

Impact of Orthodontic Treatment Needs on Oral Health-Related Quality of Life among the Early Adults: A Questionnaire Study

Patel Jay¹, Santosh Kumar Goje², Kulkarni Narayan³, Patel Riddhi¹, Dave Chinmay¹, Shah Aakash¹

Contributors:

¹Post-graduate Student, Department of Orthodontics and Dentofacial Orthopedics, K.M. Shah Dental College and Hospital, Vadodara, Gujarat, India; ²Professor and Head, Department of Orthodontics and Dentofacial Orthopedics, K.M. Shah Dental College and Hospital, Vadodara, Gujarat, India; ³Professor, Department of Orthodontics and Dentofacial Orthopedics, K.M. Shah Dental College and Hospital, Vadodara, Gujarat, India.

Correspondence:

Dr. Santosh Kumar Goje, Professor and Head, Department of Orthodontics and Dentofacial Orthopedics, K.M. Shah Dental College and Hospital, Vadodara, Sumandeep Vidyapeeth, Gujarat, India. Tel.: +91-9978349891. Email: santoshgoje@gmail.com

How to cite the article:

Jay P, Goje SK, Narayan K, Riddhi P, Chinmay D, Aakash S. Impact of orthodontic treatment needs on oral health-related quality of life among the early adults: A questionnaire study. J Int Oral Health 2016;8(12):1095-1100.

Abstract:

Background: The importance of evaluating oral health-related quality of life (OHRQoL) among orthodontic patients relates to the impact of dental esthetics on social acceptance and self-concept. The aim of the study was to assess the impact of different orthodontic treatment needs on the OHRQoL in early adults.

Methods: The study sample comprised 100 young adult orthodontic patients (50 men and 50 women; age range, 18-22 years) selected from institutional OPD. Each participant of the study was assessed for orthodontic treatment need and OHRQoL by using Orthodontic Treatment Need Index (IOTN) and the shortened version of Oral Health Impact Profile questionnaire.

Result: Orthodontic patients who had little or no, borderline, and actual need for orthodontic treatment represented 13%, 11%, and 76% of the total sample, respectively. Orthodontic treatment needs significantly affected mouth aching, uncomfortable to eat food, self-consciousness, tension, unsatisfactory diet, meal interruption, embarrassment, irritability, taste, and relaxation in both men and women ($P < 0.001$). Pronunciation, life satisfaction, and ability to do jobs or function were not significantly associated with orthodontic treatment needs in either sex.

Conclusions: These findings of this study emphasize the impact of malocclusion on OHRQoL of young adults.

Key Words: Early adults, Orthodontic Treatment Need Index, Oral Health Impact Profile-14, oral health-related quality of life, orthodontic treatment

Introduction

Oral health possesses a great significance in terms of functional, physiological, and structural well-being of an individual to have

a quality life.¹ Oral health-related quality of life (OHRQoL) can be explained as a person's sense to have satisfaction or dissatisfaction in the interest areas, which are important to him or her.²

Malocclusion, one of the oral conditions, is highly dominant, and its consequences can be physical, social, and psychological. The effect of malocclusion may be so severe that it may disrupt the QoL in individuals and interrupt routine activity of day-to-day life. This may also show its effects on function and facial appearance.³ Individuals with malocclusion have feeling of self-consciousness and embarrassment. They may also feel shy in social gathering.⁴ These feelings may be because of their dental ailment. Few studies^{5,6} have reported the association between malocclusion and OHRQoL, but the strength of evidence for this finding is low. Hence, there is a need to use standardized methods for this association.⁷

Treatment in orthodontics is different from most of other medical treatments. It is different because the main objective of orthodontic treatment is to correct disparities from arbitrary norms. The reason why people frequently undertake orthodontic treatment is to effectuate an improvement in esthetics and a subsequent enhancement of psychosocial well-being, which contributes to QoL.⁸

OHRQoL assessments are recommended in orthodontics for a number of reasons: To study the treatment needs and outcomes and to study treatment efficiency and impact during said period of treatment and as part of clinical trials, which have the potential to improve the QoL.⁸

Several indices are used to evaluate malocclusion. Among all these indices, Index of Orthodontic Treatment Need (IOTN) given by Brook and Shaw is most commonly used. This index is a mechanism of prioritizing and thereby classifying the malocclusion according to the treatment need. IOTN index has two components, a dental health component which is used to evaluate the need of dental health for orthodontic treatment and esthetic component which is used to evaluate the need of facial esthetics for orthodontic treatment.³

There were only two studies done in India by Manjith *et al.*⁹ and Saxena *et al.*¹⁰ who evaluated the effect on OHRQoL for different orthodontic treatment needs in adolescents. Both the studies have assessed the effect of orthodontic treatment

need on adolescents. However, the major life changes which take place during adolescent period have an influence on QoL. Because of this reason, it is hard to identify which daily actions are altered only by orthodontic treatment need. Hence, in the present study, instead of adolescents, early adults with malocclusion were chosen. Moreover, after searching through literature till December 2015, there was no study done to assess the effect of orthodontic treatment need on OHRQoL in early adults in India. Hence, there is a need to conduct the study which evaluates the effects of orthodontic treatment need on OHRQoL among the early adults with malocclusion. Hence, the present study was conducted.

Materials and Methods

The approval to conduct the study was obtained from the Institutional Ethics Committee. Participants of the study were early adults who came to seek orthodontic treatment and were obtained from the institutional OPD. Inclusion criteria for the study were early adults ranging from 18 to 22 years, who were willing to take part in the study and had a need for orthodontic treatment. The participants who know to read and write English were included in the study. Exclusion criteria of the study were participants who have cognitive disorders, medical conditions, earlier orthodontic treatment, untreated mental and physical impairments, and poor oral hygiene. The sample size was estimated by using the parameters of previous study done by Hassan AH.³ A sample size of 100 achieves 80% power to detect an effect size (W) of 0.3000 using 1 degree of freedom. Chi-square test with a significance level (alpha) of 0.05000 was used for analysis. Hence, a total of 100 participants were included in the present study who fulfilled the inclusion criteria. Out of these 100 participants, 50 were men and 50 were women.

The participants of the study were explained about the procedure of the study and its importance. A signed informed consent was obtained from the participants. Participant information sheet was given to the participants. Orthodontic treatment need for all the participants was evaluated by IOTN. All the participants were classified into no treatment need, borderline need, and treatment need, based on the scores of IOTN. Oral health impact profile (OHIP-14) questionnaire¹¹ was used to evaluate OHRQoL. The questionnaires were distributed to the participants and asked to fill on the same day. The filled questionnaires were collected from the participants. Likert scale was used to evaluate responses of the questions. The answers of the questions were evaluated as follows: 0=never, 1= hardly ever, 2= occasionally; 3= fairly often; and 4= very often. The positive impact of the answer was represented by fairly often and very often, occasionally. While a negative impact was represented by the following answers: Never and hardly ever. After collection of data from all the filled questionnaires, statistical analysis was performed.

Statistical analysis

SPSS software (version 21) was used for statistical analysis. Chi-square test was used for data analysis of filled questionnaire at a significance level of 0.001.

Results

The maximum age of the study sample was 22 years and minimum age was 18 years. Average age of the study sample was 20 years (Table 1).

Overall, the 100 participants according to IOTN scores, i.e. 13%, 11%, and 76%, were falling under no treatment need, borderline, and need for orthodontic treatment, respectively (Table 2). In male participants, 5 (10%), 5 (10%), and 40 (80%) were in no treatment need, borderline, and need for orthodontic treatment, respectively. In female participants, 8 (16%), 6 (12%), and 36 (72%) were in no treatment need, borderline, and need for orthodontic treatment, respectively (Table 2, Graph 1).

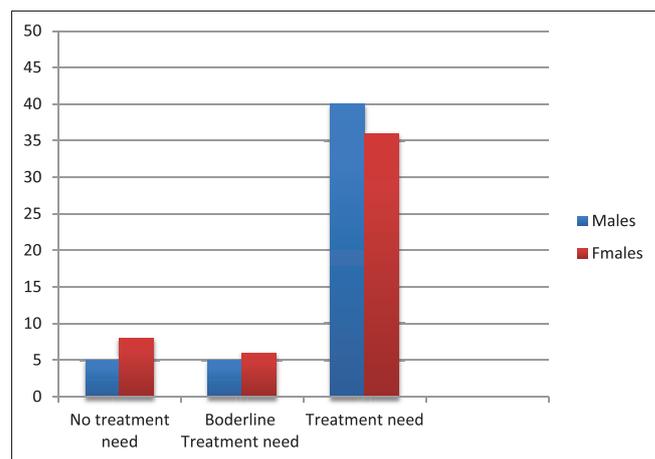
In both male and female participants, mouth aching, uncomfortable to eat food, self-consciousness, tension, unsatisfactory diet, meal interruption, embarrassment, irritability, taste, and relaxation showed significant effects by orthodontic treatment need ($P < 0.01$) (Tables 3 and 4).

There was no significant impact of orthodontic treatment need in both male and female participants on pronunciation of word ($P = 0.024$ in men and $P = 0.226$ in women), life satisfaction ($P = 0.563$ in men and $P = 0.329$ in women), ability to do jobs ($P = 0.497$ in men and $P = 0.417$ in women), and function ($P = 0.785$ in men and $P = 0.868$ in women) (Tables 3 and 4).

Table 1: Minimum, maximum, and mean age of the sample.

n	Minimum	Maximum	Mean±SD
100	18	22	20±1.25

SD: Standard deviation



Graph 1: Orthodontic treatment need of males and females.

Table 2: Different orthodontic treatment needs of the participants.

Orthodontic treatment need	Frequency			Percentage		
	Male (50)	Female (50)	Overall (100)	Male	Female	Combined
No or little treatment need	5	8	13	10	16	13.0
Borderline treatment need	5	6	11	10	12	11.0
Treatment need	40	36	76	80	72	76.0
Total	50	50	100	100	100	100

Table 3: Effects on daily events in relation to males and need for orthodontic treatment.

OHIP-14 daily activity	Orthodontic treatment need, n (%)				$\chi^2 P$
	Number or little treatment need	Borderline treatment need	Treatment need		
Had problem in pronouncing words					
Impact	3 (60)	5 (100)	15 (37.5)		7.428
No impact	2 (40)	0 (0)	25 (62.5)		0.024
Felt sense of taste worsened					
Impact	0 (0)	3 (60)	39 (97.5)		33.817
No impact	5 (100)	2 (40)	1 (2.5)		<0.001
Had painful aching in mouth					
Impact	0 (0)	3 (60)	39 (97.5)		33.817
No impact	5 (100)	2 (40)	1 (2.5)		<0.001
Found it uncomfortable to eat food					
Impact	0 (0)	1 (20)	38 (95)		34.266
No impact	5 (100)	4 (80)	2 (5)		<0.001
Had been self-conscious					
Impact	0 (0)	4 (80)	39 (97.5)		35.257
No impact	5 (100)	1 (20)	1 (2.5)		<0.001
Felt tense					
Impact	0 (0)	3 (60)	39 (97.5)		33.817
No impact	5 (100)	2 (40)	1 (2.5)		<0.001
Had an unsatisfactory diet					
Impact	1 (20)	4 (80)	39 (100)		31.538
No impact	4 (80)	1 (20)	0 (0)		<0.001
Had to interrupt meals					
Impact	0 (0)	3 (60)	38 (95)		28.997
No impact	5 (100)	2 (40)	2 (5)		<0.001
Found it difficult to relax					
Impact	0 (0)	4 (80)	39 (97.5)		35.257
No impact	5 (100)	1 (20)	1 (2.5)		<0.001
Had been a bit embarrassed					
Impact	0 (0)	3 (60)	39 (97.5)		33.817
No impact	5 (100)	2 (40)	1 (2.5)		<0.001
Had been irritable with people					
Impact	0 (0)	4 (80)	37 (92.5)		25.779
No impact	5 (100)	1 (20)	3 (7.5)		<0.001
Had difficulty doing useful jobs					
Impact	3 (60)	4 (80)	21 (52.5)		1.400
No impact	2 (40)	1 (20)	19 (47.5)		0.497
Felt life in general less satisfactory					
Impact	3 (60)	4 (80)	22 (55)		1.149
No impact	2 (40)	1 (20)	18 (45)		0.563
Had been unable to function					
Impact	3 (60)	2 (40)	22 (55)		0.483
No impact	2 (40)	3 (60)	18 (45)		0.785

OHIP: Oral health impact profile

Discussion

There were only very few studies^{9,10} done in India to evaluate the various effects of orthodontic treatment need on OHRQoL in adolescents. Major life changes which are taking place during adolescent period have an influence on QoL. Because of this reason, it is hard to identify which

daily actions are altered by orthodontic treatment need. No study has been done in India to assess the effect of orthodontic treatment need on OHRQoL in early adults. Hence, in the present study, instead of adolescent participants, early adults were taken in whom major life change has diminished.

The OHIP-14 questionnaire was used in the general population and patients who have oral disorders.¹² OHIP-14 questionnaire was used in the present study to evaluate the effect of malocclusion on QoL. Previous cross-sectional and longitudinal studies have evaluated the specificity and sensitivity of this questionnaire.^{13,14}

QoL is relative. Because of this reason, results of the present study were presented as a comparison of effects of day-to-day events of those who came to take orthodontic treatment. In the present study, both female and male orthodontic participants had similar effect of orthodontic treatment needs on their

day-to-day events. This may be because both the genders have equal self-perception and rating about their dental appearance. This was in contrast to the study done by Allen *et al.*¹⁵ who observed that female participants have significantly more effect of orthodontic treatment needs on OHRQoL.

In this study, it was found that speech and difficulty in pronunciation of words have no significant association with needs for orthodontic treatment. This was in agreement with the study done by Vallino *et al.*¹⁶ They also reported no correlation between difficulty in speech and malocclusion. The non-association between need for orthodontic treatment and difficulty in pronunciation of word can be explained on the

Table 4: Effects on daily events in relation to females and need for orthodontic treatment.

OHIP-14 daily activity	Orthodontic treatment need, n (%)			
	No or little treatment need	Borderline treatment need	Treatment need	χ^2 P
Had problem in pronouncing words				
Impact	3 (37.5)	1 (16.7)	19 (52.80)	2.997
No impact	5 (62.5)	5 (83.3)	17 (47.2)	0.226
Felt sense of taste worsened				
Impact	0 (0)	4 (66.7)	36 (100)	41.667
No impact	8 (100)	2 (33.3)	0 (0)	<0.001
Had painful aching in mouth				
Impact	2 (25)	3 (50)	32 (88.9)	15.927
No impact	6 (75)	3 (50)	4 (11.1)	<0.001
Found it uncomfortable to eat food				
Impact	0 (0)	4 (66.7)	32 (88.9)	25.75
No impact	8 (100)	2 (33.3)	4 (11.1)	<0.001
Had been self-conscious				
Impact	2 (25)	5 (83.3)	34 (94.4)	21.394
No impact	6 (75)	1 (16.7)	2 (5.6)	<0.001
Felt tense				
Impact	1 (12.5)	5 (83.3)	35 (97.2)	31.839
No impact	7 (87.5)	1 (16.7)	1 (2.8)	<0.001
Had an unsatisfactory diet				
Impact	1 (12.5)	5 (83.3)	35 (97.2)	31.839<0.001
No impact	7 (87.5)	1 (16.7)	1 (2.8)	
Had to interrupt meals				
Impact	1 (12.5)	3 (50)	36 (100)	35.156
No impact	7 (87.5)	3 (50)	0 (0)	<0.001
Found it difficult to relax				
Impact	1 (12.5)	3 (50)	34 (94.4)	26.623
No impact	7 (87.5)	3 (50)	2 (5.6)	<0.001
Had been a bit embarrassed				
Impact	1 (12.5)	5 (83.3)	33 (91.7)	24.019
No impact	7 (87.5)	1 (16.7)	3 (8.3)	<0.001
Had been irritable with people				
Impact	0 (0)	5 (83.3)	35 (97.2)	38.715
No impact	8 (100)	1 (16.7)	1 (2.8)	<0.001
Had difficulty doing useful jobs				
Impact	4 (50)	4 (66.7)	14 (38.9)	1.750
No impact	4 (50)	2 (33.3)	22 (61.1)	0.417
Felt life in general less satisfactory				
Impact	4 (50)	4 (66.7)	13 (36.1)	2.221
No impact	4 (50)	2 (33.3)	23 (63.9)	0.329
Had been unable to function				
Impact	4 (50)	3 (50)	15 (41.7)	0.284
No impact	4 (50)	3 (50)	21 (58.3)	0.868

OHIP: Oral health impact profile

basis that speech, being a complex procedure, requires equal co-ordination of brain, tongue, teeth, lips, and muscles to ensure perfect speech pronunciation.¹³ In contrast, Pakkala *et al.* in their study found an association between speech difficulties and malocclusion.¹⁷

The ability to function and difficulty of doing usual jobs showed no significant association with needs for orthodontic treatment. These findings were similar with the findings of Albino *et al.*¹⁸ who found that most of the orthodontic patients' complain is related to facial esthetics and the complaints related to health and function are less. In addition, orthodontic treatment needs had no significant effect on less satisfactory life.

Orthodontic treatment needs had a significant effect on taste, ability to chew, selection of diet, and meal interruption in the observed participants. This result shows similarity with other studies¹⁹⁻²² which reported that individuals with malocclusion have a reduced amount of masticatory efficiency in comparison to individuals with normal occlusion. This confirms that individuals with malocclusion had impact on diet for taste and chewing ability.

It was also found that in both male and female participants, orthodontic treatment needs had a significant impact on oral pain. This was in agreement with the results of previous studies done by Koroluk *et al.*²³ and Shulman and Peterson²⁴ They reported that malocclusion can be a reason of pain leading to temporomandibular joint disorders. Nicolau *et al.*²⁵ found that retroclined maxillary incisors are the reason for oral pain by causing injury to the labial gingiva.

The results of the present study show that embarrassment and self-consciousness were significantly correlated with the needs for orthodontic treatment. It was observed that in young adults with more severe orthodontic treatment need, the greater was the self-consciousness scores. It is in agreement with the studies done by Klages *et al.*,²⁶ Zhou *et al.*,²⁷ Zhou *et al.*,²⁸ and Lazaridou-Terzoudi *et al.*²⁹ They found that most of the participants who require orthodontic treatment had a feeling of embarrassment, and higher the treatment need or malocclusion, the greater will be the patient's embarrassment. However, studies done by DiBiase and Sandler³⁰ found no significant association between different types of malocclusion and embarrassment. Shulman and Peterson²⁴ and Lazaridou-Terzoudi *et al.*²⁹ reported that patients who had higher need for treatment were more socially deprived than those with lesser need for treatment.

There are three shortcomings in the present study. First, the majority of the sample of the present study represented only early adults who required orthodontic treatment. The study did not include all the individuals with different orthodontic treatment needs equally. Orthodontic treatment need might be different according to their daily events. Second, the

applicability of the findings of early adult participants for older participants is limited. The reason for this is that the significant physical attractiveness is much greater in early adult individuals than the older individuals. Third, the sample size of the study was very small since the present study includes only those individuals who came to seek orthodontic treatment.

Conclusion

The outcome of the present study shows the various effects of orthodontic treatment needs on OHRQoL in early adults. In both male and female participants, orthodontic treatment need had a significant effect on mouth aching, uncomfortable to eat food, self-consciousness, tension, unsatisfactory diet, meal interruption, embarrassment, relaxation, worsened taste, and irritability. In both genders, orthodontic treatment needs had no significant effect on pronunciation of word, satisfaction of life, ability to do useful jobs, and ability to function.

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