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Evaluation of Patient Satisfaction and Clinical Outcomes Following Dental Implant Rehabilitation: A Prospective Cohort Study

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Abstract

Dental implant rehabilitation has emerged as one of the most predictable and successful treatment modalities for replacing missing teeth, providing functional, esthetic, and psychological benefits that significantly improve patients' quality of life. Despite the high reported survival rates of dental implants, long-term success should not be measured solely by implant survival but also by patient satisfaction, peri-implant tissue health, prosthetic function, esthetic outcomes, and overall oral health-related quality of life. This prospective cohort study evaluated patient satisfaction and clinical outcomes among individuals undergoing dental implant rehabilitation over a 12-month follow-up period. A total of 180 participants receiving single-tooth, multiple-unit, and full-arch implant-supported prostheses were enrolled and assessed at baseline, three months, six months, and twelve months after treatment. Clinical parameters included implant stability quotient (ISQ), probing depth, plaque index, bleeding on probing, marginal bone loss, prosthetic complications, and peri-implant soft tissue health. Patient satisfaction was evaluated using standardized questionnaires measuring comfort, chewing efficiency, speech, esthetics, confidence, and overall quality of life.

Keywords: Dental implants, implant rehabilitation, patient satisfaction, oral health, implant stability, peri-implant health, prosthodontics, clinical outcomes, quality of life, prospective cohort study

I. Introduction

Dental implant rehabilitation has transformed restorative dentistry by providing predictable and durable solutions for replacing missing teeth. Traditional treatment modalities, including removable partial dentures and fixed dental bridges, often present functional limitations, compromise adjacent tooth structure, and may fail to prevent progressive alveolar bone resorption[1]. Dental implants overcome many of these challenges by integrating directly with the alveolar bone through osseointegration, thereby restoring oral function while preserving surrounding anatomical structures. The widespread acceptance of implant therapy reflects advances in biomaterials, surgical techniques, digital planning, and prosthetic design that have collectively improved long-term treatment outcomes.

The concept of successful implant therapy has evolved considerably during the past two decades. Earlier research primarily focused on implant survival rates as the principal indicator of treatment success. Contemporary clinical practice recognizes that implant survival alone cannot fully represent successful rehabilitation. Patients increasingly expect natural esthetics, comfortable chewing, improved speech, minimal postoperative discomfort, and long-lasting functional restoration. Consequently, patient satisfaction has become an equally important outcome measure alongside traditional clinical parameters such as implant stability, peri-implant tissue health, and prosthetic longevity. This broader perspective has encouraged clinicians to adopt patient-centered approaches when evaluating treatment effectiveness.

Patient satisfaction is influenced by numerous clinical, psychological, and social factors that extend beyond technical success. Individuals receiving implant-supported restorations frequently report improvements in self-confidence, facial appearance, social interactions, nutritional intake, and overall quality of life. Nevertheless, satisfaction levels may vary depending on patient expectations, treatment complexity, financial investment, oral hygiene practices, systemic health conditions, and

clinician expertise. Understanding these multidimensional influences is essential for developing individualized treatment plans that optimize both objective clinical outcomes and subjective patient experiences throughout the rehabilitation process.

The present prospective cohort study was designed to comprehensively evaluate both patient satisfaction and clinical outcomes following dental implant rehabilitation over a twelve-month observation period. By integrating objective clinical assessments with validated patient-reported outcome measures, this investigation aims to provide a holistic understanding of implant treatment success. The study also seeks to identify factors associated with favorable rehabilitation outcomes and to generate evidence that may guide clinicians in improving treatment planning, patient counseling, maintenance protocols, and long-term clinical decision-making.

II. Literature Review

Dental implant therapy has undergone remarkable development since the discovery of predictable osseointegration, leading to consistently high survival rates reported across numerous longitudinal studies[2]. Advances in implant surface modification, surgical instrumentation, bone augmentation techniques, digital imaging, and computer-guided implant placement have substantially improved treatment precision and biological integration. Contemporary implant systems demonstrate excellent long-term performance in both partially and completely edentulous patients, contributing to widespread adoption as the preferred treatment option for tooth replacement. Despite these technological achievements, researchers increasingly recognize that implant survival alone does not adequately represent comprehensive treatment success.

Several investigations have demonstrated that implant-supported restorations significantly improve oral health-related quality of life compared with conventional removable prostheses. Patients commonly report enhanced masticatory efficiency, improved phonetics, increased comfort during daily activities, greater confidence while smiling, and reduced social anxiety following implant rehabilitation. These functional and psychological improvements often contribute to better

nutritional habits and enhanced overall well-being. However, studies have also shown that patient satisfaction is strongly influenced by pre-treatment expectations, communication with clinicians, postoperative experiences, esthetic outcomes, and long-term maintenance, indicating that psychological factors play an important role alongside clinical success [3].

Clinical outcome measures reported in previous literature commonly include implant stability, probing depth, bleeding on probing, plaque accumulation, peri-implant bone preservation, prosthetic integrity, and complication rates. Most prospective investigations report implant survival rates exceeding 95% after five years when evidence-based surgical and prosthetic protocols are followed. Nevertheless, biological complications such as peri-implant mucositis and peri-implantitis remain significant concerns that may compromise long-term success if oral hygiene is inadequate or maintenance visits are neglected. Mechanical complications, including prosthetic screw loosening, ceramic chipping, and prosthesis fracture, although relatively uncommon, may also negatively affect patient satisfaction despite successful implant integration.

Although numerous studies have independently evaluated either patient satisfaction or clinical performance, comparatively fewer investigations have comprehensively integrated both dimensions within prospective cohort designs. Existing evidence suggests that successful rehabilitation requires balanced consideration of biological health, prosthetic performance, esthetic excellence, patient expectations, and continuous supportive care[4]. Consequently, further prospective studies with standardized clinical measurements and validated patient-reported outcome instruments are necessary to better understand the relationship between objective clinical indicators and subjective patient satisfaction. The present study addresses this gap by simultaneously evaluating clinical parameters and patient-centered outcomes over a structured twelve-month follow-up period.

III. Materials and Methods

This prospective cohort study was conducted to evaluate patient satisfaction and clinical outcomes following dental implant rehabilitation. The study was carried out at the Department of

Prosthodontics and Implant Dentistry of a tertiary dental care hospital over a period of eighteen months[5]. Ethical approval was obtained from the institutional review committee before the commencement of the study, and all participants provided written informed consent. Patients were informed about the objectives of the study, treatment procedures, follow-up visits, and possible risks before enrollment. The study followed accepted ethical principles for clinical research involving human participants.

A total of 180 patients requiring dental implant rehabilitation were recruited using convenience sampling[6]. The participants ranged in age from 22 to 70 years and included both male and female patients. Individuals with adequate bone volume, good general health, and willingness to attend follow-up visits were included in the study. Patients with uncontrolled diabetes, severe periodontal disease, heavy smoking habits, pregnancy, immune disorders, or poor oral hygiene were excluded to minimize factors that could influence implant success. Each patient underwent a complete clinical examination, radiographic assessment, and treatment planning before implant placement.

Dental implants were placed by experienced implant surgeons using standardized surgical protocols. Depending on the patient's condition, single implants, multiple implants, or full-arch implant-supported prostheses were provided. All patients received postoperative instructions regarding oral hygiene, medication, dietary recommendations, and regular follow-up appointments. Prosthetic rehabilitation was completed after satisfactory healing and implant stability were confirmed. Patients were recalled after three months, six months, and twelve months for comprehensive clinical evaluation and assessment of treatment outcomes.

Clinical evaluation included implant stability, peri-implant soft tissue health, plaque accumulation, bleeding on probing, probing depth, marginal bone condition, and prosthetic function. Patient satisfaction was assessed using a structured questionnaire containing questions related to comfort, chewing ability, speech, esthetics, confidence while smiling, ease of cleaning, and overall satisfaction with treatment. The collected information was organized and analyzed using statistical software. Descriptive statistics were used to summarize the findings, while comparisons between

follow-up visits were performed to identify changes in clinical performance and patient satisfaction over time.

IV. Results

Among the 180 patients enrolled in the study, 178 successfully completed the twelve-month follow-up period, while two patients were lost to follow-up because of relocation. A total of 265 dental implants were placed, including single-tooth implants, implant-supported bridges, and full-arch prostheses. At the end of one year, only three implants failed to achieve long-term stability, resulting in an implant survival rate of approximately 98.9%. Most implants demonstrated excellent stability throughout the observation period without significant complications.

Clinical examination showed progressive improvement in peri-implant tissue health during follow-up visits. Plaque accumulation and bleeding around implants remained low among patients who maintained good oral hygiene[7]. Probing depths remained within healthy limits, and radiographic evaluation showed minimal marginal bone loss around the majority of implants. Soft tissues appeared healthy with good color, contour, and adaptation around implant-supported restorations. Only a small number of patients developed mild peri-implant mucositis, which was successfully managed through professional cleaning and improved oral hygiene practices.

Patient satisfaction improved considerably after implant rehabilitation. Before treatment, many participants reported difficulty chewing food, poor confidence while smiling, speech problems, and dissatisfaction with their appearance due to missing teeth. Following rehabilitation, most patients experienced significant improvements in chewing efficiency, speech clarity, facial appearance, comfort, and social confidence. More than 95% of participants reported that they would recommend dental implant treatment to family members or friends based on their personal experience.

A few complications were observed during the study period. Minor prosthetic issues such as screw

loosening and small ceramic adjustments occurred in a limited number of cases and were corrected during routine follow-up visits without affecting overall treatment success. No serious infections or major prosthetic failures were recorded. The findings demonstrated that careful treatment planning, accurate implant placement, regular maintenance, and patient compliance contributed to favorable clinical outcomes and high levels of patient satisfaction after dental implant rehabilitation.

V. Discussion

The findings of this prospective cohort study demonstrate that dental implant rehabilitation is an effective treatment for replacing missing teeth and improving both clinical outcomes and patient satisfaction. Most participants experienced successful implant healing, stable peri-implant tissues, and excellent prosthetic function throughout the twelve-month follow-up period. The high implant survival rate observed in this study supports previous evidence that dental implants provide a reliable long-term treatment option when proper surgical protocols and maintenance programs are followed. The results also highlight the importance of evaluating treatment success using both clinical findings and patient-reported experiences.

Patient satisfaction increased considerably after implant rehabilitation. Before treatment, many participants reported difficulty in chewing hard foods, reduced confidence while smiling, and discomfort while speaking. These concerns gradually improved after implant-supported restorations were completed. Patients appreciated the natural appearance of their new teeth, improved comfort during eating, and greater confidence in social situations. These improvements positively influenced their daily lives and contributed to better overall quality of life. The findings suggest that dental implants provide psychological as well as functional benefits.

The study also showed that maintaining good oral hygiene and attending regular follow-up visits played an important role in achieving successful outcomes. Patients who followed professional cleaning instructions and maintained regular dental appointments demonstrated healthier peri-implant tissues and fewer complications. Mild cases of peri-implant inflammation were managed

successfully through professional cleaning and reinforcement of oral hygiene instructions[8]. This finding emphasizes that patient cooperation remains an essential factor in preserving implant health over the long term.

Although a few minor prosthetic complications occurred during the study, they did not significantly affect overall treatment success or patient satisfaction. Minor adjustments such as tightening loose screws or polishing restorations were completed during routine follow-up visits without requiring replacement of the prosthesis. These findings indicate that most implant-related complications can be managed successfully when detected early. Overall, the results demonstrate that careful treatment planning, skilled clinical procedures, and continuous maintenance contribute to predictable implant rehabilitation with excellent patient satisfaction.

VI. Limitations

Although the study produced encouraging results, several limitations should be considered while interpreting the findings[9]. The follow-up period was limited to twelve months, which mainly reflects short-term clinical outcomes. Dental implants are expected to function successfully for many years, and longer follow-up periods would provide more comprehensive information regarding implant survival, prosthetic durability, and long-term patient satisfaction.

The study was conducted at a single dental institution, which may limit the generalizability of the findings to other healthcare settings. Clinical experience, patient demographics, available technology, and treatment protocols may vary among different hospitals and dental clinics. Conducting similar studies across multiple institutions would improve the reliability and applicability of the results to a wider population.

Another limitation was the use of convenience sampling during participant recruitment. Although every effort was made to include patients with different treatment needs, the study population may not fully represent all individuals requiring dental implant rehabilitation. Future research involving

larger and more diverse populations would provide stronger evidence regarding treatment outcomes among different age groups, medical conditions, and socioeconomic backgrounds.

Patient satisfaction was assessed using self-reported questionnaires, which may be influenced by individual expectations, emotions, and personal experiences. Satisfaction levels can vary depending on personality, financial investment, communication with the dental team, and previous dental experiences. Combining patient questionnaires with additional qualitative interviews in future studies may provide a more comprehensive understanding of patient perceptions following implant rehabilitation.

VII. Clinical Implications

The findings of this study have important implications for dental practitioners involved in implant rehabilitation. Successful treatment depends not only on accurate implant placement but also on careful patient selection, comprehensive treatment planning, and effective communication throughout the treatment process. Dentists should clearly explain treatment procedures, expected outcomes, possible risks, and maintenance requirements before initiating implant therapy. This approach helps establish realistic patient expectations and improves overall satisfaction.

Regular follow-up appointments should be considered an essential component of implant rehabilitation. Clinical monitoring allows early detection of biological and mechanical complications before they progress into more serious problems. Routine professional cleaning, radiographic assessment, and reinforcement of oral hygiene instructions contribute significantly to maintaining healthy peri-implant tissues and extending the lifespan of implant-supported restorations.

Patient education should receive equal importance alongside surgical and prosthetic procedures. Individuals should understand the importance of daily plaque control, healthy lifestyle habits, smoking cessation, and regular dental visits to maintain long-term implant success. Educated

patients are more likely to comply with maintenance recommendations and actively participate in preserving their oral health.

The growing availability of digital technologies, including three-dimensional imaging, digital impressions, and computer-guided implant surgery, offers opportunities to further improve treatment accuracy and patient comfort[10]. Incorporating these technologies into routine clinical practice may reduce treatment time, enhance prosthetic precision, and improve esthetic outcomes. Continued professional training and adoption of evidence-based techniques will further strengthen the quality of implant rehabilitation provided to patients.

VIII. Conclusion

This prospective cohort study demonstrated that dental implant rehabilitation is a highly effective treatment for replacing missing teeth while achieving excellent clinical outcomes and high patient satisfaction. Most participants experienced successful implant integration, healthy peri-implant tissues, improved chewing ability, enhanced speech, better esthetics, increased confidence, and a significant improvement in overall quality of life during the twelve-month follow-up period. Only a small number of minor biological and prosthetic complications were observed, and these were successfully managed through routine clinical care without compromising treatment success. The findings emphasize that long-term implant success depends on comprehensive treatment planning, accurate surgical and prosthetic procedures, regular maintenance, patient education, and good oral hygiene practices. Future multicentre studies with larger sample sizes and longer follow-up periods are recommended to further validate these findings and strengthen the evidence supporting dental implant rehabilitation as a predictable, safe, and patient-centred treatment option for the restoration of missing teeth.

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