

Patient Satisfaction in Implant-Supported Prosthesis Applications: A Retrospective Analysis at Kırıkkale University Faculty of Dentistry Between 2021 and 2025

İmplant Destekli Protez Uygulamalarında Hasta Memnuniyeti: 2021–2025 Yılları Arasında Kırıkkale Üniversitesi Diş Hekimliği Fakültesi'nde Yapılan Retrospektif Bir Analiz

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ÖZET

Bu çalışmanın amacı, 2021–2025 yılları arasında bir üniversite diş hekimliği fakültesinde uygulanan implant destekli protetik tedavilere ilişkin hasta memnuniyet düzeylerini değerlendirmek ve tedavi sonrası dönemde karşılaşılan klinik sorunları ortaya koymaktır. Estetik, çiğneme ve konuşma fonksiyonları, konfor, oral hijyenin sürdürülebilirliği ve kontrol randevularına ilişkin hasta bildirimli sonuçlar analiz edilmiştir.

Bu çalışmada retrospektif, tanımlayıcı ve kesitsel olarak planlanmıştır. Kurumsal klinik kayıtlar üzerinden belirlenen 130 hastadan 88'ine ulaşılmış ve yapılandırılmış telefon anketi uygulanmıştır. Katılımcılar; implant destekli kron-köprü restorasyonları, tam ark sabit implant üstü protezler ve implant destekli hareketli protezler olmak üzere üç gruba ayrılmıştır. Hasta memnuniyeti 5'li Likert tipi ölçek kullanılarak değerlendirilmiştir. Elde edilen veriler, istatistiksel analiz öncesinde anonimleştirilmiştir.

Katılımcıların %63,6'sı tedavilerinden "çok memnun" olduğunu bildirirken, %10'u memnuniyetsizlik ifade etmiştir. Estetik sonuçlar yüksek düzeyde değerlendirilmiş olup, katılımcıların %69,3'ü estetikten çok yüksek memnuniyet bildirmiştir. Konuşma fonksiyonunun hastaların büyük çoğunluğunda korunduğu saptanmıştır (%92). Çiğneme fonksiyonuna ilişkin değerlendirmeler de genel olarak yüksek düzeyde hasta memnuniyetine işaret etmektedir. Tedavi sonrası komplikasyonlar açısından değerlendirildiğinde, katılımcıların yaklaşık dörtte üçü herhangi bir komplikasyon yaşamadığını bildirmiştir. Komplikasyon yaşayan hastalar arasında en sık bildirilen teknik sorunlar desimantasyon (%13,8), vida gevşemesi (%11,5) ve vida kırığı (%4,5) olmuştur. Ağız hijyeni uygulamalarına ilişkin yeterli bilgilendirme aldığını belirten hasta oranı ise %55,7 olarak saptanmıştır.

İmplant destekli protetik tedavilerin, özellikle estetik, konuşma ve çiğneme fonksiyonları açısından yüksek düzeyde hasta memnuniyeti sağladığı görülmüştür. Bununla birlikte, teknik komplikasyonların yönetimi ve oral hijyenin sürdürülmesine yönelik hasta bilgilendirmesinin klinik takip süreçlerinde güçlendirilmesi gerektiği düşünülmektedir. Standartlaştırılmış bakım protokolleri ve yapılandırılmış uzun dönem izlem yaklaşımlarının, hasta bildirimli sonuçları ve klinik başarımı olumlu yönde etkileyebileceği öngörülmektedir.

Anahtar Kelimeler: dental protezler, implant destekli protez, hasta memnuniyeti, anket.

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ABSTRACT

Objective: The aim of this study was to evaluate patient satisfaction levels associated with implant-supported prosthetic treatments performed at a university faculty of dentistry between 2021 and 2025 and to identify clinical problems encountered during the post-treatment period. Patient-reported outcomes related to esthetics, chewing and speech functions, comfort, sustainability of oral hygiene, and follow-up requirements were analyzed.

Methods: This study was designed as a retrospective, descriptive, and cross-sectional investigation. Of the 130 patients identified through institutional clinical records, 88 were included in the study. Participants were classified into three groups: implant-supported crown–bridge restorations, full-arch fixed implant-supported prostheses, and implant-supported removable prostheses. Patient satisfaction was evaluated using a structured questionnaire covering esthetic and functional parameters, with responses recorded on a 5-point Likert-type scale. All data were anonymized before statistical analysis.

Results: Of the participants, 63.6% reported being "very satisfied" with their treatment, while 10% expressed dissatisfaction. Esthetic outcomes were rated highly, with 69.3% of patients reporting very high esthetic satisfaction. Speech function was preserved in the majority of patients (92%). Evaluations related to chewing function also indicated a generally high level of patient satisfaction. Regarding post-treatment complications, approximately three-quarters of the participants reported no complications. Among those who experienced complications, the most frequently reported technical issues were decementation (13.8%), screw loosening (11.5%), and screw fracture (4.5%). Adequate information regarding oral hygiene practices was reported by 55.7% of the patients.

Conclusion: Implant-supported prosthetic treatments were associated with high levels of patient satisfaction, particularly in terms of esthetics, speech, and chewing functions. However, the management of technical complications and patient education related to the maintenance of oral hygiene requires further attention during clinical follow-up. Standardized maintenance protocols and structured long-term follow-up strategies may contribute to improved patient-reported outcomes and overall clinical success.

Keywords: dental prosthesis, implant-supported prosthesis, patient satisfaction, questionnaire.

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INTRODUCTION

In dentistry, implant treatment is a widely preferred treatment option in modern dentistry due to its high clinical success rates in the rehabilitation of edentulous areas and the biocompatibility of implant materials (Hanawa, 2019; Ramani et al., 2020; Topçu et al., 2017). Implant-supported prostheses improve patient quality of life by providing better function, comfort, and aesthetics compared to traditional prostheses. They also contribute to the restoration of chewing, speech, and facial esthetics by offering long-lasting, functional solutions to replace lost teeth (Andrade de Lima et al., 2012; Bardis et al., 2023; Kashbur & Bugaighis, 2019; Varghese et al., 2024). However, it has been reported that clinical success is closely related not only to biological integration but also to the level of satisfaction perceived by patients (Gallucci et al., 2014; Larsson, Manuh, & Chrcanovic, 2023).

Patient satisfaction has become a multidimensional concept that is increasingly important in treatment planning today. Esthetic expectations, ease of use of the prosthesis, intraoral fit, impact on social life, and general perceptions of the treatment process are among the main factors affecting this satisfaction (Almasri, 2021; Halim & Dewi, 2019). This situation requires that not only objective technical success criteria but also the patient's subjective assessments be taken into account in clinical decision-making processes (Bonde et al., 2013; Gurgel et al., 2015). The combination of factors such as functional adequacy, esthetic satisfaction, comfort, prosthesis care, and the level of fulfillment of the patient's expectations plays a decisive role in the formation of overall patient satisfaction (Chochlidakis et al., 2022; Wittneben et al., 2023). In implant-supported prostheses, functional performance, esthetic appearance, comfort, and the sustainability of hygiene play a decisive role in patient satisfaction (Sailer et al., 2022; Verma et al., 2023). However, technical complications such as screw loosening, porcelain or acrylic fracture, and decementa-

tion can negatively affect both functional performance and psychological satisfaction (Oh et al., 2016; Thieu et al., 2023). Although patient satisfaction has been addressed in the literature, available evidence varies considerably in terms of study design, follow-up duration, and sample size, which may limit the generalizability of findings (Derks et al., 2015; Jung et al., 2008; Thieu et al., 2023; Topçu et al., 2017).

Therefore, evaluating implant-supported prosthetic treatments from a patient-centered perspective remains clinically relevant. The present study aimed to retrospectively assess patient satisfaction following implant-supported prosthetic therapy and to descriptively report patient-reported clinical outcomes related to function, esthetics, and post-treatment experiences.

METHODS

Study Design and Aim

This study was designed as a retrospective, descriptive, cross-sectional observational investigation conducted to assess patient satisfaction and self-reported clinical experiences following implant-supported prosthetic treatments performed at the Faculty of Dentistry, Kırıkkale University, between 2021 and 2025. The primary aim of the study was to descriptively evaluate patient satisfaction across multiple domains, including esthetic perception, functional performance, speech comfort, ease of prosthesis care, and peri-implant tissue-related parameters.

Sample and Inclusion Criteria

Among 130 patients registered in the faculty's clinical automation system, 88 individuals who met the inclusion criteria and agreed to participate were included in the study. The inclusion criteria were defined as being 18 years of age or older, having completed implant-supported prosthetic treatment at least six months prior to data collection, and providing informed consent to participate in the survey.

Participants were categorized into three groups according to prosthesis type: implant-supported crown–bridge prostheses, implant-supported full-arch fixed prostheses, and implant-supported removable prostheses.

Data Collection Tool

Data were collected using a structured questionnaire designed to assess patient satisfaction and self-reported clinical outcomes following implant-supported prosthetic treatment. The questionnaire was developed based on a review of previous studies evaluating patient satisfaction in implant dentistry and was structured to cover key domains frequently reported in the literature. These domains included overall satisfaction, esthetic perception, chewing function, speech comfort, fulfillment of treatment expectations, prosthesis-related complications, ease of prosthesis care, oral hygiene practices, and peri-implant tissue-related complaints.

All satisfaction-related items were assessed using a five-point Likert-type scale (1 = very dissatisfied/very difficult, 5 = very satisfied/very easy). Questions related to prosthesis type and post-treatment complications were recorded as categorical variables. Responses were collected anonymously, and no personally identifiable information was included in the analysis.

Statistical Analyses

The mean, standard deviation, and minimum–maximum values were calculated for Likert-type variables. Categorical variables were presented as frequencies and percentages.

The internal consistency of the nine-item satisfaction scale was assessed using Cronbach's alpha coefficient. An alpha value ≥ 0.70 was interpreted as an acceptable level of reliability. Principal component analysis was applied to test the multidimensional structure of the scale. Factors with eigenvalues above one were evaluated, and factor loadings and total variance explained were reported. The relationship between prosthesis type and overall satisfaction was analysed using the chi-square (χ^2) test. Fisher's exact test was used for 2×2 tables

where more than 20% of the expected cell frequencies were below 5. Cramer's V coefficient was calculated for effect size assessment. Multivariate logistic regression analysis was applied to determine the factors predicting overall satisfaction (satisfied/not satisfied). The independent variables considered were aesthetic satisfaction, chewing function, speech comfort, hygiene/ease of care, cleaning training and knowledge level, peri-implant bleeding status, and prosthesis type. Model results were reported as odds ratios and 95% confidence intervals. All statistical tests were performed bilaterally, and $p < 0.05$ was considered statistically significant.

The analyses of the results obtained were performed using Jamovi (Version 2.6.17) and Python-based statistical libraries (pandas, scipy, statsmodels). $P < 0.05$ was set as the significance level.

Ethical Considerations

Ethical approval for the study was obtained from the Kırıkkale University Non-Interventional Research Ethics Committee (Approval No: 2025.10.40; Meeting No: 2025/14; Date: 22.10.2025). The study was conducted in accordance with the principles of the Declaration of Helsinki, and written informed consent was obtained from all participants prior to inclusion.

RESULTS

A total of 88 patients who received implant-supported prosthetic treatment were included in the analysis. Descriptive statistics for patient satisfaction scores are presented in Table 1.

Variable	Mean ± SD	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
Overall satisfaction	4.10 ± 1.41	11.4	5.7	8.0	11.4	63.6
Aesthetics	4.47 ± 1.03	4.5	3.4	2.3	20.5	69.3

Chewing	4.59 ± 0.87	1.1	3.4	12.5	20.5	62.5
Speech	4.89 ± 0.49	1.1	0.0	1.1	6.8	91.0
Treatment expectati- ons	4.22 ± 1.25	6.8	6.8	14.8	15.9	55.7
Treatment recom- mendation	4.47 ± 1.14	6.8	4.5	10.2	9.1	69.3
Hygiene difficulties	4.33 ± 1.07	5.7	3.4	18.2	17.0	55.7
Informa- tion provi- ded	4.57 ± 0.81	1.1	3.4	14.8	10.2	70.5
Bleeding	4.63 ± 0.94	2.3	2.3	12.5	0.0	83.0

Table 1. Descriptive statistics of implant-supported prosthesis satisfaction using a likert scale (n=88)
(Likert scale scoring: 1 = very dissatisfied, 5 = very satisfied)

Across all Likert-scale items, responses were predominantly concentrated in the upper categories, indicating a clear ceiling effect. Regarding overall satisfaction, 63.6% of patients reported being very satisfied, while an additional 11.4% reported being satisfied. Only 11.4% of participants expressed dissatisfaction at any level. Aesthetic satisfaction was high, with 69.3% of patients selecting the highest category. Speech function demonstrated the highest satisfaction among functional parameters, with a mean score of 4.89 ± 0.49 and 92.0% of patients reporting no speech-related difficulties. Chewing function also showed a high mean satisfaction score (4.59 ± 0.87). Although most patients reported satisfactory chewing ability, chewing scores were relatively lower when compared with aesthetics and speech, indicating that chewing function represents a

comparatively more sensitive functional domain rather than an area of absolute dissatisfaction.

With respect to care and hygiene, 54.5% of patients reported that cleaning implant-supported prostheses was very easy, and 21.6% described it as easy. Peri-implant bleeding during cleaning was uncommon, with 71.6% of patients reporting no bleeding. The adequacy of information provided regarding hygiene and maintenance was rated positively, with approximately two-thirds of patients indicating that they received sufficient instructions. In addition, 72.7% of participants stated that they would recommend the treatment to others.

Post-treatment complications were not reported by 75.0% of the participants. Among those who experienced complications, the most common were decementation (13.8%), screw loosening (11.5%), and screw fracture (4.5%). Nearly all reported complications were successfully managed with additional clinical interventions.

The internal consistency of the satisfaction scale was high (Cronbach's alpha = 0.85), indicating good reliability (Table 2).

Measure	Value
Cronbach's Alpha	0.85

Table 2. Reliability of the satisfaction scale

Factor analysis performed to assess construct validity revealed a two-dimensional structure (Table 3, Figure 1). The first component represented an aesthetic–functional–overall satisfaction dimension, while the second component reflected a care–hygiene dimension.

Figure 1 presents the results of the principal component analysis (PCA) performed for exploratory purposes to descriptively examine the distribution of patient satisfaction items among individuals who received implant-supported prosthetic treatment. Panel (A) shows the loadings of the first principal component, primarily reflecting esthetic, functional, and overall satisfaction–related items. Panel (B) illustrates the loadings of the second

principal component, mainly associated with hygiene and maintenance-related items. Panel (C) displays the PCA biplot, demonstrating the relative positioning of variables along two interpretable axes. Panel (D) presents the scree plot, showing an inflection after the second component. The analysis suggests a coherent grouping of satisfaction-related items, with acceptable internal consistency (Cronbach's alpha = 0.85).

Component	Explained Structure	Included Dimensions
Component 1	Aesthetics × Function × General Satisfaction	Aesthetics, Chewing, Speech, Overall Satisfaction
Component 2	Care × Hygiene Axis	Hygiene Difficulty, Cleaning Knowledge

Table 3. Factor analysis results (Principal Components)

To identify factors independently associated with overall satisfaction, a multivariable logistic regression analysis was conducted (Table 4).

Predictor	Odds Ratio (OR)	p
Aesthetic satisfaction	1.82	<0.05
Chewing function	2.04	<0.01
No peri-implant bleeding	2.76	<0.01
Hygiene difficulty	0.71	0.07

Table 4. Multivariable logistic regression for overall satisfaction

Aesthetic satisfaction emerged as a significant predictor, with higher aesthetic ratings increasing the likelihood of overall satisfaction by approximately 1.8-fold (OR = 1.82, $p < 0.05$). Similarly, better chewing function was strongly associated with higher overall satisfaction (OR = 2.04, $p < 0.01$), underscoring the importance of functional performance in patient-reported outcomes. In addition, the absence of peri-implant bleeding was iden-

tified as the strongest independent predictor of overall satisfaction (OR = 2.76, $p < 0.01$), highlighting the close relationship between peri-implant tissue health and patient perception of treatment success. Although increased difficulty in maintaining hygiene showed a negative association with satisfaction, this effect did not reach conventional levels of statistical significance (OR = 0.71, $p = 0.07$), suggesting a borderline trend rather than a definitive independent effect. Together, these findings indicate that overall patient satisfaction with implant-supported prostheses is primarily driven by esthetic outcomes, functional chewing performance, and peri-implant tissue health, whereas hygiene-related factors, although clinically relevant, exert a more indirect or secondary influence on global satisfaction perceptions. The association between prosthesis type and overall satisfaction was further evaluated using chi-square analysis (Table 5). No statistically significant difference was observed between prosthesis types ($\chi^2 = 2.14$, $df = 2$, $p = 0.34$).

Variable	χ^2	df	p
Prosthesis type × Overall satisfaction	2.14	2	0.34

Table 5. Association between prosthesis type and overall satisfaction

Overall, patients treated with implant-supported prostheses demonstrated high levels of satisfaction in terms of aesthetics, functional performance, and speech comfort. Care and hygiene processes were generally perceived as manageable, and complication rates were low. Taken together, these findings indicate that implant-supported prosthetic treatment exhibits a strong profile with respect to patient-centered clinical outcomes.

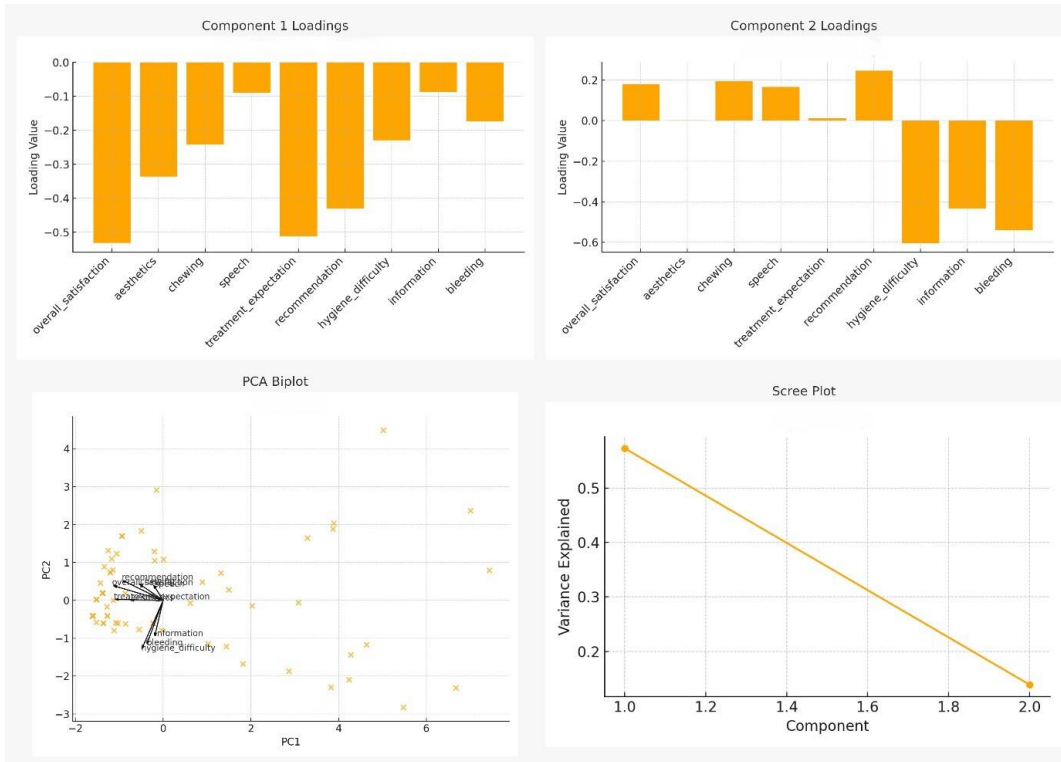


Figure 1. Principal Component Analysis of the patient satisfaction items

DISCUSSION

The results of the present study demonstrate that implant-supported prostheses provide high levels of patient satisfaction, particularly in terms of esthetics and speech function. These findings are consistent with previous studies reporting that implant-supported prosthetic treatments successfully meet patient expectations related to appearance, comfort, and phonetic performance (Andrade de Lima et al., 2012; Kashbur & Bugaighis, 2019). The high aesthetic satisfaction observed in our cohort (69.3% of patients reporting “very satisfied”) supports the effectiveness of implant-supported prostheses in restoring facial esthetics and smile harmony.

Speech function emerged as the parameter with the highest satisfaction scores, with more than 90% of patients reporting no speech-related difficulties. This finding is in line with the literature, which indicates that implant-supported prostheses offer superior stability and phonetic adaptation compared with conventional removable prostheses (Awadalkreem et al., 2020). The

preservation of speech comfort is a critical determinant of patient-reported success, particularly in social and psychological domains.

Chewing function in the present study was also rated highly, with a mean score of 4.59 ± 0.87 , and the majority of patients reported satisfactory masticatory performance. However, when evaluated comparatively across functional domains, chewing satisfaction was relatively lower than esthetics and speech, suggesting that mastication represents a more sensitive functional parameter rather than an area of absolute dissatisfaction. Similar observations have been reported in the literature, where chewing efficiency is often identified as the functional domain most susceptible to prosthesis design, occlusal scheme, and maintenance-related factors (Pradyachaipimol et al., 2023). Therefore, while overall chewing satisfaction was high, this relative difference highlights an area where further clinical optimization may be beneficial.

In terms of technical outcomes, the majority of patients in the present study reported no post-treatment

complications. Nevertheless, decementation (13.8%) and screw loosening (11.5%) were the most frequently observed mechanical issues. These findings are consistent with previous reports indicating that technical complications, even when infrequent, can negatively influence patient satisfaction by increasing the need for additional clinical visits and maintenance procedures (Chochlidakis et al., 2022). Importantly, most complications in our cohort were successfully resolved, suggesting that effective follow-up and maintenance protocols were in place. However, patients who experienced such complications tended to report lower satisfaction, underscoring the direct impact of technical stability on patient experience.

Maintenance and hygiene-related perceptions constituted another important aspect of patient satisfaction. Although more than half of the patients reported that cleaning implant-supported prostheses was “very easy,” and the majority indicated that they received sufficient information, a subset of participants experienced difficulties with hygiene procedures. This finding aligns with previous studies reporting that maintenance complexity and hygiene-related challenges can affect long-term satisfaction, even in otherwise successful implant treatments (Oh et al., 2016; Michaud et al., 2024). These results emphasize the importance of standardized post-treatment education, individualized hygiene instruction, and structured follow-up programs.

The findings of the present study are largely consistent with previous reports in the literature. For example, Pradyachaipimol et al. (2023) demonstrated high overall satisfaction following implant-supported crown and fixed prosthesis treatments, while identifying lower satisfaction related to cleaning ability and treatment-related burden. Similarly, Fernández-Ruiz et al. (2021) reported high patient-reported satisfaction in esthetics, stability, and comfort, highlighting the central role of

maintenance and follow-up in sustaining favorable outcomes.

Study Limitations

Several limitations of this study should be acknowledged. The retrospective design, single-center setting, and unequal distribution of prosthesis types may limit the generalizability of the findings. In addition, the relatively limited sample size may have reduced the statistical power to detect smaller effect sizes, particularly in subgroup and multivariable analyses. Although the questionnaire used to assess patient satisfaction was developed based on previous implant satisfaction studies, it was not subjected to a formal psychometric validation process; therefore, the results should be interpreted as descriptive patient-reported outcomes. Due to the cross-sectional nature of the analysis, causal relationships between the evaluated factors and overall satisfaction cannot be inferred. Furthermore, the use of self-reported data may have introduced recall or response bias. In addition, differences in survey administration methods (e.g., telephone-based versus face-to-face responses) may have influenced patient response behavior. Future studies with larger sample sizes, prospective designs, validated assessment tools, and longer follow-up periods are warranted to further elucidate patient-centered outcomes following implant-supported prosthetic treatment.

CONCLUSION

This retrospective survey study revealed that the overall satisfaction levels of patients who underwent implant-supported prosthetic treatment at Kırıkkale University Faculty of Dentistry between 2021 and 2025 were high. The vast majority of participants stated that they were “very satisfied” with the treatment, with esthetic appearance and speech comfort emerging as the parameters providing the highest satisfaction. The high satisfaction with esthetic results supports the success of implant-

supported prostheses in improving facial esthetics and smile appearance.

However, chewing satisfaction, although generally high, was relatively lower compared with esthetics and speech. The significant proportion of patients reporting problems during chewing indicates that functional performance, particularly with removable implant-supported prostheses, remains an area open to improvement. Regarding speech function, the majority of patients reported experiencing no difficulties, indicating that implant-supported prostheses offer a stable and successful solution in terms of phonetic performance.

When considering post-treatment complications, approximately three-quarters of patients experienced no problems. However, decementation, screw loosening, and screw fracture are the most common complications, indicating that mechanical problems have not been completely eliminated. The fact that the majority of patients who experienced problems reported resolution suggests that repair and maintenance processes were effectively carried out. However, satisfaction levels were relatively lower among individuals who experienced complications; this finding indicates that technical problems have a direct impact on the patient experience.

Another noteworthy result of the study is that some patients find implant-supported prosthesis care difficult and report that the level of information provided on cleaning is not sufficient for everyone. Providing clear cleaning instructions, standardizing care protocols, and scheduling regular check-ups are considered important for both maintaining the health of peri-implant tissues and increasing long-term satisfaction.

Overall, it can be concluded that implant-supported prosthetic applications offer high satisfaction and are a successful treatment alternative in terms of aesthetics, speech, and comfort of use. However, improving chewing function, reducing mechanical complications, and making patient education more systematic stand out as key areas for increasing the long-term success of treat-

ment. In this regard, strengthening patient information processes and emphasizing the importance of regular follow-up appointments will further improve both the functional and psychosocial outcomes of implant-supported prostheses.

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