



Patient Satisfaction with the esthetic Outcome of Anterior Fixed Dental Bridges: A Cross-Sectional Questionnaire-Based Study

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رضا المرضى عن النتائج الجمالية للجسور السنية الثابتة الأمامية: دراسة مقطعية قائمة على الاستبيان

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Abstract:

Patient-reported satisfaction is an important outcome in evaluating the success of fixed prosthodontic treatment. This study aimed to evaluate patient satisfaction with the esthetic outcome of anterior fixed partial dentures (FPDs). A descriptive cross-sectional study was conducted at a private dental clinic from March to August 2026 using a structured questionnaire administered to patients who had received anterior FPDs. The questionnaire assessed color matching, tooth shape, tooth size and proportion, gingival appearance, harmony with the smile line, and overall esthetic satisfaction. Data were analyzed using SPSS (version 23). Descriptive statistics were presented as frequencies, percentages, means, and standard deviations, and correlations were assessed using Spearman's rank correlation coefficient (p), with a p -value <0.05 considered statistically significant. A total of 83 participants (mean age 45.63 years, range 18–80) were included, of whom 43% were male and 40% were female. Maxillary bilateral FPDs were the most common configuration (54.2%), and PFM and all-ceramic restorations were similarly represented (45.8% and 44.6%, respectively). The highest satisfaction (satisfied or very satisfied) was observed for the final esthetic outcome (97.6%), followed by color matching, tooth shape, and harmony with the smile line (96.4% each). Gingival appearance had the highest proportion of dissatisfaction (12.0%). Satisfaction was not significantly correlated with gender, age, education level, prosthesis material, location, or duration of placement ($p > 0.05$). Anterior FPDs were generally associated with favorable patient-perceived esthetic outcomes, with gingival appearance being the dimension most in need of attention. These findings highlight the importance of soft-tissue management and individualized esthetic planning in anterior fixed prosthodontics, and larger longitudinal studies using validated esthetic indices are recommended.

Keywords: fixed partial denture; patient satisfaction; esthetics; anterior teeth; prosthodontics.

المخلص:

تُعدّ درجة رضا المرضى المُعلن عنها من قِبلهم من المؤشرات المهمة لتقييم نجاح المعالجات التعويضية الثابتة. هدفت هذه الدراسة إلى تقييم رضا المرضى عن النتيجة الجمالية للتعويضات السنية الثابتة الجزئية (الجسور) في المنطقة الأمامية.

أجريت دراسة وصفية مقطعية في عيادات أسنان خاصة خلال الفترة من مارس إلى أغسطس 2026، باستخدام استبيان مُهيكل وُزِعَ على المرضى الذين تلقوا جسوراً سنية في المنطقة الأمامية. قِيمَ الاستبيان تطابق اللون، وشكل السن، وحجمه وتناسبه، والمظهر اللثوي، والانسجام مع خط الابتسامة، والرضا الجمالي العام. حُلِّلَت البيانات باستخدام برنامج SPSS (الإصدار 23)، وعُرِضَت الإحصاءات الوصفية في صورة تكرارات ونسب مئوية ومتوسطات حسابية وانحرافات معيارية، فيما قِيمَت الارتباطات بمعامل ارتباط سبيرمان للترتيب (p)، واعتُبرت قيمة $p > 0.05$ ذات دلالة إحصائية. شملت الدراسة 83 مشاركاً بمتوسط عمر 45.63 عاماً (المدى: 18–80 عاماً)، منهم 43 ذكراً (51.8%) و40 أنثى (48.2%). كان النمط الأكثر شيوعاً هو الجسور الثنائية في الفك العلوي (54.2%)، وتقاربت نسبة التعويضات المصنوعة من الخزف الكامل (44.6%) والخزف المدمج بالمعدن (PFM) (45.8%). سُجِّلَ أعلى مستوى من الرضا (راضٍ/راضٍ جداً) عن النتيجة الجمالية الإجمالية (97.6%)، يليه تطابق اللون وشكل السن والانسجام مع خط الابتسامة بنسبة 96.4% لكلٍ منها، في حين سُجِّلَ المظهر اللثوي أعلى نسبة عدم رضا (12.0%). ولم يُظهر التحليل ارتباطاً ذا دلالة إحصائية بين مستوى الرضا وكلٍ من الجنس والعمر والمستوى التعليمي ونوع مادة التعويض وموقعه ومدة وجوده في الفم ($p < 0.05$). ارتبطت الجسور السنية الثابتة الأمامية بنتائج جمالية مرضية بوجه عام من وجهة نظر المرضى، وكان المظهر اللثوي أكثر الجوانب حاجةً إلى التحسين. وتؤكد هذه النتائج أهمية التدبير الأمثل للأنسجة الرخوة والتخطيط الجمالي الفردي في التعويضات الثابتة الأمامية. وتوصي الدراسة بإجراء دراسات طولية أوسع نطاقاً تعتمد مقاييس جمالية مُعتمدة.

الكلمات المفتاحية: التعويض السني الجزئي الثابت؛ رضا المريض؛ الجماليات؛ الأسنان الأمامية؛ الاستعاضة السنية.

Introduction:

Esthetic prosthodontics field is a dynamic and rapidly expanding branch of restorative dentistry due to patients' increasing desire for restorations that are both functional and identical to their natural dentition [1]. The anterior region of the mouth has a significant impact on facial aesthetics because it is highly visible during speaking and smiling. Therefore, the success of these restorations depends not only on their ability to restore mastication and phonetics but also on their capacity to achieve a natural appearance that blends with the patient's facial features and existing dentition. Factors such as tooth color, shape, size, alignment, gingival contour, and harmony with adjacent teeth play an essential role in determining the aesthetic outcome of anterior fixed dental bridges [2].

Dissatisfaction with dental appearance can lead to self-consciousness, avoidance of smiling, and withdrawal from social interactions, behaviors linked to increased anxiety and potential risk of depression [3]. Conversely, satisfaction with one's smile is positively correlated with self-confidence, greater ease in social interaction, and improved coping skills [4,5].

Despite advances in restorative dentistry, limited information is available regarding the relationship between the aesthetic characteristics of anterior fixed dental bridges and patients' satisfaction with their final appearance. Therefore, evaluating patient satisfaction through a cross-sectional questionnaire-based approach can provide valuable insights into how individuals perceive the aesthetic results of their restorations [6].

while dental professionals are required to provide restorations with optimal shade matching, translucency, surface texture and anatomical contour, long-term durability and biological compatibility [7]. They often evaluate the success of fixed dental bridges through clinical parameters, whereas patients judge success of treatment according to their personal perception of appearance and satisfaction with their smile. A restoration may be considered clinically acceptable by the dentist while still failing to meet the patient's aesthetic expectations. This difference highlights the importance of evaluating treatment outcomes from the patient's perspective, especially in the aesthetic zone where personal preferences and psychological factors strongly influence satisfaction [8].

Questionnaire-based assessments are widely used to measure patient satisfaction because they allow direct evaluation of patients' experiences, perceptions, and aesthetic preferences. Through structured questionnaires, researchers can identify the factors that contribute to satisfaction or dissatisfaction following restorative treatment. In the context of anterior fixed dental bridges, such assessments are particularly important because aesthetic success is subjective and may vary considerably among individuals. Understanding these perceptions can assist dental practitioners in improving treatment planning, communication with patients, and the achievement of predictable aesthetic outcomes [9].

Therefore, the present study aimed to evaluate patient satisfaction regarding the esthetic results of anterior fixed dental bridges and to identify sociodemographic and clinical factors associated with esthetic satisfaction outcomes using a cross-sectional questionnaire-based design.

Materials and methods:

Study Design:

This cross-sectional study aimed to evaluate patient-reported esthetic (PROS) satisfaction with anterior fixed dental bridges. The study was conducted over a six-month period, from March to August 2026, among patients attending private dental clinics in Libya for follow-up or routine dental care.

Study Population and Eligibility Criteria:

The study included adult patients aged 18 years or older who had completed treatment with an anterior fixed dental bridge and agreed to participate in the study.

Patients were excluded if they had removable prosthesis, severe untreated periodontal diseases, or were unwilling to participate.

Sample Size and Sampling Technique:

The sample size was determined based on a review of previous comparable studies using patient-reported outcome measures (PROMs) in anterior dental prosthodontics. Previous studies evaluating patient satisfaction with fixed dental prosthesis used reported sample sizes ranging from 70 to 100 participants. A consecutive sampling technique was used to recruit 83 eligible adult patients, including 40 males and 43 females, during the study period.

Data Collection Instrument:

Data were collected using a structured, interviewer-assisted questionnaire developed based on previously published studies assessing patient-reported outcomes in dental prosthodontics. The questionnaire was reviewed by specialists in prosthodontics to assess its content validity, clarity and suitability for measuring study variables. Before the main study, a pilot test was conducted among 15 patients who met the study eligibility criteria.

The pilot participants were not included in the final study sample; the reliability of the questionnaire was assessed using Cronbach's alpha coefficient of 0.92.

Data Collection Procedure:

Eligible participants completed the interviewer assisted questionnaire in a private setting at the dental clinics after providing informed consent. Completed questionnaires were checked for completeness immediately after collection.

Statistical Analysis:

Data were analyzed using SPSS version 23, descriptive statistics were presented as frequencies, percentages, means, and standard deviations. Correlations were assessed using Spearman's rank correlation test."

Result:

A total of 83 participants were included in the study. The mean age of the participants was 45.63 ± 13.64 years, with an age range of 18–80 years. Females constituted a slightly higher proportion of the study population (43, 51.8%) than males (40, 48.2%). Regarding educational level, more than half of the participants had a university-level education (45, 54.2%), followed by secondary education (20, 24.1%), primary education (10, 12.0%), and postgraduate education (8, 9.6%) (Table 1).

Regarding the arch and site of the bridge, maxillary bilateral bridges were the most common, accounting for 45 participants (54.2%), followed by maxillary unilateral bridges (20, 24.1%). Mandibular bilateral bridges were reported in 15 participants (18.1%), whereas mandibular unilateral bridges were the least common (3, 3.6%) (Figure 1).

With respect to bridge material, porcelain-fused-to-metal (PFM) bridges were used in 38 participants (45.8%), closely followed by all-ceramic bridges in 37 participants (44.6%). Eight participants (9.6%) were not sure of the material used (Figure 2).

Concerning the duration of bridge use, the largest proportion of participants had used their bridge for more than 3 years (39, 47%), followed by 1–3 years (27, 32.5%) and 6 months–1 year (10, 12.0%). Seven participants (8.4%) had used their bridge for less than 6 months (Figure 3).

The majority of participants reported satisfaction with the esthetic aspects of their bridge treatment. The proportion of participants who were dissatisfied or very dissatisfied was highest for gingival appearance, with 10 participants (12.0%) reporting dissatisfaction. This was followed by alignment (5, 6.0%), size (4, 4.8%), and shade, shape, self-confidence, and facial harmonization (3, 3.6% each). Dissatisfaction was less frequently reported for overall satisfaction (2, 2.4%), natural smile (1, 1.2%), and recommendation of treatment (1, 1.2%) (Table 2).

When the individual items were grouped into broader domains, the highest proportion of dissatisfaction was observed for gingival appearance (12.0%), whereas dissatisfaction with natural smile was lowest among the esthetic outcomes (1.2%). For psychosocial/general outcomes, dissatisfaction was reported for self-confidence (3.6%), facial harmonization (3.6%), overall satisfaction (2.4%), and recommendation of treatment (1.2%) (Figure 3).

The mean score for esthetic satisfaction was 3.99 ± 0.72 , with a mean difference of 0.99 compared with the reference value, and this difference was statistically significant ($p < 0.001$; 95% CI: 0.83–1.15). The mean score for psychosocial/general outcome was higher at 4.23 ± 0.66 , with a mean difference of 1.23, which was also statistically significant ($p < 0.001$; 95% CI: 1.09–1.37).

The overall satisfaction score was 4.09 ± 0.67 , with a mean difference of 1.09 ($p < 0.001$; 95% CI: 0.94–1.23). Direct comparison between the esthetic and psychosocial/general outcome scores showed that the psychosocial/general outcome score was significantly higher than the esthetic satisfaction score, with a mean difference of -0.24 (95% CI: -0.32 to -0.16 ; $p < 0.001$) (Table 2).

Spearman's correlation analysis showed no statistically significant correlation between age and esthetic satisfaction ($\rho = -0.001$, $p = 0.990$) or psychosocial/general outcome ($\rho = 0.073$, $p = 0.513$). Gender showed weak positive correlations with both esthetic satisfaction ($\rho = 0.166$, $p = 0.133$) and psychosocial/general outcome ($\rho = 0.186$, $p = 0.092$), although neither association reached statistical significance. Similarly, educational level was not significantly correlated with esthetic satisfaction ($\rho = -0.090$, $p = 0.418$) or psychosocial/general outcome ($\rho = -0.027$, $p = 0.808$).

No statistically significant correlations were observed between arch and site of bridge and esthetic satisfaction ($\rho = 0.128$, $p = 0.249$) or psychosocial/general outcome ($\rho = 0.047$, $p = 0.671$). Bridge material showed weak positive correlations with esthetic satisfaction ($\rho = 0.133$, $p = 0.232$) and psychosocial/general outcome ($\rho = 0.205$, $p = 0.064$), but these were not statistically significant. Duration of bridge use was also not significantly correlated with esthetic satisfaction ($\rho = 0.014$, $p = 0.903$) or psychosocial/general outcome ($\rho = -0.037$, $p = 0.738$) (Table 3).

Table 1. Baseline characteristics of the study participants (N = 83).

Variable	Category	Mean $\pm$ SD (Range)
Age (years)	Mean $\pm$ SD (range)	45.63 $\pm$ 13.64 (18–80)
Variable	Category	n (%) / Mean $\pm$ SD (Range)
Gender	Male	40 (48.2%)
	Female	43 (51.8%)
Educational Level	Primary	10 (12.0%)
	Secondary	20 (24.1%)
	University	45 (54.2%)
	Postgraduate	8 (9.6%)

Note: Data are presented as n (%) unless otherwise indicated. Age is presented as mean $\pm$ standard deviation (SD) and range. PFM = porcelain-fused-to-metal.

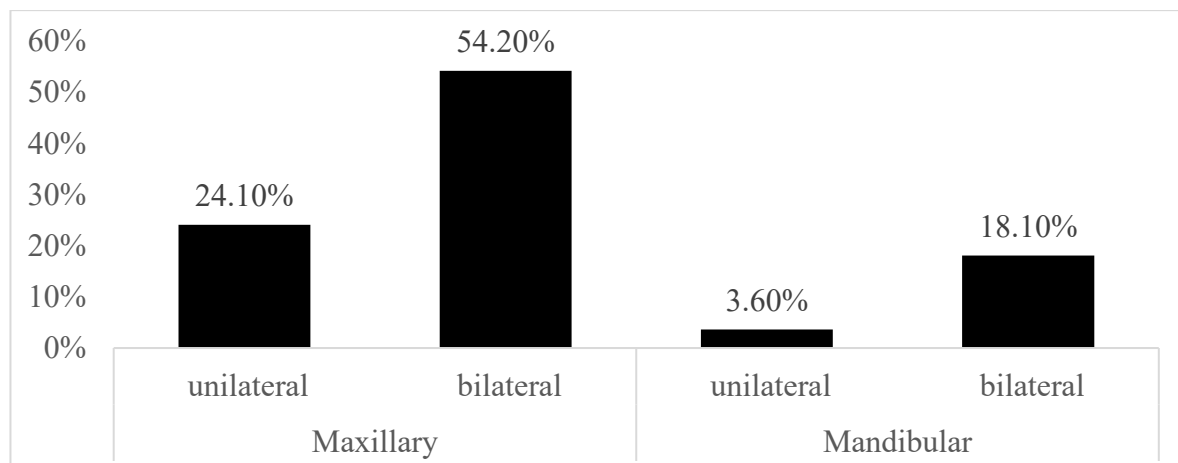


Figure 1. Distribution of Study Participants According to the Arch and Site of the Fixed Dental Bridge (N = 83).

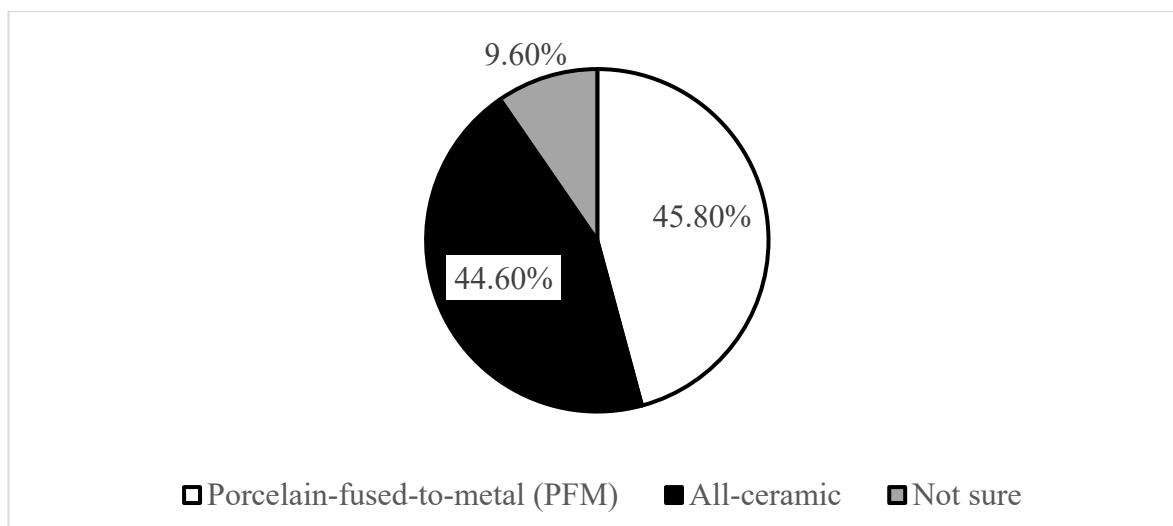


Figure 2. Distribution of Study Participants According to the Type of Bridge Material.

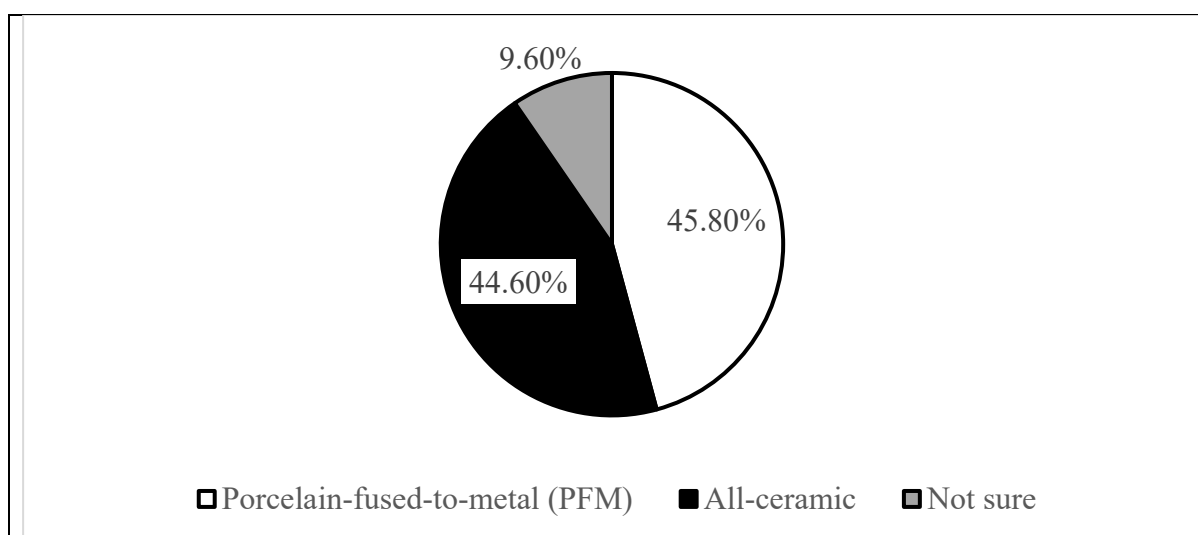


Figure 3. Distribution of Study Participants According to the Duration of Bridge Use.

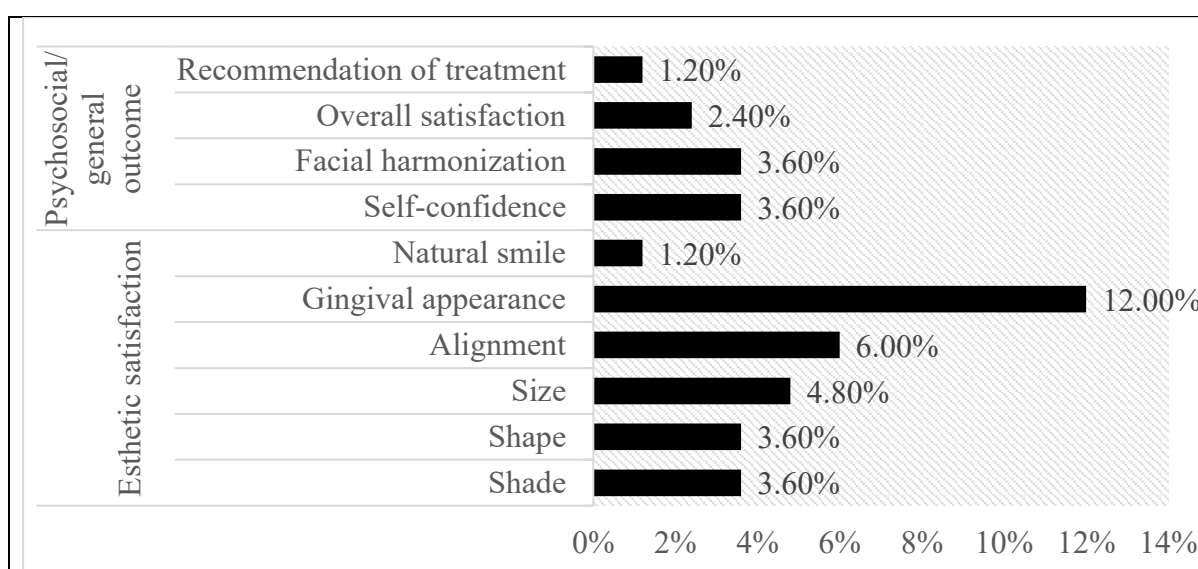


Figure 4. Proportion of Participants Reporting Dissatisfaction with Esthetic and Psychosocial/General Outcomes of Bridge Treatment.

Table 2. Descriptive and Inferential Analysis of Patient Satisfaction Scores Following Bridge Treatment (N = 83).

Satisfaction domain / comparison	Mean $\pm$ SD	Mean difference	p-value	95% CI
Esthetic satisfaction	3.99 $\pm$ 0.72	0.99	<0.001	0.83–1.15
Psychosocial/general outcome	4.23 $\pm$ 0.66	1.23	<0.001	1.09–1.37
Overall satisfaction	4.09 $\pm$ 0.67	1.09	<0.001	0.94–1.23
Esthetic vs. Psychosocial/general outcome	3.99 $\pm$ 0.72 vs. 4.23 $\pm$ 0.66	–0.24	<0.001	–0.32 to –0.16

Note: Satisfaction scores are based on a five-point Likert scale (1 = very dissatisfied, 5 = very satisfied). Mean difference represents the difference between the observed mean score and the reference value of 3. The 95% CI represents the 95% confidence interval for the mean difference. Statistical significance was set at $p < 0.05$.

Table 3. Spearman's Correlations Between Patient Satisfaction Scores and Sociodemographic and Bridge-Related Characteristics (N = 83).

Variable	Esthetic satisfaction ρ	p-value	Psychosocial/general outcome ρ	p-value
Age	–0.001	0.990	0.073	0.513
Gender	0.166	0.133	0.186	0.092
Educational level	–0.090	0.418	–0.027	0.808
Arch and site of bridge	0.128	0.249	0.047	0.671
Bridge material	0.133	0.232	0.205	0.064
Duration of bridge use	0.014	0.903	–0.037	0.738

Note: ρ = Spearman's correlation coefficient. $p < 0.05$ was considered statistically significant. Correlations were assessed using Spearman's rank correlation test.

Discussion:

The primary objective of this study was to evaluate the influence of socio-demographic factors and prosthetic variables on patient-reported satisfaction following anterior fixed prosthodontic rehabilitation. Overall, patients reported high satisfaction with the esthetic outcome of their anterior fixed partial dentures (FPDs), with only limited variation across demographic and prosthetic subgroups. The sample showed a relatively balanced gender distribution, and university-educated participants formed the largest educational group. The mean age was 45.63 years (range, 18–80 years). These characteristics are relevant because dental esthetics are shaped not only by clinical factors but also by individual perception, psychological factors, and personal expectations. Ahmad (2021) emphasized that dental esthetics are largely perceptual and that no single universal standard can define an ideal esthetic outcome for all patients [10].

Descriptively, satisfaction with FPDs appeared similar across gender and age groups. In the broader literature, the relationship between demographic characteristics and prosthodontic satisfaction remains nuanced. Carek (2021) and Rahman et al (2026) reported no significant difference in overall satisfaction with fixed restorations between male and female patients [11,12]. Standardized shade selection and digital CAD/CAM design may contribute to more predictable esthetic outcomes for both sexes. Similarly, Carek (2021) reported no statistically significant difference in overall satisfaction across age groups. Although esthetic perception and priorities may change with age, the present findings suggest that satisfaction with fixed restorations may be comparable across age groups [11].

Educational level likewise showed no apparent relationship with satisfaction in this sample. Memon et al. (2023). observed that higher education may be associated with higher esthetic expectations at the time of crown cementation, but that satisfaction became comparable across educational groups at follow-up [13]., and Carek (2021) reported no statistically significant effect of educational level on overall prosthodontic satisfaction [11]. One possible explanation is that, once functional comfort and esthetic integration are achieved, satisfaction tends to be high irrespective of educational background; however, because the present design was cross-sectional, this interpretation remains speculative.

Maxillary bilateral FPDs were the most common configuration (54.2%), followed by maxillary unilateral FPDs (24.1%). Satisfaction did not appear to differ notably between FPD configurations. Likewise, the duration of FPD placement did not appear to influence satisfaction, which is consistent with previous reports. Carek (2021) evaluated satisfaction across restoration-age categories and found no statistically significant difference [11], and Geiballa et al. (2016). observed sustained high satisfaction among patients wearing fixed prostheses over long-term follow-up [9]. Memon et al. (2023) also reported that satisfaction at initial cementation (65%) and at follow-up (69.2%) was statistically

comparable. Such stability over time may reflect psychological adaptation and response shift, although these mechanisms were not measured in the present study and should be interpreted with caution [13]. PFM and all-ceramic FPDs were similarly represented (45.8% and 44.6%, respectively), reflecting the use of both conventional and contemporary restorative systems. Material type did not appear to produce a major difference in patient-perceived esthetic satisfaction, which is in line with previous reports (Rahman et al., 2026; Ozhohan & Biben, 2018; Shrestha et al., 2020) [12,14,15]. This is noteworthy because all-ceramic and zirconia-based restorations offer superior translucency, light transmission, and biomimetic optical properties compared with metal-ceramic systems [12,16]. Nevertheless, when PFM restorations are meticulously fabricated with adequate metal masking and ceramic layering, they can achieve acceptable esthetic outcomes [13,14,15]. Patients may also judge esthetics on the overall appearance of the restoration rather than on material-specific optical properties, which may explain why clinically detectable differences did not translate into different satisfaction ratings.

The results showed particularly favorable satisfaction with color matching and tooth shape, with 96.4% of participants satisfied with each. These findings are consistent with Shah et al. (2014), who identified tooth color, morphology, and alignment as important determinants of anterior dental esthetics [17]. In addition, Alnuwaiser et al. (2024) emphasized the importance of accurate shade selection in achieving a natural appearance [18].

Tooth size and proportion did not show notable variability in satisfaction. This is relevant because tooth size, contour, and proportion are fundamental determinants of smile harmony in fixed prosthodontic rehabilitation [11,15,16]. and discrepancies in size, shape, or contour relative to adjacent natural teeth are a recognized source of patient dissatisfaction after cementation [13,15]. Sharma and Sharma (2012) noted that tooth proportions should be individualized according to facial characteristics rather than based exclusively on standardized mathematical concepts [19]. Digital smile design and CAD/CAM workflows may contribute to favorable outcomes in this regard by allowing pre-treatment visualization and modification of tooth proportions and by improving communication between clinician, technician, and patient [16].

One of the strongest findings concerned the harmony of the FPD with the smile line and lip movement, with which 96.4% of participants were satisfied or very satisfied. This is consistent with Sharma and Sharma (2012), who emphasized that anterior esthetics depend on the dynamic relationship between the teeth, lips, gingival tissues, smile arc, and facial structures [19]. The highest satisfaction was observed for the final esthetic outcome (97.6% satisfied or very satisfied). This agrees with the multidimensional concept of patient satisfaction described by Benavides (2026), who noted that satisfaction with prosthodontic treatment reflects esthetic, functional, psychological, and social considerations [20]. Astuti et al. (2024) and Lim and Ariff (2020) similarly emphasized patient satisfaction as an important outcome in evaluating dental prosthetic treatment [21,22].

In contrast, gingival appearance showed the highest proportion of dissatisfaction among the evaluated dimensions. Soft-tissue integration ("pink esthetics") remains one of the less predictable aspects of anterior fixed prosthodontics, because it depends on biological factors in addition to material and design choices, whereas tooth shade, shape, and proportion ("white esthetics") can be controlled more precisely with modern ceramic materials and CAD/CAM workflows [12,14,16]. This may explain why high satisfaction with tooth-related attributes did not extend equally to gingival appearance, although the present study did not assess the underlying causes. From a clinical standpoint, these observations highlight the importance of respecting the biological width during subgingival margin placement, and of oral hygiene instruction and regular recall to preserve peri-restorative soft-tissue health.

Overall, the anterior FPDs examined in this study were associated with a generally favorable patient-perceived esthetic outcome. However, satisfaction varied across individual esthetic dimensions, with gingival appearance showing the highest proportion of dissatisfaction compared with color matching, tooth shape, smile harmony, and overall appearance. This supports the patient-centered approach emphasized in the literature, whereby successful prosthodontic treatment should address both clinical requirements and individual patient expectations, including soft-tissue outcomes [20].

Several limitations should be acknowledged. Because this was a cross-sectional, questionnaire-based study and the subgroup comparisons (prosthesis material, location, duration, and demographic characteristics) were descriptive, the findings should be interpreted as associations rather than causal effects. The cross-sectional design also limits causal inference, and the absence of a baseline pre-treatment esthetic assessment restricts direct evaluation of esthetic improvement. Although internal consistency was assessed, the questionnaire did not undergo extensive psychometric validation in the present sample. In addition, the limited sample size, unequal subgroup sizes, and reliance on self-reported data may restrict statistical power and generalizability, and no clinician-rated esthetic

assessment was available for comparison. Future longitudinal studies with larger samples using validated esthetic indices are recommended.

Within the limitations of this study, anterior FPDs were associated with favorable patient-reported esthetic outcomes. Appropriate material selection, meticulous clinical execution, and long-term maintenance remain essential to optimize esthetic success and patient satisfaction.

Conclusion:

Anterior fixed partial dentures were associated with high patient-reported esthetic satisfaction across demographic and prosthetic characteristics, with gingival appearance showing the highest proportion of dissatisfaction. These findings highlight the importance of soft-tissue management and individualized esthetic planning in fixed prosthodontics, and larger longitudinal studies using validated esthetic indices are recommended to confirm them.

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