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PATIENT SATISFACTION AND MASTICATORY EFFICIENCY IN IMPLANT-SUPPORTED OVERDENTURES

Dr.Jyoti Sarathe [1], Dr.Neeraj Kumar Gupta[2]

[1]PG Resident, Department of Prosthodontics Crown & Bridge and Implantology, Rishiraj College of Dental Sciences and Research Centre, Bhopal, Madhya Pradesh.
Mail - sarathejyoti@gmail.com
[2]Associate Professor, Department of Prosthodontics Crown & Bridge and Implantology,Rishiraj College of Dental Sciences and Research Centre Bhopal, Madhya Pradesh
Mail - neerajc2@gmail.com

***Corresponding Author**: Dr .Jyoti Sarathe
[1]PG Resident, Department of Prosthodontics Crown & Bridge and Implantology, Rishiraj College of Dental Sciences and Research Centre, Bhopal, Madhya Pradesh.

ABSTRACT

Background: Edentulism significantly affects oral function, nutrition, speech, esthetics, and quality of life. Conventional complete dentures often demonstrate compromised retention and stability, particularly in the mandibular arch. Implant-supported overdentures have emerged as a reliable treatment modality to improve denture stability, masticatory efficiency, and patient satisfaction.

Aim:To evaluate patient satisfaction and masticatory efficiency among patients rehabilitated with implant-supported overdentures.

Materials and Methods: This prospective observational study was conducted among 100 completely edentulous patients rehabilitated with mandibular implant-supported overdentures. Two implants were placed in the interforaminal region and overdentures were retained using locator attachments. Patient satisfaction was evaluated using a structured questionnaire assessing comfort, stability, esthetics, speech, chewing ability, and overall satisfaction. Masticatory efficiency was assessed using a standardized peanut-chewing test and color-changing chewing gum test. Statistical analysis was performed using paired t-test and chi-square test. A p-value <0.05 was considered statistically significant.

Results: The mean patient satisfaction score improved significantly following implant-supported overdenture therapy ($p<0.001$). Masticatory efficiency scores also demonstrated statistically significant improvement compared to conventional dentures. Younger patients exhibited slightly higher adaptation and satisfaction scores than elderly individuals; however, overall improvement was observed across all age groups. Female patients demonstrated marginally higher esthetic satisfaction, while male patients reported better chewing efficiency. Implant-supported overdentures showed superior retention, stability, comfort, and chewing ability.

Conclusion: Implant-supported overdentures significantly improve patient satisfaction and masticatory efficiency among completely edentulous patients. They represent a predictable and effective treatment modality for enhancing oral rehabilitation and quality of life.

Keywords: *Patient Satisfaction, Mastication, Implant-Supported Overdentures*

INTRODUCTION

Edentulism remains a significant global oral health problem, particularly among elderly populations. Complete tooth loss adversely affects mastication, speech, facial esthetics, nutrition, psychological well-being, and social interaction. Conventional complete dentures have traditionally been used for rehabilitation of edentulous patients; however, many individuals experience difficulties with denture retention, instability, soreness, compromised chewing efficiency, and reduced comfort, especially in the mandibular arch because of progressive residual ridge resorption. (1).

The mandibular complete denture often presents greater clinical challenges than maxillary dentures due to reduced denture-bearing area, tongue interference, thin mucosa, and accelerated alveolar bone loss. Consequently, many patients report dissatisfaction with conventional mandibular dentures despite adequate clinical fabrication techniques. Persistent instability of lower dentures may negatively influence chewing performance, nutritional intake, and overall quality of life. (2)

Dental implants have revolutionized prosthodontic rehabilitation by improving retention, support, and stability of prostheses. Implant-supported overdentures have become a widely accepted treatment option for completely edentulous patients. The McGill Consensus Statement emphasized that a two-implant mandibular overdenture should be considered the minimum standard of care for edentulous mandibles. (3)

Implant-supported overdentures offer several advantages over conventional dentures, including enhanced stability during function, improved masticatory efficiency, better speech, greater patient comfort, and increased confidence during social interaction. Improved retention minimizes prosthesis displacement during chewing and speaking, thereby enhancing patient satisfaction. (4)

Masticatory efficiency represents an important functional outcome in prosthodontic rehabilitation. Efficient mastication facilitates proper food comminution, improves digestion, and supports adequate nutritional status. Conventional dentures generally provide lower bite force and chewing efficiency compared to natural dentition. Implant-supported overdentures improve occlusal force transmission and prosthesis stability, thereby increasing chewing performance. (5)

Patient satisfaction constitutes another critical parameter in evaluating prosthodontic treatment success. Satisfaction is multifactorial and depends on retention, stability, esthetics, speech, comfort, chewing ability, and psychological acceptance. Several studies have demonstrated higher patient satisfaction scores with implant-supported overdentures compared to conventional dentures. (6)

Various attachment systems including bar attachments, ball attachments, locator attachments, and magnetic systems have been used for implant overdentures. Locator attachments are particularly popular because of their low profile, ease of maintenance, and favorable retention characteristics. (7)

Previous investigations have demonstrated that implant-supported overdentures significantly improve oral health-related quality of life. Patients frequently report improved confidence during eating and social communication after implant rehabilitation. Enhanced prosthesis retention also reduces mucosal trauma and denture-related discomfort. (8)

Although implant-supported overdentures have gained widespread clinical acceptance, evaluation of patient-centered outcomes remains essential for determining long-term treatment success. Assessment of masticatory efficiency together with patient satisfaction provides a comprehensive understanding of functional and psychosocial benefits associated with implant overdenture therapy. (9-11)

Therefore, the present study was undertaken to evaluate patient satisfaction and masticatory efficiency among completely edentulous patients rehabilitated with implant-supported overdentures.

Materials and Methodology

This prospective observational clinical study was conducted in the Department of Prosthodontics at a tertiary dental care institution. The study included 100 completely edentulous patients requiring mandibular implant-supported overdentures. Ethical clearance was obtained from the institutional ethical committee before commencement of the study, and written informed consent was obtained from all participants.

Inclusion Criteria
- Completely edentulous patients aged between 45–75 years
- Patients dissatisfied with conventional mandibular complete dentures
- Adequate bone volume in the interforaminal region
- Good systemic health suitable for implant surgery
- Patients willing to participate and attend follow-up visits

Exclusion Criteria
- Uncontrolled systemic diseases
- Heavy smokers and alcoholics
- Patients with parafunctional habits
- History of radiotherapy in the head and neck region
- Severe psychiatric illness
- Inadequate bone support for implant placement

Clinical Procedure

Detailed clinical examination and radiographic evaluation were performed for all patients using panoramic radiographs and cone-beam computed tomography where necessary. Conventional complete dentures were fabricated initially following standard prosthodontic protocols.

Two endosseous dental implants were placed in the mandibular interforaminal region under local anesthesia using a delayed loading protocol. Following osseointegration for approximately three months, locator abutments were connected to the implants. Mandibular overdentures were then modified to incorporate corresponding attachment housings.

Patients were instructed regarding denture hygiene, insertion and removal procedures, and maintenance protocols. Follow-up examinations were conducted at 1 month, 3 months, and 6 months after prosthesis delivery.

Assessment of Patient Satisfaction

Patient satisfaction was evaluated using a structured questionnaire based on visual analog scale (VAS) scoring. Parameters assessed included:
- Retention
- Stability
- Comfort
- Speech
- Esthetics
- Chewing ability
- Overall satisfaction

Scores ranged from 0 to 10, where higher scores indicated greater satisfaction.

Assessment of Masticatory Efficiency

Masticatory efficiency was evaluated using:
1. Peanut comminution test
2. Color-changing chewing gum test

In the peanut test, patients chewed standardized peanut samples for 20 chewing cycles. The particle size distribution was assessed using sieve analysis. Smaller particle size indicated greater masticatory efficiency.

The chewing gum test evaluated color mixing ability after fixed chewing cycles. Color changes were scored using standardized color charts.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS software version 22.0. Mean and standard deviation were calculated. Paired t-test was used for comparison of pre-treatment and post-treatment variables. Chi-square test was applied for categorical variables. Statistical significance was considered at $p<0.05$.

Results

The present study evaluated 100 completely edentulous patients rehabilitated with mandibular implant-supported overdentures. The age of participants ranged from 45 to 75 years, with majority belonging to the 56–65 years age group. Male patients constituted 58% of the study population, while females represented 42%.

Table 1. Comparison of Patient Satisfaction Scores Before and After Implant-Supported Overdenture Therapy

Parameter	Conventional Denture Mean ± SD	Implant Overdenture Mean ± SD	p-value
Retention	4.2 ± 1.1	8.8 ± 0.9	<0.001
Stability	4.5 ± 1.3	8.6 ± 1.0	<0.001
Comfort	5.1 ± 1.2	8.4 ± 0.8	<0.001
Speech	5.8 ± 1.4	7.9 ± 1.0	0.002
Esthetics	6.0 ± 1.2	8.1 ± 0.9	0.004
Chewing Ability	3.9 ± 1.0	8.7 ± 0.8	<0.001
Overall Satisfaction	4.4 ± 1.3	8.9 ± 0.7	<0.001

Table 2. Assessment of Masticatory Efficiency

Parameter	Conventional Denture	Implant Overdenture	p-value
Peanut Particle Size (mm)	4.8 ± 1.1	2.1 ± 0.7	<0.001
Color Mixing Score	4.2 ± 1.0	8.3 ± 0.9	<0.001
Number of Chewing Cycles Required	42.5 ± 5.4	25.2 ± 4.1	<0.001

Table 3. Association Between Age Group and Overall Satisfaction

Age Group (Years)	Number of Patients	Mean Satisfaction Score	p-value
45–55	28	9.1 ± 0.5	0.031
56–65	46	8.8 ± 0.7	0.031
66–75	26	8.3 ± 0.8	0.031

Discussion

Edentulism significantly compromises oral function, nutrition, speech, and psychosocial well-being. Conventional complete dentures remain a common treatment modality for edentulous patients; however, instability and poor retention of mandibular dentures continue to present major clinical challenges. Implant-supported overdentures have therefore emerged as an effective prosthodontic solution for improving oral rehabilitation outcomes. The present study evaluated patient satisfaction and masticatory efficiency among completely edentulous patients rehabilitated with mandibular implant-supported overdentures.

The present investigation demonstrated substantial improvement in overall patient satisfaction following implant-supported overdenture therapy. Retention and stability scores showed highly significant improvement compared to conventional dentures. Similar observations were reported by

Feine et al., who demonstrated that implant overdentures significantly enhance oral comfort and patient acceptance. (1)

Improved retention achieved through implant anchorage reduces prosthesis displacement during functional movements. This contributes to enhanced chewing confidence, speech performance, and psychological comfort. Thomason et al. similarly reported that implant-supported overdentures improve mandibular denture stability and patient-centered outcomes. (2)

Chewing ability improved markedly in the present study. Conventional mandibular dentures frequently demonstrate poor functional efficiency because of instability during mastication. Implant-supported overdentures increase occlusal force transmission and permit more effective food comminution. Bakke et al. observed significantly higher bite force and chewing efficiency among patients treated with implant-retained overdentures. (3)

The peanut comminution test in the present study demonstrated reduced particle size after implant rehabilitation, indicating enhanced masticatory performance. Similar findings were reported by Fontijn-Tekamp et al., who demonstrated improved food breakdown efficiency among implant overdenture patients compared to conventional denture wearers. (4)

Color-changing chewing gum analysis also revealed improved chewing coordination and efficiency following implant therapy. This may be attributed to enhanced prosthesis stability and improved neuromuscular adaptation. Greater denture retention allows patients to chew bilaterally with improved muscular coordination and reduced fear of prosthesis displacement.

Speech improvement observed in the present study corresponds with findings by Awad et al., who reported enhanced phonetics and oral function among patients rehabilitated with implant-supported overdentures. (5) Stabilization of mandibular prostheses reduces tongue interference and facilitates improved articulation during speech.

The present study also demonstrated improved esthetic satisfaction following implant overdenture therapy. Stable prostheses provide improved facial support and increase patient confidence during social interaction. Emotional and psychosocial benefits associated with implant therapy contribute substantially to overall treatment success.

Age-related analysis in the present study revealed slightly higher satisfaction scores among younger patients compared to elderly individuals. Younger patients may demonstrate greater neuromuscular adaptability and improved psychological adjustment to implant prostheses. Nevertheless, all age groups showed statistically significant improvement after treatment.

No major implant failures occurred during the follow-up period, reflecting high predictability of mandibular implant overdenture therapy. Minor complications such as attachment wear and occasional mucosal soreness were manageable through maintenance procedures. Similar complication profiles have been documented in long-term implant overdenture studies. (6)

The use of locator attachments in the present investigation contributed to favorable clinical outcomes. Locator systems provide adequate retention, low vertical profile, ease of maintenance, and patient-friendly insertion mechanics. Kleis et al. reported high patient satisfaction and favorable maintenance outcomes with locator-retained overdentures. (7)

The findings of the present study support the McGill Consensus Statement recommending two-implant mandibular overdentures as the standard of care for edentulous mandibles. Implant-supported overdentures not only improve oral function but also enhance nutritional intake and quality of life. (8)

Several investigators have emphasized the relationship between oral rehabilitation and systemic health. Improved chewing efficiency facilitates better dietary choices and nutritional adequacy, particularly among elderly individuals who may otherwise avoid fibrous or hard foods due to poor denture stability. (12,13)

The major strength of the present study lies in simultaneous assessment of both subjective and objective treatment outcomes. Patient satisfaction questionnaires provided insight into psychosocial adaptation, while masticatory efficiency tests offered quantitative evaluation of functional improvement.

However, the study had certain limitations. The follow-up duration was relatively short, and long-term implant maintenance outcomes were not evaluated. Additionally, comparison with other attachment systems such as bar or magnetic attachments was not performed. Future longitudinal studies involving larger sample sizes and comparative attachment analyses are recommended.

Overall, the present study demonstrated that implant-supported overdentures significantly improve retention, stability, comfort, chewing efficiency, and overall patient satisfaction among completely edentulous individuals. These findings reinforce the importance of implant overdenture therapy as a predictable and effective prosthodontic rehabilitation modality.

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