

# Awareness of Orthodontic Patients about Oral Hygiene: A Cross-Sectional Study

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## ABSTRACT

**Introduction:** Maintaining excellent oral hygiene during orthodontic treatment is necessary to avoid the accumulation of plaque. Plaque can cause damage to teeth and gingiva.

**Aim:** In the current study, we aim to evaluate the status of oral hygiene awareness in people wearing orthodontic appliances in the Qassim province, Saudi Arabia.

**Settings and Design:** This is a cross-sectional questionnaire based study.

**Methods and Material:** A sample of 200 orthodontic patients from the Qassim region, aged  $\geq 16$  years old were asked to fill out an online questionnaire. The questionnaire has 5 main questions, all aiming to assess the oral hygiene status. The data were saved as an Excel sheet.

**Statistical Analysis Used:** We used Excel to calculate the statistics of each question.

**Results:** The collected data showed that all patients brush their teeth during the course of orthodontic treatment. Most of them used medium-type brushes. The most used extraoral hygiene aid was dental floss. Also, a high percentage of the participants (63.5%) used mouthwash during the course of their orthodontic treatment. A high number of the participants (n=178, 89%) were advised by their dentists to not eat sticky foods.

**Conclusion:** The majority of patients were aware of oral hygiene methods and had a good oral hygiene practice throughout their orthodontic treatment, although not at an ideal ratio.

**Keywords:** Orthodontic, Dentistry, Oral hygiene, Teeth

## INTRODUCTION

After tooth caries and periodontal disorders, malocclusion is the third most common dental and oral health condition. Malocclusion is a contributing factor to a variety of temporomandibular joint disorders, periodontal illnesses, speech difficulties, mouth breathing, and poor oral hygiene<sup>1</sup>. Orthodontic treatment corrects malocclusion and has a proven reputation for improving patients' appearance, function, and self-esteem<sup>2</sup>. However, enamel demineralization, tooth caries, and gingival inflammation can be caused by orthodontic appliances, which are all unpleasant side effects. Different studies found that patients wearing orthodontic appliances can have a higher degree of demineralization or white spot lesions on the buccal surfaces of the bonded teeth compared to untreated controlled patients<sup>3,4</sup>. The white spot lesions are provoked by excessive plaque retention near brackets and attachments<sup>5</sup>. According to Dilip, CL. a quick fall in oral cleanliness consistency after the placement of orthodontic appliances was found<sup>6</sup>. Orthodontic appliances can make brushing and flossing difficult<sup>6</sup>. A study showed that the plaque and bleeding indices, and pocket depth were all higher in orthodontic patients than they were in the general population<sup>7</sup>. Also, various types of anaerobic bacteria, such as *Bacteroides intermedius*, *Spirochetes*, *B.forsythus*, *Denticola*, *P.nigrescens*, *C.rectus*, and *fusiform bacteria*, are found in larger quantities in the dental plaque of

orthodontic patients<sup>8</sup>. Orthodontic patients are more likely to acquire dental caries because of the overall rise in *Lactobacilli* count in saliva and *Spirochete* and *Fusiform* bacteria count in subgingival oral flora<sup>8</sup>. Another study found that after three months of active orthodontic treatment, there were statistically significant increases in salivary flow rate, pH, buffer capacity, and plaque index (PLI) scores<sup>9</sup>. Also, pseudopockets can emerge as a result of gingival overgrowth during orthodontic treatment with fixed appliances. Pseudopockets do not cause gingival enlargement, but hyperplasia of gingival tissue leads to the creation of an artificially deep pocket<sup>9</sup>. Manschot A. described a patient who had extensive mucogingival alterations, such as gingival recession, as a result of orthodontic therapy and poor oral hygiene<sup>10</sup>.

In well-motivated patients, plaque accumulation and gingival inflammation can both be minimized<sup>11</sup>. As an assist to brushing and flossing, orthodontic patients are advised to use 20 mL of mouthwash twice a day<sup>12</sup>. Lee et al. found that about 64% of orthodontic patients were using a mouthwash during orthodontic treatment<sup>13</sup>. However, other studies reported lower use of mouthwash among orthodontic patients<sup>14-16</sup>. It has been suggested that the patients' overall oral hygiene can be improved significantly with continuous advice and monitoring by their orthodontists<sup>17</sup>. Patients should be informed about the need of

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maintaining regular dental hygiene before they begin their orthodontic treatment<sup>18,19</sup>. It is critical to demonstrate the correct tooth brushing approach and frequency to orthodontic patients<sup>19,20</sup>. They must learn about the proper toothbrushes, interdental brushes, orthodontic brushes, as well as oral hygiene assistant tools<sup>21,22</sup>. Maintaining good oral hygiene in patients receiving fixed orthodontic treatment to prevent tooth decay and gingival inflammation is a challenging responsibility. Several studies found that majority of orthodontic patients brush their teeth twice a day<sup>14,17,23</sup>. Orthodontic patients must take practical actions to maintain and enhance their oral health for orthodontic treatment to be successful and the risk of oral health problems linked with it to be minimized. Because oral hygiene habits and awareness play such a crucial part in oral health, this study aims to evaluate the current status of oral hygiene awareness in people wearing orthodontic appliances in the Qassim province, Saudi Arabia

### SUBJECTS AND METHODS

The study was approved by the Committee of Research Ethics, Deanship of Scientific Research, Qassim University (Date 24.11.2021, Number: 21-04-08). A sample of 200 orthodontic patients was included in this study. We included people from the Qassim region aged ≥16 years old. We only included people who were wearing orthodontic appliances with no physical disabilities.

The questionnaire used in our study was adapted from another study and it has five main parts<sup>24</sup>. All the questions aimed to assess the practical habits used by patients to maintain good oral hygiene. The questionnaire was translated into Arabic because the targeted group was not expected to fully understand the English language. The questionnaire was divided into three parts. In the first part, we explained the purpose of the study and the inclusion and exclusion criteria. The second part covered the demographic data such as gender and age. The third part consisted of five main questions, all aimed to capture the oral hygiene awareness and practices of orthodontic patients. Copies of the original and translated questionnaires are shown in **Appendix (I)**. An online survey (Google form) was used to collect participant data and responses. Information and responses were saved as an Excel sheet. We used a Microsoft Excel® spreadsheet (Microsoft Corp., Redmond, Washington, 2016) to analyse the data and obtain the percentages for each question.

### RESULTS

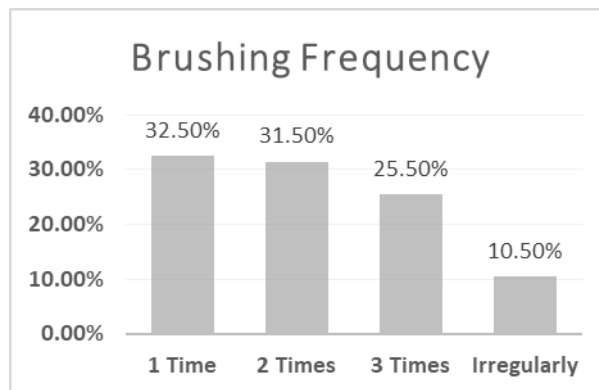
In total, 200 persons undergoing active orthodontic treatment filled the questionnaire, in which 51.5% were males and 48.5% were females.

**Table 1** shows that majority of the participants (65.5%) were in the second age group (21 and 30 years), followed by the first age group (20%, 16-20 years old).

**Table 1:** Demographic data of the participants

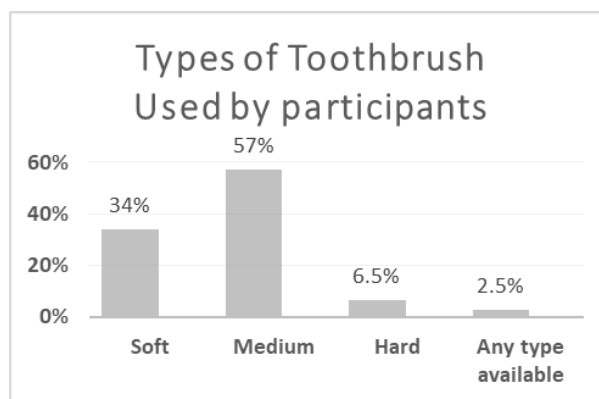
Gender n (%)	
Male	103 (51.5)
Females	97 (48.5)
Age groups	
16-20	40 (20)
21-30	131 (65.5)
31-40	14 (7)
>40	15 (7.5)

**Brushing Frequency and Tooth Brushing:** All participants in our sample brush their teeth during their orthodontic treatment. The brushing frequency is shown in **Figure 1**.



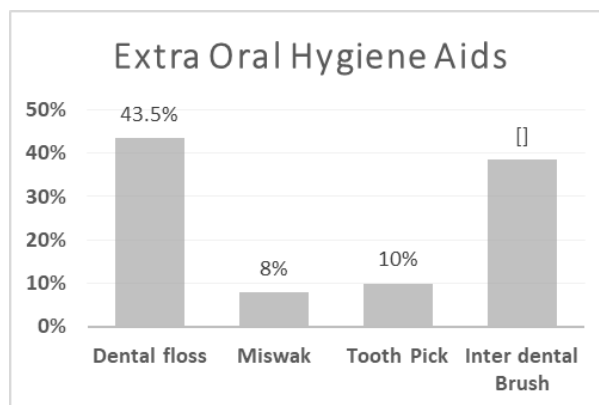
**Figure 1:** Brushing frequency of the current sample

**Types of Toothbrushes Used for Brushing:** Most orthodontic patients in our study used medium-type brushes. The percentages of each type used by the participants are shown in **Figure 2**.



**Figure 2:** Type of toothbrushes used by the participants

**Use of Extraoral Hygiene Aids:** A sample of 142 participants (71%) said that they were using extraoral hygiene aids. The most used extraoral hygiene aid was the dental floss followed by the interdental brush. **Figure 3** shows the percentages of extraoral hygiene aids used by orthodontic patients.



**Figure 3:** Extraoral hygiene aids used by the participants

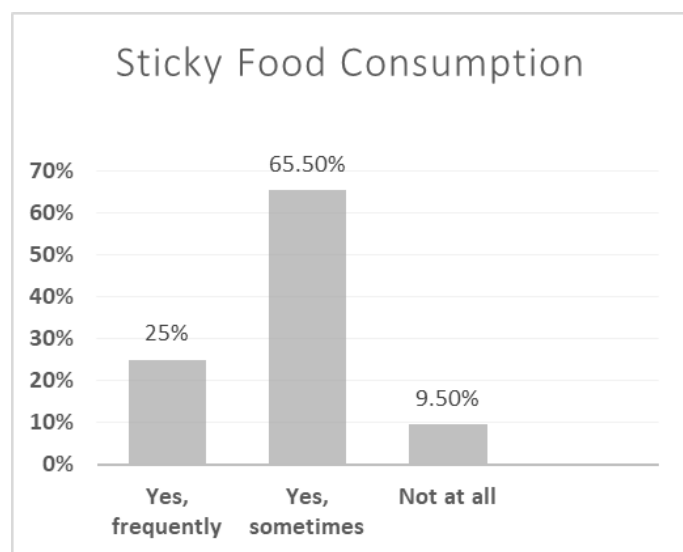
**Use of Mouthwash:** A sample of 127 respondents (63.5%) reported that they were using a mouthwash during the course of their orthodontic treatment. Almost half of the participants (n=61, 48%) used mouthwash

once a day and 30 patients (23.6%) used it twice a day. However, fewer people (n=21, 16.5%) used the mouthwash when their orthodontist recommended it for them and only 15 participants (11.9%) used it just before going to their orthodontic appointment.

Among those who used mouthwash, around 85 respondents (67%) used fluoridated mouthwash, 9 patients (7%) used non-fluoridated mouthwash, and 33 people (26%) had no clear idea of what type of mouthwash they were using.

**Sticky Food Consumption:** Most of the participants (89%) in our study were advised by their dentists to not eat sticky foods. Only a few people (6%) said that they were not given such instructions, and about 5% do not recall whether they were given such guidelines or not.

The consumption of sticky food is given in percentages in **Figure 4**.



**Figure 4:** Sticky food consumption of the respondents

**Periodontal Department Visit for Scaling:** During orthodontic treatment, a high number of patients (n=133, 66.5%) visited the periodontist for scaling. Most of them (54.9%) had good oral health and do scaling at regular intervals to maintain the good health of the gingiva. On the other hand, 23.3% of them had their teeth scaled once at the start of their orthodontic treatment, and 21.8% had their teeth scaled twice or more on the suggestions of their dentist.

## DISCUSSION

The current study aimed to investigate the oral health awareness and practice of patients wearing orthodontic appliances. We found that all of the respondents brush their teeth during the course of orthodontic treatment. About 71% of the participants used oral hygiene aids. Similarly, Shah, K. et al, found that all participants used toothbrushes and oral hygiene aids to clean their teeth<sup>14</sup>. Also, Al-harbi et al. reported that about two-thirds of the participants used oral hygiene aids<sup>23</sup>. Based on our findings, the dental floss was used frequently by the orthodontic patients. This is in accordance with another study carried out in Ontario, Canada, which reported that dental floss was the most used extraoral hygiene aid<sup>15</sup>. On the other hand, a study carried out in a rural area in India reported that only 6% of their subjects used dental floss<sup>17</sup>. The reason for this could be the comprehensive oral hygiene awareness programs implemented in cities compared to rural areas. This highlights the critical importance of educating and motivating the public about oral health care in rural areas.

The majority of patients in this study used medium toothbrushes to clean their teeth. The same results were seen in another study<sup>17</sup>. However, Shah, K. et al. reported that the majority of the study participants used a soft-bristled toothbrush<sup>14</sup>. Axelsson P., recommended the use of fluoride toothpaste twice a day to control plaque accumulation<sup>11</sup>. In contrast and based on the results of the current study, only one-third of the patients brushed their teeth twice a day. Al-harbi et al. showed that 66% of their participants brushed their teeth twice a day<sup>23</sup>. This is very similar to the results of other studies<sup>14,17</sup>.

The use of mouthwash was commonly used among the subjects in this study (63.5%). Similarly, Lee et al. reported that a higher percentage of their participants (64%) utilized mouthwashes during orthodontic therapy<sup>13</sup>. In contrast, (Baheti and Toshniwal) found that only 31.3% of their participants used mouthwashes<sup>17</sup>. Also, another study reported limited use of mouthwashes among their participants as well<sup>16</sup>.

In this study, although orthodontists advised 89% of patients not to eat sticky foods, only 9.5% of the patients strictly followed the instructions and avoided eating sticky foods. An opposite finding was found in another study that mentioned that 35% of participants did not consume any sticky foods<sup>19</sup>. Also, another study mentioned that 52% of those surveyed did not eat any sticky foods during their course of orthodontic treatment<sup>22</sup>.

In this study, we observed that most of the patients (66.5%) visited a periodontist for scaling. On the contrary, a study reported that during orthodontic treatment, the majority of the patients (68%) did not visit a dental hygienist for either oral hygiene instructions or scaling<sup>22</sup>. However, they found that 60% of the participants had poor oral hygiene. Orthodontic appliances are local factors for gingival and periodontal deterioration. Accordingly, it is important for orthodontic patients to visit a periodontist if there were any signs of gingival inflammation or calculus formation.

The majority of patients were aware of oral hygiene methods and had good oral hygiene practice throughout their orthodontic treatment, although not at an ideal ratio. All of the respondents brush their teeth with a toothbrush and more than half of them used dental floss and/or interdental brushes every day. Also, about two-thirds of the participants visited a periodontist for scaling either just before their orthodontic treatment started or during the treatment. Dentists should remind their patients about oral hygiene advice at every appointment, particularly about the use of an interdental brush, fluoride mouthwash, and avoiding sticky foods. It is now more important than ever to implement oral health awareness programs periodically to engage the public and encourage them to perform oral hygiene procedures continuously to achieve good oral hygiene status.

**Authorship Contribution:** All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

**Potential Conflict of Interest:** None

**Competing Interest:** None

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## APPENDICES

**Appendix (I).** The English version of the questionnaire.

You are invited to participate in a web-based online survey on topic Awareness of Orthodontic patient about Oral hygiene In the Qassim province, Cross sectional study. This is a research project being conducted by Ahmed Nayef Alsharif, an Intern at college of dentistry, Qassim university. It should take approximately 3 minutes to complete.

The current study aims to evaluate the status of oral hygiene awareness in people wearing orthodontic appliances in the Qassim province, Saudi Arabia. Please do not fill the questionnaire if you are from outside the Qassim region or you do not wear orthodontic appliances. Also, please do not fill the questionnaire if you struggle with brushing.

## PARTICIPATION

Your participation in this survey is voluntary. You may refuse to take part in the research or exit the survey at any time without penalty. You are free to decline to answer any particular question you do not wish to answer for any reason.

Agree  
Disagree

### Gender

a-Male b- female

### Age

a-16-20 b-21-30 c- 31-40 d- > 40

### 1. Do you use Tooth Brush?

a. Yes b- No

**If yes, how many times do you use it daily?**

a. 1 Time b- 2 Times c- 3 Times d- Irregularly

**Which type of Tooth brush do you use?**

a. Soft b- Medium c- Hard d-Any type available

**2. Other than brushing, do you take extra measures to improve your oral health?**

a. Yes b- No

**If yes, which of the following oral hygiene aids do you employ?**

a. Dental floss b- Miswak c- Tooth Pick d- Inter dental Brush

**3 Have you used mouthwash during your orthodontic treatment?**

a. Yes b- No

**If yes, how frequently do you use it?**

a. Once Daily b- Twice Daily c- Before going to your dentist d- When your dentist prescribes it to treat your swollen gums.

**Which type of Mouthwash do you use?**

a. Fluoridated b- Non-Fluoridated c- Any type available d- have no idea

**4. Have your dentist told you not to eat Sticky Foods?**

a. Yes b- No c- I do not remember.

**Do you eat Sticky Food during orthodontic treatment?**

a. Yes, frequently b- Yes, Sometimes c- Not at all.

**5. Have you visited Periodontal Department for scaling during orthodontic treatment?**

a. Yes b- No

**If yes, how many times have you visited?**

a. One at the start of orthodontic treatment b. At regular intervals to maintain the good health of gums c. Off and on when dentist suggests you.