than that reported by the orthodontists in recently published studies[16].

The role of mouth washes for effective plaque control can never be neglected. Along with tooth brushing it is helpful to reduce the bacterial count around the brackets and wires. These medications also assist orthodontic patients who have trouble maintaining plaque control through mechanical methods alone. Although chemical agents cannot replace the use of mechanical inter dental tooth brushing and interproximal washing[17,18]. Patients in the present study probably won't remember the proposals they have been instructed about mouth washes, or they may be recalled once and it was not checked by the orthodontist during the accompanying visits[19].

In the current study, the association between orthodontists' awareness and participants' age was found statistically significant "p=0.004". This finding could be due to the fact that as patients grow older, they tend to become more aware of their oral hygiene and hence ask for recommendations from their orthodontists. A study conducted in Syria, published in 2010, revealed that the goal of developing "really nice" to "awesome" standards of oral hygiene in patients among orthodontists in this study sample during orthodontic care is not yet well appreciated. Even more learning for orthodontists is also required in this area[20].

Moreover, there was a strong connection between the realization of orthodontists and place of receiving treatment "p=0.001". This finding is crucial with respect to the treatment facility and the policy running in it. Although many studies have been published to evaluate the effect of various factors on orthodontic treatment but none has studied the effect of place of treatment on orthodontist realization[21-23].

There were some limitations in time, resources and participants' cooperation. Cross sectional study design and small sample size were also the limitations of study.

As indicated by the present study which is according to patient's judgment orthodontists ought to improve their attention to patients' dental wellbeing by educating them on the significance of tooth brushing, technique of tooth brushing and utilization of fluoride supplementation. They must be referred consistently for regular check-ups by their dental hygienists. More attention should be drawn towards applying policies in treatment facilities to educate orthodontists on the importance of their awareness. In order to discover the real factors that decide the relationship between the dentist and the patient, further studies are needed and also to learn how to monitor the actions of the patient in the dental clinic.

It is recommended that refresher courses must be planned for the Orthodontists and postgraduate trainees to revive their attentions towards their patient's oral hygiene practices during active orthodontic treatment along with education of orthodontic patients to comply with orthodontist instructions for their oral hygiene maintenance.

Conclusion

The orthodontists' knowledge about maintenance of oral hygiene in the course of active management in subpopulation of Saudi Arabia is insufficient in patient's opinion and there is significant association between orthodontist's age and place of treatment.

Conflict of Interests

Authors have no conflict of interests and received no grant/funding from any organization.

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Answer of Picture Quiz

Right External Angular Dermoid Cyst