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Ministry of Higher Education  
And Scientific Research  
University of Almustaqbal  
Collage of Dentistry



**EVALUATING THE IMPACT OF IMPRESSION MATERIALS AND  
TECHNIQUES ON THE ACCURACY OF COMPLETE DENTURE  
RESTORATION**

A Project

Submitted to the College of Dentistry, University of Almustaqbal, and Department  
of Prosthodontics in Partial Fulfillment for the Bachelor of Dental Surgery

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**2026 A.D**

**1446 A.H**

## بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

لَا إِلَهَ إِلَّا هُوَ الْحَيُّ الْقَيُّومُ ۚ لَا تَأْخُذُهُ سِنَّةٌ وَلَا نَوْمٌ ۚ لَّهُ مَا فِي السَّمَاوَاتِ وَمَا فِي الْأَرْضِ ۗ مَنْ ذَا الَّذِي يَشْفَعُ عِنْدَهُ إِلَّا بِإِذْنِهِ ۚ يَعْلَمُ مَا بَيْنَ أَيْدِيهِمْ وَمَا خَلْفَهُمْ ۗ وَلَا يُحِيطُونَ بِشَيْءٍ مِّنْ عِلْمِهِ إِلَّا بِمَا شَاءَ ۚ وَسِعَ كُرْسِيُّهُ السَّمَاوَاتِ وَالْأَرْضَ ۗ وَلَا يَئُودُهُ حِفْظُهُمَا ۚ وَهُوَ الْعَلِيُّ الْعَظِيمُ ﴿١٠٢﴾

## **Dedication**

In the name of God, the Most Gracious, the Most Merciful. Praise is to God, for whom we have not succeeded, for whom we have risen, or surpassed us, except with His pleasure. Praise is to God, for whom we have not passed a path, nor have we skipped any effort, except by His grace, and to Him are credit, perfection, and completion attributed. Praise be to God, for love and thanks, and to our nation,

Who granted us this, and had it not been for Him, we would not have achieved it. Praise is to Him in the beginning and in the end. (And their last supplication is: Praise is to God, Lord of the world) To the one whom God made Paradise under her feet, to the one to whom God has bestowed high honor and invincible glory, whose heart embraced me before her hand and made adversity easy forme with her supplications, to the hidden hand that was removed by thorns, and who endured every moment of pain that I went through. To you, my most precious thing (my mother, May God protect her and grant her long life). her age (.To the dear one, whose name I carry with pride, to the one whom God has crowned with prestige and reverence, to my great inspiration, my first supporter, and my steadfast support, the one who extended his arm like the earth, and the one who was a source of strength and security on every path I feared, to the one who taught me that the world is a struggle and its weapon is knowledge and knowledge, to the one who instilled in my soul noble morals,my first supporter. My pride and pride (my father, may God prolong his life) To the brave souls who gave their lives for the dignity, freedom, and sovereignty of IraqTo those who are happy with my success and to those who smoothed the pitfalls of my path with their prayers and love for the best days and the apple of my eye (my brothers, my sisters).

## **ACNOWLEDGEMENT**

With deep gratitude and appreciation, we extend our sincere thanks (Dr Athraa Al-Hijazi), the Dean of the Dentistry Department, for her continuous support and guidance. Her dedication to fostering an inspiring and motivating academic environment has been invaluable to us.

We also express our heartfelt appreciation to (Dr. Ali AL-Sultani) our research supervisor, for his valuable time, insightful guidance, and unwavering support throughout our research journey. His mentorship has been a pillar of strength for us.

Furthermore, we extend our sincere thanks to all our esteemed professors in the Dentistry Department, whose knowledge and expertise have been instrumental in our academic growth and development.

May your efforts be rewarded, and may your dedication continue to inspire future generations.

## **ABSTRACT:**

**Objective:** To evaluate the influence of different impression materials and techniques on the functional accuracy and patient-reported outcomes of complete denture restorations using a standardized assessment tool.

**Materials and Methods:** A prospective clinical study was conducted on five completely edentulous patients rehabilitated with maxillary and mandibular complete dentures fabricated using different impression protocols. Patients were allocated into two groups: Group I (conventional impression compound and zinc oxide eugenol using a mucostatic technique) and Group II (alginate preliminary impression followed by polyvinyl siloxane [2,6,7] using a selective pressure technique). Patient-reported outcomes [11,12] were assessed after a 4-week adaptation period using a 10-point ordinal scale across five domains: chewing ability, retention during mastication, pain due to pressure points, speech interference, and cleaning ease and satisfaction. Non-parametric statistical analysis (Mann–Whitney U test) was applied.

**Results:** Dentures fabricated using elastomeric impression materials combined with selective pressure techniques demonstrated significantly improved patient-reported outcomes, with lower median scores across all evaluated parameters compared to conventional techniques. Group II showed higher satisfaction levels and a 100% recommendation rate.

**Conclusion:** Impression material and technique significantly influence the clinical performance and patient satisfaction of complete dentures. Elastomeric materials used with selective pressure techniques provide superior functional and patient-centered outcomes.

**Keywords:** Complete Dentures, Elastomeric Impressions, Polyvinyl Siloxane ,Selective Pressure Technique Mucostatic Technique, Denture Retention ,Patient Satisfaction.

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## List of Abbreviations

Abbreviations	Full Term
<b>PVS</b>	Polyvinyl Siloxane
<b>ZOE</b>	Zinc Oxide Eugenol
<b>PROMS</b>	Patient-Reported Outcome Measures
<b>PMMA</b>	Polymethyl Methacrylate
<b>OVD</b>	Occlusal Vertical Dimension
<b>CR</b>	Centric Relation

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# **Introduction**

## **Introduction**

Accurate impression making represents a fundamental determinant in the success of complete denture therapy [10,14], as it directly influences denture base adaptation, retention, stability, and patient comfort. The selection of impression materials and techniques plays a critical role in achieving optimal functional outcomes [5,15].

Traditionally, materials such as impression compound and zinc oxide eugenol have been widely used in complete denture fabrication [4,16]. However, advancements in dental materials have led to the increasing adoption of elastomeric impression materials, particularly polyvinyl siloxane [2,6,7], due to their superior dimensional stability [4,6], elastic recovery, and ability to reproduce fine surface details.

Despite extensive *in vitro* investigations assessing impression accuracy, there is limited clinical evidence correlating impression techniques with patient-reported functional outcomes [11,12]. Since patient satisfaction remains the ultimate indicator of prosthodontics success, it is essential to evaluate both clinical accuracy and patient-centered parameters.

In addition, denture base materials—particularly polymethyl methacrylate (PMMA)—have remained the gold standard [17,18] due to their favorable mechanical properties, cost-effectiveness, and ease of manipulation. However, dimensional changes [18–20] during processing, influenced by polymerization shrinkage and thermal stresses, may compromise denture adaptation and occlusal accuracy.

Therefore, this study aims to clinically evaluate the impact of different impression materials and techniques on complete denture accuracy, with emphasis on patient-reported functional outcomes [11,12].

## **Aims and objectives:**

**Aim:** To evaluate the clinical effectiveness of different impression materials and techniques on the functional accuracy and patient satisfaction of complete dentures.

### **Objectives:** To

1. Compare conventional and elastomeric impression materials in complete denture fabrication [4,16].
2. Assess mucostatic versus selective pressure impression techniques.
3. Evaluate denture retention, stability, and functional performance.
4. Analyze patient-reported outcomes using a standardized scoring system.
5. Determine the most clinically effective impression protocol.

# **Literature Review**

## **Literature Review:**

### **1.1 Introduction:**

Complete denture prosthodontics remains a cornerstone in the rehabilitation of edentulous patients, aiming to restore function, esthetics, and psychological well-being. Among all clinical procedures involved, impression making is widely regarded as the most critical step, as it directly determines the accuracy of the final prosthesis. The success of a complete denture largely depends on the precise recording of oral tissues, including both static and functional anatomical landmarks.

The impression procedure must accurately capture the supporting tissues, peripheral borders, and functional sulcus depth, ensuring optimal retention, stability, and support. Any inaccuracies introduced during this stage may propagate through subsequent clinical and laboratory procedures, ultimately compromising denture performance.

### **1.2 Classification of Impression Materials:**

Dental impression materials are broadly classified into [4,15]:

- Non-elastic materials (e.g., impression compound, zinc oxide eugenol)
- Elastic materials (e.g., alginate, elastomers such as polyvinyl siloxane [2,6,7] and polyether)

#### **1.2.1 Conventional Materials**

Impression compound and zinc oxide eugenol (ZOE) have been extensively used in complete denture prosthodontics due to their simplicity and cost-effectiveness. ZOE, in particular, is known for its dimensional stability [4,6] and ability to record fine details under minimal pressure.

However, these materials have inherent limitations, including rigidity [15] after setting and inability to record undercut areas accurately. Additionally, mucostatic techniques using these materials may fail to adequately capture functional tissue dynamics.

### **1.3 Elastomeric Impression Materials:**

Elastomeric materials, including polyvinyl siloxane [2,6,7] (PVS), polyether, and hybrid materials, have gained significant popularity due to their superior properties.

Polyvinyl siloxane materials demonstrate excellent dimensional stability [2,6,7] [4,6], elastic recovery, and detail reproduction, making them highly suitable for precision prosthodontics . Furthermore, they maintain dimensional accuracy over extended periods, allowing delayed pouring without significant distortion.

Recent studies have also explored hybrid elastomeric materials [25] such as vinylsiloxanether, which combine the hydrophobicity of polyether with the dimensional stability [4,6] of PVS .

Advancements in material science have led to improved formulations with enhanced wettability, flow ability, and antibacterial properties, further improving clinical outcomes .

### **1.4 Impression Techniques in Complete Dentures:**

Impression techniques are broadly classified into [4,15]:

- Mucostatic technique
- Mucocompressive technique
- Selective pressure technique [5,10]

#### **1.4.1 Mucostatic Technique**

This technique records oral tissues in their displaced form, minimizing tissue distortion. While it preserves tissue health, it often results in reduced retention due to inadequate border seal.

#### **1.4.2 Mucocompressive Technique**

This approach records tissues under functional load, aiming to improve retention. However, it may lead to tissue rebound and long-term discomfort.

### **1.4.3 Selective Pressure Technique**

The selective pressure technique represents a balanced approach, applying controlled pressure to stress-bearing areas while relieving non-stress-bearing regions. This technique is widely considered the most biologically and biomechanically favorable.

### **1.5 Accuracy of Impression Materials:**

Accuracy in impression making is influenced by multiple factors:

- Material properties (viscosity, elasticity)
- Tray design
- Technique used
- Operator skill

Studies have demonstrated that elastomeric materials provide superior accuracy [3,7,8] compared to conventional materials due to their ability to reproduce fine details and resist distortion .

Furthermore, dimensional changes [18–20] such as polymerization shrinkage may occur in elastomeric materials; however, these changes are minimal and clinically acceptable when impressions are poured promptly .

### **1.6 Role of custom trays:**

Custom trays [15] are essential for achieving uniform material thickness and minimizing distortion. Research indicates that individually fabricated trays improve accuracy compared to stock trays, particularly when using elastomeric materials .

### **1.7 Denture Base Materials and Dimensional Stability:**

Polymethyl methacrylate (PMMA) remains the most widely used denture base material due to its favorable properties, including:

- Ease of processing
- Acceptable esthetics
- Cost-effectiveness

However, PMMA is prone to dimensional changes [18–20] during polymerization and service. These changes may affect denture adaptation and occlusion.

Alternative materials such as cobalt-chromium offer superior dimensional stability [4,6] but are less commonly used due to higher cost and complexity.

### **1.8 Processing Techniques:**

Two primary processing techniques are used:

- Compression molding
- Injection molding [23,24]

Injection molding [23,24] has been shown to reduce polymerization shrinkage and improve dimensional accuracy compared to compression techniques.

### **1.9 Patient-Reported Outcome Measures (PROMs):**

Traditional evaluation of dentures relied primarily on clinical parameters. However, modern prosthodontics emphasizes patient-centered outcomes.

**PROMs assess:**

- Comfort
- Function
- Esthetics
- Satisfaction

These measures provide valuable insight into real-life denture performance and are increasingly used in clinical research.

**1.10 Clinical Relevance of Impression Accuracy:**

Accurate impressions contribute to:

- Improved denture retention
- Better stability
- Enhanced comfort
- Reduced need for adjustments

Recent systematic reviews highlight that elastomeric materials such as PVS and polyether are recommended for achieving high accuracy [1,3,8] in prosthodontics impressions .

**1.11 Summary:**

The literature strongly supports the superiority of elastomeric impression materials combined with selective pressure techniques in achieving optimal denture performance. However, clinical studies correlating these factors with patient-reported outcomes remain limited, justifying the need for the present study.

# **Materials and Methods**

## **Materials and Methods:**

### **Study Design and Ethical Considerations:**

This study was designed as a prospective, comparative clinical investigation aimed at evaluating the effect of different impression materials and techniques on the functional accuracy and patient-reported outcomes of complete dentures. The study was conducted in accordance with the principles of the Declaration of Helsinki for biomedical research involving human subjects.

Ethical approval was obtained from the institutional review committee prior to study initiation, and all participants provided written informed consent after being fully informed about the nature, objectives, and potential benefits of the study.

### **Sample Selection:**

A total of five completely edentulous patients (three males and two females) with an age range of 55–72 years were recruited from the postgraduate prosthodontics clinic.

### **Inclusion Criteria:**

- Completely edentulous maxillary and mandibular arches
- Healthy oral mucosa without pathological lesions
- Adequate ridge height and width for conventional denture fabrication
- Patients willing to participate and comply with follow-up

### **Exclusion Criteria:**

- Patients with systemic conditions affecting oral tissues (e.g., uncontrolled diabetes)
- Severe ridge resorption or flabby ridges
- Temporomandibular joint disorders
- Previous history of unsuccessful denture therapy due to psychological factors

### **Clinical Standardization:**

To minimize operator-dependent variability and ensure consistency, all clinical and laboratory procedures were performed by a single operator following a standardized protocol.

The following parameters were strictly controlled:

- Custom tray fabrication: Uniform spacer thickness (approximately 2 mm) using auto polymerizing acrylic resin
- Border molding: Performed using a consistent technique and material appropriate for each group
- Occlusal vertical dimension (OVD): Established using physiological rest position and phonetic methods
- Centric relation (CR): Recorded using a standardized bilateral manipulation technique
- Occlusal scheme: Balanced occlusion was established in all dentures to ensure uniform distribution of occlusal forces

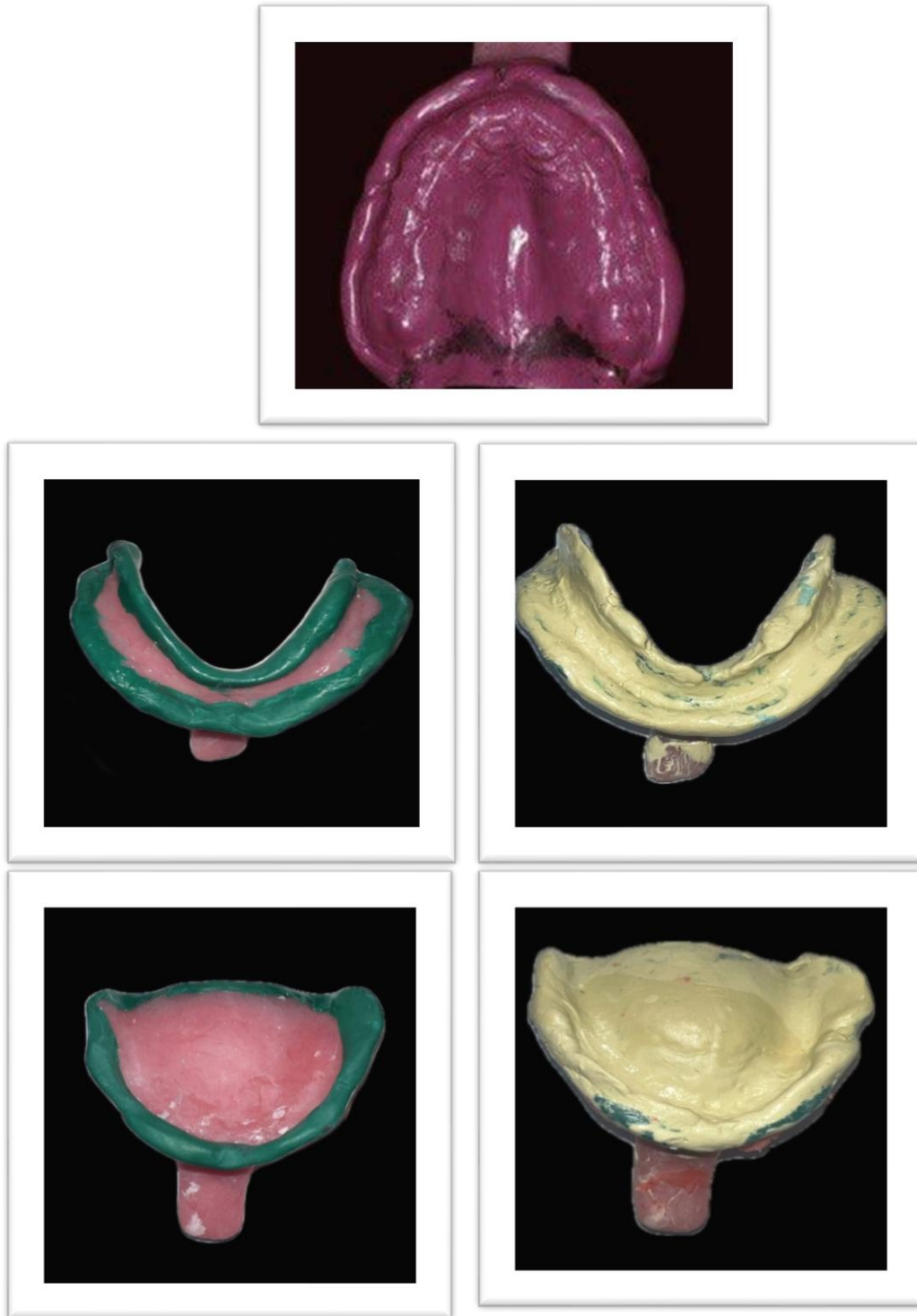
All dentures were processed using heat-polymerized polymethyl methacrylate under controlled laboratory conditions to minimize processing-related distortion.

Grouping and Impression Protocols:

Participants were allocated into two groups based on the impression material and technique employed:

**Group I** (Conventional Technique; n = 2)

- Primary impression: Impression compound
- Final impression: Zinc oxide eugenol paste
- Technique: Mucostatic approach

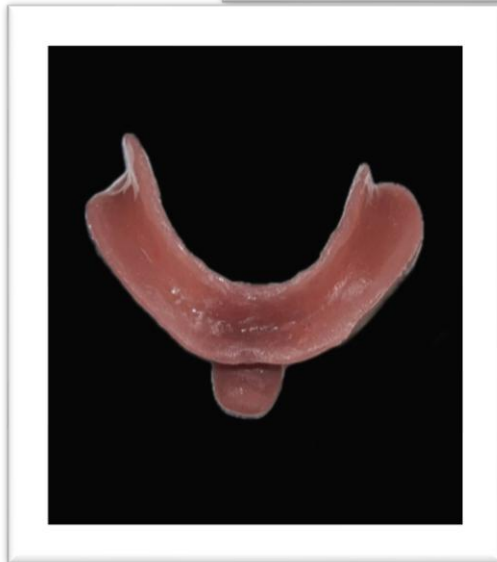


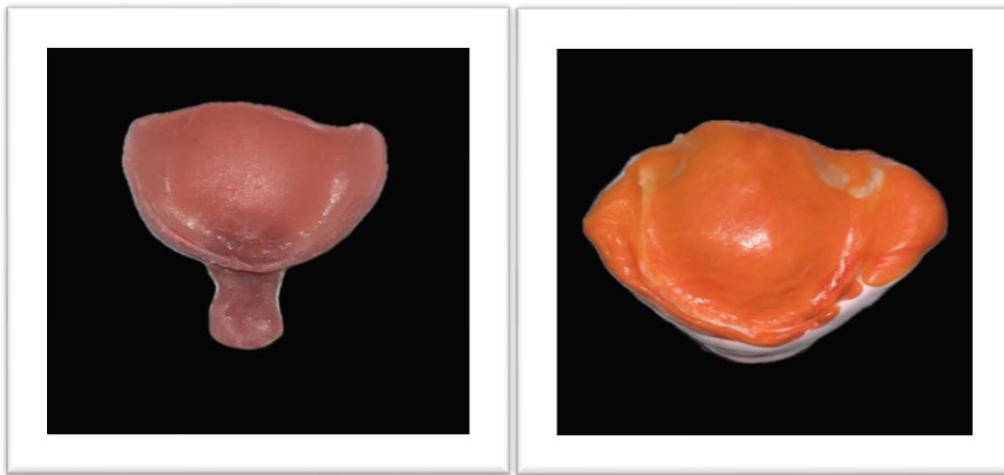
**Figure .1Group I Impression protocol (Conventional Technique)**

This protocol aimed to record oral tissues in a minimally displaced state, focusing on tissue preservation.

**Group II** (Elastomeric Technique; n = 3)

- Primary impression: Irreversible hydrocolloid (alginate)
- Final impression :Polyvinyl Siloxane (PVS)
- Technique: Selective pressure approach





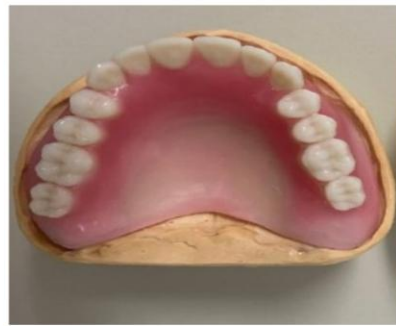
**Figure .2 Group II Impression protocol (Elastomeric Technique)**

In this group, selective relief was provided in non-stress-bearing areas, while controlled pressure was applied to primary stress-bearing regions to optimize support, retention, and stability.

**Denture Fabrication Protocol:**

All complete dentures were fabricated following standardized clinical and laboratory steps:

1. Preliminary impressions and cast preparation
2. Custom tray fabrication
3. Border molding and final impression procedures
4. Master cast preparation
5. Jaw relation record (OVD and CR)
6. Teeth arrangement following esthetic and functional guidelines
7. Try-in verification
8. Denture processing using heat-polymerized acrylic resin
9. Finishing and polishing
10. Denture insertion and occlusal adjustment





### **Figure. 3 Denture Fabrication Protocol**

All patients received standardized post-insertion instructions regarding denture use, hygiene, and maintenance.

#### **Outcome Assessment (Patient-Reported Measures):**

Patient-reported outcomes [11,12] were assessed after a 4-week adaptation period, allowing sufficient time for neuromuscular adjustment and tissue accommodation.

A structured and validated questionnaire was used to evaluate the following parameters:

- Chewing ability
- Retention during mastication
- Pain associated with pressure areas
- Speech interference
- Cleaning ease and overall satisfaction

Each parameter was scored using a 10-point ordinal scale, where:

- 1 = Best outcome (optimal function/comfort)
- 10 = Worst outcome (severe impairment/discomfort)

The total score per patient ranged from 5 to 50, with lower scores indicating better overall performance.

### Outcome Categorization:

- Scores  $\leq 3$ : Good outcome
- Scores 4–7: Moderate outcome
- Scores  $\geq 8$ : Poor outcome

Additionally, patients were asked a binary question regarding their willingness to recommend the dentures, providing an indirect measure of overall satisfaction.

### Statistical Analysis:

Data were analyzed using appropriate statistical methods considering the small sample size and ordinal nature of the variables.

### Descriptive Statistics:

- Mean and standard deviation (SD)
- Median values
- Percentage distribution of outcomes

### Inferential Statistics:

Intergroup comparisons were performed using the Mann–Whitney U test, a non-parametric test suitable for small sample sizes and non-normally distributed data.

### Level of Significance:

- Statistical significance was set at  $p < 0.05$

### Data Interpretation:

In addition to p-values, emphasis was placed on:

- Magnitude of differences between groups
- Consistency of trends across parameters
- Clinical relevance of findings

Given the limited sample size, results were interpreted with consideration of both statistical significance and clinical significance

## **Results:**

All five participants completed the study and were included in the final analysis. A consistent trend was observed across all evaluated parameters, with patients in Group II (elastomeric impression with selective pressure technique) demonstrating superior outcomes compared to Group I (conventional mucostatic technique).

### **Descriptive Outcomes:**

Patients in Group II exhibited consistently lower scores (indicating better clinical performance) across all assessed domains, including chewing ability, retention during mastication, pain associated with pressure areas, speech interference, and cleaning satisfaction.

The median total score demonstrated a marked difference between groups:

- Group I: 29.5 (moderate to poor outcome)
- Group II: 12 (good outcome)

Furthermore, patients in Group II achieved favorable scores ( $\leq 3$ ) in the majority of parameters (80–100%), whereas no patients in Group I reached this threshold.

### **Patient Satisfaction and Recommendation:**

A clear distinction in overall satisfaction was observed:

- **Group I:** 0% recommendation rate
- **Group II:** 100% recommendation rate

This finding reflects a strong correlation between improved functional outcomes and patient-perceived treatment success.

Statistical analysis and Interpretation

Given the small sample size ( $n = 5$ ) and ordinal nature of the data, non-parametric analysis using the Mann–Whitney U test was applied.

All evaluated parameters demonstrated statistically significant differences between the two groups at the threshold level ( $p = 0.05$ ). Notably, the U value was 0.0 across all comparisons, indicating complete separation of scores between groups.

However, due to the limited sample size, these results should be interpreted cautiously. While statistical significance is borderline, the consistency and magnitude of intergroup differences suggest a strong effect size, supporting the presence of clinically meaningful differences rather than random variation. **Several key observations reinforce the robustness of the findings:**

- Complete separation of scores between groups across all parameters
- Consistently lower median values in Group II
- High proportion of favorable outcomes ( $\leq 3$ ) in Group II
- Universal recommendation (100%) in Group II

Together, these findings indicate a substantial clinical advantage of elastomeric impression materials used in conjunction with selective pressure techniques.

## Tables:

**Table 1. Descriptive Statistics (Mean  $\pm$  SD)**

Parameter	Group I (Mean $\pm$ SD)	Group II (Mean $\pm$ SD)
<b>Chewing Ability</b>	5.5 $\pm$ 0.7	2.3 $\pm$ 0.6
<b>Retention</b>	6.5 $\pm$ 0.7	2.3 $\pm$ 0.6
<b>Pain</b>	5.5 $\pm$ 0.7	2.3 $\pm$ 0.6
<b>Speech</b>	5.5 $\pm$ 0.7	2.7 $\pm$ 0.6
<b>Cleaning</b>	6.5 $\pm$ 0.7	2.3 $\pm$ 0.6
<b>Total Score</b>	<b>29.5 <math>\pm</math> 0.7</b>	<b>12.0 <math>\pm</math> 1.0</b>

**Table 2. Mann–Whitney U Test Results**

Parameter	U Value	p-value	Significance
<b>Chewing Ability</b>	0.0	0.05	Significant
<b>Retention</b>	0.0	0.05	Significant
<b>Pain</b>	0.0	0.05	Significant
<b>Speech</b>	0.0	0.05	Significant
<b>Cleaning</b>	0.0	0.05	Significant
<b>Total Score</b>	<b>0.0</b>	<b>0.05</b>	<b>Significant</b>

Table 3. Percentage of Favorable Outcomes (Score  $\leq 3$ )

Parameter	Group I (%)	Group II (%)
<b>Chewing Ability</b>	0%	100%
<b>Retention</b>	0%	100%
<b>Pain</b>	0%	100%
<b>Speech</b>	0%	80%
<b>Cleaning</b>	0%	100%

**Table 4. Patient Recommendation Rate**

Group	Yes (%)	No (%)
<b>Group I</b>	0%	100%
<b>Group II</b>	100%	0%

## Patient Questionnaire

**Study:** Evaluation of the Impact of Impression Materials and Technique on the Accuracy of Complete Denture Restoration

**Instructions for patient:** For each item below, mark the number (1–10) that best describes your experience since receiving the denture.

**Scale:** 1 = Excellent (no problem) ..... 10 = Very bad (severe problem)

Patient ID:	<b>1</b>	Date:	<b>2026 / 2 / 25</b>
Age:	<b>59</b>	Gender:	<b>Female</b>
Type of denture:	<b>1-New complete</b> 2-Repaired/relined    3-Upper    4-Lower <b>5- Both</b>		
Impression material used__ (if know)	<b>Impression compound</b>		
Impression technique (if Know):	<b>Mucostatic technique</b>		
Clinician:	<b>مرتضى عباس عناد / حسين سليم حسين</b>		

Question	1	2	3	4	5	6	7	8	9	10
A. Chewing ability			√							
B. Retention during chewing		√								
C. Pain from pressure points		√								
D. Speech impact		√								
E. Cleaning ease & satisfaction	√									

**Overall satisfaction (optional):**

**1** -2 -3 -4 -5 -6 -7 -8 -9 -10

**Would you recommend these dentures to others? Yes / No**

**Additional comments:**

**No comment**

### Researcher Notes:

- Lower scores = better outcome (1 = best).
- For each patient, calculate per-item mean/median and total score (sum of A–E; range 5–50).
- Use non-parametric tests (e.g., Mann–Whitney U, Kruskal–Wallis) for group comparisons.
- Report percentage of patients scoring  $\leq 3$  (good) or  $\geq 8$  (poor) for clarity.

## **Discussion:**

The present study provides clinically relevant evidence that both impression material and technique significantly influence the functional performance and patient satisfaction of complete dentures. The superior outcomes observed in Group II are consistent with contemporary prosthodontics literature emphasizing the advantages of elastomeric materials and selective pressure techniques.

Elastomeric impression materials, particularly polyvinyl siloxane [2,6,7] (PVS), demonstrated significantly improved patient-reported outcomes across all evaluated parameters. This can be attributed to their superior dimensional stability [4,6], high elastic recovery, and excellent surface detail reproduction, which enable precise recording of both hard and soft tissues [2,6,7]. These findings align with previous investigations reporting that elastomeric materials produce more accurate impressions with minimal distortion compared to conventional materials [3,7].

The selective pressure technique further contributed to improved clinical outcomes by optimizing load distribution across denture-bearing areas. By selectively compressing stress-bearing regions while relieving non-stress-bearing tissues, this technique enhances denture stability and retention [5,10]. This biomechanical advantage has been widely supported in the literature, where controlled tissue displacement is associated with improved functional efficiency and patient comfort [9,13].

In contrast, the mucostatic technique employed in Group I, although biologically conservative, may fail to establish an adequate peripheral seal, resulting in compromised retention and stability [10,14]. The higher median scores observed in this group suggest that the absence of functional tissue recording negatively impacts denture performance, particularly during mastication and speech.

The integration of patient-reported outcome measures (PROMs) represents a significant strength of this study. Traditional prosthodontic evaluations often rely on clinician-based assessments, which may not fully capture patient experience. PROMs provide a more comprehensive evaluation of treatment success by incorporating functional, psychological, and satisfaction-

related dimensions [11,12]. The strong correlation observed between lower scores and higher recommendation rates in Group II underscores the clinical relevance of patient-centered assessment tools.

Despite the small sample size, the consistency of results across all parameters strengthens the validity of the findings. Similar trends have been reported in previous studies comparing impression techniques, where elastomeric materials consistently outperform conventional approaches in both accuracy and patient satisfaction [1,3,8].

Furthermore, advances in impression material technology, including improved hydrophilicity and wettability, have enhanced the clinical applicability of elastomeric materials, particularly in challenging intraoral conditions [2,25]. These improvements contribute to more predictable outcomes and reduced need for post-insertion adjustments.

## **Limitations:**

Despite the clinically relevant findings, several limitations of this study should be acknowledged.

First, the small sample size ( $n = 5$ ) limits the statistical power of the analysis and restricts the generalizability of the results to a broader edentulous population. Although consistent trends were observed across all parameters, larger sample sizes are required to validate these findings.

Second, the short follow-up period (4 weeks) may not adequately reflect long-term denture performance, including tissue adaptation, residual ridge changes, and prosthesis wear over time.

Third, the study relied on patient-reported outcome measures (PROMs), which, although clinically valuable, are inherently subjective and may be influenced by individual expectations, psychological factors, and prior denture experience.

Additionally, the absence of objective digital assessment methods, such as three-dimensional surface deviation analysis or pressure mapping, limits the ability to quantitatively evaluate denture base adaptation and impression accuracy.

Finally, although operator standardization was maintained, operator-dependent variability cannot be entirely eliminated, particularly in procedures such as border molding and impression making, which require clinical judgment and skill.

Future studies incorporating larger cohorts, longer follow-up periods, and objective measurement techniques are recommended to strengthen the evidence base.

## **CONCLUSION :**

Within the limitations of this prospective clinical study, it can be concluded that impression materials and techniques are critical determinants of the functional success of complete denture therapy [10,14].

Elastomeric impression materials, particularly polyvinyl siloxane [2,6,7], demonstrated superior clinical performance, likely due to their enhanced dimensional stability [4,6], elastic recovery, and ability to accurately reproduce fine anatomical details.

The selective pressure impression technique provided improved denture retention, stability, and patient comfort compared to the conventional mucostatic approach, supporting its clinical applicability in complete denture fabrication [4,16].

Furthermore, patient-reported outcomes revealed a strong association between impression accuracy and overall satisfaction, emphasizing the importance of incorporating patient-centered evaluation in prosthodontic practice.

From a clinical perspective, the adoption of a standardized impression protocol combining elastomeric materials with selective pressure techniques is recommended to optimize both functional outcomes and patient satisfaction.

Further well-designed studies with larger sample sizes and objective assessment methods are necessary to confirm these findings and enhance their generalizability.

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