

PSYCHOSOCIAL EFFECTS OF ORTHODONTIC TREATMENT IN ROMANIAN TEENAGERS: A PIDAQ-RO CROSS-SECTIONAL STUDY

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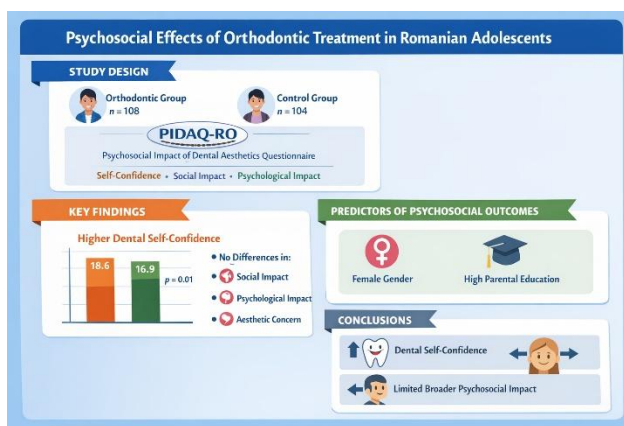
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ABSTRACT



Aim of the study This cross-sectional analytical study investigated the association between orthodontic treatment and psychosocial outcomes among Romanian adolescents, using the validated Romanian version of the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ-RO). **Materials and methods** A total of 212 teenagers aged 13–18 years attending a university dental clinic were enrolled. Participants were divided into two groups: those currently undergoing or having completed orthodontic treatment within the past three years (n = 108) and those without orthodontic history (n = 104). Psychosocial outcomes were evaluated using PIDAQ-RO, which measures dental

self-confidence, social impact, psychological impact, and aesthetic concern. Sociodemographic information and parental education were also recorded. Group comparisons were performed using independent-sample tests and multivariate regression.

Results Orthodontically treated teenagers demonstrated significantly higher dental self-confidence scores (18.6 ± 4.1 vs. 16.9 ± 4.5 ; $p = 0.01$). No significant differences were observed in social impact, psychological impact, or aesthetic concern domains. Female gender predicted higher aesthetic concern and psychological impact, while higher parental education was associated with greater dental self-confidence. The regression model explained 24% of variance in psychosocial outcomes.

Conclusions Orthodontic treatment appears to improve perceptions of dental appearance but has a modest influence on overall psychosocial well-being. Broader social and family determinants remain major contributors to adolescents' self-perception.

Key words: orthodontics; dental aesthetics; adolescents; PIDAQ-RO; psychosocial impact; quality of life.

INTRODUCTION

Adolescence represents a developmental stage characterized by intense psychological, emotional, and social changes. During this period, physical appearance becomes closely linked to identity formation and self-evaluation [1]. Facial features and dental appearance play an important role in social interactions, particularly as adolescents become increasingly sensitive to peer

feedback and social comparison [2].

Malocclusion is a frequent oral condition in adolescents and can influence both functional and aesthetic aspects of the dentofacial complex. Previous research has shown that dissatisfaction with dental appearance may be associated with decreased confidence, social avoidance, and reduced quality of life [3,4]. As a result, orthodontic therapy is often perceived not only as a

functional intervention but also as a means of improving psychological well-being.

However, the relationship between orthodontic treatment and psychosocial outcomes remains debated. Some investigations suggest that treatment improves social confidence and perceived attractiveness, while others report only limited or temporary benefits [5–7]. This inconsistency may be partly explained by differences in measurement tools.

One of the most widely used instruments for evaluating the psychosocial consequences of dental aesthetics is the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ). Developed to assess subjective orthodontic treatment need, the instrument measures four dimensions: dental self-confidence, psychological impact, social impact, and aesthetic concern [8].

The Romanian adaptation, PIDAQ-RO, has demonstrated strong psychometric properties, including excellent internal consistency and factorial validity in young populations [9]. Its use enables a multidimensional evaluation of the psychosocial implications of dental appearance, offering a broader perspective than general self-esteem scales.

Given the importance of cultural adaptation and the limited number of Romanian clinical studies using PIDAQ-RO in adolescents, this research aimed to examine whether orthodontic treatment is associated with measurable differences in psychosocial outcomes among Romanian adolescents.

MATERIALS AND METHODS

This analytical cross-sectional study was conducted between January 2024 and December 2025 at the University Dental Clinic. The research protocol followed the ethical standards of the Declaration of Helsinki and received approval from the

Institutional Ethics Committee (Approval No. 2709/27.12.2023). Written informed consent was obtained from all participants and from parents or legal guardians for minors.

A total of 212 adolescents aged 13–18 years were consecutively recruited during routine dental visits.

Participants were eligible if they were:

- Within the defined age range
- Able to understand Romanian language questionnaires
- Free from diagnosed psychiatric disorders or systemic diseases affecting psychological well-being

Exclusion criteria were:

- Craniofacial syndromes or congenital anomalies
- Severe untreated dental pathology requiring urgent intervention
- History of maxillofacial surgery
- Incomplete questionnaire responses

Participants were stratified into two groups:

- Orthodontic Treatment Group (n = 108): adolescents were currently undergoing orthodontic therapy or have completed treatment within the previous three years.
- Control Group (n = 104): adolescents without any history of orthodontic treatment.

All participants completed a structured questionnaire administered in a quiet clinical environment under the researcher's supervision to ensure clarity and completeness.

Data collected included:

- Age and gender
- Place of residence (urban/rural)
- Parental educational level (primary, secondary, university)

- Orthodontic treatment history and duration

Psychosocial outcomes were evaluated using the Romanian version of the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ-RO) [9], a culturally adapted and psychometrically validated instrument.

The questionnaire contains 23 items grouped into four domains:

1. Dental Self-Confidence (DSC) – positive perceptions related to dental appearance
2. Social Impact (SI) – social avoidance and interpersonal discomfort
3. Psychological Impact (PI) – emotional distress associated with dental aesthetics
4. Aesthetic Concern (AC) – dissatisfaction and negative self-evaluation

Items were rated on a 5-point Likert scale:

0 = Not at all

1 = Slightly

2 = Moderately

3 = Strongly

4 = Very strongly

Higher scores indicate greater psychosocial impact, except for the Dental Self-Confidence domain, where higher scores reflect more positive perceptions.

The Romanian adaptation includes items evaluating:

- Social anxiety related to dental appearance
- Fear of negative evaluation by peers
- Behavioral coping mechanisms (e.g., hiding teeth)
- Emotional responses such as embarrassment or dissatisfaction
- Social comparison with peers' dental aesthetics

This multidimensional structure enables assessment of both functional social effects

and emotional self-perception.

Internal consistency of the PIDAQ-RO in the present sample was evaluated using Cronbach's alpha coefficients for each domain and for the total scale. Values above 0.70 were considered acceptable.

Data were analyzed using SPSS version 27.0. Means and standard deviations were calculated for continuous variables. Frequencies and percentages were computed for categorical variables. Data distribution was assessed using the Shapiro–Wilk test and visual inspection of histograms.

Group differences were evaluated using:

- Independent sample t-tests for normally distributed variables
- Mann–Whitney U tests for non-parametric data
- Chi-square tests for categorical variables

Effect sizes were calculated using Cohen's d. Multiple linear regression models were constructed to identify predictors of psychosocial outcomes. Independent variables included:

- Orthodontic treatment status
- Gender
- Age
- Parental education
- Urban/rural residence

Collinearity diagnostics and residual analysis were performed to ensure model validity. Statistical significance was set at $p < 0.05$.

RESULTS

The final study sample consisted of 212 teenagers aged between 13 and 18 years, with a mean age of 15.6 ± 1.4 years. Females represented 56% of participants ($n = 119$), while males accounted for 44% ($n = 93$).

Participants were divided into two groups:

Orthodontic group: 108 adolescents (currently undergoing treatment or completed within the last three years)

Control group: 104 adolescents with no orthodontic history

Comparative analysis revealed no statistically significant differences between groups regarding age distribution, gender ratio, place of residence, or parental educational level, indicating good baseline comparability (Table 1).

Table 1. Sociodemographic Characteristics of Participants

Variable	Orthodontic Group (n=108)	Control Group (n=104)	p-value
Age (years, mean $\pm$ SD)	15.7 $\pm$ 1.3	15.5 $\pm$ 1.4	>0.05
Female (%)	57%	55%	>0.05
Urban residence (%)	62%	60%	>0.05
Higher parental education (%)	48%	45%	>0.05

Internal consistency analysis demonstrated excellent reliability across all PIDAQ-RO domains (Table 2).

Table 2. Internal Consistency of PIDAQ-RO Domains

Domain	Cronbach's Alpha
Dental Self-Confidence	0.91
Social Impact	0.88
Psychological Impact	0.90
Aesthetic Concern	0.85
Total Scale	0.93

These results confirm the strong psychometric performance of the questionnaire in adolescent clinical populations.

Comparison of PIDAQ-RO Domain Scores Between Groups

Dental Self-Confidence

The Dental Self-Confidence domain showed the only statistically significant difference between groups. Adolescents who received orthodontic treatment reported significantly higher levels of confidence related to dental appearance.

- Orthodontic group: 18.6 $\pm$ 4.1
- Control group: 16.9 $\pm$ 4.5

- $p = 0.01$
- Effect size: Cohen's $d = 0.40$ (moderate)

This domain reflects positive perceptions of dental aesthetics, including comfort when smiling and confidence in social interactions.

Social Impact

No statistically significant differences were observed between groups in the Social Impact domain. However, untreated adolescents displayed slightly higher scores, indicating a tendency toward greater social inhibition related to dental appearance.

This domain assesses behaviors such as avoiding smiling, feeling uncomfortable in social situations, and concerns about negative peer evaluation.

Psychological Impact

Untreated adolescents showed marginally higher Psychological Impact scores, suggesting greater emotional distress related to dental aesthetics, including feelings of embarrassment or self-consciousness. Nevertheless, these differences did not reach statistical significance.

Aesthetic Concern

Higher mean scores for Aesthetic Concern were also observed among untreated participants, reflecting greater dissatisfaction with dental appearance. However, substantial variability within both groups prevented statistical significance (Table 3).

Table 3. Comparison of PIDAQ-RO Domain Scores Between Groups

Domain	Orthodontic Group (Mean $\pm$ SD)	Control Group (Mean $\pm$ SD)	p-value
Dental Self-Confidence	18.6 $\pm$ 4.1	16.9 $\pm$ 4.5	0.01
Social Impact	Slightly lower	Slightly higher	>0.05
Psychological Impact	Slightly lower	Slightly higher	>0.05
Aesthetic Concern	Slightly lower	Slightly higher	>0.05

Multiple linear regression analysis was

performed to identify predictors of psychosocial outcomes.

Key findings included:

- Female gender significantly predicted higher Psychological Impact and Aesthetic Concern scores ($p < 0.01$).
- Higher parental educational level predicted increased Dental Self-Confidence ($p = 0.02$).
- Orthodontic treatment status remained a significant predictor only for Dental Self-Confidence ($p = 0.01$).

The final regression model explained approximately 24% of the variance in overall psychosocial outcomes (Table 4).

Table 4. Significant Predictors of PIDAQ-RO Outcomes

Predictor	Outcome Domain	Significance
Female gender	Psychological Impact	$p < 0.01$
Female gender	Aesthetic Concern	$p < 0.01$
Parental education	Dental Self-Confidence	$p = 0.02$
Orthodontic treatment	Dental Self-Confidence	$p = 0.01$

Overall, orthodontic treatment demonstrated a domain-specific psychosocial effect, significantly improving adolescents' confidence in dental appearance while showing limited influence on social functioning, emotional distress, and aesthetic dissatisfaction. Sociodemographic factors, particularly gender and parental education, appeared to exert stronger associations with psychosocial outcomes than treatment status alone.

DISCUSSION

The present study investigated psychosocial outcomes associated with orthodontic treatment in Romanian teenagers using a culturally validated multidimensional instrument, the PIDAQ-RO. The final sample included 212 participants with comparable baseline sociodemographic characteristics, ensuring that observed differences in psychosocial outcomes were unlikely to be

attributable to demographic confounding factors. The PIDAQ-RO demonstrated excellent internal consistency across all domains, with Cronbach's alpha values ranging from 0.85 to 0.91, confirming its strong reliability for assessing psychosocial aspects of dental aesthetics in adolescent populations.

Domain-specific analysis revealed a differentiated psychosocial profile, indicating that orthodontic treatment exerts selective rather than generalized psychological effect [1,2,9]. The most notable finding was the significantly higher Dental Self-Confidence scores among treated adolescents compared with untreated peers (18.6 ± 4.1 vs. 16.9 ± 4.5 ; $p = 0.01$; Cohen's $d = 0.40$). This domain reflects positive perceptions of dental appearance, comfort when smiling, and reduced concern regarding visible dental irregularities [11,12]. The moderate effect size suggests that orthodontic treatment produces a clinically meaningful improvement in appearance-related self-perception, reinforcing its recognized role in enhancing satisfaction with dental aesthetics [13].

In contrast, the Social Impact domain showed no statistically significant differences between groups, although untreated adolescents reported slightly higher levels of social inhibition [14]. This domain captures behavioral manifestations such as avoidance of smiling, discomfort in interpersonal interactions, and perceived negative evaluation by peers [14,15]. The absence of significant differences suggests that social functioning during adolescence is influenced by a complex interplay of factors beyond dental aesthetics, including personality characteristics, peer acceptance, and broader social competence [15,16]. These findings support the concept that orthodontic treatment alone may not be sufficient to modify established patterns of social

behavior [17].

Similarly, the Psychological Impact domain demonstrated only modest between-group differences, with untreated adolescents reporting marginally higher levels of emotional distress related to dental appearance. This domain includes feelings of embarrassment, self-consciousness, and dissatisfaction. The limited effect observed in this study suggests that while orthodontic treatment can improve aesthetic satisfaction, emotional responses to appearance are multifactorial and may be more strongly shaped by individual psychological resilience, developmental stage, and sociocultural influences [18].

The Aesthetic Concern domain followed a comparable pattern, with untreated adolescents showing higher dissatisfaction scores but without statistical significance. High intra-group variability likely reflects individual differences in aesthetic expectations, personal coping strategies, and cultural perceptions of dental attractiveness.

Notably, regression analysis identified female gender as a significant predictor of both Psychological Impact and Aesthetic Concern scores ($p < 0.01$), highlighting well-documented gender differences in appearance sensitivity during adolescence. Female adolescents are known to engage more frequently in social comparison and exhibit heightened awareness of physical appearance, which may explain their greater vulnerability to dental aesthetic concerns [19,20].

Parental educational level emerged as another significant determinant of psychosocial outcomes, predicting higher Dental Self-Confidence scores ($p = 0.02$). This finding underscores the influence of family socioeconomic context on adolescents' self-perception, potentially reflecting differences in health literacy, access to orthodontic care, parental support,

and communication patterns [21,22]. The final regression model explained approximately 24% of the variance in psychosocial outcomes, indicating that additional psychological and environmental factors contribute to adolescents' perceptions of dental aesthetics.

Taken together, these results support a multidimensional conceptualization of orthodontic treatment effects. The findings indicate that orthodontic therapy primarily enhances appearance-specific self-confidence rather than producing broad psychosocial improvements [23]. This pattern aligns with previous research demonstrating that orthodontic treatment improves satisfaction with dental appearance and willingness to smile, but has a more limited impact on general psychological well-being or social functioning. The domain-specific effects observed in the present study reinforce the distinction between localized self-image improvements and global psychosocial adaptation [23,24].

From a clinical perspective, these findings emphasize that orthodontic treatment should not be regarded solely as a psychological intervention capable of producing comprehensive improvements in well-being. Instead, its psychosocial benefits appear to be selective and context-dependent [25]. While treatment can significantly enhance confidence related to dental aesthetics, broader psychosocial outcomes are influenced by a constellation of social, developmental, and familial factors. Consequently, orthodontic care for adolescents should incorporate a holistic patient-centered approach that includes realistic expectation management, assessment of psychosocial vulnerability, and supportive communication strategies [2,4,18,24].

Despite its strengths, including the use of a validated instrument and adequate sample

size, the study has certain limitations. The cross-sectional design precludes causal inference, self-reported measures may introduce response bias, and the absence of objective orthodontic indices limits the ability to correlate psychosocial outcomes with malocclusion severity. Longitudinal studies integrating clinical assessment of treatment need and monitoring psychosocial changes throughout treatment stages are warranted to provide a more comprehensive understanding of these relationships.

Overall, the integrated analysis of PIDAQ-RO subscales [9] demonstrates that orthodontic treatment contributes meaningfully to adolescents' confidence in dental appearance while exerting a comparatively modest influence on broader psychosocial well-being.

CONCLUSIONS

Orthodontic treatment in Romanian teenagers is associated with significantly higher dental self-confidence but shows

limited effects on broader psychosocial domains such as social functioning, emotional distress, and aesthetic concern. These findings indicate that orthodontic therapy primarily enhances appearance-specific self-perception rather than overall psychological well-being. Gender [19] and parental educational level [21,22] emerged as stronger predictors of psychosocial outcomes than treatment status. The results highlight the importance of considering social and developmental factors when evaluating orthodontic treatment benefits. The PIDAQ-RO proved to be a reliable instrument for assessing psychosocial aspects of dental aesthetics in adolescent populations [9].

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