

Orthodontic Treatment and Oral Hygiene from the Patients' Perspective

Hastaların Bakış Açısından Ortodontik Tedavi ve Oral Hijyen

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ABSTRACT

Objective: Present study aims to investigate patients' oral hygiene habits, their perspective of the relationship between orthodontic treatment and periodontal health, and the effectiveness of oral hygiene education (OHE).

Materials and Methods: In this cross-sectional study, subjects were randomly selected among the patients who were under active fixed orthodontic treatment. 100 patients with a mean age of 16.4 years (range: 13-28 years) was included. Patients were asked to join a paper-based survey of 20 questions at the end of their routine orthodontic session. At the end of survey, group A received OHE conventionally on a dental model using orthodontic and interdental toothbrushes; group B received OHE visually with a digital video on a personal digital assistant (PDA). Patients were asked to reply the last question after the OHE to assess the retention of key concepts from the education.

Results: 46% believed that orthodontic materials are harmful for their oral health and 39% thought that orthodontic treatment and oral hygiene are independent. 36% confirmed that they received OHE, and 25% of these patients do not think that OHE helps with their orthodontic treatment. 88% of the patients stated that the OHE given at the end of the survey was beneficial while the remaining 12% found it unhelpful.

Conclusion: Patients were unable to realize the benefits of OHE adequately at the first bonding session. The use of audiovisual animations like short digital videos were found to be more effective method for patient education compared to conventional methods.

Keywords: Orthodontics, Oral Hygiene, Health survey, Audiovisual aids

ÖZ

Amaç: Bu çalışma, hastaların ağız hijyeni alışkanlıklarını, ortodontik tedavi ile periodontal sağlık arasındaki ilişkiye bakış açılarını ve ağız hijyeni eğitiminin (AHE) etkinliğini araştırmayı amaçlamaktadır.

Gereç ve Yöntemler: Bu kesitsel çalışmada denekler aktif sabit ortodontik tedavi gören hastalar arasından rastgele seçilmiştir. Ortalama yaşı 16,4 yıl (dağılım: 13-28 yıl) olan 100 hasta dahil edildi. Hastalardan rutin ortodontik seanslarının sonunda 20 soruluk kağıt tabanlı bir ankete katılmaları istendi. Anketin sonunda A grubu, ortodontik ve interdental diş fırçaları kullanan bir diş modelinde geleneksel olarak AHE aldı; B grubu, AHE'yi bir kişisel dijital asistan (PDA) üzerinde dijital bir video ile görsel olarak aldı. Eğitimden anahtar kavramların akılda tutulmasını değerlendirmek için hastalardan AHE'den sonraki son soruyu yanıtlamaları istendi.

Bulgular: %46'sı ortodontik malzemelerin ağız sağlığına zararlı olduğuna inanırken, %39'u ortodontik tedavi ve ağız hijyeninin bağımsız olduğunu düşündü. %36'sı AHE aldığını doğruladı ve bu hastaların %25'i AHE'nin ortodontik tedavilerine yardımcı olduğunu düşünmüyor. Hastaların %88'i anket sonunda verilen AHE'nin faydalı olduğunu belirtirken, kalan %12'si yararsız bulmuştur.

Sonuç: Hastalar ilk bonding seansında AHE'nin faydalarını yeterince anlayamadıkları görüldü. Kısa dijital videolar gibi görsel-ışitsel animasyonların kullanılmasının hasta eğitiminde geleneksel yöntemlere göre daha etkili bir yöntem olduğu görüldü.

Anahtar Kelimeler: Ortodonti, Ağız hijyeni, Sağlık anketleri, Odyovizüel araçlar

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Submitted / Gönderilme: 26.08.2022

Accepted/Kabul: 28.11.2022

INTRODUCTION

Teeth move in a periodontal surrounding. The health and hygiene of these tissues directly affect orthodontic treatment starting from treatment planning throughout the mechanics and treatment progress, until the treatment outcome. Therefore, understanding of the biological basis of the relationship between orthodontics and periodontology is one of the keys for a successful orthodontic treatment.

The nature of orthodontic appliances makes it difficult to maintain proper oral hygiene, requiring special care. Doctors have a control over the mechanics and appliances but it is the patients who have an active role in maintaining oral care. For the patients to supply this special care, it is very important that they understand the underlying justifications. In the literature the relationship between fixed orthodontic treatment and some adverse conditions (such as white spot lesions, gingivitis, increased probing depth, increased crevicular fluid volume, increased bleeding on probing, white spot lesions, increased anaerobic microbial flora, and even loss of alveolar bone and periodontal attachment) has been documented (Bollen et al., 2013; Weltman et al., 2010; Höchli et al., 2017; van Gastel et al., 2008). However, most of these problems are transient and can actually be prevented with proper oral hygiene education, patient awareness and motivation (Gomes et al., 2007).

As clinicians, we try to give proper oral hygiene education (OHE) and inform our patients about the importance of oral care both for their personal well-being and orthodontic treatment success. However, despite our efforts, we may sometimes be disappointed with what we encounter in the patients' mouth. This present study aims to investigate patients' oral hygiene habits; their perspective of the relationship between orthodontic treatment and periodontal health, and to evaluate the effectiveness of OHE in a group of patients who are undergoing fixed orthodontic treatment.

MATERIALS AND METHODS

The Ethical Committee of Marmara University, Faculty of Dentistry approved the study with the protocol number 2020-386. Signed informed consent was obtained from patients and their parents. Data from 100 patients with a mean age of 16.4 years (range: 13-28 years) was included in the study and analyzed. A survey of 20 questions was prepared (Table 1). Patients were asked to join a paper-based survey in a private location at the end of their routine orthodontic session. They were randomly assigned to one of the two groups. At the end of survey, group A received OHE conventionally on a dental model using orthodontic and interdental toothbrushes; group B received OHE visually with a digital video on a personal digital assistant (PDA). Patients were asked to reply the last question after the OHE to assess the retention of key concepts from the education. The same investigator performed the surveys and oral hygiene instructions for all patients and the education process in both groups lasted about 10 minutes.

Table 1: The questionnaire with the percentage of answers given

Date:	
Name-Surname:	
Sex:	
<input type="checkbox"/> Male	47%
<input type="checkbox"/> Female	53%
Educational status:	
<input type="checkbox"/> Primary school	0%
<input type="checkbox"/> Secondary school	36%
<input type="checkbox"/> High school	41%
<input type="checkbox"/> University	21%
<input type="checkbox"/> MSc	2%
<input type="checkbox"/> Phd	0%
Employment:	
<input type="checkbox"/> Yes	29%
<input type="checkbox"/> No	71%
Profession:.....	
Do you smoke?	
<input type="checkbox"/> Yes (.... cigarettes /day)	39%
<input type="checkbox"/> No	61%
Do you think that the orthodontic appliances used during your treatment are harmful for your gingiva and teeth?	
<input type="checkbox"/> Yes	46%
<input type="checkbox"/> No	54%
Do you think that there is a correlation between oral hygiene and orthodontic treatment?	
<input type="checkbox"/> Yes	61%
<input type="checkbox"/> No	39%
Do you think that orthodontic treatment makes it difficult to maintain oral hygiene?	
<input type="checkbox"/> Yes	62%
<input type="checkbox"/> No	38%
Did you receive oral hygiene education (OHE) previously?	
<input type="checkbox"/> Yes	36%
<input type="checkbox"/> No	64%

If yes, please explain **when** and **where**:

- when: where:

If yes, do you think that this OHE helped you with your orthodontic treatment?

- Yes 75%
 No 25%

Which of the following tools do you use during your orthodontic treatment?

- Tooth brush 81%
 Interdental brush 21%
 Dental floss 8%
 Mouthwash 27%

Why do you prefer to use this/these oral hygiene tool(s)?

- Orthodontist advised 45%
 Comfortable to use 52%
 Efficient 57%
 Cheap/Easy to afford 41%
 Other: 14%

Do you think that you use your oral hygiene tool(s) in the correct way?

- Yes 51%
 No 49%

Do you use your oral hygiene appliance regularly?

- Yes 46%
 No 54%

How often per day do you use your oral hygiene tools?

- Once 40%
 Twice 55%
 Three times 5%

Do you think that your oral hygiene tool is efficient enough?

- Yes 57%
 No 43%

OHE . . . (to be signed by the investigator)

- A – Verbally on model 50%

- B – Visually on video 50%

Do you think that the OHE was beneficial?

- Yes A – 40% B – 48%
 No A – 10% B – 2%

According to the OHE that you just listened to, which of the following is correct?

Toothbrush should be moved with horizontal movements to and fro, in contact with the teeth and braces & interdental brush should be horizontally applied to interdental area and clean adjacent teeth surfaces by contacting them

Tooth brush should be moved up and down with straight movements from gingiva towards teeth from front to back, in contact with the teeth and braces & interdental brush should be applied perpendicularly and with a strong force to interdental area and clean adjacent teeth surfaces by coarse contact

Tooth brush should be moved from gingiva towards teeth in round movements, and then angulated to contact the teeth and braces from under and above again with round brushing movements & interdental brush should be applied to interdental area perpendicularly and with a light force and clean adjacent teeth surfaces by contacting them with light vibrations

Inclusion criteria were receiving active fixed orthodontic treatment longer than 6 months, volunteering to join the study, fulfilling the questionnaire including the oral hygiene education at the end, normal physical, systemic and mental status. Exclusion criteria were receiving fixed treatment for less than 6 months, incomplete surveys, failure to complete oral hygiene education, periodontally compromised patients, poor physical, systemic or mental condition. All participants provided written informed consent after receiving explanations of study objectives and procedures.

As a rule of thumb, all patients were instructed to complete all necessary dental treatments (such as fillings, root canal treatment, periodontal treatment) prior to orthodontic treatment. All patients were given oral hygiene education (OHE) by their orthodontists at the first appointment after brackets were bonded.

The main outcome measure of this study is the evaluation of personal habits and awareness in oral care of the orthodontic patients. Secondary outcome measure is the effectiveness of the first and the second OHE.

Statistical Analysis

In this cross-sectional study, the subjects were randomly selected among the patients who were under active fixed orthodontic treatment in the Orthodontic Department of Marmara University Dental Faculty. Sample size of the study was calculated as 47 with G*Power Version 3.1.9.2, considering a previous study (7) and 0,5 effect size, 95% power and %5 Type I error. After data collection was completed, the responses to the surveys were evaluated. Distributions of important variables were graphed and descriptive statistics calculated.

RESULTS

Table 1 displays the questions in the survey and the percentage of given answers. Table 2 summarizes the descriptive statistics of the study sample. 39% of the employed patients were smokers. Table 3 shows the chart of the responses to questions concerning orthodontics and oral hygiene. 46% believed that orthodontic materials are harmful for their oral health and 39% thought that orthodontic treatment and oral hygiene are independent. Table 4 displays the chart of responses to questions concerning oral hygiene education. 36% stated that they received OHE, and 25% of these patients do not think that OHE helps with their orthodontic treatment. 81% confirmed using tooth brush and they mostly preferred it for its efficiency (57%) and the ease of use (52%). 51% thought that they use the oral hygiene instrument in the correct way and 46% confirmed using it regularly, with 55% using it twice a day. 57% find their oral hygiene instrument inadequate for proper cleaning. 88% of the patients stated that the OHE given at the end of the survey was beneficial while the remaining 12% found it unhelpful.

Table 2: Summary of sociodemographic characteristics for entire sample

Study variable	Descriptive statistics
Sample size (n)	100
Gender -- male	47 (47%)
Age (years)	16.4±4.8
Educational status	
Primary school	0 (0%)
Secondary school	36 (36%)
High school	41 (41%)
University	21 (21%)
MSc	2 (2%)
Phd	0 (0%)
Employment	29 (29%)

Table 3: Patients’ response to questions concerning orthodontics and oral hygiene

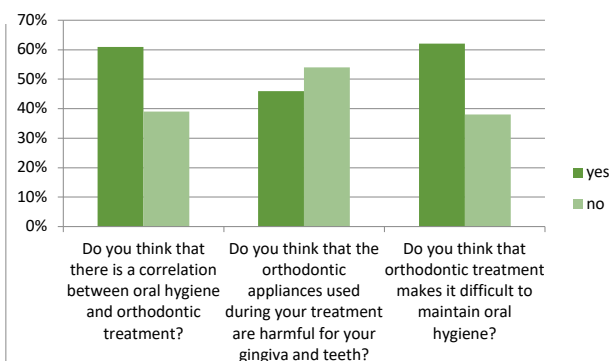
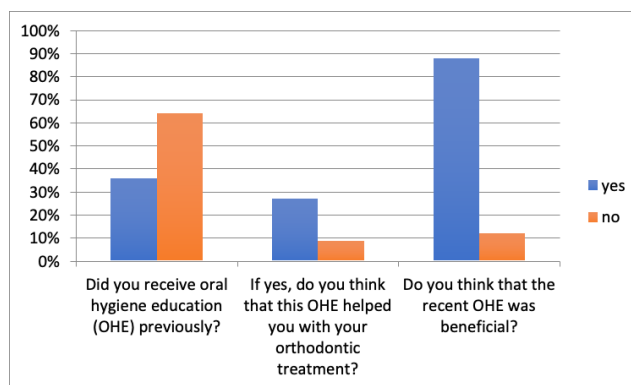


Table 4: Patients’ response to questions concerning oral hygiene education



DISCUSSION

Clinicians spend time to understand patients’ concerns and to communicate their own point-of-views and instructions about diagnosis and treatment plan. While both parties may think that they understand each other and communicate their own concerns well enough, the actual situation may not be as such. All in all, the wisdom that one can transfer is as much as the listener comprehends. In our orthodontic department, despite the attention we pay to give oral care instructions at the bonding appointment and continue to warn patients at monthly visits in case of necessity, we may fail to be content with the oral hygiene status of most patients. The aim of the present study was to evaluate patients’ perspective of the relationship between orthodontics and their oral hygiene and their conception of oral hygiene instructions.

Questionnaires are used in a wide range of settings in all fields to collect information and evaluate the general opinion on a specific subject. In the literature, many studies

are based on questionnaires (Paillaud et al., 2018; Obeidat et al., 2018; Fleming et al., 2018; Mafla et al., 2019). With the emphasis on patient involvement for evaluation of treatment outcomes (patient related outcome measures), questionnaires are becoming more systematic, standardized and valuable tools that provide objective assessment from the patients' perspective (Baiju et al., 2017). This survey was performed on 100 patients whose mean age was 16.4 years (range: 13-28 years) and majority (71%) were students. According to the results of this survey, patients prefer to use toothbrush in the first place, as the main tool but the number of patients who use mouthwash and interdental brush is rather low. Only 50% of the patients brush their teeth twice a day and do it regularly. They also seem to have a tendency to blame the oral hygiene tool for ineffectiveness. 61% of the patients think that there's a correlation between orthodontic treatment and oral hygiene and that orthodontic appliances make it difficult to maintain oral hygiene. However, less patient (46%) find orthodontic appliances harmful for their gingiva and teeth. This may be an indicator of patients' awareness about the fact that rather than orthodontic appliances, poor oral hygiene is to be blamed for the adverse effects during treatment. However, this consciousness definitely needs to be increased.

Patient education has a gross role in treatment progress. It has been documented that informed patients are better at presenting positive health behaviors (Stone et al., 2001), participating at health decisions (Fairley et al., 2003) and adhering to medication regimens (Di Matteo et al., 2002; Simoni et al., 2003; Edworthy et al., 1999; Smith et al., 2003). For patient education, a clinician-led theory-based manner explaining why and how's with feedback from the patient is described as the ideal method. In a study that evaluated orthodontists' assessment and management of patient compliance, "verbally praising the patient" was selected as the most effective method for improving patient compliance among 24 methods in total (including various options such as charging additional fee, rewarding, reminding etc.). (Mehra et al., 1998). The following 9 of the top 10 methods were about educating the patient and parents about treatment goals and discussing the consequences of poor compliance.

In the present study, patients were given oral hygiene education at two time points. First OHE was given verbally by their orthodontists at the first bonding appointment, patients had a hand mirror and they were told how and which tools to use at this time. Second OHE was after 6-8 months, given by the same clinician at the end of the survey in one of two ways: either on a dental model using orthodontic and interdental

toothbrushes; or visually with a video on a PDA. Different from the first time, visual objects were included at the second OHE. It is an interesting finding of this survey that although all patients received OHE at the end of first bonding session, 64% replied that they did not receive OHE previously. This may be related to the fact that patients were more involved in their new appliances and esthetics at this first time experience. Moreover, at this first session, patients had no previous experience of brushing with the braces and arch wires. It may be a better idea to have an extra session a few days later when OHE is given separately to indoctrinate patients about this subject. They will be used to their appliances and will have experienced brushing with the appliances on. Then, they may have a more active participation at this session. 75% of those patients who recognized the first OHE found it helpful for their oral care. This may show that patients do benefit from a good oral hygiene education but they need and deserve a well arranged time and space which will increase their conception. The increase in the number of patients who found the second OHE helpful (88%) is also supporting this. Also, the last question was replied correct by a higher number of patients in group B (video group, 98%) compared to group A (model group, 90%).

CONCLUSION

In conclusion, this survey documents the following facts: firstly, the majority of patients in our university clinic were not paying enough attention to their oral hygiene in their daily life. Secondly, they did not benefit enough from OHE at the first bonding session. Finally, the use of audiovisual animations like short digital videos were a more effective method for patient education compared to conventional methods.

Main Points

- 46% of the patients participating in the survey believed that orthodontic materials are harmful for their oral health and 39% thought that orthodontic treatment and oral hygiene are independent.
- 57% of the patients find their oral hygiene instrument inadequate for proper cleaning.
- 88% of the patients stated that the OHE given at the end of the survey was beneficial while the remaining 12% found it unhelpful.
- 36% confirmed that they received OHE, and 25% of these patients do not think that OHE helps with their orthodontic treatment.

- The use of audiovisual animations like short digital videos were found to be more effective method for patient education compared to conventional methods.

Acknowledgements

None.

Conflict of interest

None.

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