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Evaluation Of Patient Satisfaction With Complete Dentures Fabricated Using Conventional Heat Cure And High Impact Heat Cure Acrylic Resin: A Questionnaire-Based Comparative Study

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Abstract

Background: Polymethyl methacrylate (PMMA) has been the most widely used denture base material for complete dentures due to its acceptable esthetics, ease of processing, and reparability. However, conventional heat cure acrylic resin exhibits limitations such as low impact strength and susceptibility to fracture, leading to patient discomfort and reduced satisfaction. High impact heat cure acrylic resins were developed to overcome these limitations by improving mechanical properties.

Aim: To evaluate and compare patient satisfaction with complete dentures fabricated using conventional heat cure acrylic resin and high impact heat cure acrylic resin.

Materials and Methods: A questionnaire-based comparative study was conducted among 100 completely edentulous patients. Fifty patients received complete dentures fabricated using conventional heat cure acrylic resin (Group I), and fifty patients received dentures fabricated using high impact heat cure acrylic resin (Group II). Patient satisfaction was assessed at denture insertion, one-week, and three-week follow-up visits. Parameters evaluated included esthetics, speech, retention, stability, comfort, masticatory efficiency, denture strength, staining, and overall satisfaction. Data were analyzed using descriptive statistics and Z-test for difference between proportions.

Results: Patients rehabilitated with high impact acrylic dentures demonstrated significantly higher satisfaction scores across most parameters. Statistically significant differences ($p < 0.001$) were observed for esthetics, comfort, retention, stability, masticatory efficiency, and perceived strength.

Conclusion: High impact heat cure acrylic resin dentures provide superior patient satisfaction and functional performance compared to conventional heat cure acrylic resin dentures and may be preferred for complete denture fabrication.

Keywords: Complete denture, High impact acrylic resin, Heat cure acrylic resin, Patient satisfaction, Questionnaire study

Introduction

Complete edentulism remains a common oral health condition, particularly among the elderly population in developing countries. Although implant-supported prostheses offer improved function and stability, conventional complete dentures continue to be the most widely accepted treatment modality due to economic limitations, systemic conditions, and patient preference [1,2].

Polymethyl methacrylate (PMMA) has been used as a denture base material since its introduction in the 1930s and remains the material of choice due to favorable esthetics, adequate strength, dimensional stability, ease of processing, and reparability [4,5]. Despite these advantages, conventional heat cure acrylic resin exhibits inherent limitations such as low impact strength, fatigue failure, and susceptibility to midline fracture, particularly under masticatory and accidental forces [6,7].

To overcome these drawbacks, high impact heat cure acrylic resins were developed by incorporating rubber or elastomeric graft copolymers into the PMMA matrix. These modifications enhance energy absorption, improve resistance to crack initiation and propagation, and increase overall impact strength [8–11]. Several in vitro studies have demonstrated superior mechanical properties of high impact acrylic resins compared to conventional PMMA; however, clinical success depends largely on patient satisfaction rather than laboratory performance alone [12].

Patient satisfaction with complete dentures is a multifactorial outcome influenced by esthetics, phonetics, retention, stability, comfort, and masticatory efficiency [13]. Questionnaire-based evaluations provide valuable insight into patient-reported outcomes and help correlate material properties with clinical performance. Therefore, the present study was undertaken to compare patient satisfaction between complete dentures fabricated using conventional heat cure acrylic resin and high impact heat cure acrylic resin.

Materials and Methods

Study Design and Setting

A questionnaire-based comparative observational study was conducted in the Department of Prosthodontics and Crown & Bridge, C.S.M.S.S. Dental College and Hospital, Chhatrapati Sambhajinagar, Maharashtra, India.

Sample Size and Grouping

A total of 100 completely edentulous patients were included and divided into two groups:

- **Group I (Low Impact Group):** 50 patients rehabilitated with complete dentures fabricated using conventional heat cure acrylic resin.
- **Group II (High Impact Group):** 50 patients rehabilitated with complete dentures fabricated using high impact heat cure acrylic resin.

Inclusion Criteria

- Completely edentulous patients
- Patients rehabilitated with removable complete dentures
- Patients willing to participate and provide informed consent

Exclusion Criteria

- Patients treated with implant-supported or tooth-supported overdentures
- Patients with neuromuscular disorders
- Patients with systemic conditions affecting denture adaptation
- Patients undergoing chemotherapy or radiotherapy

Questionnaire Assessment

Patient satisfaction was evaluated using a structured questionnaire at three time intervals:

- At denture insertion
- One-week follow-up
- Three-week follow-up

Parameters assessed included esthetics, speech, retention, stability, comfort, salivation, use of denture adhesive, masticatory efficiency, denture staining, perceived strength, diet, and overall satisfaction.

Statistical Analysis

Data were analyzed using descriptive statistics. Z-test for difference between two proportions was applied to compare responses between the two groups. Statistical significance was set at $p < 0.05$ and $p < 0.001$.

Results

Table 1. Comparison of Esthetic and Speech-Related Parameters

Parameter	Low Impact (%)	High Impact (%)	p-value
Esthetic satisfaction	40	94	<0.001
Speech difficulty	76	58	<0.001
Hollow space sensation	74	34	<0.001
Lip fullness dissatisfaction	72	34	<0.001

Patients in the high impact group reported significantly better esthetic satisfaction and fewer speech-related problems.

Table 2. Comparison of Retention, Stability, and Comfort

Parameter	Low Impact (%)	High Impact (%)	p-value
Denture displacement	68	34	<0.001
Intraoral discomfort	72	26	<0.001
Altered salivation	76	16	<0.001
Use of denture adhesive	84	58	<0.001

High impact dentures demonstrated improved retention and stability, resulting in reduced discomfort and lesser dependence on denture adhesives.

Table 3. Comparison of Functional Parameters and Overall Satisfaction

Parameter	Low Impact (%)	High Impact (%)	p-value
Good masticatory efficiency	12	54	<0.001
Severe denture staining	14	4	<0.001
Perceived strength issues	60	2	<0.001
High overall satisfaction	Low	High	<0.001

Functional performance and overall satisfaction were significantly higher in the high impact group.

Discussion

The present study evaluated patient satisfaction with complete dentures fabricated using two different denture base materials. The findings demonstrated significantly higher satisfaction levels among patients wearing high impact heat cure acrylic dentures.

Improved esthetic outcomes observed in the high impact group may be attributed to better denture base adaptation and resistance to microfracture formation, which preserves surface integrity over time [9,10]. Reduced speech difficulty and denture displacement suggest enhanced stability and retention, which are critical factors influencing phonetic adaptation and patient confidence [1,13].

The superior masticatory efficiency reported by patients in the high impact group can be explained by improved flexural strength and resistance to deformation under functional loads [11,22]. Reduced perceived strength issues further support the mechanical advantage of high impact acrylic resin.

These findings are consistent with previous studies that emphasized the influence of denture base material on patient comfort and satisfaction [15–17]. Although patient satisfaction is multifactorial, material selection plays a significant role during the early adaptation phase of complete denture therapy.

Clinical Significance

High impact heat cure acrylic resin dentures offer improved comfort, functional efficiency, and patient satisfaction and may be particularly beneficial for patients with high masticatory demands or a history of denture fracture.

Limitations

- Short follow-up period
- Subjective nature of questionnaire-based assessment
- Single-center study

Conclusion

Within the limitations of the study, complete dentures fabricated using high impact heat cure acrylic resin demonstrated superior patient satisfaction compared to conventional heat cure acrylic resin dentures. High impact acrylic resin can be considered a clinically advantageous alternative for complete denture fabrication.

Ethical Clearance and Consent

Ethical clearance was obtained from the institutional ethical committee. Written informed consent was obtained from all participants prior to inclusion in the study.

Conflict of Interest

The authors declare no conflict of interest.

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