

Patient Satisfaction with Orthodontic Treatment and Associated Factors

Soodeh Tahmasbi^a, Mahshid Namdari^b, Mohsen Ziaei^c

^aAssociate Prof., Dept. of Orthodontics, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

^bAssistant Prof., Dept. of Community Oral Health, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

^cPostgraduate Student, Dept. of Prosthodontics, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran.

Correspondence to Mohsen Ziaei (email: mohsenziaei70@yahoo.com).

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Objectives This study evaluated the satisfaction of patients receiving orthodontic treatment and the related factors probably affecting their level of satisfaction.

Methods In this cross-sectional study, 193 patients who had finished their orthodontic treatment at the Department of Orthodontics of Shahid Beheshti Dental School, completed a researcher-made questionnaire on satisfaction with the process of treatment, treatment outcomes and its psychosocial benefits. The validity and reliability of the questionnaire were first verified. Descriptive statistics, t-test, one-way ANOVA and Pearson's correlation test were used to assess the level of patient satisfaction, and the effects of gender, age, type of malocclusion, and type and duration of treatment on the level of satisfaction. Level of significance was set at 0.05.

Results The frequency of patients who were highly satisfied with the final alignment of their teeth, esthetic facial appearance and smile attractiveness was 62.7%, 50.8% and 63.7%, respectively. Respondents gave the highest satisfaction score to smile attractiveness (1.62±0.53) and alignment of their teeth (1.61± 0.52) and the lowest score to the postgraduate student's professional skills (0.79± 0.54). The mean total satisfaction score was 1.36 out of 2, which indicated that patient satisfaction with the orthodontic treatment was relatively high. Duration of treatment showed a weak ($r=0.186$) but significant ($P=0.011$) correlation with the level of satisfaction.

Conclusion Generally speaking, patient satisfaction with the health services provided in the Department of Orthodontics of Shahid Beheshti Dental School was relatively high. No correlation was found between patient satisfaction and gender, type of malocclusion or type of treatment.

Keywords Patient satisfaction; Orthodontics; Surveys and Questionnaires

Introduction

In addition to the adverse effects of malocclusion on nutrition, masticatory function and facial appearance, it has negative psychological effects and can increase the patient's susceptibility to trauma, periodontal disease and tooth decay. It can also adversely impact on the social interactions of patients.¹

In the recent years, the number of orthodontic patients has greatly increased.²⁻⁴ Undoubtedly, the success of orthodontic treatment depends on patient cooperation and satisfaction with the treatment process.^{5, 6} Assessment of patient satisfaction after orthodontic treatment has revealed a wide range of satisfaction levels, since it is influenced by various factors. The level of satisfaction of patients with orthodontic treatment reportedly ranges from 34% to 75%.⁷⁻⁹ In a study by Birkeland and his colleagues¹⁰, the satisfaction level of patients with orthodontic treatment was very high and reported to be about 95.4%. Some studies have shown that level of satisfaction of patients is influenced by a number of factors such as gender, age, duration of treatment, compliance, and improvement in dentofacial status.^{7, 11-13}

The level of satisfaction of patients and the influential factors may vary among patients presenting to public compared with private clinics due to the differences in their

socioeconomic status and level of expectations. This makes comparisons between studies more difficult.

To the best of our knowledge, no similar study has evaluated the level of satisfaction of orthodontic patients presenting to Iranian dental school clinics. Therefore, this study was conducted to design a valid and reliable questionnaire appropriate for such public clinics and evaluate the patient satisfaction and its related factors at the Department of Orthodontics of Shahid Beheshti Dental School. The results of this study may be used for promotion of the quality of services offered.

Materials and Methods

Questionnaire:

This study was carried out using a questionnaire designed at the Department of Orthodontics of Shahid Beheshti Dental School during 2015-2016.

At first, based on a literature review and by considering additional specific conditions present at the Department of Orthodontics of Shahid Beheshti Dental School, a questionnaire containing 33 questions about patient satisfaction and patient perspectives about the process of orthodontic treatment, treatment outcome and psychosocial effects of treatment was designed. Afterwards, the questionnaire was evaluated for validity by 10 experts (5

faculty members of Orthodontics Department, 3 faculty members of Community Oral Health Department and 2 orthodontists). Considering the comments of experts, 10 questions were deleted and the questionnaire with 23 questions was evaluated for reliability on 10 patients with a 2-week interval, and the Kappa coefficient was calculated. According to the reliability results, three more questions were deleted; the final questionnaire contained 20 questions.

For satisfaction questions, a three-point scale was used: zero indicated completely dissatisfied, one indicated relatively satisfied, and two indicated completely satisfied, and the mean score of satisfaction in 8 domains was calculated (out of 2).

Patients:

All 238 patients whose comprehensive orthodontic treatment at the Department of Orthodontics had been completed in 2015-2016 were contacted by phone and were encouraged to show-up.

A number of 193 patients accepted the invitation. Explanations were given to them about the objectives of the study and they were requested to fill out the questionnaire anonymously. The age, type of malocclusion, type of treatment and duration of treatment were also retrieved from the patient records.

Data analysis:

The data were extracted from the questionnaires, classified and presented in tables. Data were analyzed using SPSS version 22.0 (SPSS Inc., IL, USA). Also, the effect of gender, type of malocclusion and type of orthodontic treatment on the level of satisfaction was determined using independent samples t-test and one-way ANOVA. The correlation of age and duration of treatment with satisfaction was evaluated by the Pearson's correlation test. Level of significance was set at 0.05.

Results

The content validity of the questionnaire was evaluated using the comments of 10 experts. Of the 33 initial questions, considering the minimum acceptable coefficient of variation ratio according to the Lawshe (14) table being

equivalent to 0.62, 10 questions were deleted and the coefficient of variation index of the 23 remained questions was equal to 0.91, which showed high validity of the questionnaire.

The results of assessment of the reliability of the questionnaire showed that for three questions, the Kappa coefficient was less than 0.45. After deleting these 3 questions, the mean Kappa coefficient for the remaining questions was 0.854.

Generally, 193 patients including 113 females (58.5%) and 80 males (41.5%) between 14 to 35 years were included. The frequency of the different types of malocclusion in these patients was as follows: class I (40%), class II div. 1 (30%), class II div. 2 (15%) and class III (15%).

According to the treatment plan, patients were divided into three groups: non-extraction (60.6%), extraction (31.6%) and orthosurgery (7.8%).

The most important reasons which led the patients to choose the Orthodontic Department of Shahid Beheshti University of Medical Sciences for their treatment were: high cost of treatment in private clinics (31.6%), guaranteed quality of services offered in the university clinics (26.4%) and suggestion by a dental clinician/friend (19.2%).

When the patients were asked about the reason for seeking orthodontic treatment, the answers were as follows: 47.2% sought orthodontic treatment to align their teeth, 21.8% to have a more attractive facial appearance, 11% to improve their masticatory function and 5% to improve their speech. The rest of patients pointed to more than one reason as their main purpose to seek treatment. Frequency of different satisfaction levels of patients are presented in Table 1.

Among all patients, 7.8% believed that their treatment period was shorter than expected, 54.4% believed that its duration was suitable and 37.8% believed that their treatment took longer than expected. For 28.5% of the patients, it was easy to show up for regular visits. For 50.8%, it was quite easy and for 20.7%, it was not easy. Regarding the discomforts experienced during treatment, 31.6% reported occasional experience of severe pain. The frequency of severe pain in 66.8% was "sometimes" and it was "permanent" in three patients.

Table 1- Frequency of different satisfaction levels of patients

Field of satisfaction	Completely satisfied	Relatively satisfied	Dissatisfied
Final alignment of teeth	62.7%	35.8%	1.6%
Final smile attractiveness	63.7%	34.2%	2.1%
Final esthetic facial appearance	50.8%	45.6%	3.6%

Trying to assess the perception of patients with regard to orthodontic treatment, 74.6% of the patients described the orthodontic treatment as an unpleasant experience while 24.9% of them did not. Those who described orthodontic treatment as unpleasant reported the most annoying aspects to be the long duration of treatment (46.2%), frequent visits for regular check-ups (26.9%), unaesthetic intraoral

mouthpieces (7.7%), long duration of each visit (7.7%) and unaesthetic extraoral mouthpieces (5.7%).

In a question aiming to know if they would undergo orthodontic treatment in this department again, only 8.8% of patients regretted undergoing treatment. Mean satisfaction scores in various fields are presented in Table 2.

Table 2- Mean satisfaction scores in various fields

Area of satisfaction	Item score (Out of 2)				Ranking
	Mean	Std. deviation	Maximum	Minimum	
Behavior of postgraduate student of orthodontics	1.56	0.61	1.98	0.80	3
Professional skills of postgraduate student of orthodontics	0.79	0.54	0.89	0.61	8
Alignment of teeth	1.61	0.52	1.87	0.97	2
Final esthetic facial appearance	1.47	0.57	1.93	0.88	4
Final smile attractiveness	1.62	0.53	1.99	0.78	1
Improvement of self confidence	1.4	0.65	1.78	0.82	5
Improvement of performance at work or study	1.05	0.81	1.68	0.65	7
Improvement of social interactions	1.34	0.75	1.85	0.72	6

Independent samples t-tests showed no significant difference in the mean scores of male and female patients ($P=0.51$).

The effects of malocclusion type and treatment method on

patient satisfaction were analyzed by one-way ANOVA, which showed no significant difference between the subgroups ($P=0.79$ and $P=0.6$, respectively).

Table 3- Total score of patient satisfaction (mean and standard deviation) according to gender, type of malocclusion and type of treatment

Total score of satisfaction factor		Mean	Std. deviation
Gender	Male	1.35	0.35
	Female	1.39	0.35
Type of malocclusion	Class I	1.34	0.37
	Class II div. 1	1.40	0.32
	Class II div. 2	1.39	0.38
	Class III	1.38	0.33
Type of treatment	Non-extraction	1.36	0.37
	Extraction	1.39	0.34
	Orthosurgery	1.46	0.25

Table 3 shows the total score of patient satisfaction according to gender, type of malocclusion and type of treatment.

The effect of age and duration of treatment on satisfaction level was evaluated by the Pearson's correlation test. The age showed no correlation ($P=0.828$) but duration of treatment showed a weak ($r:0.186$) but significant ($P=0.011$) correlation with the level of satisfaction.

Discussion

Facial beauty is considered as the most important physical characteristic in development of self-image and self-esteem.^{15, 16} People who are satisfied with their facial appearance seem to be more self-confident and have higher self-esteem than those who are dissatisfied with it.¹⁷ People who are dissatisfied with their facial appearance, however, often express more dissatisfaction with their teeth than with any other facial feature.¹⁶ Therefore, it is not surprising that most people view orthodontic treatment primarily as a way to improve their dentofacial appearance.¹⁷⁻²⁰

When assessing the main concerns of patients who sought orthodontic treatment, it was found that most of the patients had esthetic concerns (85%). This data corroborates with previous studies that showed that the great majority of

patients seek treatment to improve their smile, teeth and facial esthetics.^{21, 22}

The predominance of female patients (58.5%) in our study is consistent with data reported in previous studies, which suggest that women have a greater motivation to undergo orthodontic treatment when compared with men. Females perceive a need for braces more often than males.^{5, 13} Although the use of different questionnaires to assess the level of satisfaction makes comparisons difficult, investigations of patient satisfaction after orthodontic treatment have shown a wide range of satisfaction levels from 34% to 95%.^{7, 10} A part of this variation could be explained by the different motivations and expectations of patients receiving orthodontic treatment.²³ Larsson and Bergstrom⁹ used the Quality from the Patient's Perspective questionnaire and reported that 74% of subjects expressed complete satisfaction with the quality of their orthodontic treatment. In their study, 29% of subjects were dissatisfied or partially satisfied.

Al-Omiri and Abu Alhaja⁷ evaluated patient satisfaction at the Orthodontic Department of Jordan University of Science and Technology Dental Teaching Center in Irbid.⁷ They reported 34% satisfied and 62% relatively satisfied patients' right after orthodontic treatment, while the percentage of dissatisfied patients was 4%. These values in

our study were 62.7%, 35.8% and 1.6% respectively; which shows higher level of satisfaction at the Orthodontic Department of Shahid Beheshti University of Medical Sciences.

According to our study, only 1.6% of patients were dissatisfied with the alignment of their teeth, while 3.6% were dissatisfied with their final facial beauty. In Uslu and Okan Akcam's²⁴ study, 5% of patients were dissatisfied with their dentition at the end of treatment. Despite different treatments performed in various studies, the degree of dissatisfaction with the treatment appears to be in a specific and similar range. Dissatisfaction with orthodontic treatment may be related to various factors; although in our study, the main reason for dissatisfaction of patients with their face (54.8%) remained to be a prognathic mandible and a retrognathic maxilla.

In the recent years, the positive psychological and social aspects of orthodontic treatment have become more prominent.^{18, 25} Uslu and Okan Akcam²⁴ reported that in 82.5% of patients, orthodontic treatment had a positive effect on their self-confidence. In the present study, 91.2% stated that orthodontic treatment had an absolute or relative positive effect on their self-esteem. On the other hand, satisfaction can be influenced by the psychological status and personality of patients. Al-Omiri and Abu Alhaja⁷ also found that the degree of satisfaction with the treatment was related to the personality traits of patients. At the same time, in the recent years, some psychometric instruments and related questionnaires highlighted the psychological and social aspects of orthodontic treatment.²⁶

Comparison of the level of satisfaction of patients in different fields in our study revealed that the respondents scored the highest on satisfaction with the final esthetic appearance of their smile and alignment of their teeth and lowest on their satisfaction with the professional skills of the postgraduate students of orthodontics who were responsible for their case. In contrast, the respondents in the study of Keles and Bos²³ scored the highest on items about satisfaction with the doctor-patient relationship and lowest on items regarding their satisfaction with psychosocial improvement. This shows that although our patients were almost satisfied with the behavior of the postgraduate students of orthodontics (ranking: 3), their professional skills need to be improved according to the perspective of patients.

Predictive factors related to patient satisfaction are controversial in the literature. Studies have reported that untreated females are more dissatisfied with the appearance of their dentition than are males.^{13, 27}

Phillips et al.²⁸ found that males have different expectations of orthodontic treatment than females. However, this difference in expectations was not translated to a significant difference in patient satisfaction in our study. Contrary to our expectations, gender showed no association with any dimension of satisfaction. This was in agreement with studies that reported gender had no effect on patient

satisfaction after orthodontic treatment.^{9, 7, 12, 23, 29}

Studies have shown that satisfaction with dentofacial appearance in untreated patients decreases with age^{11, 30}, while in previous studies on orthodontically-treated patients, no significant correlation was found between age and satisfaction scores^{23, 29}, which was in accordance to our results.

No association was found between patient satisfaction and the method of treatment (extraction, non-extraction, orthosurgery) or type of malocclusion in the present study. Similarly, Maia et al.²⁹ observed no significant association of satisfaction with extraction or the severity of malocclusion at the beginning or at the end of orthodontic treatment. Another study reported that patients treated with non-extraction orthodontic treatment showed more dissatisfaction with their dentition when examined immediately after orthodontic treatment.⁷ It is possible that the diagnostic criteria for tooth extraction and their impact on dentofacial morphology are more relevant than the treatment procedure itself.

Other studies have found different influencing factors. Feldmann³¹ reported that patients' perception of how well they had been informed and cared for during treatment has the highest correlation with their level of satisfaction. This shows that satisfaction is a complex topic and requires further exploration in future research.

Despite the value of the data presented here, some limitations must be noted. First, our findings reflect the responses of subjects seeking treatment at the Department of Orthodontics of Shahid Beheshti Dental School. Therefore, the results cannot be generalized to all orthodontic patients.

We acknowledge that people from different socioeconomic backgrounds, cultures, and ethnicities may have different levels of expectations and satisfactions. This is an interesting area that requires further investigation. Longitudinal studies can also be considered in future to evaluate patient satisfaction with orthodontic treatment based on their goals and expectations and their personality traits at the onset of treatment.

Conclusion

The results of the satisfaction survey on patients presenting to the Department of Orthodontics of Shahid Beheshti Dental School showed that most of the patients sought orthodontic treatment for esthetic reasons. After treatment, more than half of the patients were satisfied with the final esthetic appearance of their face and smile but a few were not. Most of the patients experienced an improvement in their self-esteem and performance at work or study following orthodontic treatment. Age, gender, type of malocclusion and method of treatment had no significant correlation with patient satisfaction. Generally, this center was relatively successful in achieving patient satisfaction.

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