



ARAŞTIRMA / RESEARCH

Relationship between the psychosocial impact of malocclusion and objective orthodontic treatment need

Maloklüzyonun psikososyal etkisi ile objektif ortodontik tedavi ihtiyacı arasındaki ilişki

Tuğba Haliloğlu Özkan¹ Sabahat Yazıcıoğlu²

¹Yaşar Eryılmaz Devlet Hastanesi, Diş Hastalıkları ve Tedavisi, Ağrı, Turkey

²Ondokuz Mayıs Üniversitesi, Diş Hekimliği Fakültesi, Klinik Bilimler, Samsun, Turkey

Cukurova Medical Journal 2019;44(Suppl 1):492-497.

Abstract

Purpose: The purpose of this study was to evaluate the association between the psychosocial effect of malocclusion and objective orthodontic treatment need in Turkish adolescents and young adults.

Materials and Methods: The study sample consisted of 152 adolescents (mean age; 14.91), and 48 young adults (mean age; 21.83). Participants were asked to answer the "Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ)". Objective treatment need was evaluated by an experienced clinician, using the Aesthetic Component (AC) of the Index of Orthodontic Treatment need (IOTN).

Results: Statistical analyzes revealed no significant difference between adolescents and young adults either in PIDAQ and AC scores. There was also no significant gender differences in PIDAQ and AC scores either in adolescents and young adults. A positive correlation was found between the PIDAQ score and the AC value just in adolescent females ($r=0.263$, $p=0.012$).

Conclusion: Malocclusion has similar degree of psychosocial impacts in adolescents and young adults. Female adolescents appear more aware of their dental appearance and feel higher psychosocial impacts than adolescent males.

Keywords: Adolescent, malocclusion, young adult

Öz

Amaç: Bu çalışmanın amacı, Türk adolesanlarda ve genç erişkinlerde maloklüzyonun psikososyal etkisi ile objektif ortodontik tedavi ihtiyacı arasındaki ilişkiyi değerlendirmektir.

Gereç ve Yöntem: Çalışma örnekleminde 152 adolesan (yaş ortalaması 14.91) ve 48 genç yetişkin (yaş ortalaması 21.83) vardı. Katılımcılardan "Diş Estetiğinin Psikososyal Etkileri Anketi (PIDAQ)" yanıtlamaları istendi. Objektif tedavi ihtiyacı, deneyimli bir klinisyen tarafından, ortodontik tedavi ihtiyacı indeksinin (IOTN) estetik bileşeni (AC) kullanılarak değerlendirildi.

Bulgular: İstatistiksel analizler, adolesanlar ile genç yetişkinler arasında PIDAQ ve AC skorlarında anlamlı bir fark olmadığını ortaya koydu. Adolesanlarda ve genç erişkinlerde PIDAQ ve AC skorlarında anlamlı bir cinsiyet farklılığı yoktu. Sadece adolesan kadınlarda PIDAQ skoru ile AC değeri arasında pozitif bir ilişki bulundu ($r=0.263$, $p=0.012$).

Sonuç: Maloklüzyonun adolesanlar ve genç erişkinlerde benzer derecede psikososyal etkileri vardır. Kadın adolesanlar, diş görünümlerinin daha fazla farkında görünmektedirler ve adolesan erkeklerden daha yüksek psikososyal etkiler hissetmektedirler.

Anahtar kelimeler: Adolesan, genç yetişkin, maloklüzyon

INTRODUCTION

The physical, social and psychological conditions caused by malocclusion and its impact on quality of life have long been investigated by the researchers. Aesthetics is a major indication for orthodontic treatment and its improvement is mandatory as a

treatment objective¹. One of the most important factors in remunerating the treatment is to pay attention to the patient's expectations regarding treatment.² Malocclusion has never been a life threatening condition, however, number of patients requiring treatment has been increasing gradually. Therefore, it is inevitable to evaluate the impact of

Yazışma Adresi/Address for Correspondence: Dr. Tuğba Haliloğlu Özkan, Yaşar Eryılmaz Devlet Hastanesi, Diş Hastalıkları ve Tedavisi, Ağrı, Turkey E-mail: dttuuba@gmail.com

Geliş tarihi/Received: 17.05.2019 Kabul tarihi/Accepted: 23.08.2019 Çevrimiçi yayın/Published online: 27.09.2019

malocclusion on quality of life for patients to get the result they expect from treatment. However, traditional methods have been mainly focused on estimating orthodontic need or evaluating treatment outcome, therefore to define success/failure of treatment³.

Recently, orthodontists recognized the importance of taking into consider the patient's perceived need for treatment and measuring the difference that the desired result by the patient and required treatment that defined by the clinician⁴. Oral Health Related Quality of Life (OHRQoL) focuses on assessing how oral health affects situations such as the experience of pain / discomfort, physical function, psychology (ie, anxiety level related with the person's appearance and self-esteem) and social interaction in society.

Recently, a novel psychometric instrument "Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ)" for assessment of orthodontic malocclusion has been developed⁵. Various international validation and translation studies of the original version have been conducted especially on young adults and have shown consistent results. However, Brazilian and Spanish translation studies have shown that the instrument can also be used among adolescence^{6,7}. Therefore, Klages et al. investigated psychometric properties of the PIDAQ in adolescents between the ages of 11 and 17 years.⁸ Researchers have made minor changes on the items of the questionnaire and stated that it has good psychometric properties in adolescents of all age groups.

Orthodontic treatment request is increasing gradually in Turkish population in recent years, this appears due to increasing awareness of malocclusion and the psychosocial impacts on the quality of life as a consequence. To our knowledge, there is currently few data investigating the impacts of malocclusion among adolescents and young adults in Turkish population. Therefore, the aim of this study determine the psychosocial effects of malocclusion on the quality of life in adolescents and young adults in Turkish population and second to evaluate these effects in relation with the normative treatment need.

MATERIALS AND METHODS

This study consisted of 152 adolescents (12-18 years) and 48 young adults (18-30 years) who

referred to our orthodontics clinic in Samsun Ondokuz Mayıs University, Dentistry Faculty. (Table I) All the subjects were asked to answer the OHRQoL questionnaire. The inclusion criterias for participants were: patients aged between 12-30 years old; patients with no previous orthodontic treatment; and both the subjects and their parents accepted informed consent. Subjects without the mental and behavioral competence to be able to master their autonomy; or patients with syndromes and clefts were excluded. Ethical approval was obtained from the Ethical Committee of the ----. The adolescent version of the "Psychosocial Impact of Dental Aesthetics Questionnaire" (PIDAQ) were used to determine participants' oral health related impacts aged under 18. Similarly, adult version of the same questionnaire was used for the participants aged over 18. To assess the normative treatment need, Aesthetic component (AC) of The Index of Orthodontic Treatment Need was used for both groups.

Table1. Descriptive statistics

	Frequency	Percent (%)
Gender		
Female	77	38,5
Male	123	61,5
City		
Samsun	157	78,5
Other	43	21,5
Group		
<18	152	76
>18	48	24

Psychosocial Impact of Dental Aesthetics Questionnaire" (PIDAQ)

The PIDAQ consists of a total of 23 items dividing into four subscales: aesthetic concern (3 items), psychological impact (6 items), social impact (8 items), and dental self-confidence (6 items). Each item is scored with the help of a Likert scale with five points; 1 (no impact) to 5 (maximum impact). The response alternatives were as follows: 1=not at all; 2=a little; 3=somewhat; 4=strongly; and 5=very strongly. In our study; translation and validation of the Turkish version⁹ of the PIDAQ has already provided us a prepared form of the questionnaire for young adults. However, to our knowledge, adolescence version of the instrument has not been translated into Turkish yet; so we performed the original adolescence version⁸ of the questionnaire to our sample under 18 years old.

Aesthetic component (AC) of Index of Orthodontic Treatment Need

Intra-oral photographs are often used to determine patient's dental attractiveness. AC of IOTN was constructed using dental photographs of 1000 12 year old children collected during a large multidisciplinary survey. The AC has a 10-degree scale, indicated by numbered colored front-taken intra-oral photos. The photographs demonstrate three treatment categories: 'no treatment need' (grades 1-4), 'borderline treatment need' (grades 5-7), and 'great treatment need' (grades 8-10).¹⁰ In this study, the clinician classified the patient's malocclusion using the AC scale.

Statistical analysis

The data was analyzed with IBM SPSS version 23. The relevance of data for normal distribution was evaluated by Kolmogorov Smirnov test. Internal consistency determined the reliability of the PIDAQ in this study according to the value of Cronbach's coefficient test (0.873). It is an indicator that the

scale is a highly reliable scale. Tukey test was used to examine the poolability of the scale. The relationship between variables was examined by Pearson correlation. Significance level was taken as $p < 0.05$.

RESULTS

In the 23-item quality of life scale, negative phrases were reversed for scoring in same direction to produce a consistent measure of impacts. (Appendix 1-2) Scores that can be taken from the Likert scale ranged between 23 and 115. A low score on the scale indicated that the appearance of the teeth does not have a negative impact on the quality of life.

The PIDAQ scores did not show a statistically significant difference between age groups ($p = 0.505$). The mean score of the questionnaire for adolescents was 65.5, while for young adults it was 63.8. Similarly, AC scores did not differ between adolescents and young adults ($p = 0.428$). The mean AC value of adolescents was found 5.1, while for young adults it was found 4.7. (Table II).

Table 2. Comparison of the AC and the PIDAQ scores between adolescents and young adults

Groups	Gender	Mean	Std. dev.	p value		
< <18	AAC	Male	5.15	2.489	0.740	
		Female	5.01			2.470
	PIDAQ	Male	64.70	16.94		0.650
		Female	66.08	19.07		
>>18	AAC	Male	3.75	2.817	0.089	
		Female	5.22	2.733		
	PIDAQ	Male	64.25	4.435	0.612	
		Female	63.50	4.958		

Std.dev: Standart deviation

Table 3. Comparison of the AC and the PIDAQ scores between genders

Groups	Gender	Correlation
<18	Male	$r = 0,141, p = 0,279$
	Female	$r = 0,263, p = 0,012$
>18	Male	$r = -0,197, p = 0,463$
	Female	$r = -0,244, p = 0,178$

r: Pearson correlation coefficient

Table 4. Correlation between the AC and the PIDAQ scores

AC score (mean±st.dev.)	p value	PIDAQ score (mean±std.dev.)	p value
<18	0.505	<18	0.428
>18		>18	
5.1 ± 2.5		65.5 ± 18.2	
4.7 ± 2.8		63.8 ± 4.8	

Std.dev: Standart deviation

The PIDAQ score and the AC value was also assessed between genders. Statistical analyzes

revealed no significant gender differences either in adolescents and young adults for both PIDAQ score

and AC value. (Table III) A significant positive correlation was found between AC value and PIDAQ score just in adolescent females ($r= 0.263$) (Table IV). It indicated that; as the impact of the malocclusion increased, AC score given by the orthodontist has also increased.

DISCUSSION

It is important to consider the patient's view of dental attractiveness before treatment is initiated.¹¹ Determining the perceptions of patients is the major factor while assessing the overall need. A number of OHRQoL measures were developed to measure the patients' perceptions on their dental attractiveness¹². In the present study, we performed PIDAQ to evaluate the effects of dental aesthetics on the QoL. PIDAQ is a scale that measures the psychosocial effects of malocclusion in young adults with high reliability¹³.

Orthodontic treatment was usually performed in adolescence. The reason for treatment at this age is not only the permanent dentition is emerging¹⁴, but also adolescence is a phase of maturation that is a transitional period of physical and psychological human development between childhood and adulthood. During this period, individuals are highly concerned with their dental appearance and tend to improve the irregularities that they interpret as "abnormal". Taibah et al. presented that malocclusion has negative effects on self-esteem; multiple malocclusions with spacing, crowding, and overjet had the greatest effects¹⁵. Studies have presented that adolescents with moderate and severe malocclusion, where the need for treatment was mandatory, experienced a greater negative impact on quality of life¹⁶⁻¹⁷. However, the patients' perceptions to improve their teeth do not always coincide with the clinicians' view. It has been reported that approximately 30% of adolescents evaluate their malocclusion more favorably and 20% rate worse than the professional. Young adults have a more stable self-confidence than adolescents, but are still concerned about physical appearance when compared to other individuals' views.¹⁸ Both populations are considered to be favorable age groups for the investigation of aesthetic perceptions and OHRQOL results.

The Index of Orthodontic Treatment Need (IOTN) was developed by Brook and Shaw¹⁰ to record orthodontic treatment priority. The index consists

of two components, the Aesthetic Component (AC) and the Dental Health Component (DHC). In the present study, we performed AC to define the normative treatment need. Although AC has some limitations such as its subjective nature and insufficiency in assessing all occlusal features, it is a fairly simple tool to assess dental attractiveness, with a reported validity in previous studies.¹⁹ Cai et al. also showed that the orthodontist's AC reflecting subjective treatment need is strongly connected to the normative need.²⁰

In the current study, the PIDAQ scores did not differ significantly between adolescents and young adults. It indicated that adolescents and young adults have similar feelings and psychosocial impacts related with their malocclusion. There was also no significant difference in AC scores between age groups. The scores were very close (5.1 for adolescents and 4.7 for young adults) demonstrating that malocclusion severity was also similar between the groups and defined between "no or borderline treatment need". However, another study demonstrated that adults seeking orthodontic treatment appear to be more affected by their malocclusion than are teens.²¹

As a result of our study, adolescent female subjects had a higher PIDAQ score than adolescent males. Kim et al. stated that women (52.2%) had a higher rate of interest in their malocclusion than did men.²² Santos et al. found no influence of malocclusion on the quality of life by different genders.²³ In young adults, PIDAQ scores were nearly similar between females and males. In adolescent females, a significant correlation was found between the PIDAQ score and the AC score. The present result revealed that adolescent females are more aware of their dental-facial appearance than adolescent males. This finding is in consistent with other studies indicating that female subjects have higher psychosocial impacts related with their malocclusion²⁴⁻²⁶.

Although it is a simple index to evaluate the dental aesthetics, as a general limitation, AC component of IOTN evaluates the malocclusion severity only from the frontal view and has a subjective nature. DHC may be used in the future studies to describe in detail the malocclusion severity and the normative treatment need.

Malocclusion have similar psychosocial impacts on individuals, either in adolescents and young adults.

Orthodontists may be more rigorous while planning and managing the treatment of female adolescents who are more aware of their dental appearance. Considering the general psychosocial effect of malocclusion on humans, the impact of the orthodontist's on patients' lives should be kept in mind.

Yazar Katkıları: Çalışma konsepti/Tasarımı: THÖ, SY; Veri toplama: THÖ; Veri analizi ve yorumlama: SY; Yazı taslağı: THÖ; İçeriğin eleştirel incelenmesi: SY; Son onay ve sorumluluk: THÖ, SY; Teknik ve malzeme desteği: SY; Süpervizyon: THÖ, SY; Fon sağlama (mevcut ise): yok.

Bilgilendirilmiş Onam: Katılımcılardan yazılı onam alınmıştır.

Hakem Değerlendirmesi: Dış bağımsız.

Çıkar Çatışması: Yazarlar çıkar çatışması beyan etmemişlerdir.

Finansal Destek: Yazarlar finansal destek beyan etmemişlerdir.

Author Contributions: Concept/Design : THÖ, SY; Data acquisition: THÖ; Data analysis and interpretation: SY; Drafting manuscript: THÖ; Critical revision of manuscript: SY; Final approval and accountability: THÖ, SY; Technical or material support: SY; Supervision: THÖ, SY; Securing funding (if available): n/a.

Informed Consent: Written consent was obtained from the participants.

Peer-review: Externally peer-reviewed.

Conflict of Interest: Authors declared no conflict of interest.

Financial Disclosure: Authors declared no financial support

REFERENCES

- Trivedi K, Shyagali T R., Doshi J, Rajpara Y. Reliability of aesthetic component of IOTN in the assessment of subjective orthodontic treatment need. *J Adv Dent Res.* 2011;2:59-66.
- Kazancı F, Aydoğan C, Alkan Ö. Patients' and parents' concerns and decisions about orthodontic treatment. *Korean J Orthod.* 2016;46:20-6.
- de Paula Jr. DF, Santos NC, da Silva ÉT, Nunes MF, Leles CR. Psychosocial impact of dental esthetics on quality of life in adolescents: association with malocclusion, self-image, and oral health-related issues. *Angle Orthod.* 2009;79:1188-93.
- O'Brien K. Northcroft Memorial Lecture 2004. Consumer centred research. what do they think? *J Orthod.* 2005;32:187-90.
- Klages U, Claus N, Wehrbein H, Zentner A. Development of a questionnaire for assessment of the psychosocial impact of dental aesthetics in young adults. *Eur J Orthod.* 2005;28:103-11.
- Sardenberg F, Oliveira AC., Paiva SM, Auad SM, Vale MP. Validity and reliability of the Brazilian version of the psychosocial impact of dental aesthetics questionnaire. *Eur J Orthod.* 2010;33:270-5.
- Montiel-Company JM, Bellot-Arcís C, Almerich-Silla JM. Validation of the psychosocial impact of dental aesthetics questionnaire (Pidaq) in Spanish adolescents. *Med Oral Pat Oral Cir Bucal.* 2013;8:e168-73.
- Klages U, Erbe C, Sandru SD, Brüllman D, Wehrbein H. Psychosocial impact of dental aesthetics in adolescence: validity and reliability of a questionnaire across age groups. *Qual Life Res.* 2015;24:379-90.
- Aglarci C, Baysal A, Demirci K, Dikmen F, Aglarci AV. Translation and validation of the Turkish version of the Psychosocial Impact of Dental Aesthetics Questionnaire. *Korean J Orthod.* 2016;46:220-7.
- Brook PH, Shaw WC. The development of an index of orthodontic treatment priority. *Eur J Orthod.* 1989;11:309-20.
- Johansson AM, Föllin ME. Evaluation of the aesthetic component of the Index of Orthodontic Treatment Need by Swedish orthodontists. *Eur J Orthod.* 2005;27:160-6.
- De Oliveira CM, Sheiham A. The relationship between normative orthodontic treatment need and oral health-related quality of life. *Community Dent Oral Epidemiol.* 2003;31:426-36.
- Bellot-Arcís C, Almerich-Silla JM. Psychosocial impact of malocclusion in Spanish adolescents. *Korean J Orthod.* 2013;43:193-200.
- Dimberg L, Arnrup K, Bondemark, L. The impact of malocclusion on the quality of life among children and adolescents: a systematic review of quantitative studies. *Eur J Orthod.* 2014;37:238-47.
- Taibah SM, Al-Hummayani FM. Effect of malocclusion on the self-esteem of adolescents. *J Orthod Sci.* 2017;6:123-8.
- Bittencourt JM, Martins LP, Bendo CB, Vale MP, Paiva SM. Negative effect of malocclusion on the emotional and social well-being of Brazilian adolescents: a population-based study. *Eur J Orthod.* 2017;39:628-33.
- Dutra SR, Pretti H, Martins MT, Bendo CB, Vale MP. Impact of malocclusion on the quality of life of children aged 8 to 10 years. *Dental Press J Orthod.* 2018;23:46-53.
- Klages U, Zentner A. Dentofacial aesthetics and quality of life. *Semin Orthod.* 2007;13:104-15.
- Howells DJ, Shaw WC. The validity and reliability of ratings of dental and facial attractiveness for epidemiologic use. *Am J Orthod.* 1985;88:402-8.
- Cai Y, Du W, Lin F, Ye S, Ye Y. Agreement of young adults and orthodontists on dental aesthetics & influencing factors of self-perceived aesthetics. *BMC Oral Health.* 2018;18:113.
- Neely ML, Miller R, Rich SE, Will LA, Wright WG, Jones JA. Effect of malocclusion on adults seeking orthodontic treatment. *Am J Orthod Dentofacial Orthop.* 2017;152:778-87.
- Kim Y. Study on the perception of orthodontic treatment according to age: A questionnaire survey. *Korean J Orthod.* 2017;47:215-21.
- Dos Santos PR, Meneghim MC, Ambrosano GM, Filho MV, Vedovello SA. Influence of quality of life, self-perception, and self-esteem on orthodontic treatment need. *Am J Orthod Dentofacial Orthop.* 2017;151:143-7.

24. Twigge E, Roberts RM, Jamieson L, Dreyer CW, Sampson WJ. The psycho-social impact of malocclusions and treatment expectations of adolescent orthodontic patients. *Eur J Orthod.* 2015;38:593-601.
25. Farzanegan F, Heravi F, Sooratgar A, Dastmalchi P. Evaluation of relationship between oral health-related quality of life and occlusion traits among female adolescents. *Dent Res J.* 2014;11:684-8.
26. Bellot-Arcís C, Montiel-Company JM, Manzanera-Pastor D, Almerich-Silla JM. Orthodontic treatment need in a Spanish young adult population. *Med Oral Pat Oral Cir Bucal.* 2012;17:e638-43.