

Was Treatment with Fixed Orthodontic Appliances as Expected?

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Received: December 17, 2019; **Published:** January 21, 2020

Abstract

Objective: This study designed to identify actual patients' expectations and experiences during fixed appliance orthodontic treatment.

Materials and Methods: A self-administered questionnaire survey was conducted for orthodontic patients who were within 3 - 9 months of their fixed appliance treatment at the College of Dentistry-University of Baghdad. Both genders were included without restrictions in terms of age. The questionnaire was developed, translated to Arabic, and face validated. Then, the participants were consented to read and fill the questionnaire and basing their answers according to their individual experience. Descriptive statistics were used and Chi-square compared between genders.

Results: One-hundred and one patients with an average age of 17.93 years participated in this survey (29% males and 72% females). There were no significant differences in the responses between males and females ($P > 0.05$). The fixed appliance was not expected as is, but it was expected to improve the smile, facial appearance, and oral health. Insufficient information about the adverse effects and duration of treatment was noted, however patients perceived their teeth movement. Twenty-two% of the patients were in need of further information regarding teeth cleaning, while only 6% needed extra information about eating with braces. Pain and improvement in facial appearance were noted by the 77% of the participants and 84% did not feel any embarrassment during treatment.

Conclusion: Adequate illustrations showing the fixed appliance before treatment should be used. Furthermore, patients should be advised to read the patient information sheet carefully.

Keywords: Fixed Appliance; Patient Expectations; Patient Experiences

Introduction

Malocclusion may result in different problems that can affect individuals, such as dissatisfaction with facial appearance, problems associated with mastication, swallowing and speech, development of caries and periodontal problems, dysfunction of the temporomandibular joint, and susceptibility to facial traumatic injuries [1]. Additionally, these problems especially the dissatisfaction with facial appearance may affect social responses and result in emotional and mental problems [2,3]. Severe anterior teeth malocclusion exerts both psychosocially and emotionally negative effects on patients' lives [4-6]. In other words, Oral Health-Related Quality of Life (OHRQoL) is disturbed in a high proportion of affected individuals [2]. The quality of life is defined as a subjective self-judgment of an individual health status and in fact satisfaction or dissatisfaction with specific aspects of life, which are considered important for the individual [7].

Orthodontic treatment with fixed appliances can be associated with various undesirable experiences that may not be completely understood by patients. Therefore, understanding these experiences can improve patients' expectations and consequently cooperation and satisfaction with treatment overall. For example, pain is one of the most obstacles to orthodontic treatment, which can reduce patient compliance during treatment, increase miss appointments or even treatment discontinuation [8-16].

Patient perception of treatment and malocclusion is often different from that of orthodontist. It is not uncommon that patients present with high concern for visible problems but adapted well with a more severe but less noticeable problem [5,6,17-19]. Upon focusing on the delivery of "patient-centered" care, current research has been increasingly set on investigating the impacts of psychosocial factors in clinical treatment outcomes. As often reported, "What patients think will happen can influence what does happen over the clinical course [20]. Expectation, as one of the significant psychological factors, is often seems to influence patient's assessment of the quality of care or satisfaction with the treatment outcomes [21].

Patient-centered measures are currently widely used to assess these subjective features in terms of orthodontic need and in determining the outcomes of orthodontic treatment [22-24]. This enhances the understanding of patients' expectations of orthodontic treatment outcomes and how their perceptions of treatment have benefited them [25,26]. The indication for orthodontic treatment is often based on clinical assessment/criteria [27,28] without taking into consideration patient's perceptions. This should be rethought as the success of orthodontic treatment depends on the partnership between the patient and the orthodontist. Hence, it is important for orthodontists to address their patients' expectations regarding treatment as well as to identify any unrealistic expectations.

In addition to considering patients' expectations, it is important to know the impact of therapeutic interventions on OHRQoL. This can help orthodontists to improve their ability to motivate patients in order to cooperate with the treatment [19,29]. Because insufficient information about orthodontic treatment and lack of communication between the orthodontist and patient were the basis for premature termination of orthodontic treatment [30].

Aim of the Study

This study/survey aims to identify actual patients' expectations and experiences during fixed appliance orthodontic treatment using a self-administered questionnaire.

Materials and Methods

Study design

This is a self-administered questionnaire survey.

Participants

Inclusion criteria

Orthodontic patients who are within 3 - 9 months of their fixed appliance treatment. Both genders are included without restrictions in terms of age.

Exclusion criteria

- Any patient within less than 3-months or more than 9-months of treatment.
- Patients who are undergoing removable or functional orthodontic treatment.

Settings

Participants Identification and Consent Process

A convenient sample of 101 participants was identified by the investigator and were consented to participate in this survey after receiving a detailed information verbally. Then, the consent document was signed by each participant. Ethical approval for this study was obtained from the Ethics Committee of the College of Dentistry-University of Baghdad.

Method

Questionnaire development

The questionnaire was developed for this study by the authors basing on two questionnaires developed by Rasool, *et al.* [31] and Yassir, *et al* [32]. After selecting the items, the questionnaire was translated to Arabic language and was piloted with 13 participants to identify any discrepancy (Table 1).

Face validation

Each participant from the 13 who assessed the face validity was asked to read the questionnaire carefully and identify if there is any word that is difficult to be understood, or if there is any missing important item. Face validation procedure was carried out according to Steiner and Norman [33] by evaluating the appropriateness of the content of the questionnaire, which can be considered as “on the face of it”, by assessing its appearance in terms of relevance to the construct, clarity of the language and readability, style and formatting consistency and feasibility (Table 1).

Was the brace as you expected?	Yes	No				
What are the benefits expected from braces?	Improve facial appearance	Improve eating	Improve smile	Improve social relationships	Improve confidence	Improve oral and dental health
How long do you expect the duration of treatment?	6 months	One year	One and a half year	Three years		
What are the adverse effects that could happen during treatment?	Root resorption	Dental caries	Gingivitis	Pain in jaw muscles and joints	Teeth mobility	Relapse (return of orthodontic problem)
Have you had any extra appointments due to braces breakage?	Yes	No	In case of Yes, have these appointments bothered you?		Yes	No
Have you noticed any teeth movement yet?	Yes	No				
Have you been bothered from teeth cleaning with the presence of braces?	Yes	No				
Do you need extra information about teeth cleaning?	Yes	No				
How was the effect of braces on eating?	Improved	No change	Worsened			
Have you been provided with enough information regarding eating with braces?	Yes	No				
How has facial appearance been changed with the presence of braces?	Improved	No change	Worsened			
Have you experienced any pain with the presence of braces?	Yes	No				
Does the brace cause embarrassment in	Social life	Work	Does not cause any embarrassment			

Table 1: The questionnaire used in this study.

Method of administration

The investigator asked the participants while they were waiting for their treatment to read and fill the questionnaire and basing their answers according to their individual experience.

Statistical analysis

The data were exported to Excel sheet and were analyzed using the Statistical Package for Social Sciences for Windows, version 22.0 (SPSS Inc., Chicago, Illinois, USA).

Descriptive statistics

Numbers, frequency and bar charts were used to describe the results.

Inferential statistics

Chi square test was used to test the relationship between genders.

Results

The results, using Chi square test, did not show significant differences in the responses between males and females ($P > 0.05$). Therefore, the results for the total sample will be presented.

Age of the participants and gender distribution

The average age of the participants was similar for males and females, which is in the late teenage. Female participants were more than double of the males (Figure 1 and 2, Table 2).

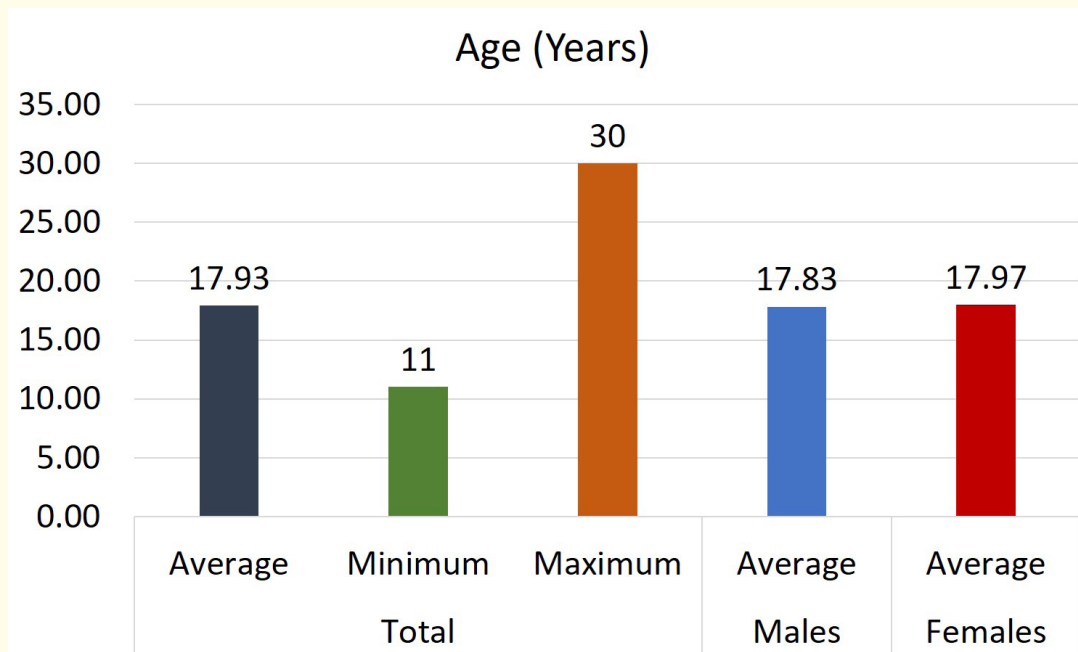


Figure 1: Age of the participants.

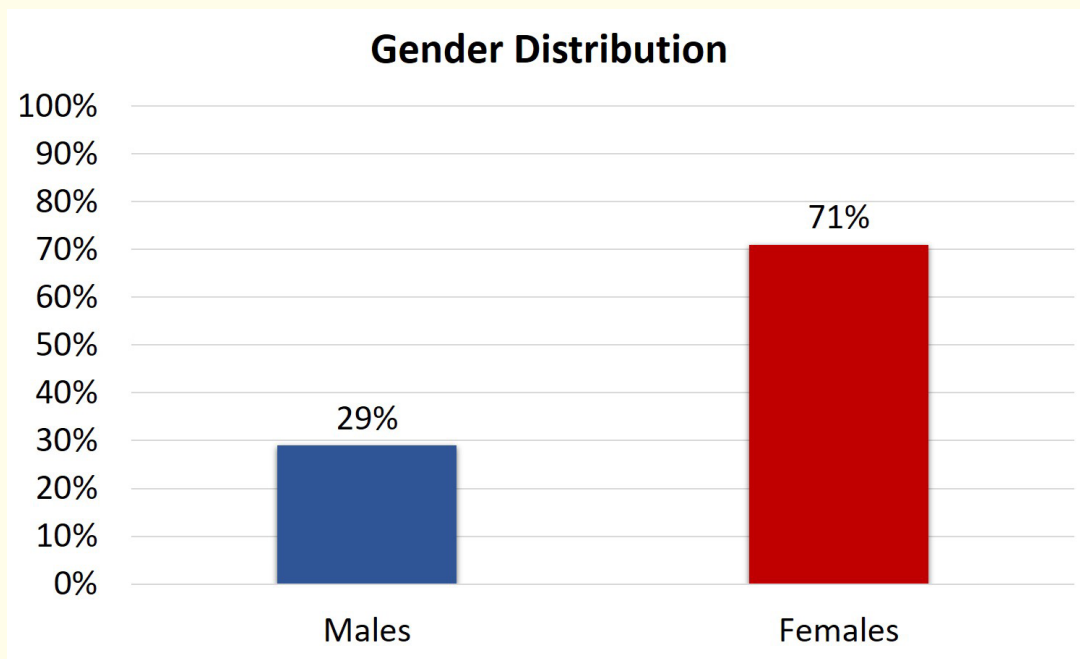


Figure 2: Gender distribution.

Participants	Number	Age
Males	29	17.83
Females	72	17.97
Total	101	17.93

Table 2: Age and gender distribution.

Patient’s expectations about the fixed appliance and its benefits

The majority of participants expected fixed appliances to improve their smile, facial appearance, and oral health. One third of them did not expect the fixed appliance as they experienced (Table 3).

Was the brace as you expected?	Yes 68%	No 32%				
What are the benefits expected from braces?	Improve facial appearance 24%	Improve eating 2%	Improve smile 45%	Improve social relationships 2%	Improve confidence 5%	Improve oral and dental health 31%
How long do you expect the duration of treatment?	6 months 8%	One year 46%	One and a half year 43%	Three years 4%		
What are the adverse effects that could happen during treatment?	Root resorption 0%	Dental caries 10%	Gingivitis 44%	Pain in jaw muscles and joints 18%	Teeth mobility 23%	Relapse (return of orthodontic problem) 5%
Have you had any extra appointments due to braces breakage?	Yes 39%	No 61%	In case of Yes, have these appointments bothered you?		Yes 11%	No 89%

Have you noticed any teeth movement yet?	Yes 96%	No 4%				
Have you been bothered from teeth cleaning with the presence of braces?	Yes 36%	No 63%				
Do you need extra information about teeth cleaning?	Yes 22%	No 78%				
How was the effect of braces on eating?	Improved 34%	No change 45%	Worsened 22%			
Have you been provided with enough information regarding eating with braces?	Yes 94%	No 6%				
How has facial appearance been changed with the presence of braces?	Improved 77%	No change 21%	Worsened 2%			
Have you experienced any pain with the presence of braces?	Yes 77%	No 23%				
Does the brace cause embarrassment in	Social life 14%	Work 4%	Does not cause any embarrassment 84%			

Table 3: Percent of survey responses.

Treatment adverse effects and treatment duration

Almost half of the participants thought that fixed appliances may cause gingivitis, whereas very few thought that the complications could be dental caries or relapse.

One year and one and a half years was selected as expected treatment duration by most of the participants (Table 3).

Experience of tooth movement and extra appointments

Ninety-six percent of the patients perceived their tooth movement during treatment. Extra appointment was experienced by 39%. Of those, only 11% were bothered from these appointments (Table 3).

Fixed appliances and teeth cleaning

A 22% of the patients found themselves in need for further information regarding cleaning their teeth and 36% of them reported that cleaning was difficult with the presence of fixed appliances (Table 3).

Fixed appliances and eating

The vast majority of patients (94%) believed that information about eating was appropriate. Additionally, most of them reported either no change or improvement in eating with fixed appliances (Table 3).

Facial changes and pain

Three-quarter (77%) of the patients reported pain experience during treatment. The same percentage also reported an improvement in facial appearance (Table 3).

Fixed appliances and feeling of embarrassment

A percentage of 84% of the patients did not feel any embarrassment during treatment, while the rest feel embarrassment during work and social life (Table 3).

Discussion

Study design and participants

This study was designed as a self-administered questionnaire survey in order to receive the highest percentage of possible responses. All the 101 participants who approved to participate were included as there was no dropout. The patients were selected from those who spent 3 - 9 months during fixed appliance treatment as this period can be considered reasonable for patients to notice treatment changes and be able to make appropriate judgement with little influence from the initial impact of placing the new appliance and similarly it is not too far into treatment so that patients could lose motivation or would be waiting for the appliance removal. The age of the participants represented the most common age for seeking treatment during late teenage/early adulthood since at this age both the external and internal motivation exert a mutual influence to increase the need for treatment. The percentage of males (29%) to females (71%) seems reasonable and might reflect the real percentage in the community.

Questionnaire development and validation

The questionnaire items were quoted from two valid questionnaires [31,32] and they were translated because the first language for the participants is Arabic. The pilot study with 13 participants who assessed the questionnaire items revealed that only one word (complications) was difficult to understand and hence it was changed with an easier synonym. Therefore, the questionnaire can be considered as "face valid".

Gender differences

Although the Chi square did not show any significant difference between males and females in their responses, which in turn justified analyzing the total sample, we noticed the following tendencies:

1. Females were more concerned about treatment in terms of compliance during treatment with lower appliance breakage, and teeth cleaning.
2. Females were more sensitive to the effect of treatment and treatment outcomes, whereas males were more satisfied about their eating, appearance, and less percentage of them reported pain during treatment compared to females.

Patient's expectations about the fixed appliance and its benefits

One-third of the participants said that they did not expect the fixed appliance like what they have. Therefore, using illustrating pictures or typodont showing the fixed appliance before treatment may be beneficial to make their expectations match the reality. Although it is

reasonable that patients would expect fixed appliance to improve their smile (45%) and facial appearance (24%), oral health on the other hand was not expected to receive a high score (31%) compared to improvement in self-confidence (5%), social interaction (2%), and eating (2%). This may reflect that patients did not have such high expectations about the emotional, social and functional effects of fixed appliance treatment. These findings agree with Yassir, *et al* [34,35].

Treatment adverse effects and treatment duration

This survey revealed that patients are not aware of some important adverse effects of fixed appliance, namely: relapse, dental caries, and root resorption, in spite of these were reported in the patient information sheet. Which means that they did not read the sheet carefully. Additionally, about half of the participants believed that treatment would last for one year which is only rare happened especially in teaching hospitals. These results may dictate the need for further pre-treatment information to be delivered because lacking such information may adversely be reflected on the compliance with treatment.

Experience of tooth movement and extra appointments

Fortunately, almost all patients perceived their tooth movement during treatment, that's to say they were concerned about their treatment. Extra-appointment due to appliance breakage with a percentage of 39% looks normal especially when clinicians are trainees. The positive side is that only 11% of the patients were annoyed from these extra-appointments.

Fixed appliances and teeth cleaning

Although only 22% reported their need for further information about teeth cleaning, this represents about quarter of the participants which is not a small percentage that can be ignored. This in turn may reflect the importance of delivering more information in this aspect. Otherwise, this could jeopardize the compliance later with treatment. Particularly, when 36% suffer from teeth cleaning with the appliances. Carter, *et al*. [36] reported that some participants in their study found difficulty in cleaning and brushing the teeth and fixed appliances and maintaining good oral hygiene.

Fixed appliances and eating

The high percentage (94%) of patients who reported that the information about eating was appropriate may be translated by the 78% who reported either no change or improvement in eating. However, still 22% of them experienced worse eating with appliance which could be due to feeling of pain due to teeth movement and this makes chewing more difficult [15,36-39]. This may mandate emphasizing on changing in eating behavior during treatment.

Facial changes and pain

Most of the participants felt pain during treatment and the percentage of 77% dictates informing patients about the possibility of pain before commencing treatment. Fortunately, the same percentage perceived an improvement in their facial appearance. This percentage would certainly increase by the end of treatment. The perception of pain during treatment was reported by different studies [16,39,40].

Fixed appliances and feeling of embarrassment

The high percentage of those who did not feel embarrassed with fixed appliance (84%) may reflect the popularity of using these appliances in the community. This finding agrees with that by Yassir, *et al* [35].

Conclusion

1. Adequate illustrations showing the fixed appliance before treatment should be used.
2. Patients should be advised to read the patient information sheet carefully.
3. Adequate information should be provided to patients in terms of:

- Treatment duration
- Pain associated with treatment
- Treatment adverse effects
- Eating
- Cleaning.

Acknowledgements

The authors would like to thank the postgraduate students in Orthodontic Department at the College of Dentistry-University of Baghdad for their assistance to get the data for this study.

Funding

This research did not receive any specific grant from funding agencies (self-funded).

Competing Interests

The authors declare that they have no competing interests.

Authors Contribution

Yassir A Yassir: Study design, project supervision, article writing and revision.

Halla A Hamdan: Data collection and review of literature writing.

Sarah A Nabbat: Data collection and article review.

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Volume 19 Issue 2 February 2020

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