

EVALUATION OF THE PSYCHOSOCIAL IMPACT OF DENTAL AESTHETICS BY SOCIODEMOGRAPHICS AND MALOCCLUSIONS

Kalender Muhammed Emin¹, Ucan Yarkac Fatma¹, Emiroglu Yunus¹

¹Necmettin Erbakan University, Faculty of Dentistry, Department of Periodontology, Konya, Turkey

Corresponding author; *e-mail*: eminnkalender03@gmail.com

ABSTRACT

Aim of the study: This study evaluates the psychological and social effects of dental aesthetics in individuals aged 18–65 using the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ). **Materials and Methods:** A total of 407 people aged 18–65 participated in the study. Exclusion criteria included intellectual disabilities, craniofacial syndromes, ongoing orthodontic treatments, and psychological therapy. Sociodemographic data, oral hygiene habits, and dental aesthetics were assessed. Participants completed the PIDAQ survey with subscales for dental self-confidence, social impact, psychological impact, and aesthetic concern. **Results:** Dental self-confidence and social impact scores were significantly higher in the 18–34 age group compared to 35–64. Women scored higher in all subscales except dental self-confidence. Participants with malocclusions showed increased psychological and social impacts, regardless of malocclusion type ($p < 0.05$). **Discussion:** Findings reveal significant psychosocial effects of dental aesthetics, varying by age, gender, and malocclusion status. Younger individuals and women reported greater concerns, likely influenced by societal expectations. These results align with previous studies but expand understanding by including a wider age range and malocclusion analysis. **Conclusion:** Dental aesthetics deeply influence self-confidence and social interactions, emphasizing the importance of addressing these concerns for both functional and psychological reasons. Further research should examine pre- and post-treatment effects to provide comprehensive insights.

Keywords: malocclusion, anxiety, oral medicine

INTRODUCTION

The psychosocial impact of dental aesthetics plays an important role in patients' quality of life and self-perception. Many studies have demonstrated that dental malocclusion and aesthetic concerns may lead to significant psychosocial difficulties (1). Perceived dental defects are associated with lower self-esteem and increased social anxiety, which may negatively affect interpersonal communication and overall quality of life (2,3). The relationship between dental aesthetics and psychosocial well-being may also be influenced by individual factors such as personality traits, cultural background and socioeconomic status. It has been shown that these factors may affect how individuals perceive dental aesthetics and the subsequent psychosocial impact (4,5). Perfectionism and self-esteem have been associated with the

extent of psychosocial distress experienced due to dental aesthetics, suggesting that psychological profiles play an important role in shaping individuals' responses to their dental appearance (6).

Anterior tooth loss negatively affects the quality of life of individuals in basic areas such as speech, chewing, aesthetics and self-esteem. Absence of anterior teeth may restrict the way individuals express themselves and may cause timidity in social relationships (7). Dental malocclusion, which is characterised by misalignment of teeth and abnormal bite, is a common condition that significantly affects the psychosocial welfare and quality of life of individuals. It has been observed that individuals with severe malocclusion report lower quality of life scores and higher psychological problems compared to those with normal occlusion (8,9). A cross-

sectional study emphasised that adolescents with severe malocclusion exhibited a poorer self-perception of dental aesthetics, which affected their willingness to enter into social relationships (10). It has been shown that the desire for orthodontic treatment is usually driven by the need to improve not only dental aesthetics but also social acceptance and self-confidence (11).

Various questionnaires have been previously used for the effect of individuals' dental profile on psychosocial status. Some of these are Dental Aesthetic Index (DAI), Oral Health Related Quality of Life (OHRQoL), Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) (12-14). The Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) was developed to assess the psychosocial consequences of dental aesthetics in orthodontic contexts, especially in young individuals. In addition to young individuals, studies have also been conducted in adults and patients receiving prosthetic treatment (15,16). The PIDAQ, developed to assess the perceived impact of dental aesthetics on individuals' quality of life, covers four different subgroups: Dental Self-Confidence (DSC), Social Impact (SI), Psychological Impact (PI) and Aesthetic Concern (AC) (17). Each of these groups captures unique aspects of how dental aesthetics influence self-perception and social interactions, thus providing a comprehensive overview of the psychosocial influences associated with dental appearance.

Reliability and adaptation studies have been conducted for PIDAQ in different regions and cultures (18- 22). For the PIDAQ questionnaire, a Turkish validity and reliability study was conducted by Aglarıcı et al. in 2016 (23). Studies on the psychosocial interaction of individuals in large age groups and due to malocclusions are limited. For this reason, the aim of our study is to investigate

the psychological effect of dental aesthetics in the society and as an individual by using the "Psychosocial Impact of Dental Aesthetics Questionnaire" (PIDAQ) in individuals aged between 18-65 years who applied to Necmettin Erbakan University for various reasons.

MATERIALS AND METHODS

Individual selection and design of the study

Necmettin Erbakan University Faculty of Dentistry, Faculty of Dentistry, Drug and Non-Medical Device Research Ethics Committee was applied for the study and approval was obtained with the decision numbered 2024/418. Study was planned to be conducted with 400 individuals aged between 18-65 years who applied to Necmettin Erbakan University Faculty of Dentistry Hospital for different reasons and was completed with 407 patients. Patients who agreed to participate in the study and signed the consent form were included. Patients with mental retardation, craniofacial syndromes, patients undergoing psychological treatment and patients undergoing ongoing orthodontic treatment were excluded. Patients were first examined by the same researcher and their malocclusion status (normal, diastema, crowding, missing teeth) was analysed. In order to prevent anxiety in the patients, they were first asked to fill in a questionnaire containing PIDAQ questions and then a form containing demographic information.

Sociodemographic data form

Participants filled in demographic information such as age (between 18-65 years), gender (Male/Female), marital status (Single/Married), education level (Primary school / High school / University / Master's degree or doctorate), place of residence (Village / Town / City), occupation (Civil servant / worker, tradesman, private sector

employee / No regular job / Not working / Other), income level (17.000 TL or less/17.000-30.000 TL/30.000 TL or more), chronic physical illness (Yes/No), chronic mental illness (Yes/No). Afterwards, they answered questions about the frequency of tooth brushing (1-2 times a day/sometimes/do not brush), the frequency of flossing or interfacial brush use (1-2 times a day/sometimes/do not use), the way of obtaining oral care information (Dentist/Other), and the frequency of dental visits (When complaints occur/ 1-2 times a year/more than 2 times a year).

PIDAQ survey

PIDAQ is a Likert-type scale. The questions are "1" strongly disagree, "2" disagree, "3" undecided, "4" agree and "5" strongly agree. The dental self-confidence scale was used to see the effect of dental aesthetics on the individual's self-confidence and mood. This scale was measured with questions 4, 7, 12, 17, 21 and 23 in the questionnaire. The social impact scale questions interpersonal communication and responses to other people's reactions and consists of questions 2, 5, 9, 13, 14, 15, 19 and 22. The psychological impact scale focuses on comparing oneself with different individuals and includes questions 3, 6, 10, 11, 16 and 20. The aesthetic anxiety scale examines the individual's criticism of his/her own dental appearance and consists of questions 1, 8, and 18. (Appendix 1). For the PIDAQ questionnaire, a Turkish validity and reliability study was conducted by Aglarıcı et al. in 2016 (23).

Statistical analysis

The data were analysed using SPSS 23.0 statistical package (SPSS Inc., Chicago, IL, USA). The conformity of the data to normal distribution was tested with the

Shaphiro Wilk test, Student t test was used to compare the normally distributed characteristics in 2 independent groups and one-way analysis of variance (ANOVA) test was used to compare the normally distributed characteristics in more than 2 independent groups. In order to test validity and reliability, Cronbach's alpha coefficients were calculated for PIDAQ subgroups. Confirmatory and exploratory factor analyses were also applied. Mean $\pm$ standard deviation was calculated for numerical variables as descriptive statistics. P value 0.05 was accepted as significant.

Results and DISCUSSIONS

A total of 248 participants between the ages of 18-34 and 159 participants between the ages of 35-64 participated in the study. The results regarding the demographic information of the participants according to age groups are given in Table 1. When the groups were compared, no statistically significant difference was found in terms of gender, occupation, chronic mental illness, frequency of dental visits, frequency of interface brush use, source of oral hygiene information and malocclusion status ($p > 0.05$). Regarding marital status, the proportion of married individuals was higher in the 35-64 age group ($p < 0.001$). In terms of education, the number of university and doctorate degrees in the 18-34 age group is statistically significantly higher ($p < 0.001$). Again, while the 18-34 age group frequently resides in the city centre ($p = 0.006$), the income level is statistically significantly lower than the 35-64 age group ($p < 0.001$). While chronic physical diseases were more common in the 35-64 age group ($p < 0.001$), the frequency of tooth brushing was statistically significantly lower ($p < 0.001$).

Demographic information	Subgroup	18-34 years	35-64 years	P
Gender	Male	102	78	0.116
	Female	146	81	
Marital status	Married	82	131	0.001
	Single	166	28	
Education level	Primary school	23	52	0.001
	High school	56	55	
	University	156	45	
	Master's degree or doctorate	13	7	
Place of residence	Village	9	12	0.006
	Town	48	49	
	City	190	99	
Occupation	Civil servant	37	24	0.02
	Private sector employee	63	52	
	No regular job	21	25	
	Not working	77	39	
Income level	17.000 ₺ or less	107	38	0.001
	17.000-30.000 ₺	59	59	
	30.000 ₺ or more	82	62	
Chronic physical illness	Yes	31	50	0.001
	No	217	108	
Chronic mental illness	Yes	10	5	0.643
	No	238	154	
Frequency of dental visits	When complaints occur	185	118	0.681
	1-2 times a year	46	33	
	More than 2 times a year	17	8	
Frequency of tooth brushing	1-2 times a day	191	93	0.001
	Sometimes	51	56	
	Do not brushing	6	10	
Frequency of flossing or interfacial brush use	1-2 times a day	26	15	0.191
	Sometimes	75	36	
	Do not use	147	108	
The way of obtaining oral care information	Dentist	203	131	0.891
	Other	45	28	
Malocclusion	Normal	85	55	0.661
	Diestema	41	25	
	Crowding	54	28	
	Missing teeth	68	51	

Table 1. Results related to demographic information of the participants according to age groups

The averages of PIDAQ subgroups according to age range are shown in Table 2. No statistically significant difference was observed between the groups in terms of psychological impact scale and aesthetic anxiety scale ($p > 0.05$). Dental self-

confidence scale and social impact scale had statistically significantly higher mean scores in the 18-34 age group ($p < 0.05$).

Subscale	Age Range	N	Mean $\pm$ SD	P
Psychological impact scale	18-34	248	16.00 $\pm$ 5.28	0.6
	35-64	159	15.72 $\pm$ 5.37	
Dental self-confidence scale	18-34	248	18.34 $\pm$ 5.29	0.011
	35-64	159	16.96 $\pm$ 5.44	
Social impact scale	18-34	248	18.82 $\pm$ 6.32	0.007
	35-64	159	17.14 $\pm$ 5.78	
Aesthetic anxiety scale	18-34	248	7.80 $\pm$ 3.12	0.085
	35-64	159	8.33 $\pm$ 2.78	

Table 2. The averages of PIDAQ subscales according to the age groups of the participants

The averages of PIDAQ subgroups according to gender are given in Table 3. There is no statistically significant difference between the groups in terms of dental self-

confidence scale. In all other subscales, females had statistically significantly higher mean scores than males ($p < 0.001$).

Subscale	Gender	N	Mean $\pm$ SD	P
Psychological impact scale	Male	180	14.71 $\pm$ 5.31	0.001
	Female	227	16.83 $\pm$ 5.13	
Dental self-confidence scale	Male	180	17.67 $\pm$ 5.53	0.66
	Female	227	17.90 $\pm$ 5.27	
Social impact scale	Male	180	16.82 $\pm$ 6.34	0.001
	Female	227	19.23 $\pm$ 5.82	
Aesthetic anxiety scale	Male	180	7.48 $\pm$ 3.01	0.001
	Female	227	8.43 $\pm$ 2.92	

Table 3. The averages of PIDAQ subscales of the participants according to gender

The averages of PIDAQ subgroups according to malocclusion status are given in Table 4. No significant difference was found between the groups in terms of dental self-

confidence scale and aesthetic anxiety scale. Psychological impact scale and social impact scale were statistically significantly higher when malocclusion was present ($p < 0.05$).

Subscale	Gender	N	Mean $\pm$ SD	P
Psychological impact scale	Normal	140	14.59 $\pm$ 5.25	0.004
	Diestema	66	16.52 $\pm$ 5.44	
	Crowding	82	16.93 $\pm$ 4.99	
	Missing teeth	119	16.36 $\pm$ 5.30	
Dental self-confidence scale	Normal	140	18.42 $\pm$ 5.41	0.213
	Diestema	66	18.20 $\pm$ 5.42	
	Crowding	82	17.33 $\pm$ 5.09	
	Missing teeth	119	17.17 $\pm$ 5.49	
Social impact scale	Normal	140	16.39 $\pm$ 6.19	0.001
	Diestema	66	18.33 $\pm$ 5.37	
	Crowding	82	19.89 $\pm$ 5.71	
	Missing teeth	119	18.97 $\pm$ 6.41	
Aesthetic anxiety scale	Normal	140	7.59 $\pm$ 3.00	0.142
	Diestema	66	7.98 $\pm$ 3.11	
	Crowding	82	8.51 $\pm$ 2.86	
	Missing teeth	119	8.17 $\pm$ 3.00	

Table 4. Means of PIDAQ subscales according to the malocclusion status of the participants

Cronbach alpha values according to PIDAQ subgroup are presented in Table 5.

Cronbach's alpha value is greater than 0.70 in all subgroups.

	Psychological impact scale	Dental self-confidence scale	Social impact scale	Aesthetic anxiety scale
Cronbach's alpha value	0.82	0.85	0.84	0.74

Table 5. Cronbach's alpha values related to PIDAQ subgroup

Dental aesthetics is an important part of facial aesthetics and affects the relationship of individuals with other people and with themselves. Having a healthy and aesthetic smile increases self-confidence and enables individuals to establish social relationships more easily (24). Studies have shown that individuals with impaired dental aesthetics generally experience significant psychological distress, which may manifest as decreased self-confidence and increased social anxiety (25,26).

The PIDAQ questionnaire was first developed by Klages et al. and evaluated the psychosocial effects of dental aesthetics in young individuals in need of orthodontic treatment (14). It was translated into Turkish by Ağlarıcı et al. and a validity and reliability

study was performed (23). When the literature is examined, the studies conducted with the PIDAQ questionnaire are generally young individuals in need of orthodontic treatment (3,4,18,19). There is one study conducted with individuals in need of prosthodontic treatment and the age range is between 31-56 (15). In our study, using the PIDAQ questionnaire, the psychological effects of dental aesthetics of individuals aged between 18-65 years who applied to our hospital for various reasons were examined in the society and as individuals.

Klages et al. compared 3 age groups (11-12, 13-14 and 15-17) in their study and reported that there was no difference between these age groups in terms of PIDAQ subscales (14). Wahab et al. 2936 individuals,

no statistically significant difference was found between age groups (18-34 and >35 years) for PIDAQ scores (27). In our study, dental self-confidence scale and social impact scale had higher mean scores in the 18-34 age group. The older patient group has more stable work and social relationship status and may not be desirous for a more beautiful aesthetic appearance (28). It has also been reported that due to the prevalence of problems such as tooth loss in elderly individuals, not only their physical health but also their psychosocial well-being is affected, leading to a decrease in self-confidence and social interaction (29). In addition, it has been reported that periodontal tooth loss increases in elderly individuals due to chronic diseases (30). In our study, the fact that the rate of tooth deficiency and chronic diseases was higher in the 34-65 age group compared to the 18-34 age group supports this result. One study shows that individuals with low income levels often experience a higher psychosocial impact due to dental aesthetics, primarily because they may not have access to orthodontic treatments that can improve their dental appearance. It has been suggested that this lack of access may lead to feelings of inadequacy and low self-esteem, as individuals perceive dental aesthetics as an obstacle to social acceptance and personal satisfaction (17). The observation of lower income and higher PIDAQ scores in the 18-34 age group in our study supports this conclusion.

Poor dental aesthetics may negatively affect self-confidence and social interactions among women (31). In two studies, the social impact scale and aesthetic anxiety scale were found to be higher in women compared to men (15, 32). In another study, the overall PIDAQ scores of women were found to be higher (27). In our study, the mean scores of women were found to be higher in all groups

except the dental self-confidence subscale. The general judgement about dental aesthetics is that women have more critical oral demands and are more interested in their dental status (33). On the other hand, men are less demanding about appearance and performance due to the nature of their social life (34). Again, among the reasons for more dissatisfaction about appearance in women, women's insecurity about their appearance arising from competition with other women and the attitude or thought of being evaluated by men according to their appearance may be effective.

Dental malocclusion may have a significant negative effect on the psychosocial well-being of individuals. One study showed that adolescents with severe malocclusions reported lower self-confidence and higher levels of dissatisfaction with their appearance, which may lead to social anxiety and decreased quality of life (18). Again, the interaction between malocclusion and mental health is further supported by findings linking poor dental aesthetics with increased anxiety and depression, especially in adolescents who are more sensitive to social perceptions (35). Low dental self-confidence has also been observed in individuals with tooth deficiency (36). In another study, it was reported that individuals with diastema frequently experienced feelings of embarrassment, shyness and reluctance to smile, and this led to social anxiety and low self-confidence. Dahong et al. evaluated the psychosocial effects of malocclusion in young adults and found that the psychosocial effects of all malocclusion groups were statistically significantly higher than individuals with normal occlusion (37). In our study, the psychological impact scale and the social impact scale were found to be statistically significantly higher in the presence of malocclusion regardless of its type. In the

literature, studies examining the relationship between malocclusion and PIDAQ scale are limited. However, it is thought that there is a positive relationship between the PIDAQ scale and malocclusion for the reasons mentioned.

Cronbach's alpha value is one of the indicators of the consistency of the items in the subscale and the scale with each other. This value is desired to be above 0.70 (38). In our study, Cronbach's alpha value was found to be greater than 0.70 in all subscales, similar to other studies (3,14,21).

Aesthetics is an important concept that directly affects the appearance and psychological state of the individual. Dental structures contribute to the appearance and psychology of the individual as one of the basic elements of facial aesthetics. A healthy and aesthetic smile has a positive effect on the psychological well-being of individuals by increasing their self-confidence. Therefore, dental aesthetics should be addressed not only for functional reasons but also to improve psychological health and social integration and the expectations of the individual should be taken into consideration (15).

To date, most studies using the PIDAQ questionnaire have been conducted for orthodontic evaluation and in young

people (3,5,14,18). The study by Chen et al. was a prosthodontic study, the age group was limited (31-56) and malocclusion was not analysed (15). The strengths of our study are that it was conducted in large age groups (18-64 years) and the relationship of malocclusion with the PIDAQ scale was examined. We recommend that future studies should be conducted in large patient groups in a way to compare before and after the treatment of malocclusions.

CONCLUSIONS

Dental aesthetics has a significant impact on the psychosocial well-being of the individual and directly affects self-confidence and social relationships. In our study, the psychological and social effects of dental aesthetics in different age groups were examined with the PIDAQ scale and it was observed that age, gender and malocclusion were positively related to these effects. While there are studies in the literature generally focused on young individuals and orthodontic treatment, it is an important contribution that this study covers a wide age range and evaluates malocclusion. Future research should aim to better understand the comprehensive effects of dental aesthetics with pre- and post-treatment evaluations.

Competing Interests:

The authors had no conflict of interest to declare

Financial disclosure

The authors declared that they have received no financial support.

REFERENCES

1. Iranzo-Cortés, J. E., Montiel-Company, J. M., Bellot-Arcís, C., Almerich-Torres, T., Acevedo-Atala, C., Ortolá-Síscar, J. C., ... & Almerich-Silla, J. M. (2020). Factors related to the psychological impact of malocclusion in adolescents. *Scientific Reports*, 10(1);
2. Bucci, R., Rongo, R., Amato, A., Martina, S., D'Antò, V., & Valletta, R. (2019). The psychological impact of dental aesthetics in patients with juvenile idiopathic arthritis compared with healthy peers: a cross-sectional study. *Dentistry Journal*, 7(4), 98;
3. Alsanabani, A. A. M., Yusof, Z. Y. M., Hassan, W. Z. W., Aldhorae, K., & Alyamani, H. A. (2021). Validity and reliability of the arabic version of the psychosocial impact of dental aesthetics questionnaire for yemeni adolescents. *Children*, 8(6), 448;

4. Venete, A., Trillo-Lumbreras, E., Prado-Gascó, V., Bellot-Arcís, C., Almerich-Silla, J. M., & Montiel-Company, J. M. (2017). Relationship between the psychosocial impact of dental aesthetics and perfectionism and self-esteem. *Journal of Clinical and Experimental Dentistry*, 0-0;
5. Yi, S., Zhang, C., Ni, C., Qian, Y., & Zhang, J. (2016). Psychosocial impact of dental aesthetics and desire for orthodontic treatment among chinese undergraduate students. *Patient Preference and Adherence*, 1037.
6. Deng, X., Wang, Y., Deng, F., Liu, P., & Wu, Y. (2018). Psychological well-being, dental esthetics, and psychosocial impacts in adolescent orthodontic patients: a prospective longitudinal study. *American Journal of Orthodontics and Dentofacial Orthopedics*, 153(1), 87-96.e2.
7. Heinlein WD. Anterior teeth: esthetics and function. *The Journal of prosthetic dentistry*. 1980;44(4):389-393.
8. Claudino, D. and Traebert, J. (2013). Malocclusion, dental aesthetic self-perception and quality of life in a 18 to 21 year-old population: a cross section study. *BMC Oral Health*, 13(1).
9. Yi, S., Zhang, C., Ni, C., Qian, Y., & Zhang, J. (2016). Psychosocial impact of dental aesthetics and desire for orthodontic treatment among chinese undergraduate students. *Patient Preference and Adherence*, 1037; <https://doi.org/10.2147/ppa.s105260>
10. Claudino, D. and Traebert, J. (2013). Malocclusion, dental aesthetic self-perception and quality of life in a 18 to 21 year-old population: a cross section study. *BMC Oral Health*, 13(1).
11. Guo, L., Yu, F., Guo, H., Liu, B., & Zhang, Y. (2016). Consequences of orthodontic treatment in malocclusion patients: clinical and microbial effects in adults and children. *BMC Oral Health*, 16(1).
12. Jenny J, Cons NC. Establishing malocclusion severity levels on the Dental Aesthetic Index (DAI) scale. *Australian dental journal*. 1996;41(1):43.
13. Dini E, McGrath C, Bedi R. An evaluation of the oral health quality of life (OHQoL) instrument in a Brazilian population. *Community dental health*. 2003;20(1):40.
14. Klages U, Claus N, Wehrbein H, Zentner A. Development of a questionnaire for assessment of the psychosocial impact of dental aesthetics in young adults. *The European Journal of Orthodontics*. 2006;28(2):103-111.
15. Chen, P., Yu, S. & Zhu, G. The psychosocial impacts of implantation on the dental aesthetics of missing anterior teeth patients. *Br Dent J* 213, E20 (2012).
16. Poyraz, C. (2017). Dental Estetiğin Psikososyal Etkisi Anketinin Türkçe uyarlaması: Geçerlilik ve güvenilirlik çalışması Gaziantep Üniversitesi, Gaziantep.
17. Campos, L. A., Costa, M. A., Bonafé, F. S. S., Marôco, J., & Campos, J. Á. D. B. (2020). Psychosocial impact of dental aesthetics on dental patients. *International Dental Journal*, 70(5), 321-327.
18. Bellot-Arcís C, Almerich-Silla JM. Psychosocial impact of malocclusion in Spanish adolescents. *The Korean Journal of Orthodontics*. 2013;43(4):193-200.
19. Spalj S, Lajnert V, Ivankovic L. The psychosocial impact of dental aesthetics questionnaire—translation and cross-cultural validation in Croatia. *Quality of life research*. 2014;23(4):1267-1271.
20. Dahong X, Xiangrong C, Ying L, Yusong L, Ying G, Yan S. Effect of incisor position on the self-perceived psychosocial impacts of malocclusion among Chinese young adults. *The Angle orthodontist*. 2012;83(4):617-622.
21. 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. *The European Journal of Orthodontics*. 2011;33(3):270-275.
22. Ngom PI, Attebi P, Diouf JS, Diop BK, Badiane A, Diagne F. (Translation and cultural adaptation of a french version of the psychosocial impact of dental aesthetics questionnaire: PIDAQ). *L'Orthodontie francaise*. 2013;84(4):319-331.

23. 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. *The Korean Journal of Orthodontics*. 2016;46(4):220-227.
24. Jacobson A. Psychological aspects of dentofacial esthetics and orthognathic surgery. *The Angle orthodontist*. 1984;54(1):18-35.
25. Gassem, A. A. B., Aldweesh, A. H., AlSagob, E. I., Alanazi, A. M., Hafiz, A. M., Aljohani, R. S., ... & Abu-Hammad, O. (2022). Psychosocial impact of malocclusion and self-perceived orthodontic treatment need among young adult dental patients. *European Journal of Dentistry*, 17(03), 713-719.
26. González, M. J., Romero, M. F., & Peñacoba, C. (2019). Psychosocial dental impact in adult orthodontic patients: what about health competence?. *Health and Quality of Life Outcomes*, 17(1).
27. Adam Wahab, Xiangqun Ju, Lisa Jamieson, Craig Dreyer, Modelling risk factors for high/low Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) in the Australian adults, *European Journal of Orthodontics*, Volume 43, Issue 2, April 2021, Pages 200–207,
28. Afroz S, Rath S, Rajput G, Rahman SA. Dental esthetics and its impact on psycho-social well-being and dental self confidence: A campus based survey of North Indian University students. *The Journal of Indian Prosthodontic Society*. 2013;13(4):455-460.
29. Castrejón-Pérez, R. C., Borges-Yáñez, S. A., Gutiérrez-Robledo, L. M., & Ávila-Fuñes, J. A. (2012). Oral health conditions and frailty in mexican community-dwelling elderly: a cross sectional analysis. *BMC Public Health*, 12(1).
30. Renvert, S. and Persson, G. R. (2016). Treatment of periodontal disease in older adults. *Periodontology 2000*, 72(1), 108-119.
31. Armalaite, J., Jarutiene, M., Vasiliauskas, A., Šidlauskas, A., Švalkauskienė, V., Šidlauskas, M., ... & Skarbalius, G. (2018). Smile aesthetics as perceived by dental students: a cross-sectional study. *BMC Oral Health*, 18(1).
32. Spalj S, Novsak A, Bilobrk P, Katic V, Zrinski MT, Pavlic A. Mediation and moderation effect of the big five personality traits on the relationship between self-perceived malocclusion and psychosocial impact of dental esthetics. *Angle Orthod*. 2016 May;86(3):413-20.
33. Venete, A., Trillo-Lumbreras, E., Prado-Gascó, V., Bellot-Arcís, C., Almerich-Silla, J. M., & Montiel-Company, J. M. (2017). Relationship between the psychosocial impact of dental aesthetics and perfectionism and self-esteem. *Journal of Clinical and Experimental Dentistry*, 0-0.
34. Al-Omiri M K, Karasneh J A, Lynch E, Lamey P J, Clifford T J. Impacts of missing upper anterior teeth on daily living. *Int Dent J* 2009; 59: 127–132.
35. Jamieson, L., Paradies, Y., Gunthorpe, W., Cairney, S., & Sayers, S. (2011). Oral health and social and emotional well-being in a birth cohort of aboriginal australian young adults. *BMC Public Health*, 11(1)
36. de Paula Ju' nior DF, Santos NC, da Silva ET, Nunes MF, Leles CR. Psychosocial impact of dental esthetics on quality of life in adolescents. *Angle Orthod*. 2009;79:1188–1193.
37. Dahong X, Xiangrong C, Ying L, Yusong L, Ying G, Yan S. Effect of incisor position on the self-perceived psychosocial impacts of malocclusion among Chinese young adults. *The Angle orthodontist*. 2012;83(4):617-622.
38. Bland JM, Altman DG. Cronbach's alpha. *BMJ*. 1997 Feb 22;314(7080):572.