

Functional Outcomes in Patients with Dental Implants: A Clinical Report on 70 Cases

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Abstract

Introduction: Dental implants have become a predictable and widely accepted treatment for replacing missing teeth, offering significant functional and esthetic benefits. This study aimed to evaluate chewing ability, speech, esthetic satisfaction, overall patient satisfaction, and implant survival in a consecutive cohort of patients receiving dental implants. **Patients and Methods:** A retrospective analysis was conducted on 70 consecutive patients (42 males and 28 females) aged 34 - 75 years (mean age 52.4 years \pm 10.6 years) who received titanium grade 5 dental implants and were followed for 12 months. Functional outcomes were assessed using validated 0 - 10 numerical rating scales and compared between baseline (pre-implant placement) and 12-month follow-up using paired *t*-tests. Implant survival and complications were recorded. **Results:** Implant survival was 98.6%. Chewing scores improved from 4.1 \pm 1.5 at baseline to 8.7 \pm 1.2 at 12 months ($p < 0.001$). Speech scores increased from 6.3 \pm 1.7 to 9.0 \pm 0.9, and esthetic satisfaction improved from 5.5 \pm 2.1 to 9.2 \pm 0.8 ($p < 0.001$). Overall satisfaction increased from 48% at baseline to 92% at follow-up. Complications included peri-implantitis (2.9%), screw loosening (4.3%), and prosthesis fracture (1.4%). **Conclusion:** Dental implants demonstrated predictable functional improvement, high survival rates, and low complication rates, confirming their reliability as a restorative treatment option.

Keywords

Dental Implants, Functional Outcomes, Patient Satisfaction, Implant Survival, Complications

1. Introduction

Tooth loss continues to be a major oral health issue worldwide, impacting both

functional ability and psychosocial well-being. Missing teeth affect mastication, disrupt speech, compromise esthetics, and diminish quality of life. Traditional prosthetic solutions, such as removable partial and complete dentures, offer some level of functional restoration but are often linked to discomfort, instability, and patient dissatisfaction. Dental implants have revolutionized restorative dentistry by offering a fixed, predictable, and durable solution for tooth replacement. Implants attain direct anchorage in bone, effectively restoring natural function and enhancing oral rehabilitation outcomes. Over the past three decades, dental implants have established themselves as the gold standard for replacing single or multiple teeth. Several studies have demonstrated the functional advantages of dental implants compared with conventional prostheses. For example, a five-year clinical study in the anterior maxilla reported implant survival of 98.04%, with high patient satisfaction: chewing comfort was rated at 94.0%, stability at 93.7%, and phonetic outcomes achieved 100% satisfaction. Esthetic outcomes were also favorable, with 85.0% of patients reporting high satisfaction with the overall appearance of their restorations [1]. Similarly, investigations on implant-supported overdentures have shown improved chewing efficiency, comfort, and quality of life compared with complete dentures, highlighting the superior functional benefits of implants [2]. Nonetheless, implant therapy is not without its limitations, which may include factors such as surgical complexity, risk of complications, cost considerations, and suitability based on individual patient conditions. Biological complications such as peri-implant mucositis and peri-implantitis, as well as technical complications such as screw loosening or prosthesis fracture, remain challenges that can potentially impact the durability and success of long-term outcomes. Systematic reviews report survival rates of 93% - 98% after 5 - 10 years; however, true long-term success, defined as survival without complications, varies between 52% and 76%, with complication rates reported as high as 48% [3]. Functional outcomes and complication rates are equally important indicators of treatment success. Biological complications such as peri-implantitis and technical complications, including screw loosening or prosthesis fracture, may compromise long-term outcomes despite implant survival. Therefore, systematic assessment of patient-reported functional outcomes is essential. The purpose of this study was to evaluate functional outcomes, implant survival, and complications over a 12-month period in a consecutive cohort of patients treated with dental implants.

2. Patients and Methods

1) Study Type and Period: This retrospective study was conducted at the Prosthodontics Clinic, Kermanshah University of Medical Sciences, between June 2021 and August 2024. Seventy consecutive patients (42 males and 28 females) aged 34 - 75 years (mean age 52.4 years \pm 10.6 years) who received titanium grade 5 dental implants were included.

2) Inclusion Criteria: This study included all patients who had placement of at least one dental implant during the study period, and completion of clinical and

radiographic evaluation with a minimum 12-month follow-up after prosthetic loading, and adequate bone volume without the need for augmentation with ASA physical status classification I or II.

3) Exclusion Criteria: This study excluded all patients who are pregnant, have a history of malignancy or radiotherapy/chemotherapy, and uncontrolled systemic disease or parafunctional habits (e.g., bruxism), osteoporosis or anti-resorptive therapy (bisphosphonates or denosumab), and active periodontal or oral infections, and incomplete documentation or loss to follow-up.

4) Surgical and Prosthetic Procedures: All implants were placed using a two-stage surgical protocol by experienced oral surgeons. After a healing period of approximately four months, patients were rehabilitated with fixed or removable implant-supported prostheses according to clinical indications. Oral hygiene instructions and maintenance protocols were provided to all patients.

5) Outcome Assessment: Functional outcomes were evaluated at baseline (pre-implant placement) and 12 months after prosthetic loading. Chewing ability, speech clarity, and esthetic satisfaction were assessed using 0 - 10 numerical rating scales, where 0 indicated the poorest outcome and 10 the best possible outcome. These scales have been validated for patient-reported oral function and satisfaction in implant dentistry. Overall satisfaction was assessed using a structured self-administered questionnaire. Peri-implantitis was defined as bleeding and/or suppuration on probing accompanied by radiographic bone loss ≥ 2 mm after prosthetic loading. Screw loosening was defined as any loss of preload requiring clinical intervention.

6) Data Collection: Data collection was conducted using a pre-established, anonymous individual data collection form. The data collected came from patient medical records and surgical report records from the Stomatology and Maxillofacial Surgery Department.

7) Data Analysis: Data were analyzed using SPSS (version 2025) and GraphPad Prism 5.03. Descriptive statistics were calculated for all variables. Paired *t*-tests were used to compare baseline and 12-month outcomes, with statistical significance set at $p < 0.05$.

8) Ethical Considerations: Ethical approval was obtained from the institutional review board prior to study initiation. All patients provided written informed consent for the use of their clinical data, and patient anonymity was maintained.

3. Results

The cohort was comprised of 70 patients (42 males and 28 females) at an average age of 52.4 years. Most patients had single implants (62.8%), while 37.2% had multiple. Data was complete, and all 12-month patients were successfully followed (Table 1).

All 70 patients completed the 12-month follow-up. Single implants were placed in 62.8% of patients, while 37.2% received multiple implants. Chewing efficiency improved significantly from 4.1 ± 1.5 at baseline to 8.7 ± 1.2 at 12 months, con-

firming restored masticatory function ($p < 0.001$). Speech clarity improved from 6.3 ± 1.7 to 9.0 ± 0.9 , and esthetic satisfaction increased from 5.5 ± 2.1 to 9.2 ± 0.8 ($p < 0.001$ for all comparisons). Overall patient satisfaction increased from 48% at baseline to 92% at follow-up (Table 2). The bar chart in Figure 1 illustrates improvements in chewing efficiency, speech clarity, and esthetic satisfaction from baseline (pre-implant placement) to 12 months after prosthetic loading.

Table 1. Patient demographics and clinical characteristics.

Variable	Value
Number of Patients	70
Male	42
Female	28
Mean Age (Years)	52.4 ± 10.6
Single Implant Cases	44
Multiple Implant Cases	26
Follow-Up Duration	12 Months

Table 2. Functional outcomes at baseline and 12 months.

Outcome	Baseline (Mean \pm SD)	12 Months (Mean \pm SD)	<i>p</i> -value
Chewing Efficiency	4.1 ± 1.5	8.7 ± 1.2	<0.001
Speech Clarity	6.3 ± 1.7	9.0 ± 0.9	<0.001
Esthetic Satisfaction	5.5 ± 2.1	9.2 ± 0.8	<0.001
Overall Satisfaction (%)	48%	92%	<0.001

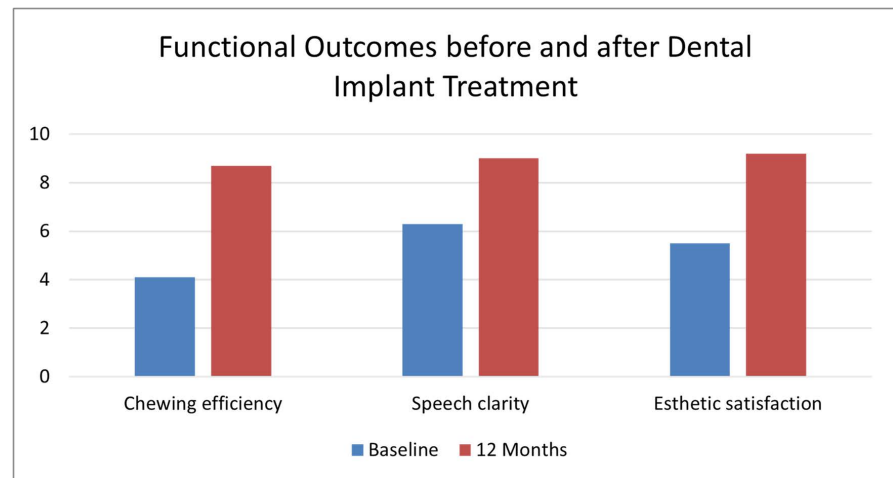


Figure 1. Functional outcomes before and after dental implant treatment.

Of the 70 implants placed, 69 remained functional at 12 months, yielding an implant survival rate of 98.6%. One early implant failure was observed (1.4%). Minor biological complications included peri-implantitis in two patients (2.9%). Technical complications included screw loosening (4.3%) and prosthesis fracture

(1.4%) (Table 3 and Figure 2).

Table 3. Implant survival and complications.

Variable	Number (%)
Implant Survival	69/70 (98.6%)
Early Implant Failure	1 (1.4%)
Peri-Implantitis	2 (2.9%)
Screw Loosening	3 (4.3%)
Prosthesis Fracture	1 (1.4%)

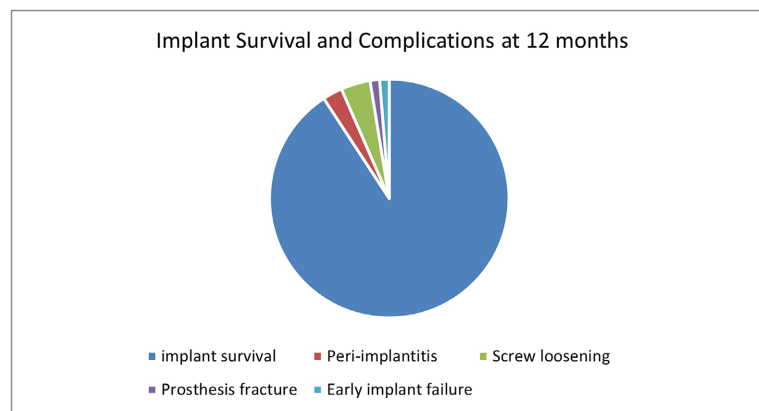


Figure 2. Implant survival and complications at 12 months.

The overwhelming majority of implants survived (98.6%), suggesting that the treatment is dependable. The low proportions of complications and adverse events that were retrievable and manageable is an important finding (Figure 2: Pie chart showing implant survival rate and distribution of biological and technical complications). The baseline level of satisfaction with oral function and the esthetic component was recorded at 48%. This number increased to 92% after a year (Figure 3: Line graph demonstrating improvement in overall patient satisfaction from baseline to 12 months following implant therapy).

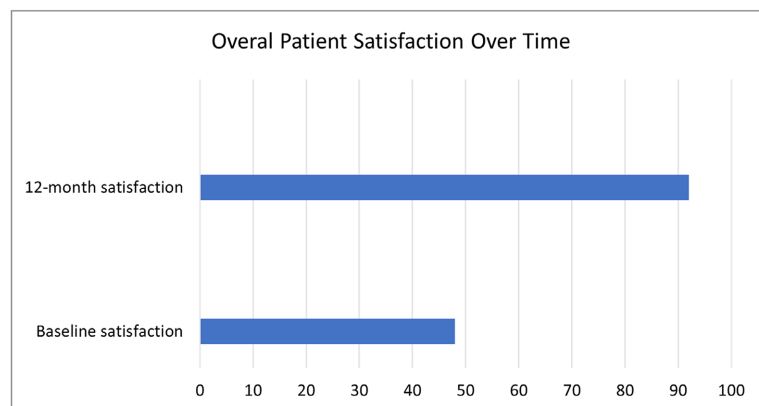


Figure 3. Overall patient satisfaction over time.

4. Discussion

This research, which centers on the functional results of 70 patients with dental implants, focuses on chewing, speaking, and overall satisfaction with the esthetic as well as 12-month survival of the implant. The outcome showed measurable positive changes in every domain with respect to the baseline recording, the efficiency of chewing, clarity of speech, and level of esthetic satisfaction and overall satisfaction of the patients reporting increased satisfaction from 48% to 92% in the six months subsequent to the implant. This study's implant survival rate of 98.6% is in line with the literature, which shows survival rates anywhere from 93% to 99% for 5 to 10 years [4]. Previous research also supports quantitative improvement in chewing efficiency. One systematic review showed that those with implant dentures had more chewing ability than those with ordinary removable dentures [5]. Likewise, Feine *et al.* showed that patients with implant overdentures were more satisfied with chewing compared to those with complete dentures. Our study found an increase in chewing score from 4.1 to 8.7 and corroborates these studies in which implants were found to give more positive and functional impacts [6]. The marked improvement in speech clarity shown by the cohort in our study supports the results by Cakarer *et al.*, which found that patients with removable prostheses had better phonetic results than those with implant-supported restorations, especially focusing on the anterior teeth [7]. Our study supports the position that implants on anterior teeth increase not only the esthetic perception but also the clarity and articulation of speech. Satisfaction from the previous studies by Gallucci *et al.* and Gjelvold *et al.* showed that esthetic satisfaction ranges from 5.5 to 9.2. The studies showed that the patient's satisfaction with esthetics was directly correlated to the peri-implant mucosal condition. Our study suggests that the favorable esthetics, which ignored two cases of peri-implantitis, were a result of careful patient selection and a prosthetic design [8] [9]. Papaspyridakos *et al.* in 5-year studies documented a cumulative survival rate ranging from 96% to 98% for single and multiple implant restorations, and thus support our rate of 98.6% implant survival over a long term [10]. Cohort studies also confirm the results by Jung *et al.*, which state that a 10-year survival rate is found to be 96.8% [11]. Our study with peri-implantitis cases in 2.9% and screw loosening in 4.3% shows a low complication rate, which is consistent with that of Derks *et al.* Studies established that within a long-term follow-up, peri-implantitis is found to occur between 8% to 20% [12]. The lengths of previous studies, paired with the follow-up maintenance protocol, explain the lower prevalence result we documented. The overall 92% patient satisfaction rate after 12 months is comparable to the results from several systematic reviews. For example, in his work, Pjetursson has shown that patients' satisfaction with implant therapy is consistently higher than with any fixed or removable dental prostheses [13]. The significant improvement that we recorded in our study is also observed by de Grandmont *et al.*, who reported satisfaction after dentures were replaced with implant-supported restorations [14]. Recent peer-reviewed studies published between 2022 and 2024 further support the positive

functional outcomes and high patient satisfaction associated with implant therapy [15]-[17].

This seemed to suggest that dental implants have a high survival rate and, at the same time, improve the overall functionality and satisfaction of the patient. The results of our study are consistent with the current literature, providing further support that dental implants are a reliable and satisfactory treatment option.

5. Conclusion

Dental implants provide predictable functional improvement, high survival rates, and strong patient satisfaction after 12 months of function. The observed 98.6% implant survival rate with minimal complications supports implant therapy as a reliable restorative treatment option. Longer prospective studies with larger sample sizes are recommended to evaluate long-term functional outcomes beyond the first year.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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