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Digital Vs Conventional Impression: Comfort, Perception and Preference Among Prosthodontic Patients – An in Vivo Study

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ABSTRACT:

Objective: *To compare patient comfort, perception, and overall preference between traditional impressions and digital intraoral scanning in prosthodontic patients.*

Materials and Methods: *A cross-sectional in vivo study was carried out in 27 dentulous and partially edentulous patients needing prosthodontic rehabilitation. All participants were subjected to both traditional alginate impressions as well as digital intraoral scanning. Parameters such as gag reflex, ease of breathing, dryness in the mouth, stress, uneasiness, time, and overall preference were evaluated using a structured 16-item questionnaire containing a 5-point Likert scale. Statistical analysis was carried out using Mann–Whitney U test with significance at $p < 0.05$.*

Results: *Patients noted much less gagging reflex with digital impressions (3.37 ± 0.97) than with conventional (2.81 ± 0.92; $p = 0.042$). Dry mouth was greater with digital (2.04 ± 0.90; $p = 0.003$) than conventional impressions (2.70 ± 0.91). Stress ($p = 0.250$), tooth sensitivity ($p = 0.921$), and appointment time ($p = 0.841$) did not show significant differences. Patient preference was largely digital impressions (4.22 ± 0.42) over traditional (3.07 ± 0.87; $p < 0.001$), with 100% of patients demonstrating favourable leaning towards digital processes.*

Conclusion: *Digital impressions yielded better patient comfort, lower gag response, and were thus a strong preference over traditional impressions. These findings highlight the need for the integration of intraoral scanners into everyday prosthodontic practice to improve patient experience and treatment acceptance.*

Keywords: *Digital impressions; Traditional impressions; Intraoral scanner; Patient comfort; Prosthodontics; Patient preference*

INTRODUCTION

The success of prosthodontic rehabilitation greatly relies on the precision of dental impressions, which serve as the base for the construction of properly fitting prostheses. An impression has been defined by Glossary of Prosthodontic Terms (10th edition, 2023) as "a negative likeness or copy in reverse of the surface of an object; an imprint of the teeth and adjacent structures for use in dentistry" (1). Conventionally, elastomeric and alginate-based impressions have been the standard for taking intraoral tissues because they are widely available, cost-effective, and provide good clinical results (2,3). These materials, however, have patient-related disadvantages including gag reflex, bad taste, discomfort in breathing, and anxiety about the procedure, all of which affect patient compliance and acceptance of prosthodontic therapy (2,3).

In the past decades, the availability of intraoral scanners (IOS) has transformed impression-making by removing most of the disadvantages linked with traditional methods. Digital impressions come with a number of advantages, such as decreased material distortion, removal of physical casts storage, immediate chairside visualization, and the transmission of data electronically for computer-aided design and manufacturing (CAD-CAM). Additionally, digital impressions have been demonstrated to enhance

patient comfort by bypassing cumbersome trays and impression material, thereby reducing gag reflex and procedural anxiety (4,5).

Literature confirms the precision and effectiveness of digital impressions for most prosthodontic indications. Clinical trials and systematic reviews have shown comparable or enhanced trueness of digital impressions compared to conventional techniques, notably for single-unit restorations and short-span fixed partial dentures (6,7). Adoption of intraoral scanners, however, depends not only on precision and effectiveness but also on patient-oriented factors including comfort, perception, and general preference in influencing clinical decision making (8,9).

Patient satisfaction is an important determinant of treatment success. Results of research in the last five years show that patients often report digital impressions as less painful and less invasive than traditional approaches, with the lack of impression material, reduced gag, and perceived quicker procedure times mentioned as significant advantages (10,11). In contrast, however, some of the issues with digital workflows remain, such as greater initial expense, scanning errors, and learning curves for operators. Notwithstanding these drawbacks, the growing need for CAD-CAM prostheses highlights the need to know how patients view and prefer various impression methods (12).

Therefore, this in vivo study was designed to directly compare comfort, perception, and preference between conventional impressions and digital intraoral scanning in prosthodontic patients. By using a structured questionnaire and statistical evaluation, the present study aims to provide evidence-based insights into patient-reported outcomes, thereby guiding clinicians in selecting impression techniques that enhance both accuracy and patient satisfaction.

MATERIAL AND METHOD

Study Design and Setting

It was an in vivo cross-sectional study carried out within the Department of Prosthodontics of a private dental college and hospital, for assessing patient-reported outcomes of digital compared to conventional impressions. Ethical permission was granted by the Institutional Review Board, and informed consent was obtained from all participants before they were included.

Sample Selection

A total of 27 patients requiring fixed or removable prosthodontic rehabilitation were recruited. Inclusion criteria were: (i) patients requiring diagnostic or definitive impressions, (ii) cooperative attitude, and (iii) ability to provide informed feedback. Patients with severe gag reflex disorders, restricted mouth opening, or contraindications for impression making were excluded.

Impression Techniques

Traditional Impression: Upper and lower arch impressions were obtained by stock trays and irreversible hydrocolloid (alginate) impression material (Tropicalgin®, Zhermack, Italy). Standard mixing, tray loading and seating procedures were carried out as per manufacturer guidelines.

Digital Impression: All participants also received intraoral scanning of the two arches with a chairside intraoral scanner (Medit i500®). Scanning was done by an experienced operator in accordance with manufacturer instructions.

Questionnaire and Data Collection

Every participant was given a validated questionnaire with 16 items immediately after both impression procedures. The responses were noted on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

During Conventional Impression(alginate) *

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
I did not have a gag reflex	○	○	○	○	○
I could easily breathe	○	○	○	○	○
I had no feeling of dry mouth	○	○	○	○	○
The appointment for the impression did not last long	○	○	○	○	○
I had no stress for the appointment	○	○	○	○	○
I did not had teeth sensitivity	○	○	○	○	○
Less time consumed	○	○	○	○	○
No discomfort on mouth opening	○	○	○	○	○

Section A (Traditional Impressions): 8 questions (gag reflex, breathing ease, dry mouth, time, stress, tooth sensitivity, time taken, discomfort). (Table 1)

Table 1-Section A (Traditional Impressions) 8 set of questions

During Digital Scanning *

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
I did not have a gag reflex	○	○	○	○	○
I could easily breathe	○	○	○	○	○
I had no feeling of dry mouth	○	○	○	○	○
The appointment for the impression did not last long	○	○	○	○	○
I had no stress for the appointment	○	○	○	○	○
I did not had teeth sensitivity	○	○	○	○	○
Less time consumed	○	○	○	○	○
No discomfort on mouth opening	○	○	○	○	○

Section B (Digital Impressions): 8 questions over the same categories for intraoral scanning. (Table 2)

Table 2- Section B (Digital Impressions):8 set of questions

Which impression will you prefer *

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Conventional alginate impression	○	○	○	○	○
Digital impression	○	○	○	○	○

Section C (Preference): 2 questions assessing overall preference between traditional or digital impressions. (Table 3)

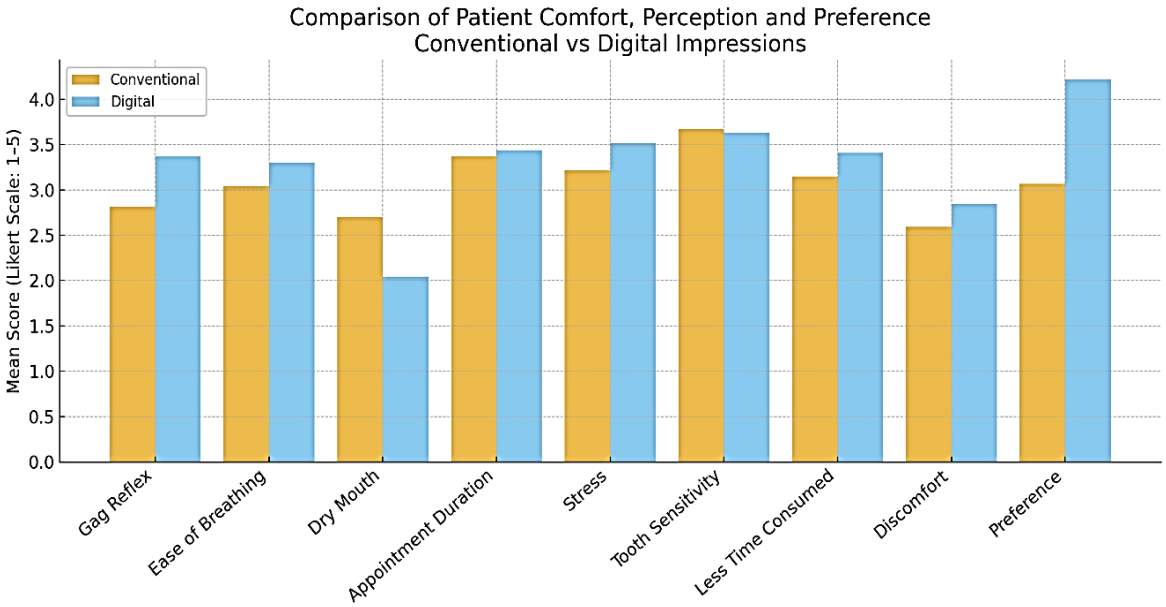
Table 3- Section C (Preference): 8 set of questions

Statistical Analysis

All answers were tabulated and categorized for statistical analysis with IBM SPSS Statistics version 26 (IBM Corp., Armonk, NY, USA). Descriptive statistics (frequency, percentage, mean ± standard deviation) of each parameter were obtained. Intergroup comparison between traditional and digital impressions was done using the Mann–Whitney U test since data were ordinal in nature. A significance level of $p < 0.05$ was taken to be statistically significant.

RESULTS

A total of 27 patients participated in the study, each undergoing both conventional (alginate-based) and digital intraoral scanning impressions.



Graph 1 - Comparison of patient comfort, perception and preference conventional vs Digital Impression

Responses were collected using a 5-point Likert scale and analysed using the Mann–Whitney U test for intergroup comparisons.

1. Comfort-related outcomes

Gag reflex: Digital impressions produced a much greater mean score (3.37 ± 0.97) than conventional impressions (2.81 ± 0.92), showing less gagging when intraoral scanning was used ($U = 252.5$, $p = 0.042$).
Ease of breathing: There was no statistical difference ($p = 0.403$), though digital scans (3.30 ± 0.87) indicated somewhat higher scores than traditional (3.04 ± 1.06).
Dry mouth feeling: Digital scans (2.04 ± 0.90) were linked with higher complaints of dryness conventional impressions (mean = 2.70 ± 0.91) compared to, and the difference was statistically significant ($U = 213.5$, $p = 0.003$).

2. Procedural experience

Time of appointment: Both groups rated equally (conventional 3.37 ± 0.79, digital 3.44 ± 0.75), with no significant difference ($p = 0.841$).
Stress for appointment: Digital impressions (3.52 ± 0.75) were ever so slightly higher than conventional (3.22 ± 0.89), though the difference was not significant ($p = 0.250$).
Tooth sensitivity: Both groups registered similar levels ($p = 0.921$).
Perceived time consumption: Digital scans (3.41 ± 0.80) was time efficient to conventional (3.15 ± 0.77), but again, the difference was not significant ($p = 0.274$).
Discomfort on mouth opening: Both techniques presented comparable responses ($p = 0.467$).

3. Patient preference

General preference: There was a statistically significant difference ($U = 97.5$, $Z = -5.028$, $p < 0.001$). Digital impressions scored a mean of 4.22 ± 0.42 versus 3.07 ± 0.87 for conventional.
77.8% of the patients "agreed" and 22.2% "strongly agreed" that they preferred digital impressions, while only 29.6% preferred conventional methods.

DISCUSSION

This in vivo research compared digital intraoral scanning with traditional impressions from the perspective of patient comfort, perception, and preference. Results show a definitive preference for digital impressions, which were linked with less gag reflex, and overall, statistically significant preference.

Comfort and gag reflex

One of the most frequent reported discomforts that occur in impression procedures is gagging. Our research indicated greatly reduced gag reflex in the digital group ($p = 0.042$). This is in accord with Burhardt et al. (2016) and Miyoshi et al. (2023), who indicated that intraoral scanners minimize the

psychological and physiological stimuli of gag reflex by removing cumbersome trays and impression material.

Dry mouth and taste-related discomfort

Patients indicated much more sensation of dry mouth in digital scanning ($p = 0.003$). Findings were contradictory as suggested by Ahmed et al. (2024) in their systematic review.

Time perception and procedural stress

Despite digital scanning being viewed as a bit quicker and less stressful, statistical differences were minor. This is contrary to Zimmermann et al. (2022) and Revilla-León et al. (2024), who all determined digital impressions consistently shorten chairside time.

Overall preference

The most significant finding was the predominant patient preference for digital impressions (mean = 4.22, $p < 0.001$). This is also in agreement with Alqahtani et al. (2021) and Mangano et al. (2025), who identified patient-reported comfort and satisfaction as a determining parameter for the adoption of digital dentistry.

Clinical implications

Patient acceptance: The study attests that patient experience overwhelmingly and favor intraoral scanners, which could enhance compliance and ease of anxiety during prosthodontic treatment.

Digital workflow integration: Since majority of patients would opt for digital impressions, it is advisable for prosthodontists to adopt intraoral scanners as part of regular practice.

Education: Only a few patients indicated familiarity with digital scans, so patient education regarding digital workflows could potentially enhance acceptance.

Limitations of the study

- Small sample size (n = 27).
- Single-site design could limit generalizability.
- Outcomes concentrated on subjective patient-reported parameters; accuracy and prosthesis fit were not measured.

Future directions

There is a requirement for larger multicentre studies with long-term follow-up of outcomes of prostheses and diverse populations. Cost-effectiveness and clinical efficiency of digital impressions in everyday prosthodontics should be investigated by research.

CONCLUSION

Within the confines of this study, it can be inferred that digital intraoral scanning was more comfortable and acceptable for patients than the traditional alginate impressions

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