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# Changes in Oral Health-Related Quality of Life, Esthetic Self-Perception, and Social Confidence After Orthodontic Treatment in Adolescents

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## ABSTRACT

**Background:** Malocclusion during adolescence may negatively influence perceived oral function, self-image, and social participation, making orthodontic treatment relevant to both clinical and psychosocial well-being. **Objective:** To assess changes in oral health-related quality of life, esthetic self-perception, and social confidence before and after orthodontic treatment initiation in adolescents. **Methods:** A descriptive observational pre-post study was conducted in South Punjab, Pakistan, over three months. Adolescents aged 12–18 years undergoing orthodontic treatment for the first time were recruited using consecutive sampling. Standardized self-administered questionnaires were completed at baseline and at three months to assess oral health-related quality of life, esthetic self-perception, and social confidence. Data were summarized using means, standard deviations, frequencies, and percentages, with changes presented descriptively. **Results:** A total of 68 adolescents completed baseline and follow-up assessments (mean age  $15.2 \pm 1.8$  years; 52.9% female). Oral health-related quality of life increased from  $42.6 \pm 8.9$  at baseline to  $63.8 \pm 7.4$  at three months ( $\Delta +21.2$ ). Esthetic self-perception increased from  $28.4 \pm 6.7$  to  $46.1 \pm 5.9$  ( $\Delta +17.7$ ), and social confidence increased from  $31.9 \pm 7.2$  to  $52.3 \pm 6.5$  ( $\Delta +20.4$ ), with reduced variability across outcomes at follow-up. **Conclusion:** Orthodontic treatment initiation was associated with early descriptive improvements in oral health-related quality of life, esthetic self-perception, and social confidence among adolescents

### Keywords

Adolescent; Esthetics; Malocclusion; Orthodontic Treatment; Quality of Life; Self Concept; Social Behavior.

## INTRODUCTION

Orthodontic treatment during adolescence occurs at a developmental stage characterized by rapid biological maturation, heightened self-awareness, and increased sensitivity to peer evaluation. During this period, facial and dental appearance can strongly influence self-image and social participation, making malocclusion a condition with potential implications beyond oral function alone (1). Although malocclusion is traditionally approached as an occlusal and functional problem, adolescents frequently experience its psychosocial dimensions through dissatisfaction with smile aesthetics, embarrassment, and avoidance of social behaviors such as smiling or speaking confidently. These experiences highlight that orthodontic care may produce benefits that extend into emotional well-being, self-perception, and interpersonal interaction, which are often underrepresented in routine clinical outcome evaluation (2).

Oral health-related quality of life (OHRQoL) offers a multidimensional framework through which adolescents' perceptions of oral health impacts can be evaluated in functional, emotional, and social domains. Adolescents seeking orthodontic care may report discomfort, activity limitations, and emotional distress associated with dental irregularities, and these effects can persist even when clinical severity is moderate, reflecting the subjective and socially mediated nature of oral health experiences (3). Evidence in pediatric and adolescent populations suggests orthodontic intervention may enhance perceived oral health functioning and reduce negative emotional impacts; however, findings vary according to measurement tools, follow-up duration, and sociocultural context, leaving uncertainty regarding how quickly meaningful improvements emerge after treatment initiation (4,5). This is particularly relevant during early treatment phases when appliance-related discomfort and adaptation could plausibly influence perceived quality of life (6).

Aesthetic self-perception is another critical component of adolescent psychosocial health, shaped by personal expectations and social feedback. Dissatisfaction with dental appearance is associated with lower self-esteem and stronger inclination toward aesthetic dental procedures, indicating that perceived smile attractiveness can act as a driver of both psychological distress and health-seeking behavior (6,7). While orthodontic treatment is intended to improve alignment and facial harmony, the extent to which adolescents translate visible early alignment changes into improved self-perception remains underexplored in many settings, especially where treatment expectations and aesthetic norms may differ across populations (8,9). Furthermore, social confidence is tightly intertwined with both OHRQoL and aesthetic self-perception, influencing adolescents' comfort in peer interactions, willingness to smile, and perceived ability to communicate without self-consciousness (10).

Despite growing recognition of patient-reported outcomes, orthodontic success is still commonly assessed using clinical indices and morphological endpoints, which may not reflect the psychosocial burden experienced by adolescents or the benefits they perceive during treatment (11). Available evidence supports associations between malocclusion severity and self-confidence, and longitudinal studies in specific orthodontic subgroups

demonstrate that treatment can improve quality of life and self-esteem; however, integrated evaluation of OHRQoL, aesthetic self-perception, and social confidence using within-participant pre-post comparisons remains limited in several contexts (12,13). Regional descriptive evidence is particularly needed to support a more holistic understanding of orthodontic outcomes and to inform clinical counseling that reflects patients' lived experiences (14–16). Therefore, this study aimed to assess changes in oral health-related quality of life, aesthetic self-perception, and social confidence among adolescents undergoing orthodontic treatment by comparing baseline scores with scores after three months of treatment initiation. It was hypothesized that adolescents would demonstrate improved scores across these interconnected psychosocial domains following initiation of orthodontic therapy (17,18).

## MATERIALS AND METHODS

A descriptive observational pre-post study was conducted in orthodontic care settings in South Punjab, Pakistan, over a three-month period to document changes in oral health-related quality of life, aesthetic self-perception, and social confidence among adolescents initiating orthodontic treatment. The study employed a within-participant comparison design with two observation points—baseline prior to appliance placement and follow-up at three months—to describe trends in patient-reported psychosocial outcomes during early fixed orthodontic therapy, consistent with patient-centered evaluation approaches reported in orthodontic outcome research (13–15).

Adolescents aged 12–18 years presenting for orthodontic treatment initiation were recruited using consecutive sampling. Eligibility criteria included initiation of orthodontic treatment for the first time, presence of permanent dentition, and ability to complete self-administered questionnaires independently. Exclusion criteria included any previous orthodontic treatment, craniofacial anomalies or congenital syndromes, systemic illnesses affecting oral health perception, and documented psychological conditions that could confound self-perception or social behavior outcomes. Participants who did not complete the follow-up assessment at three months were excluded from final analysis to ensure complete paired observations for descriptive comparison across timepoints (15,17).

Data collection occurred at baseline immediately prior to treatment initiation and again at three months. Oral health-related quality of life was assessed using an adolescent-focused standardized questionnaire designed to measure perceived impacts of oral health on functional limitations, emotional well-being, and social interactions. Aesthetic self-perception was measured using a structured self-assessment scale evaluating satisfaction with dental appearance and smile aesthetics. Social confidence was assessed using a questionnaire evaluating comfort in social interactions, willingness to smile, and perceived confidence in peer communication contexts. All instruments were administered in a supervised setting to ensure comprehension and to minimize missing responses, with standardized instructions applied across participants. Demographic data, including age and gender, were collected using a structured form at baseline (3,6,12).

The sample size was determined pragmatically based on feasibility within the three-month study period and clinical flow, while targeting a cohort size comparable to similar descriptive observational orthodontic studies assessing psychosocial outcomes (3,15). A total of 68 adolescents completed both baseline and follow-up assessments and were included in the final dataset. Data were coded and entered into statistical software for analysis. Descriptive statistics were used to summarize demographic variables and outcome scores. Continuous variables were reported as means and standard deviations, while categorical variables were reported as frequencies and percentages. Outcome scores at baseline and follow-up were described and absolute changes were calculated as differences in mean scores between the two timepoints. Data distribution was assessed descriptively and found to be approximately normal, supporting the use of mean-based summaries. Given the descriptive objective of the study, findings were presented without inferential hypothesis testing, and interpretation focused on magnitude and direction of observed changes rather than statistical significance (14–17). Ethical conduct was maintained by ensuring voluntary participation and confidentiality, with participants assessed using anonymized identifiers and study data stored securely with restricted access to the research team (16,17).

## RESULTS

A total of 68 adolescents completed both baseline and three-month follow-up assessments and were included in the analysis. The mean age of participants was  $15.2 \pm 1.8$  years, with females comprising 52.9% ( $n = 36$ ) and males 47.1% ( $n = 32$ ) of the cohort (Table 1). Across all domains, baseline scores were comparatively lower, while follow-up scores demonstrated consistent upward shifts with reduced variability, suggesting more favorable and more uniform perceptions after treatment initiation.

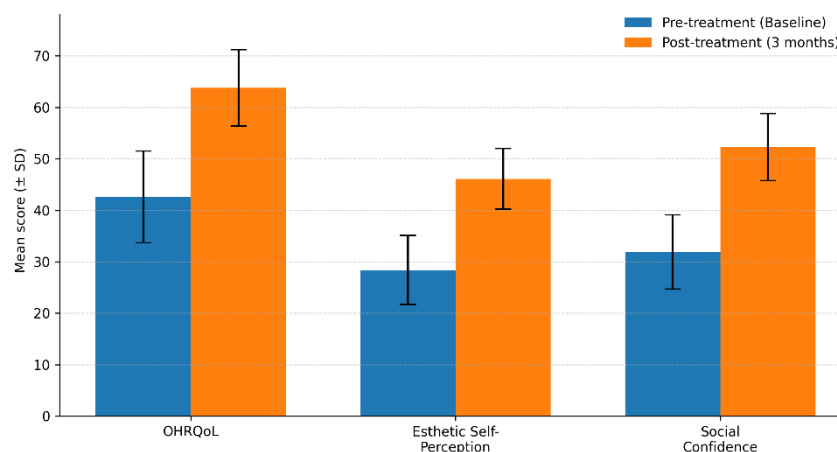
**Table 1. Demographic Characteristics of the Participants ( $n = 68$ )**

Variable	Value
Age (years), mean $\pm$ SD	$15.2 \pm 1.8$
Gender, n (%)	
Male	32 (47.1%)
Female	36 (52.9%)

**Table 2. Outcome Scores at Baseline and 3 Months Following Orthodontic Treatment Initiation ( $n = 68$ )**

Outcome	Baseline mean $\pm$ SD	3-month mean $\pm$ SD	Absolute change ( $\Delta$ mean)
Oral health-related quality of life (OHRQoL)	$42.6 \pm 8.9$	$63.8 \pm 7.4$	+21.2
Esthetic self-perception	$28.4 \pm 6.7$	$46.1 \pm 5.9$	+17.7
Social confidence	$31.9 \pm 7.2$	$52.3 \pm 6.5$	+20.4

Oral health-related quality of life scores increased from  $42.6 \pm 8.9$  at baseline to  $63.8 \pm 7.4$  at three months, reflecting an absolute mean increase of 21.2 points and a reduction in dispersion (SD decreased from 8.9 to 7.4) (Table 2). Esthetic self-perception similarly improved, with mean scores rising from  $28.4 \pm 6.7$  to  $46.1 \pm 5.9$ , yielding a mean increase of 17.7 points and a narrowing of score spread over time (SD 6.7 to 5.9). Social confidence showed a comparable improvement, increasing from  $31.9 \pm 7.2$  at baseline to  $52.3 \pm 6.5$  at follow-up, representing an absolute mean gain of 20.4 points alongside reduced variability (SD 7.2 to 6.5) (Table 2). Collectively, these descriptive findings demonstrate a consistent pattern of improvement across perceived oral health-related quality of life, esthetic self-perception, and social confidence within the early phase of orthodontic treatment.



**Figure 1** Changes in psychosocial outcomes among adolescents before and after orthodontic treatment initiation ( $n = 68$ ). Mean ( $\pm$  SD) scores for oral health-related quality of life (OHRQoL), esthetic self-perception, and social confidence are shown at baseline (pre-treatment) and at 3 months following treatment initiation. Across all domains, mean scores increased from baseline to 3 months, indicating improved perceived oral health and psychosocial well-being. OHRQoL increased from  $42.6 \pm 8.9$  to  $63.8 \pm 7.4$ , esthetic self-perception from  $28.4 \pm 6.7$  to  $46.1 \pm 5.9$ , and social confidence from  $31.9 \pm 7.2$  to  $52.3 \pm 6.5$ , with reduced variability at follow-up suggesting more consistent positive perceptions after treatment initiation.

## DISCUSSION

The present study descriptively documented early changes in oral health-related quality of life, esthetic self-perception, and social confidence among adolescents within three months of orthodontic treatment initiation. The observed upward shifts across all three patient-reported domains suggest that adolescents may begin to perceive psychosocial and functional benefits relatively early during fixed appliance therapy, aligning with the conceptual understanding that malocclusion influences not only oral function but also emotional comfort and social participation during adolescence (1,3). Given the heightened salience of self-image, peer comparison, and social evaluation in this developmental stage, even modest visible alignment changes or the reassurance of active treatment engagement may contribute to improved perceptions of oral health and appearance, which are central to adolescents' daily interactions and self-appraisal (1,6).

The increase in oral health-related quality of life scores observed in this cohort is consistent with literature indicating that orthodontic care can reduce perceived functional limitations and negative emotional impacts attributed to malocclusion, particularly in adolescent populations where oral health perceptions are closely intertwined with psychosocial well-being (4,11). Importantly, the present follow-up captured a relatively early treatment window, a phase during which discomfort and adaptation challenges could plausibly impair perceived quality of life. Despite this, the cohort demonstrated improved OHRQoL scores, suggesting that perceived benefits may emerge even before treatment completion and may reflect early improvements in self-perceived oral health status, emotional reassurance, or expectations regarding future outcomes (3,4). This finding reinforces the argument that patient-reported outcomes are essential complements to clinical indices when evaluating orthodontic care, particularly because clinical alignment improvements alone may not fully represent adolescents' lived experiences of treatment and its psychosocial meaning (2,11).

Marked improvement in esthetic self-perception was also observed, supporting the premise that dental appearance strongly contributes to self-image and satisfaction during adolescence (6,7). Adolescents with malocclusion may experience dissatisfaction with smile aesthetics and heightened self-consciousness, which can be driven by perceived deviations from social norms of attractiveness and reinforced by peer feedback (6,12). In this context, orthodontic therapy may influence esthetic self-perception through visible incremental alignment changes, increased perceived attractiveness, and reduced appearance-related worry. These mechanisms are consistent with reports that dissatisfaction with dental aesthetics and self-esteem are important psychosocial determinants shaping interest in esthetic dental interventions and orthodontic treatment uptake (6,7). Although the present design does not establish causality, the magnitude of change observed suggests clinically meaningful perceived shifts that merit further evaluation using longitudinal designs and validated tools with established minimal important difference thresholds (13,15). The improvement in social confidence observed in this cohort further supports the interdependence of oral health perceptions, appearance-related satisfaction, and social functioning. Adolescents who perceive their teeth as unattractive or socially noticeable may restrict smiling, limit participation in conversations, or avoid social settings, which can reduce confidence and contribute to sustained psychosocial burden (10,12). The observed shift toward higher social confidence scores suggests that adolescents may experience greater comfort in smiling and interacting with peers after treatment initiation, potentially mediated by improved appearance satisfaction and reduced anticipatory embarrassment. Prior work has highlighted the relationship between malocclusion severity, facial appearance concerns, and self-confidence among orthodontic patients, supporting the plausibility that orthodontic care may facilitate improvements in social behavior and interpersonal confidence (12,14). However, social confidence is shaped by broader psychological and environmental determinants, and future studies should incorporate contextual variables such as peer dynamics, baseline self-esteem, and sociocultural norms regarding dental aesthetics to better characterize mechanisms of change (6,9). A notable finding across outcomes was the reduced variability (lower standard deviations) at follow-up compared to baseline, suggesting more consistent perceptions after treatment initiation. This may indicate that once adolescents enter treatment, perceptions converge toward more favorable evaluations, possibly reflecting reassurance, structured follow-up, and a shared experience of progressive correction. Such convergence is relevant because psychosocial outcomes are often heterogeneous at baseline due to differences in malocclusion severity, self-esteem, and social experiences (3,15). Nonetheless, several limitations must be acknowledged. The descriptive observational design restricts causal inference, and the absence of a control group prevents comparison against natural psychosocial maturation or external influences over time (15,17). The short follow-up window may not capture sustained trajectories throughout treatment or after completion, and self-reported data remain susceptible to

response bias and social desirability effects, particularly in adolescents (15,16). Additionally, malocclusion severity and treatment complexity were not stratified, limiting assessment of whether psychosocial gains differ by baseline clinical need or perceived severity (15,17). Future research should employ longer-term longitudinal designs with standardized measures, include severity adjustment, and consider mixed-method approaches to integrate quantitative change scores with qualitative insights into adolescents' lived experiences and expectations (13,17).

Overall, the findings contribute context-specific descriptive evidence that orthodontic treatment initiation may be associated with early improvements in oral health-related quality of life, esthetic self-perception, and social confidence among adolescents. Incorporating these psychosocial endpoints into orthodontic outcome evaluation may strengthen patient-centered care, improve counseling and expectation-setting, and support holistic assessment of treatment benefits beyond occlusal correction alone (2,11,18).

## CONCLUSION

Orthodontic treatment initiation in adolescents was associated with notable descriptive improvements in oral health-related quality of life, esthetic self-perception, and social confidence over a three-month observation period, with reduced variability in follow-up scores suggesting more consistent positive perceptions after treatment onset. These findings underscore the value of integrating patient-reported psychosocial outcomes into orthodontic evaluation and highlight the need for larger, longer-term, severity-adjusted longitudinal studies to clarify the sustainability and determinants of these perceived benefits across the full course of treatment.

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