

EVALUATION OF PSYCHOSOCIAL EFFECT OF MALOCCLUSION AND ITS RELATIONSHIP WITH THE SEVERITY OF MALOCCLUSION

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ABSTRACT

Background: Malocclusion can have a negative impact on the psychological health, social interactions and self-esteem of a person, especially when it happens during young adulthood. Knowledge of the psychosocial effects of malocclusion and the correlation of malocclusion severity and its effects is important in planning orthodontic treatment that is geared toward the patient's needs and enhancing their quality of life. **Objectives:** To assess the effect of malocclusion from a psychosocial aspect and to see if this is correlated with the severity of malocclusion, and to see if there is a difference between males and females in this correlation.

Methods: This study was conducted at the Department of Orthodontics, Punjab Dental Hospital, a high-volume teaching hospital with an OPD of around 150 orthodontic patients daily, ensuring adequate recruitment. A convenience sampling technique in a cross-sectional design was used to sample young adults (ages 18 to 28) who fulfilled the inclusion and exclusion criteria. The validated Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) was used to gather data as well as malocclusion assessment was carried out using the Index of Orthodontic Treatment Need (IOTN). Ethical approval was obtained, and informed consent, confidentiality, and participants' rights were strictly maintained.

Results: Among 279 young adults, malocclusion was associated with varying psychosocial effects. The mean total PIDAQ score was 36.26 ± 15.25 , with higher scores reflecting greater psychosocial burden. While participants reported moderate concerns in self-confidence, social, psychological, and aesthetic domains, Spearman correlation showed no significant relationship between severity of malocclusion (IOTN grade) and psychosocial effect (all $p > 0.05$).

Conclusion: Malocclusion exerted a psychosocial effect on young adults, particularly affecting dental self-confidence and psychological well-being. However, the severity of malocclusion showed no significant correlation with psychosocial outcomes, except for higher psychological impact reported among males.

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INTRODUCTION

Malocclusion occurs when the lower jaw teeth are behind upper jaw teeth. The underbite taken place on the other hand when the lower teeth position further forward as compared to that of the upper teeth ¹. Malocclusion or misalignment of jaws and teeth could be problematic for the individual in several ways, some of which are distress

and pain, difficulty in speaking and eating. It may be having several etiologies and these can be hereditary and developmental factors.² Surprisingly, a survey conducted by Basyouni et al. established that 87.5 percent of the population experienced malocclusion.³ A total of 32 percent of the Brazilian schoolchildren suffered malocclusion, and it was also associated with bottle-feeding history and bad oral hygiene habits⁴. Similarly, schoolchildren in Nigeria had a higher tendency of having type 1 and type 3 malocclusion compared to boys although the association was not present in type 2⁵. Despite malocclusion in 84 percent of children, no noticeable disparity between boys and girls concerning the occurrence of malocclusion could be identified⁶. Prevalence is influenced by age, sex, and urbanization and the geographic base.⁷

This acknowledgment of the psychological impact of a malocclusion highlights the importance of satisfying patients' aesthetic needs and their smiles' possible positive contributions to their self-image and life quality.⁸ It is intended to explore the consequences of malocclusions on the psychological well-being of young people from Lahore, Pakistan. Cultural traditions and socioeconomic elements can affect individuals' perception of dental anomalies.⁹

Previous literature on the psychosocial impact of malocclusions primarily revolves around Western respondents, while samples from culturally diverse places such as Lahore were rather limited. An in-depth analysis of socio cultural dynamics that could have affected the psychosocial impacts of the malocclusions in certain demographic groups was rarely available.¹⁰ Although the incidence of psychosocial nerve of malocclusions is being noted more frequently, little attention has been given to the population of young adults. Considering the diversity of culture and socio-economic status in the city, it is noteworthy to recognize the psychosocial effect of malocclusions to implement appropriate interventions and foster the establishment of relevant support service. Therefore, there is a dire need for the present study to broaden orthodontic care to holistic actions focusing on psychosocial well-being. The outcomes and impacts would be worrisome and it is suspected that it can lead to psychosocial distress, hence we intend to carry out this study and come to a conclusion.

MATERIALS AND METHODS

Study Design: This is a cross-sectional study.

Setting: The study was done at university institute of public health, Allied health sciences, the University of Lahore. Data was collected at the Punjab Dental Hospital Department of Orthodontics.

Duration of study: The study was done from Aug 2025 till Feb 2026

Sampling Technique: The study utilized a convenience sampling technique to ensure the representation of young adults seeking treatment.

Sample Size: The sample size was measured by utilizing WHO software and it was calculated as 284 participants based on a reported prevalence of malocclusion of 75.6%¹¹, a 95% confidence level, and a 5% margin of error.

An extra 15% was added to the sample size required because of the possibility of some non-response and also incomplete questionnaires, bringing the required sample size to 327. Following data collection, 48 questionnaires were excluded due to incomplete information, leaving 279 participants with complete data for the final analysis.

Sample Selection Criteria

Inclusion criteria

- Individuals with malocclusions seeking treatment from ages 18-28 years of either gender.
- Individuals with all teeth present.
- Individuals with normal mouth opening.
- Individuals with complete eruption of permanent 1st Molars.

Exclusion criteria

- Individuals with severe medical conditions or cognitive impairments affecting their capability to comprehend the study.
- Exclude individuals who are currently taking medications that affect mental health or cognition.
- Individuals suffering from genetic conditions or syndromes.
- Individuals with fillings, tooth discolorations, learning disability and dental anxiety.
- Individuals with history of jaw trauma.

Data collection procedure

The University of Lahore was requested to give ethical clearance. During the study period data was obtained from young adults visiting OPD Orthodontics, Punjab Dental Hospital. Consecutive sampling was used to recruit eligible participants who gave written informed consent for participation. A structured proforma was used for recording of sociodemographic data including age, education, gender, income etc. Psychosocial effect of dental aesthetics was assessed using the questionnaire called "Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ)". It consists of 4 domains: Dental Self-Confidence (DSC), Social Impact (SI), Psychological Impact (PI) and Aesthetic Concern (AC) with 23 items. The strength of psychosocial impact was rated on each item using a Likert scale system with a higher score representing a stronger psychosocial impact. The reliability and validity of the questionnaire have been reported to be good with Cronbach's alphas ranging from 0.83 to 0.88 and test-retest reliability coefficients being 0.74 – 0.91. After the administration of questionnaires, a clinical examination of the malocclusion was conducted by the qualified dental professional who used the standardized instrument "Index of Orthodontic Treatment Need (IOTN)" to assess the severity of the malocclusion. Malocclusion was identified as any inappropriate contact between the upper and lower dental arches and/or teeth alignment. Treatment need was classified using IOTN grading and social impact, confidence, psychological effect and aesthetic apprehensions associated with dental appearance was measured using the PIDAQ domains. The

completed questionnaires were checked for completeness and consistency and the participants' confidentiality was ensured throughout the study. The data were entered and analyzed using the SPSS version 26. Mean $\pm$ standard deviation was used for quantitative variables and frequencies and percentages for categorical variables. The relationship between the severity of malocclusion and psychosocial impact scores were quantitatively analyzed using Spearman's rank correlation coefficient. The Mann–Whitney U test was used for comparing the mean score of the plaintiff with the mean score of the defendant (males versus females) for each PIDAQ, and the Chi-square test was used for comparing the level of malocclusion with gender. A p value < 0.05 was taken as statistically significant.

RESULTS

A total of 279 young adults were involved in the study with a mean age of '24.49 $\pm$ 2.92' years (range 18–28 years). Most participants were 24–28 year age group (65.9%), while 34.1% were aged 18–23 years. The sample incorporated 146 (52.3%) men and 133 (47.7%) women. The level of education and household income was fairly evenly spread among the categories. The overall dental self-confidence of participants was moderate and psychosocial effect linked with dental appearance. The mean scores for DSC was 13.51 $\pm$ 6.50, SI was 9.39 $\pm$ 8.50, PI was 9.58 $\pm$ 6.48, and AC was 3.78 $\pm$ 3.73. The average PIDAQ score was 36.26 $\pm$ 15.25, indicating a moderate psychosocial effect of malocclusion among the study population.

Regarding malocclusion severity, 36.9% of participants were classified as IOTN Grade-2, 41.6% as Grade-3, and 21.5% as Grade-4. Spearman correlation analysis demonstrated no significant association between malocclusion severity and DSC ($r = -0.029$, $p = 0.625$), SI ($r = 0.067$, $p = 0.267$), PI ($r = 0.063$, $p = 0.298$), AC ($r = 0.016$, $p = 0.785$), or total PIDAQ score ($r = 0.050$, $p = 0.407$). Similar findings were observed after stratification by gender. Comparison of psychosocial outcomes between males and females showed that PI scores were significantly higher among males than females (10.27 $\pm$ 5.88 vs. 8.83 $\pm$ 7.01, $p = 0.015$). on the other hand, no considerable gender differences were observed for DSC, SI, AC, or total PIDAQ scores (all $p > 0.05$). Furthermore, the distribution of malocclusion severity did not differ significantly between genders ($\chi^2 = 0.559$, $p = 0.756$).

Table 1. Socio-demographic Characteristics of Participants (n = 279)

Variable	Category	n (%)
Age group (years)	18–23	95 (34.1)
	24–28	184 (65.9)
Gender	Male	146 (52.3)
	Female	133 (47.7)
Educational level	High school	100 (35.8)
	College (11–13 years)	92 (33.0)
	University (≥ 14 years)	87 (31.2)
Monthly household income	<20,000	64 (22.9)
	20,000–50,000	83 (29.7)

	50,000–100,000	63 (22.6)
	>100,000	69 (24.7)

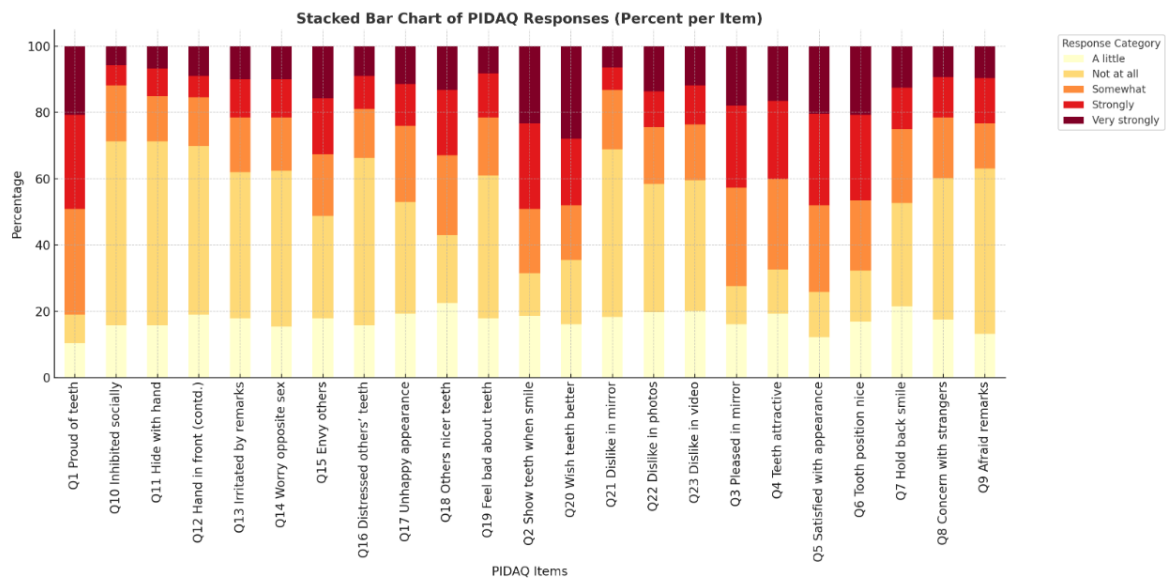


Fig-1: Distribution of all items of PIDAQ (n = 279)

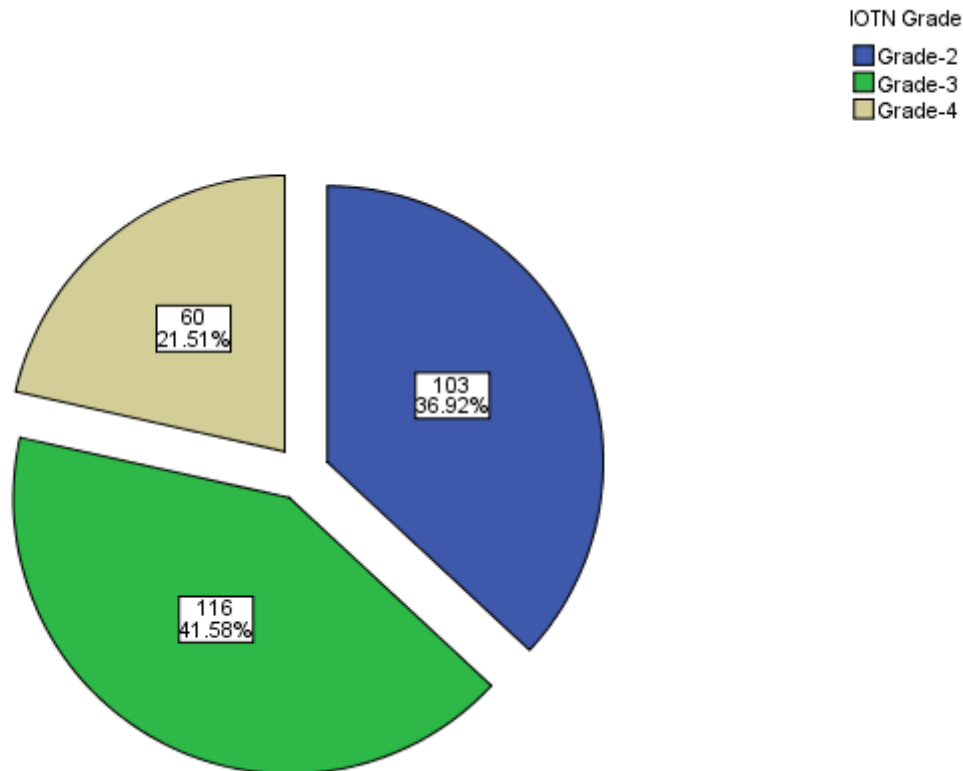


Fig-6: Severity of malocclusions

Table 2. Descriptive Statistics of PIDAQ Domains and Total Score (n = 279)

Domain	Mean $\pm$ SD	Min–Max
Dental Self-Confidence (DSC)	13.51 $\pm$ 6.50	0–24
Social Impact (SI)	9.39 $\pm$ 8.50	0–32
Psychological Impact (PI)	9.58 $\pm$ 6.48	0–24
Aesthetic Concern (AC)	3.78 $\pm$ 3.73	0–12
Total PIDAQ Score	36.26 $\pm$ 15.25	1–92

Table 3. Correlation Between Severity of Malocclusion (IOTN Grade) and Psychosocial Impact (n = 279)

Domain	Overall r (p-value)	Male r (p-value)	Female r (p-value)
Dental Self-Confidence (DSC)	-0.029 (0.625)	-0.023 (0.779)	-0.040 (0.644)
Social Impact (SI)	0.067 (0.267)	0.000 (0.997)	0.128 (0.142)
Psychological Impact (PI)	0.063 (0.298)	-0.029 (0.724)	0.155 (0.074)
Aesthetic Concern (AC)	0.016 (0.785)	0.010 (0.905)	0.022 (0.803)
Total PIDAQ Score	0.050 (0.407)	-0.039 (0.640)	0.148 (0.090)

Spearman correlation coefficient (r).

Table 4. Comparison of PIDAQ Scores and Severity of Malocclusion by Gender (n = 279)

Variable	Male (n=146) Mean $\pm$ SD	Female (n=133) Mean $\pm$ SD	p-value
Dental Self-Confidence (DSC)	13.22 $\pm$ 6.39	13.83 $\pm$ 6.63	0.400
Social Impact (SI)	9.26 $\pm$ 8.10	9.53 $\pm$ 8.96	0.990
Psychological Impact (PI)	10.27 $\pm$ 5.88	8.83 $\pm$ 7.01	0.015
Aesthetic Concern (AC)	3.93 $\pm$ 3.57	3.61 $\pm$ 3.91	0.295
Total PIDAQ Score	36.68 $\pm$ 14.26	35.80 $\pm$ 16.30	0.433
Grade-2 Malocclusion	56 (54.4%)	47 (45.6%)	$\chi^2 = 0.559$, p = 0.756
Grade-3 Malocclusion	61 (52.6%)	55 (47.4%)	
Grade-4 Malocclusion	29 (48.3%)	31 (51.7%)	

DISCUSSION

The present study explored the psychosocial impact of malocclusion among 279 young adults in Lahore, Pakistan, using the "Psychosocial Impact of Dental Aesthetics Questionnaire" (PIDAQ) and the "Index of Orthodontic Treatment Need" (IOTN). The mean total PIDAQ score in our sample was 36.26 $\pm$ 15.25, with domain-specific means of 13.51 $\pm$ 6.50 for Dental Self-Confidence (DSC), 9.39 $\pm$ 8.50 for Social Impact (SI), 9.58 $\pm$ 6.48 for Psychological Impact (PI), and 3.78 $\pm$ 3.73 for Aesthetic Concern (AC). Although participants reported varying levels of psychosocial burden, Spearman's correlation analysis showed no significant association between IOTN grade and PIDAQ domains (DSC r = -0.029, p = 0.625; SI r = 0.067, p = 0.267; PI r = 0.063, p = 0.298; AC r = 0.016, p = 0.785; Total score r = 0.050, p = 0.407). Gender comparisons revealed that males had significantly

higher psychological impact (mean PI = 10.27 ± 5.88) compared to females (mean PI = 8.83 ± 7.01 , $p = 0.015$), whereas total scores and other domains were not significantly different. The results indicate that there are psychosocial effects of malocclusion, but these effects are not necessarily directly correlated with the clinical severity. This is similar to the findings from Georgina et al. (2023) in India, who found that the malocclusion had a psychosocial effect among children and young adults, but that the effect was relatively small, with some children being more affected than others depending on factors such as age and socioeconomic status.¹² Their review also noted that mild malocclusion was sometimes associated with high self-esteem, echoing the variability observed in our sample where many participants with moderate or severe malocclusions reported only modest psychosocial burden.

By contrast, several studies have reported stronger associations. In Saudi Arabia, Gassem et al. (2023a) reported psychosocial effect of malocclusion was considerably related to severity across all PIDAQ domains except DSC.¹³ In their sample of 355 young adults, women were more affected than men ($p < 0.05$), and higher IOTN and DAI scores were directly correlated with higher PIDAQ scores.¹³ Similarly, Džemidžić et al. (2023) in Bosnia reported that both total PIDAQ and its four subscales were positively correlated with IOTN categories ($p < 0.05$), with girls showing slightly greater aesthetic concern. In contrast, our findings showed no correlation between IOTN severity and PIDAQ domains (all $p > 0.2$), but a gender difference favoring higher male PI, a pattern opposite to these studies.¹⁴

Studies from Latin America further highlight the variability of psychosocial outcomes. In Brazil, Muniz et al. (2022) reported that adolescents with low self-esteem were 2.20 times more likely (95% CI: 1.23–3.93) to perceive a stronger impact of malocclusion on dental aesthetics.¹⁵ Their analysis showed domain-specific risks of 2.33 times greater impact on PI and 1.93 times greater on SI. Similarly, Dallé et al. (2019) found that high aesthetic concern and low self-esteem were 3.43 and 3.34 times more likely, respectively, to affect oral health-related quality of life.¹⁶ By comparison, in our study, the mean AC score was relatively low (3.78 ± 3.73), suggesting aesthetic dissatisfaction was less pronounced among Pakistani young adults.

African studies also point toward significant psychosocial consequences. In Ghana, Amuasi et al. (2020) reported that malocclusion negatively influenced oral health-related quality of life, with the psychological discomfort domain most affected.¹⁷ Similarly, Ilijazi Shahiqi et al. (2021) in Kosovo observed that severity, gender, and age were all related to psychosocial impact, with females and older participants reporting greater burden ($p < 0.05$).¹⁸ These findings differ from our results, where no significant differences were observed across age subgroups, and females actually reported lower psychological burden compared to males. European evidence is more aligned with the severity-psychosocial relationship. Iranzo-Cortés et al. (2020) found that PIDAQ scores increased significantly with the degree of orthodontic treatment need, as determined by DAI ($\beta =$

0.20) and IOTN-DHC ($\beta = 4.87$).¹⁹ They also found that women reported significantly higher psychosocial burden ($\beta = 2.66$, $p < 0.05$), while prior orthodontic treatment reduced perceived impact ($\beta = -5.74$). In contrast, our results showed non-significant correlations across all PIDAQ domains ($r = -0.029$ to 0.067 , $p > 0.2$), and no significant total score differences by gender. Regional studies from Pakistan have also produced differing results. Javed & Bernabé (2016) reported that adult patients with Class III malocclusion experienced significantly poorer oral health-related quality of life compared to those with Class I, particularly in psychological and social disability domains.²⁰ In contrast, our study, with a broader categorization into IOTN Grades 2–4, did not detect significant psychosocial differences by severity ($\chi^2 = 0.559$, $p = 0.756$). These differences could be due to variations in study design, malocclusion classification and age distribution. In combination, these results suggest that the psychosocial consequences of malocclusion have been widely documented in a variety of populations but associations with severity and gender are different in strength and direction. Social and psychosocial impacts were observed in our Pakistani sample (mean PIDAQ = 36.26 ± 15.25), but were not found to be significantly related to the severity of IOTN. The gender finding, males with higher PI ($p = 0.015$) is contrary to many international reports which gave females a higher PI. This may be due to cultural differences in the way that individuals express body image concerns, coping strategies, or social norms about aesthetics of the teeth.

The following limitations of this study should be noted. First, a cross-sectional design was used, limiting the capacity to make causal inferences regarding the relationship between severity of malocclusion and the psychosocial outcomes. Second, the study used a convenience sampling technique and was conducted at one teaching hospital so may not be generalizable to the broader population of young adults in Pakistan. Third, self-report instruments may be subject to response bias, with participants being less likely to report psychosocial problems or over-reporting them. Moreover, the socio-cultural factors including family, peer and societal expectations that may impact the perception of dental aesthetics were not systematically evaluated. Last, the measurement of severity based on the IOTN might have given complementary information based on other measures (e.g., DAI or PAR index).

CONCLUSION

The study concluded that malocclusion causes an undeniably measurable socio-psychological impact on young adults, which was manifested in the following aspects: low self-confidence, problems with social interaction, psychological impact and low aesthetic satisfaction. The degree of malocclusion measured by IOTN, however, did not correlate significantly with psychosocial outcomes and results suggest that individual and socio-cultural factors may also have a role in determining the perception of dental esthetics. Females did not show any significant differences from males except that males reported significantly higher psychological impact than

females. The overall results highlight the need to consider and manage the psychosocial aspects of orthodontic treatment in addition to clinical assessment, especially in young adults who seek orthodontic treatment.

RECOMMENDATIONS

Longitudinal study designs would be helpful in determining more clearly causal relationships between malocclusion and psychosocial well-being. More and larger multi-center studies of more diverse samples would increase the generalizability and provide for regional and cultural comparisons. It may be possible to have a more comprehensive picture of the psychosocial impact from combining clinical indices (IOTN, DAI, PAR) with qualitative assessments (interviews or focus groups). The moderating effect of variables like self-esteem, body image perception, and SEB are also recommended to be explored as they are likely to influence the link between malocclusion and the psychosocial burden.

Clinician should use patient-reported outcomes in conjunction with clinical parameters when planning orthodontic treatment, as they address the patient's clinical and psychological problems. Lastly, the prevention of any form of intervention aimed at the adolescents, early orthodontic diagnosis/education on aesthetics and orthodontic intervention should be encouraged to reduce long-term social/psychological effects.

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