

The Effect of Bonding Orthodontic Fixed Appliances on the Esthetic Self-Perception in Adults and Adolescents

Omar H Alkadhi^{1*}, Haifa E Alsalmi², Lama S Alsaleh³, Latifa M Alsewailem², Shiana A Alhawas²

¹Department of Preventive Dentistry, Riyadh Elm University, Saudi Arabia

²Intern, Riyadh Elm University, Riyadh, Saudi Arabia

³Intern, King Saud University, Riyadh, Saudi Arabia

ABSTRACT

Objective: The aim of this study was to investigate esthetic self-perception of individuals with orthodontic fixed appliances using the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ).

Materials and methods: A cross-sectional study were carried out using a self-reported questionnaire (PIDAQ) which targeted adolescent and adult orthodontic patients divided into two groups; participants undergoing orthodontic treatment with orthodontic fixed appliances (group I) and those seeking orthodontic treatment (group II). The questionnaire was validated using translation-retranslation method and distributed both online and in Riyadh city orthodontics clinics. Scores of PIDAQ were compared between the two groups.

Results: 756 responses (120 males and 636 females) were received. Participants aged 12 to 18 years old comprised 13.8% of participants and participants over 18 years old comprised 86.2%. Among responses, 402 (53.2%) in group I and 354 (46.8%) in group II. A statistically significant difference between the two groups was found where the total PIDAQ score in group I was (mean=36.85, SD=23.26), and in group II was (mean=31.21, SD=23.81) ($p=0.000$). No statistically significant differences were found between males and females in all components and the total PIDAQ scores in both groups ($p>0.05$).

Conclusions: The total PIDAQ score was higher in group I compared to group II. This indicates that bonding orthodontic fixed appliance can negatively affect esthetics and psychosocial well-being of participants.

Key words: Orthodontic fixed appliances, PIDAQ, Esthetics, Self-perception, Saudi Arabia

HOW TO CITE THIS ARTICLE: Omar H Alkadhi, Haifa E Alsalmi, Lama S Alsaleh, Latifa M Alsewailem, Shiana A Alhawas, The Effect of Bonding Orthodontic Fixed Appliances on the Esthetic Self-Perception in Adults and Adolescents, J Res Med Dent Sci, 2021, 9(10): 243-247

Corresponding author: Omar H Alkadhi
e-mail ✉: omar.alkadhi@riyadh.edu.sa
Received: 16/9/2021
Accepted: 04/10/2021

INTRODUCTION

Dental esthetic is the main driver for individuals seeking orthodontic treatment as they recognize the social impact of their smiles [1]. Compromised smiles were found to be unattractive by both dental professionals and laypeople as minor asymmetries as low as 0.5-2.0 mm in the smile can affect the perception of smile esthetic [2,3].

Many reports indicated that malocclusion has a social and psychological impact on individuals. The association between malocclusion and psychological and social statuses has been well established in the literature. Psychological negative effects of malocclusion worsen as the severity of malocclusion increases [4,5]. Moreover, quality of life decreases with malocclusion where low self-esteem and high esthetic concern were found to affect quality of life [6,7].

Zheng et al. used Oral Health Impact Profile (OHIP-14) to investigate the effect of different types of malocclusion during comprehensive orthodontic treatment on the quality of life. They found that there is a significant decrease in all the domains of OHIP-14 but at different stages of treatment based on the type of initial malocclusion [8]. Demirovic et al. investigated the difference in quality of life between treated and untreated orthodontic patients. It was found that participants who didn't undergo orthodontic treatment had higher impact on quality of life compared to those who were treated [9].

Gazit-Rappaport examined the effect of orthodontic treatment on 69 participants before and after receiving the treatment. A significant decrease in all Psychosocial Impact of Dental Aesthetics (PIDAQ) components was observed after completion of treatment [10].

However, during orthodontic treatment, the appearance of metal brackets may compromise facial esthetic. Therefore, the aim of this study was to investigate the psychosocial impact of dental esthetic in patients with metal fixed

orthodontic appliances compared to patients without orthodontic fixed appliances using PIDAQ.

MATERIALS AND METHODS

This is a cross-sectional study that was registered at the research center and ethical approval was obtained from the institutional review board.

The Arabic version of the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) by having one bilingual (Arabic-English) translator translating the original English questionnaire into Arabic and another bilingual translator translating it back to English and compared the final translation with the original. This self-reported and validated Arabic version of PIDAQ was used and distributed it in electronic format via social media (WhatsApp, Twitter, and Instagram) in addition to distributing the electronic form to patients in the waiting areas in orthodontic offices.

The target population was adults and adolescents seeking or have already started orthodontic treatment living in Saudi Arabia. The sample was divided into two groups. One group included participants undergoing orthodontic treatment with metal orthodontic fixed appliances (Group I), and a control group of individuals who are seeking orthodontic treatment but not undergoing orthodontic treatment with fixed appliances (Group II).

Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ)

PIDAQ is a psychometric instrument that was developed to measure the effects of dental esthetics on specific aspects of quality of life. Validity and reliability of PIDAQ have been tested. Twenty-three questions comprise PIDAQ that are distributed into 4 components. Each question is based on a Likert scale of 5 points (4: very strongly, 3: strongly, 2: somewhat, 1: a little, and 0: not at all). Each component measures a specific aspect of the quality of life, namely, dental self-confidence measured in 6 questions, social impact in 8 questions, psychological impact in 6 questions, and esthetic concern in 3 questions. It is important to note that all domains are

scored negatively, except the self-confidence domain that is scored positively. The total score of PIDAQ can range from 0 to 92. The sum of scores of the components was calculated as well as the score for each component. As the score grows higher, the psychosocial negative effect increases [11].

Statistical analysis

Descriptive statistics were reported and comparisons between groups for PIDAQ and its individual components were done using Mann-Whitney U t-test. The cut-off point was set at ($p < 0.05$). The statistical software used was IBM SPSS version 27 statistical package (IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp.).

RESULTS

756 responses were received. 402 participants in group I were undergoing orthodontic treatment (53.2%) and 354 in group II (46.8%) as controls that were seeking orthodontic treatment. The sample consisted of 120 males (15.9%) and 636 females (84.1%). 115 participants (15.2%) were aged between 12 to 18 years and 641 (84.8%) were above 18 years of age.

Normality tests were carried out using Shapiro-Wilk Test. Data were found to be not normally distributed ($p < 0.05$). Comparing males and females in each group separately, no statistically significant differences were found between participants in all PIDAQ components ($p > 0.05$) (Tables 1 and 2).

PIDAQ total score and all its components was not found to be different among participants with different levels of education in group I ($p > 0.05$) (Table 3).

Mean scores for PIDAQ and all its components are shown in Table 4 along with comparisons between the two groups.

A statistically significant increase was found in PIDAQ total score and all its components in group I compared to group II ($p < 0.05$).

Table 1: Comparison of PIDAQ components between males (n=56) and females (n=346) in group I using Mann-Whitney U test.

Component	Male mean (SD)	Females mean (SD)	P-value
Self Confidence	12.4 (5.9)	13.4 (6.6)	0.251
Social Impact	7.2 (7.9)	9.6 (9)	0.074
Psychosocial Impact	9.6 (6)	10.1 (6.9)	0.798
Esthetic Concern	3.5 (4)	4.4 (4.2)	0.138
Total PIDAQ Score	32.7 (20)	37.5 (23.7)	0.181

Table 2: Comparison of PIDAQ components between males (n=64) and females (n=290) in group II using Mann-Whitney U test.

Component	Male mean (SD)	Females mean (SD)	P-value
Self Confidence	11.9 (6.6)	12.1 (7.2)	0.95
Social Impact	3.6 (7.6)	7.3 (8.4)	0.123
Psychosocial Impact	8.9 (6)	9 (7.1)	0.661
Esthetic Concern	2.8 (3.5)	3.4 (4.3)	0.617
Total PIDAQ Score	23.7 (21.1)	31.7 (24.4)	0.726

Table 3: Comparison of PIDAQ components between participants with different education levels; high school or lower (n=101), bachelor's degree or equivalent (n=280), and higher education (n=21) using Kruskal Wallis test.

Level of education	<=High Mean (SD)	Bachelor's degree or equivalent Mean (SD)	Higher education Mean (SD)	P-value
Self Confidence	14.3 (6.2)	12.8 (6.6)	13.6 (5.5)	0.141
Social Impact	9.1 (8.6)	9.3 (9.1)	9.3 (8)	0.922
Psychosocial Impact	9.8 (6.2)	10.3 (7.1)	9 (5.9)	0.797
Esthetic Concern	4.1 (4.1)	4.2 (4.2)	5.1 (3.9)	0.59
PIDAQ_Score	37.4 (21.5)	36.6 (24.1)	36.9 (20.4)	784

Table 4: Comparison of PIDAQ components between group I (n=402) and group II (n=354) using Mann-Whitney U test.

Component	Group	Mean	Std. Deviation	Mean Difference	Sig. (2-tailed)
				Group I-Group II	
Self Confidence	Group I	13.23	6.49	1.19*	0.013
	Group II	12.04	7.04		
Social Impact	Group I	9.31	8.89	2.37***	0
	Group II	6.94	8.29		
Psychosocial Impact	Group I	10.07	6.82	1.09*	0.018
	Group II	8.98	6.9		
Esthetic Concern	Group I	4.24	4.15	0.99***	0
	Group II	3.25	4.16		
PIDAQ Total Score	Group I	36.85	23.26	5.64***	0
	Group II	31.21	23.81		

*: p<0.05
***: p<0.001

DISCUSSION

Orthodontic treatment can be performed using a multitude of appliances including fixed and removable appliances, metal, ceramic, or polycarbonate materials. With the introduction of orthodontic treatment with lingual appliances, ceramic brackets and clear aligners, patients started to accept orthodontic treatment more than ever. This may be due to the fact that they are less obtrusive and they have a decreased effect on dental and facial appearance. In this study, the aim was to investigate the psychosocial impact of dental esthetics in patients with metal fixed orthodontic appliances compared to patients without orthodontic fixed appliances.

We opted to use PIDAQ as a standard and well-established questionnaire with proven internal validity [11]. We also used the translation-retranslation method to ensure the validity of the Arabic version as described in several studies [12,13].

In this study, it was found that metal orthodontic fixed appliances can hinder esthetic self-perception and compromise self-confidence, increase social impact and psychosocial impact, and esthetic concern of patients. Previous findings come in line with the findings of this study. Jeremiah et al. demonstrated that adults wearing orthodontic fixed appliances were less attractive than those without appliances. Moreover, the type of appliance

can have an effect on attractiveness where metal and ceramic brackets were judged as less attractive compared to lingual appliances and clear aligners [14]. Stainless steel appliances, both conventional and self-ligating appliances, were the least attractive among different appliance types where the most acceptable and attractive type of appliances are clear aligners and lingual appliances [15]. Similar findings were reported by Alansari et al. as clear aligners were found to be more attractive compared to conventional appliances in both adults and children [16,17]. On the contrary, another study found that an immediate positive effect of orthodontic fixed appliances was observed in Brazilian adolescents [18]. While in a study Kuhlman et al. in Brazil it was reported that individuals saw themselves less attractive wearing orthodontic fixed appliances [19]. Interestingly, metallic brackets are seen to be improving attractiveness scores in adolescents and some young adults in some geographical areas [20].

In this study, gender and level of education did not influence self-confidence, psychosocial impact, social impact, and esthetic concern of participants in both groups. However, in one study, females were found to have a negative social effect of orthodontic fixed appliances [14]. more susceptible to social socioeconomic status was found to play a role in the choice, acceptance, attractiveness, and preference of orthodontic appliances [21]. The limitations of this study include the widespread of participants.

CONCLUSIONS

- The psychosocial impact is higher in participants with orthodontic fixed appliances compared to those who have not started treatment which indicates an increased negative psychosocial effect of bonding orthodontic fixed appliances in adults and adolescents.
- The total PIDAQ score, and individual components scores were similar in both males and females.

REFERENCES

1. Lin F, Ren M, Yao L, et al. Psychosocial impact of dental esthetics regulates motivation to seek orthodontic treatment. *Am J Orthod Dentofac Orthop* 2016; 150:476-82.
2. Pinho S, Ciriaco C, Faber J, et al. Impact of dental asymmetries on the perception of smile esthetics. *Am J Orthod Dentofac Orthop* 2007; 132:748-53.
3. Al Taki A, Hayder Mohammed T, Mohammad Hamdan A. Influence of the smile line on smile attractiveness in short and long face individuals. *Int J Dent* 2017; 2017.
4. Velangi CS, Yavagal PC, Nagesh L. Dental Aesthetics and its psychosocial impact among adolescents: A cross-sectional survey. *IJADS* 2020; 6:184-188.
5. Bellot-Arcís C, Almerich-Silla JM. Psychosocial impact of malocclusion in Spanish adolescents. *Korean J Orthod* 2013; 43:193-200.
6. Kang JM, Kang KH. Effect of malocclusion or orthodontic treatment on oral health-related quality of life in adults. *Korean J Orthod* 2014; 44:304-11.
7. Dallé H, Vedovello SA, Degan VV, et al. Malocclusion, facial and psychological predictors of quality of life in adolescents. *Community Dent Health* 2019; 36:298-302.
8. Zheng DH, Wang XX, Su YR, et al. Assessing changes in quality of life using the oral health impact profile (OHIP) in patients with different classifications of malocclusion during comprehensive orthodontic treatment. *BMC Oral Health* 2015; 15:1-8.
9. Demirovic K, Habibovic J, Dzemicidic V, et al. Comparison of oral health-related quality of life in treated and non-treated orthodontic patients. *Med Arch* 2019; 73:113.
10. Gazit-Rappaport T, Haisraeli-Shalish M, Gazit E. Psychosocial reward of orthodontic treatment in adult patients. *Eur J Orthod* 2010; 32:441-6.
11. Klages U, Claus N, Wehrbein H, et al. Development of a questionnaire for assessment of the psychosocial impact of dental aesthetics in young adults. *Eur J Orthod* 2006; 28:103-11.
12. Göranson E, Norevall LI, Bågesund M, et al. Translation and validation of the Swedish version of the psychosocial impact of dental aesthetics questionnaire (PIDAQ) for adolescents. *Acta Odont Scandinavica* 2021; 79:241-7.
13. Bucci R, Rongo R, Zito E, et al. Translation and validation of the italian version of the psychosocial impact of dental aesthetics questionnaire (pidaq) among adolescents. *Eur J Paediatr Dent* 2017; 18:158-62.
14. Jeremiah HG, Bister D, Newton JT. Social perceptions of adults wearing orthodontic appliances: A cross-sectional study. *Eur J Orthod* 2011; 33:476-82.
15. Ziuchkovski JP, Fields HW, Johnston WM, et al. Assessment of perceived orthodontic appliance attractiveness. *Am J Orthod Dentofac Orthop* 2008; 133:S68-78.
16. Alansari RA, Faydhi DA, Ashour BS, et al. Adult perceptions of different orthodontic appliances. *Patient Preference Adherence* 2019; 13:2119.
17. Alansari RA. Youth perception of different orthodontic appliances. *Patient Preference Adherence* 2020; 14:1011.
18. de Almeida AB, Leite IC, da Silva GA. Brazilian adolescents' perception of the orthodontic appliance: A qualitative study. *Am J Orthod Dentofac Orthop* 2019; 155:490-497.

19. Fonseca LM, de Araújo TM, Santos AR, et al. Impact of metal and ceramic fixed orthodontic appliances on judgments of beauty and other face-related attributes. *Am J Orthod Dentofac Orthop* 2014; 145:203-206.
20. Kuhlman DC, Lima TA, Duplat CB, et al. Esthetic perception of orthodontic appliances by Brazilian children and adolescents. *Dent Press J Orthod* 2016; 21:58-66.
21. Feu D, Catharino F, Duplat CB, et al. Esthetic perception and economic value of orthodontic appliances by lay Brazilian adults. *Dent Press J Orthod* 2012; 17:102-114.