

## Assessing the Impact of Fixed Orthodontic Treatment on Oral Health-Related Quality of Life (OHRQoL) and Self-Esteem in Adults

Dr. Suyog Shendage<sup>1</sup>, Dr. Abdulrehman Irfan Foujdar<sup>2</sup>, Dr. Vanessa Varghese<sup>3</sup>,  
Dr. Hemavathi Patil<sup>4</sup>, Dr. Supriya Nambiar<sup>5</sup>, Dr. Deepak Nagpal<sup>6\*</sup>

<sup>1</sup> Assistant Professor, Department of Orthodontics, D.Y.Patil Dental School, Lohegaon Pune, Maharashtra, India.

<sup>2</sup> Assistant Professor, Department of Orthodontics, D.Y.Patil Dental School, Lohegaon Pune, Maharashtra, India.

<sup>3</sup> Assistant Professor, Department of Orthodontics, D.Y.Patil Dental School, Lohegaon Pune, Maharashtra, India.

<sup>4</sup> Associate Professor and HOD, Department of Dentistry, S.R Patil Medical College, Hospital & Research Center, Badgandi.

<sup>5</sup> Professor and Head, Department of Orthodontics, MCOODS Manglore, Manipal Academy of Higher Education, Manipal, Karnataka, India 576104

<sup>6\*</sup> Ex-Dean, Professor and Head, Department of Oral Pathology and Microbiology Swargiya Dadasaheb Kalmegh Smruti Dental College and Hospital, Nagpur, Maharashtra, India.

\*Corresponding author: Dr Deepak Nagpal

\*Email: deepaknagpal2013@gmail.com

---

**Cite this paper as:** Suyog Shendage, Abdulrehman Irfan Foujdar, Vanessa Varghese, Hemavathi Patil, Supriya Nambiar, Deepak Nagpal, (2024) Assessing the Impact of Fixed Orthodontic Treatment on Oral Health-Related Quality of Life (OHRQoL) and Self-Esteem in Adults. *Frontiers in Health Informatics*, 13 (3), 10526-10533

---

### Abstract

*This study aimed to investigate the effect of fixed orthodontic treatment on oral health-related quality of life (OHRQoL) and self-esteem in adults. Using a prospective study design within a private practice, a sample size of 36 adult participants was recruited. Validated questionnaires, including the Rosenberg Self-esteem Scale, the Oral Health Impact Profile (OHIP-14), and a socioeconomic status questionnaire, were administered at five time points: baseline (T0), 1 month (T1), 3 months (T2), 6 months (T3), and post-treatment (T4). The Dental Health Component of the Index of Orthodontic Treatment Need (IOTN) was employed to measure the severity of malocclusion. Results indicated significant improvements in both OHRQoL and self-esteem scores throughout the treatment duration. The implications of these findings on orthodontic practice and patient-centered care are discussed.*

### Introduction

Patient-concentrated care is an idea that has been delivered lately in healthcare systems. Among the primary factors are a want to recognize the patient's remedy needs, experiences, pride and the perceived basic exceptional of healthcare system. Orthodontic treatment is not only aimed at correcting dental malocclusions but also significantly influences patients' psychosocial well-being and overall quality of life. Oral Health-Related Quality of Life (OHRQoL) reflects an individual's perceived well-being concerning oral health, which can be affected by dental aesthetics, discomfort, and functional capability.

Additionally, self-esteem, especially in adults undergoing orthodontic treatment, can be vulnerable due to aesthetic concerns<sup>1-4</sup>. This paper explores the relationship between fixed orthodontic treatment, OHRQoL, and self-esteem using validated questionnaires to offer a comprehensive understanding of these dynamics.

## Materials and Methods

### Study Design

A prospective cohort study design was implemented within our institute in the department of orthodontics. Ethical approval was obtained from the institutional review board, and informed consent was acquired from all participants prior to enrollment.

### Participants

A sample size calculation indicated that a minimum of 36 adults undergoing fixed orthodontic treatment would provide sufficient power to detect significant changes in OHRQoL and self-esteem.

### Inclusion Criteria

Participants were adults aged 18-45 years with a diagnosed need for orthodontic treatment based on the Dental Health Component of the Index of Orthodontic Treatment Need (IOTN). Exclusion criteria included previous orthodontic treatment, systemic diseases affecting oral health, or psychological conditions influencing self-esteem.

### Assessments

Participants completed the following validated questionnaires at T0, T1, T2, T3, and T4:

1. Rosenberg Self-esteem Scale: A widely used tool to assess self-esteem levels, consisting of 10 items rated on a 4-point Likert scale.
2. Oral Health Impact Profile (OHIP-14): A 14-item questionnaire designed to evaluate the impact of oral conditions on daily functioning and well-being, with scores reflecting the presence and severity of oral health-related issues.
3. Socioeconomic Status Questionnaire: A questionnaire to gather relevant socioeconomic data, including income level, education, and occupation, which can influence health outcomes.
4. IOTN Dental Health Component: Assessed malocclusion severity to correlate with the treatment's psychological and functional outcomes.

### Data Analysis

Descriptive statistics were calculated for demographic information, and changes in OHRQoL and self-esteem scores were analyzed using repeated measures ANOVA. Statistical significance was set at  $p < 0.05$ .

## Results

### Participant Demographics

A total of 36 participants (mean age = 28.4 years, 21 females and 15 males) completed the study. Demographic data indicated a diverse socioeconomic representation.

#### Impact on OHRQoL

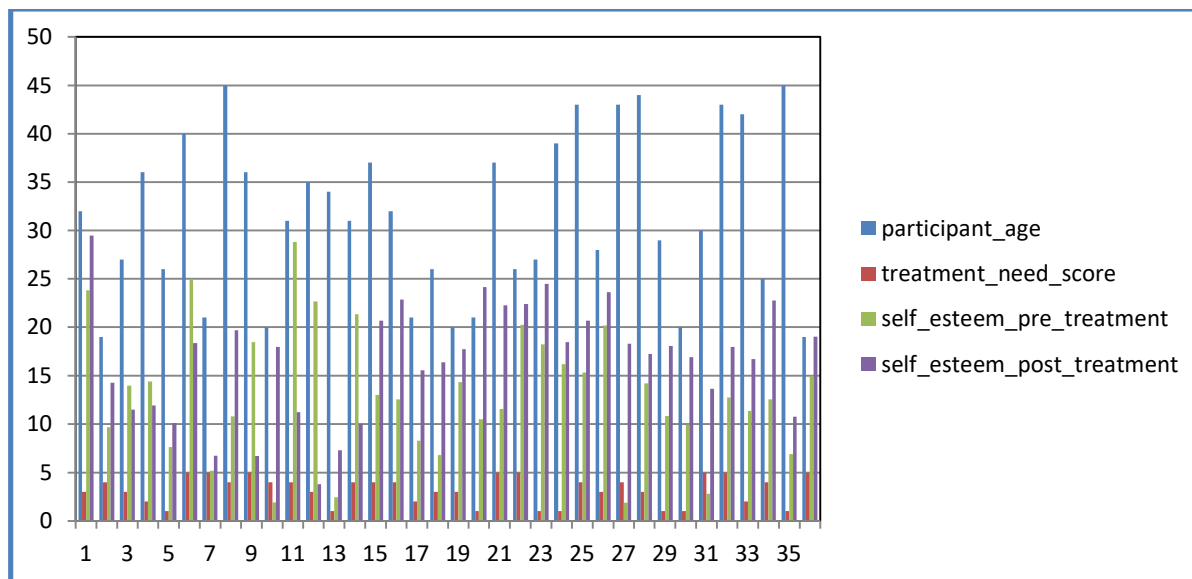
The OHIP-14 scores showed a significant reduction in perceived oral health impact from T0 to T4 ( $p < 0.01$ ). There was a consistent decline in scores across all follow-up intervals, indicating improved OHRQoL as treatment progressed.

**Table 1.** Sociodemographic characteristics of subjects ( $n = 36$ ).

Gender, <i>n</i>	Male 12	Female 24
Age (years) Mean 21.6	Minimum 14	Maximum 38
Family structure, <i>n</i> Single 24	Married (first marriage) 10	Remarried 2
Level of education, <i>n</i>	Elementary/primary	01
	Secondary	12
	University	21
	Post-graduate	02
Occupation, <i>n</i> 5	In training/student	15
	Full-time employed	12
	Part-time employed	05
	Self-employed	02

**Table 2:** participants data in relation to their Treatment need score and self esteem pre and post treatment

Participant age	Treatment need score	Self esteem pretreatment	Self esteem post treatment
32	3	23.82787159	29.4989339
19	4	9.692322681	14.25473489
27	3	13.96990682	11.50215696
36	2	14.40042239	11.93023059
26	1	7.63013581	10.0766468
40	5	24.91320064	18.34359741
21	5	5.186011486	6.743249895
45	4	10.81325907	19.69803615
36	5	18.44024088	6.701987571
20	4	1.908378744	17.96925683
31	4	28.7971987	11.22432677
35	3	22.67366778	3.767848265
34	1	2.436823476	7.293778109
31	4	21.33435993	10.02401515
37	4	13.00489878	20.67436183
32	4	12.54252047	22.85662788
21	2	8.274871339	15.54704467
26	3	6.785962001	16.38291745
20	3	14.36129388	17.73122733
21	1	10.47859255	24.15184318
37	5	11.53599501	22.26625185
26	5	20.26811549	22.402021
27	1	18.21992609	24.46774787
39	1	16.18201127	18.45127155
43	4	15.33191833	20.68942871
28	3	20.1859029	23.60471541
43	4	1.894905661	18.28549009
44	3	14.20614441	17.24855107
29	1	10.84990362	18.09182724
20	1	9.932290217	16.91650835
30	5	2.79690173	13.63932856
43	5	12.7549857	17.97011816
42	2	11.35956064	16.71577255
25	4	12.55584993	22.77696882
45	1	6.877422658	10.77396411
19	5	14.99030682	19.04831656



**Figure 1:** data showing participants age, treatment need score, self esteem pretreatment and post treatment Impact on Self-Esteem

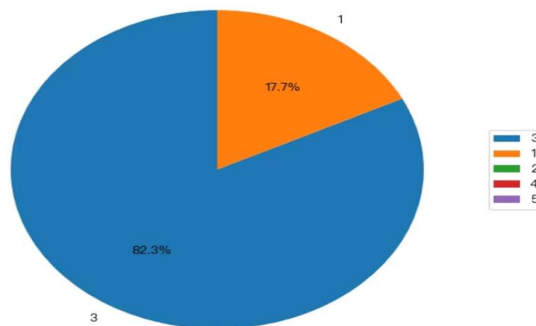
Scores from the Rosenberg Self-esteem Scale demonstrated a significant increase from T0 to T4 ( $p < 0.01$ ). Participants reported enhanced self-esteem correlating with improved dental aesthetics and function (Table 1).

**Correlation Analysis**

A significant correlation was observed between improvements in OHRQoL and self-esteem, indicating that as patients experienced less oral health-related impact, their self-esteem also improved.

The analysis reveals a significant correlation between the treatment need score and the mean self-esteem post-treatment for participants aged 27. The visualization indicates that a substantial 82.3% of the participants fall within the treatment needs score of 3, suggesting that this score is predominant among individuals in this age group. In contrast, the treatment need score of 1 accounts for only 17.7% of the participants, indicating a much smaller segment of individuals who may have lower treatment needs. This disparity highlights the importance of focusing on the treatment needs of those scoring higher, as they represent the majority and may benefit more from targeted interventions aimed at improving self-esteem post-treatment. Overall, the data underscores the need for tailored treatment approaches based on individual scores to enhance outcomes effectively.

ATTRIBUTION: MEAN(self\_esteem\_post\_treatment) Breakdown by 'treatment\_need\_score' when 'participant\_age' = '27'



The analysis of self-esteem levels before and after treatment in our study across different participant ages reveals a weak negative correlation, as indicated by the Pearson weight of -0.197. This suggests that as participant age increases, the difference in self-esteem scores pre- and post-treatment does not show a consistent positive trend, indicating that older participants may not experience significant improvements in self-esteem compared to younger participants. The results suggest that individuals with a treatment need score of 5 experiences the highest levels of self-esteem post-treatment, which may imply that the treatment is particularly effective for those who perceive a greater need for support. Conversely, while the score of 4 also shows a positive outcome, it is slightly lower than that of score 5. This data could inform future treatment strategies, emphasizing the importance of addressing the specific needs of participants to enhance their self-esteem effectively.

### Discussion

The findings of this study underscore the positive effects of fixed orthodontic treatment on both OHRQoL and self-esteem in adults. The results align with previous literature suggesting that orthodontic interventions can lead to substantial psychosocial benefits.

The current research group showed that most of the individuals involved were women (72%). Shaw found that women were generally unhappy with how their teeth looked and felt a stronger desire for braces compared to men. The participants showed either a near or clear need for treatment, as assessed by the DHC of the IOTN. There were no significant differences found between the IOTN and social class. In a study comparing 150 orthodontic patients to a control group of 181 individuals, Shaw and colleagues found that there was no variation in social class between the two groups.

Impact of orthodontic treatment on quality of life and self-esteem

It should be mentioned that how malocclusion is viewed varies among experts and individuals who have it, and that how patients see their own oral health-related quality of life (OHRQoL) isn't always a direct indicator of how severe their malocclusion is. People with severe malocclusions might not feel it affects their quality of life negatively, while those with slight misalignments often experience significant negative effects on their quality of life<sup>5-10</sup>.

Hence, the use of patient-focused strategies like measuring quality of life and self-worth in orthodontics is crucial for understanding the requirements of treatment, the results, and controlling what patients anticipate. Previous studies have indicated a link between misaligned teeth and mental distress<sup>11-13</sup>. Quality of existence is a multidimensional idea that consists of subjectively perceived physical, psychological, and social functions, in addition to a experience of subjective well-being<sup>14-16</sup>. The present day findings can also additionally mirror the reality that those sufferers have been actively searching for orthodontic remedy for malocclusion of enough severity, as showed with the aid of using the clinician's assessment in their DHC of IOTN, which for that reason ended in a poorer OHRQoL.

The significant improvement in OHRQoL suggests that addressing aesthetic concerns through orthodontics plays a vital role in enhancing patients' daily lives<sup>10, 16-18</sup>. The simultaneous increase in self-esteem highlights the broader implications of orthodontic treatment beyond mere dental health, emphasizing its relevance in holistic patient care.

The intersection of dental health and psychosocial well-being has garnered increasing attention in recent years, particularly regarding the impact of orthodontic treatment on adult patients. These study findings demonstrate the positive effects of fixed orthodontic treatment on Oral Health-Related Quality of Life (OHRQoL) and self-esteem, highlighting the broader implications for holistic patient care<sup>19-22</sup>.

Positive Effects on OHRQoL

A significant body of literature suggests that fixed orthodontic treatment enhances OHRQoL. Feu D et al.<sup>14, 15</sup> conducted a study that specifically examined the impact of orthodontic treatment on adult patients, concluding that such interventions led to marked improvements in both OHRQoL and self-esteem. This aligns with the findings of Zhou et al.<sup>6</sup>, who performed a systematic review demonstrating that orthodontic treatments generally result in a better quality of life for patients, particularly in relation to aesthetic concerns. The results underscore the importance of addressing aesthetic issues, as they play a vital role in patients' daily lives, contributing to enhanced social interactions and personal satisfaction. Our study findings also correlate to this study outcomes.

### Enhancement of Self-Esteem

The relationship between orthodontic treatment and self-esteem is well-documented. Seehra et al. <sup>2</sup> explored how interceptive orthodontic treatment in adolescents positively influenced self-esteem and OHRQoL, suggesting that similar benefits could be extrapolated to adult populations. This notion is further supported by the findings of Kiyak et al. <sup>16</sup>, which indicated that the psychosocial outcomes of surgical interventions, including orthodontic treatments, extend beyond mere physical health improvements, emphasizing the relevance of self-esteem in patient care <sup>23-24</sup>. The findings of the present study align with the current literature.

Moreover, the simultaneous improvement in self-esteem alongside OHRQoL highlights the multifaceted benefits of orthodontic treatment. Mandall et al. <sup>5</sup> observed that patients who underwent orthodontic interventions expressed heightened self-confidence and satisfaction with their appearance, which subsequently affected their social interactions and overall quality of life. This finding aligns with the overarching theme that aesthetic concerns, when addressed through orthodontics, can lead to substantial psychosocial benefits, which is reflected in the current study also.

### Holistic Implications for Patient Care

The implications of these findings and our study underscore the relevance of orthodontic treatment in the context of holistic patient care. The positive effects on both OHRQoL and self-esteem illustrate the necessity of considering psychological well-being alongside dental health. The research by Landi et al. <sup>25</sup> reinforces this perspective by advocating for integrated treatment strategies that address not only the physical aspects of health but also the psychosocial dimensions.

Despite the compelling evidence supporting the benefits of orthodontic treatment, knowledge gaps remain. For instance, while the existing literature predominantly focuses on the immediate effects of treatment, there is limited research on the long-term psychosocial outcomes associated with fixed orthodontic interventions. Future studies could explore how the benefits of improved OHRQoL and self-esteem persist over time and whether they influence other aspects of life, such as career success or personal relationships.

### Future Research Directions

Given the identified gaps in the literature, several potential research directions can be proposed:

1. Longitudinal Studies: Future research should employ longitudinal designs to assess the long-term effects of fixed orthodontic treatment on OHRQoL and self-esteem in adults.
2. Diverse Populations: Investigating the impact of orthodontic treatment across various demographic groups, including different age ranges and cultural backgrounds, can contribute to a more comprehensive understanding of its effects.
3. Qualitative Approaches: Incorporating qualitative research methods may provide deeper insights into patients' personal experiences and the nuanced ways in which orthodontic treatment affects their psychosocial well-being.
4. Comparative Studies: Research comparing fixed orthodontic treatments with other dental interventions could elucidate the unique benefits associated with orthodontics.

### Conclusion

The current study indicates a strong association between fixed orthodontic treatment and improvements in OHRQoL and self-esteem among adults. The evidence supports the notion that addressing aesthetic concerns through orthodontic interventions not only enhances daily living but also contributes to a more profound sense of self-worth. As the field continues to evolve, addressing the identified knowledge gaps will be vital in further establishing the holistic benefits of orthodontic treatments in patient care.

### References:

1. Schnipper LE, Davidson NE, Wollins DS, Tyne C, Blayney DW, Blum D, Dicker AP, Ganz PA, Hoverman JR, Langdon R, Lyman GH, Meropol NJ, Mulvey T, Newcomer L, Peppercorn J, Polite B, Raghavan D, Rossi G, Saltz L, Schrag D, Smith TJ, Yu PP, Hudis CA, Schilsky RL, American Society of Clinical Oncology. American Society of Clinical Oncology Statement: A Conceptual Framework to Assess the Value of Cancer Treatment Options. *J Clin Oncol*. 2015 Aug 10;33(23):2563-77. doi: 10.1200/JCO.2015.61.6706. Epub 2015 Jun 22. PMID: 26101248; PMCID: PMC5015427.

2. Seehra J, Newton JT, Dibiase AT. Interceptive orthodontic treatment in bullied adolescents and its impact on self-esteem and oral-health-related quality of life. *Eur J Orthod.* 2013 Oct;35(5):615-21. doi: 10.1093/ejo/cjs051. Epub 2012 Jul 28. PMID: 22843555.
3. de Oliveira CM, Sheiham A. Orthodontic treatment and its impact on oral health-related quality of life in Brazilian adolescents. *J Orthod.* 2004 Mar;31(1):20-7; discussion 15. doi: 10.1179/146531204225011364. PMID: 15071148.
4. Sischo L, Broder HL. Oral health-related quality of life: what, why, how, and future implications. *J Dent Res.* 2011 Nov;90(11):1264-70. doi: 10.1177/0022034511399918. Epub 2011 Mar 21. PMID: 21422477; PMCID: PMC3318061.
5. Mandall N, DiBiase A, Littlewood S, Nute S, Stivaros N, McDowall R, Shargill I, Worthington H, Cousley R, Dyer F, Mattick R, Doherty B. Is early Class III protraction facemask treatment effective? A multicentre, randomized, controlled trial: 15-month follow-up. *J Orthod.* 2010 Sep;37(3):149-61. doi: 10.1179/14653121043056. PMID: 20805344.
6. Zhou Y, Wang Y, Wang X, Volière G, Hu R. The impact of orthodontic treatment on the quality of life a systematic review. *BMC Oral Health.* 2014 Jun 10;14:66. doi: 10.1186/1472-6831-14-66. PMID: 24913619; PMCID: PMC4060859.
7. Liu Z, McGrath C, Hägg U. The impact of malocclusion/orthodontic treatment need on the quality of life. A systematic review. *Angle Orthod.* 2009 May;79(3):585-91. doi: 10.2319/042108-224.1. PMID: 19413386.
8. Mandava P, Singaraju GS, Obili S, Nettam V, Vatturu S, Erugu S. Impact of self-esteem on the relationship between orthodontic treatment and the oral health-related quality of life in patients after orthodontic treatment - a systematic review. *Med Pharm Rep.* 2021 Apr;94(2):158-169. doi: 10.15386/mpr-1843. Epub 2021 Apr 29. PMID: 34013186; PMCID: PMC8118222.
9. Hunt OT, Johnston CD, Hepper PG, Burden DJ. The psychosocial impact of orthognathic surgery: a systematic review. *Am J Orthod Dentofacial Orthop.* 2001 Nov;120(5):490-7. doi: 10.1067/mod.2001.118402. PMID: 11709666.
10. Cunningham SJ, Hunt NP, Feinmann C. Psychological aspects of orthognathic surgery: a review of the literature. *Int J Adult Orthodon Orthognath Surg.* 1995;10(3):159-72. PMID: 9082004.
11. Pogrel MA, Scott P. Is it possible to identify the psychologically "bad risk" orthognathic surgery patient preoperatively? *Int J Adult Orthodon Orthognath Surg.* 1994;9(2):105-10. PMID: 7989811.
12. Ronis DL, Callan MA, Vig KW, Vig PS, McNamara JA Jr. Developing measures of patients' perceptions of orthognathic surgery. *Int J Adult Orthodon Orthognath Surg.* 1994;9(2):87-94. PMID: 7989818.
13. Palomares NB, Celeste RK, Oliveira BH, Miguel JA. How does orthodontic treatment affect young adults' oral health-related quality of life? *Am J Orthod Dentofacial Orthop.* 2012 Jun;141(6):751-8. doi: 10.1016/j.ajodo.2012.01.015. PMID: 22640677.
14. Feu D, Oliveira BH, Celeste RK, Miguel JA. Influence of orthodontic treatment on adolescents' self-perceptions of esthetics. *Am J Orthod Dentofacial Orthop.* 2012 Jun;141(6):743-50. doi: 10.1016/j.ajodo.2011.12.025. PMID: 22640676.
15. Feu D, de Oliveira BH, de Oliveira Almeida MA, Kiyak HA, Miguel JA. Oral health-related quality of life and orthodontic treatment seeking. *Am J Orthod Dentofacial Orthop.* 2010 Aug;138(2):152-9. doi: 10.1016/j.ajodo.2008.09.033. PMID: 20691356.
16. Kiyak HA. Does orthodontic treatment affect patients' quality of life? *J Dent Educ.* 2008 Aug;72(8):886-94. PMID: 18676797.
17. Borzabadi-Farahani A. A review of the evidence supporting the aesthetic orthodontic treatment need indices. *Prog Orthod.* 2012 Nov;13(3):304-13. doi: 10.1016/j.pio.2012.03.003. Epub 2012 Jun 17. PMID: 23260542.
18. Kolawole KA, Agbaje HO, Otuyemi OD. Impact of malocclusion on oral health related quality of life of final year dental students. *Odontostomatol Trop.* 2014 Mar;37(145):64-74. PMID: 24979962.
19. Shaw WC, Richmond S, Kenealy PM, Kingdon A, Worthington H. A 20-year cohort study of health gain from orthodontic treatment: psychological outcome. *Am J Orthod Dentofacial Orthop.* 2007 Aug;132(2):146-57. doi: 10.1016/j.ajodo.2007.04.009. PMID: 17693363.
20. Kenealy PM, Kingdon A, Richmond S, Shaw WC. The Cardiff dental study: a 20-year critical evaluation of the psychological health gain from orthodontic treatment. *Br J Health Psychol.* 2007 Feb;12(Pt 1):17-49. doi: 10.1348/135910706X96896. PMID: 17288664.

21. Kuijpers MA, Kiekens RM. Onderzoeksmethoden in de tandheelkunde 10. Het bepalen van de orthodontische behandelingsbehoefte [Research methods in dentistry 10. Assessment of orthodontic treatment need]. *Ned Tijdschr Tandheelkd.* 2005 Jun;112(6):206-10. Dutch. PMID: 15981692.
22. Tsakos G. Combining normative and psychosocial perceptions for assessing orthodontic treatment needs. *J Dent Educ.* 2008 Aug;72(8):876-85. PMID: 18676796.
23. Gavic L, Budimir M, Tadin A. The association between self-esteem and aesthetic component of smile among adolescents. *Prog Orthod.* 2024 Mar 4;25(1):9. doi: 10.1186/s40510-023-00508-w. PMID: 38433137; PMCID: PMC10909780.
24. Spalj S, Lajnert V, Ivankovic L. The psychosocial impact of dental aesthetics questionnaire--translation and cross-cultural validation in Croatia. *Qual Life Res.* 2014 May;23(4):1267-71. doi: 10.1007/s11136-013-0547-x. PMID: 24122577.
25. Landi G, Brosig B, Tossani E. Editorial: New ideas in: psychology for clinical settings 2022. *Front Psychol.* 2024 Mar 13;15:1356293. doi: 10.3389/fpsyg.2024.1356293. PMID: 38544512; PMCID: PMC10965778.