Impression Techniques for Fixed Partial Denture : A Systematic Review

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ABSTRACT

These articles are search forms from published databases; electronic databases are searched using the terms MeSH (Medical Subject Headings), search terms, and their combinations: "impression techniques" and "fixed dentures." Ninety-seven journals explain this, with only nine journals that meet the inclusion criteria. The results of one-step impression techniques using polyether and polyvinyl siloxane indicate no accuracy on the impression material. In the two-step technique, smaller porosity occurs on impression material, yet it takes longer divided into putty and light body impression. One-step and two-step techniques are acceptable for many clinicians. This study suggests there aren't significant differences between the one-step and two-step impression techniques in the buccal section. Still, there were significant differences between both impression techniques in the mesial and distal region.

INTRODUCTION

The impression process involves transferring the soft tissue and hard tissue from the patient to impression material as a part of prosthetic treatment.¹ Anatomical impressions on soft and hard tissue must be obtained accurately, including the ends of the line, the impression material used must be precise, and the accuracy of the impression technique, precise and specific impressions are very important.² Impression techniques are crucial to the end of the final restoration. Besides, the importance of preparation limits and impression techniques on the adaptation of marginal preparations shows the need to apply appropriate impression techniques.³ Accurate impression techniques can be seen when restoring the appropriate marginal adjustments and the minimum distance after preparation.^{2,4}

Silicone materials most commonly used in dentistry for the reproduction of the mouth's structure because of the accuracy and high dimensional stability. Condensation silicone elastomeric material is in a group of print. The settings are obtained by the polycondensation crosslinking reaction of hydroxyl-terminated polysiloxane prepolymer tetra alkoksisilan, catalyzed by dibutyl-tin dilaurate (DBTD).⁵ The advantages of silicone condensation are a good fit when poured quickly after collection and excellent elastic recovery after making an impression from the mouth. The disadvantages are hydrophobicity, reduced impression with an interval (up to 4 hours) and the possibility of an allergic reaction caused by a catalyst.6,7

In a few decades, it was reported as the most accurate reproduction of dimensional stability and surface by the addition of silicone mold. Much of its success is attributed to its excellent physical properties and handling characteristics. Additional silicones were introduced as dental molding materials in the 1970s. Polyvinyl siloxanes have become very popular over the past decade. These materials have excellent physical properties. Unmatched material accuracy and materials can record better details. This silicone material also has the best elasticity of all available materials. Because almost Keywords: Fixed Denture, Impression Techniques, Silicone.

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no other product from the polymerization reaction, this material is dimensionally stable. Two impression techniques are commonly used. There are two, namely, the one-step putty washing technique and the two-step putty washing technique, namely aiming with a spacer and taking an impression without a spacer. The accuracy of the molded material depends on the technique and type of technique used.⁸

The single-step technique in both materials combines two materials, reducing time and saving material use. Although time is a limiting factor because professionals must accommodate both high consistency materials before the material harden or setting time, this technique produces independently accurate prints of curing kinetic from syringed material.^{9,10,11} a one-step technique with polysiloxane vinyl or polyether produces highly accurate prints based on the literature. The two-step technique for initial impression uses a high viscosity material, while a low viscosity material is used for the final impression. Although the two-step technique is widely used and can offer excellent accuracy, some problems can occur with this technique, such as changing dimensions, longer shooting times, and badly needed materials. Light body and putty impression materials, putty and medium body, or heavy body and light body can be used in one-step or two-step procedures.12,13,14

METHODS

The articles are in the form of data search forms to make research protocols. PICO questions (Population (P), Interventions (I), Comparison (C), Results and Study Design (O), define search strategies, where P = patients with fixed restorations, I = fixed dentures, C = impression techniques, O = accurate prints: Electronic databases are searched using the MeSH terms (Medical Subject Headings), search terms, and their combinations: "impression techniques" and "fixed dentures." Ninety-seven journals explain this, with only nine journals meeting the inclusion criteria. Study selection and eligibility criteria

Inclusion criteria based on all selected journals and abstracts were reviewed for the following:

- English article
- Impression techniques
- The journal includes information about fixed dentures
- The studies report information about types of impression technique in fixed denture
- The journal contains information about ideal impression techniques

Exclusion criteria were all journals that did not meet the criteria mentioned above, as with animal studies, treatment with complications was not included in this study. After reading the full text of the article, the data was evaluated with predetermined exclusion criteria. To identify articles for this systematic review used the eligibility criteria.

Data extraction

Data was reviewed by three authors (AJ, ID, and EJ) regarding the following parameters: fixed restoration type, impression technique. All full texts that meet the inclusion criteria are read independently and evaluated to formulate this systematic review.

RESULT

The database search resulted in 97 references from PubMed. Titles and abstracts were reviewed, and 14 studies met the requirements for further analysis. The full text has been reviewed by authors and produced nine articles that met the inclusion criteria. The flowchart of article selection is shown in figure 1, with a total of 9 articles selected from the initial results of 49 studies by electronic literature searches. After 97 full-text titles were reviewed, nine articles were selected to be included in this systematic review, while 88 other articles were excluded for various reasons (see Table 1).

DISCUSSION

According to Poonam R et al. stated that it is associated with the selection of viscosity of impression materials for the dimensions of buccolingual and mesiodistal parts. The accuracy of the impression material depends on the length of setting the time on the content and the ideal impression technique.

Following Borjan N, et al. recommend using two-step or double mix techniques to make accurate prints because of spacers for light bodies. Eduardo Batista et al., porosity in a one-step technique occurs when using polyether and vinyl polysiloxane, which shows no accuracy in impression materials. In the two-step technique, smaller porosity occurs but takes a long time to do due to separate putty and light body impression.

In addition to the consideration of accurate printing techniques, it requires collaboration between clinicians and patients. Ladan J, et al. explain the significant differences between impression techniques in the middle of the mesial, distal, and all surface.

CONCLUSION

One Step and two-step techniques are accepted by many operators and reported no significant difference in most studies. The findings of several studies showed no significant difference between the one-step and two-step impression techniques in the buccal section. The significant differences were observed between the two printing techniques in the middle of the mesial, distal, and all surface (p<0.05). Therefore, it can be said the accuracy of the two-step technique is higher than the one-step technique. However, the marginal gap in both techniques is clinically acceptable (the marginal difference is less than 120 μ m) and recommended.

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Author (y)	Type of Study	Region	Number of model master (n)	Type of impression techniques
Poonam R et al. (2017)	Prospective Study	Asia (India)	300	Two-Step
Anshul chungh, et al. (2012)	Prospective Study	Asia (India)	10	Two-Step
Eduardo Batista, et al. (2011)	Prospective Study	America (Brazil)	10	Two-Step
Ladan J, et al. (2016)	Prospective Study	Afrika (Iran)	20	Two-Step
Shifra L, et al. (2013)	Prospective Study	Africa (Israel)	10	Two-Step
Satheesh BH, et al. (2016)	Prospective Study	Asia (Arab Saudi)	5	Two-Step
Sami D, et al. (2015)	Case Report	America (Washington)	20	One Step and two Step
Varvara et al. (2014)	Prospective Study	Europe (Italy)	20	Two-Step
Usama N, et al. (2014)	Prospective Study	America (Canada)	10	One Step and two Step

 Table 1. Descriptive data from 9 included studies of reported criteria using fixed denture impression techniques



Figure 1. Article selection flow chart