



ORIGINAL RESEARCH PAPER

Dental Science

SURVEY OF CURRENT MATERIALS AND IMPRESSION TECHNIQUES FOR COMPLETE DENTURES AMONG KASHMIRI PROSTHODONTISTS

**KEY WORDS:** complete denture; custom tray; edentulism; impression.

<b>Mohammad Arif Lone*</b>	Lecturer Department of Prosthodontics Government Dental College Srinagar J&K *Corresponding Author
<b>Shazia Mir</b>	Associate Professor Department of Prosthodontics Government Dental College Srinagar J&K
<b>Ubaid Iqbal Shah</b>	Assistant Professor Department of Prosthodontics Government Dental College Srinagar J&K

ABSTRACT

**Background:** Impression making is one of the critical factors in determining success or failure of complete denture therapy. The precise reproduction of edentulous foundation is essential for retention, stability, and support of the removable prosthesis. Evidence suggests that there is variability in materials and techniques regarding impressions making for complete dentures. There is little published information on studies conducted among Kashmiri Prosthodontists. The purpose of this study was to evaluate current materials and methods for impressions for complete denture prosthodontics in Kashmir.

**Materials & Methods:** A questionnaire based survey was conducted among Kashmiri Prosthodontists. A self-administered anonymous questionnaire was distributed to the participants. Data were analyzed by using frequency distribution.

**Results:** Majority of responses indicated use of irreversible hydrocolloid in stock metal tray for making the preliminary impression. The selective pressure was the predominantly used impression philosophy (78.3%). The most common material for the fabrication of custom trays was auto polymerizing acrylic resin (96.7%). All respondents border molded the custom tray prior to making the final impression. The final impression materials used were zinc oxide eugenol impression paste (73.3%), polyvinylsiloxane (11.7%), polyether (11.7%) and polysulphide (3.3%).

**Conclusion:** Although there is variability in impression materials and techniques used by Prosthodontists in Kashmir for the fabrication of complete dentures, the results showed interesting trends. Most practitioners followed the traditional techniques of complete denture impression procedures.

INTRODUCTION

An impression is a registration of intraoral hard and soft tissues made with an impression material.<sup>1</sup> Success of complete denture (CD) primarily depends on precision of impression, which requires an in-depth knowledge of biomechanics of denture bearing foundation and properties of impression materials.<sup>2</sup> Complete denture impressions are believed to be one of the critical factors in determining success or failure for patients wearing CD.<sup>3</sup> The precise replication of the denture bearing foundation is necessary for the retention, stability and fit of CD.<sup>4,6</sup> In last decade, the surge of innovative impression materials has led to the evolution in the theories of impression making resulting in the development of better techniques. Investigators have suggested using elastomeric materials over older traditional materials like zinc oxide impression paste for complete denture impressions.<sup>7,9</sup> There are various advantages of using elastomers, which includes superior details and accuracy, good dimensional stability, superb elastic recovery and flexibility, ease of handling and options of multiple pour.<sup>10-13</sup> However, there is lack of agreement regarding impression materials and techniques for CD denture among dental practitioners.<sup>14-21</sup>

Studies have been done to find out the preference of materials and techniques used for impression making in CD in different parts of the world. Evidence suggests that there is variability in choice of the materials and techniques for CD impressions making among practitioners. A diverse range of clinical preferences exists.<sup>22-25</sup> But, to our knowledge there is little published information of such studies conducted in Kashmir. The purpose of this survey is to assess current trends in CD impression making among Kashmiri Prosthodontics.

MATERIALS AND METHODS

A questionnaire-based survey was conducted among Prosthodontists practicing in Kashmir. A pre-tested questionnaire from a published study was used for the study.<sup>22</sup> A self-administered questionnaire consisting of 16 close-ended questions was distributed to the participants and the researcher facilitated the respondents. All the participants remained anonymous throughout the survey. Data was entered in Statistical Package for Social Sciences (SPSS) version 17 for descriptive analysis using frequency distributions.

RESULTS

Of the 70 questionnaires distributed among Prosthodontists practicing in Kashmiri, 60 were returned ensuing in the total response rate of 83%. When inquired about the kind of tray used for making preliminary impression, 95% responded that they use stock metal tray for making the preliminary impression. Only 3.3% reported that they use stock plastic tray. Of the respondents those fabricated custom tray, 58.3% preferred to construct the tray a few days prior to final impression making, others made few hours before on the day of procedure.

The material of choice for preliminary impression was irreversible hydrocolloid (alginate) (66.7%); 15% of practitioners showed using modeling plastic impression compound. A majority of the respondents (78.3%) favored selective pressure impression philosophy. 15% indicated using the mucostatic technique and 6.7% employed the mucocompressive technique. Most of the practicing prosthodontists used self-cure acrylic resin for the fabrication of custom trays (96.7%).

Majority of respondents (75%) used peripheral limiting structures for marking the periphery on the primary cast which was used to determine the extensions of the custom tray, 18.5% marked the borders on the primary impression and the remaining 6.7% used both the techniques. 90% used a wax spacer while fabricating the custom tray and similarly 95% preferred incorporating tissue stops in the special tray.

All respondents border molded the custom tray before taking final record. 88.3% recorded the borders in sections, 10% simultaneously recorded all the borders and 1.7% reported using both the techniques. The most widely used material for peripheral tracing of the custom tray was modeling plastic impression compound (95%), followed by wax (5%).

The final impression materials used were zinc oxide eugenol impression paste (73.3%), polyvinylsiloxane (11.7%), polyether impression material (11.7%) and polysulphide impression material (3.3%).

Respondents were queried regarding correction of minor deficits in the final impression. 70% reported that they corrected minor

deficits with dental wax. With regards to determining depth of post dam area, majority (75%) determined the depth by palpating with T- burnisher, 23.3 % determined it arbitrarily and 1.7% used both the techniques.

Most of the respondents (78.3%) usually instructed their patients to discontinue wearing existing complete dentures 24 hours prior to making impression .

With regards to locating the junction of hard and soft palate, the most common technique reported was delineating it in patient's mouth chair side followed by transferring it to the final impression (88.3%).

## DISCUSSION

With the unprecedented upsurge in life expectancies of individuals, there has been increase in the prevalence of edentulism, which has increased the need for prosthetic rehabilitation of edentulous patients with complete dentures to restore masticatory function and esthetics.<sup>26</sup> Complete denture impression making are considered as most vital step in the denture fabrication procedure.<sup>22</sup>The objectives of impression making are to capture all potential denture-bearing surfaces and tissues to provide support, retention, and stability for dentures under function.<sup>26</sup>

The expansion in the spectrum of available impression materials and techniques has enabled dentist to select a suitable one based on conditions of denture bearing foundation along with properties, clinical applications and limitations of the available impression materials.<sup>20,26</sup> The findings of this survey reveal inconsistencies in the choice of impression materials and techniques used by Kashmiri Prosthodontics for CD fabrication.

The impression tray is the most important part of impression making procedures which facilitates the dentist to transport the material to the mouth and confine and control it without distortion.<sup>26</sup> In the present study majority of respondents (95%) used stock metal trays for preliminary impressions. Preference of using stock metal trays for preliminary impression has been cited in previous studies.<sup>23,25</sup> However, a recent study of postdoctoral Prosthodontic curriculums in the US revealed that there was almost equal preference for both metal and plastic trays.<sup>22</sup>

This research exhibited that the majority of Kashmiri prosthodontist used alginate (66.7%) for making preliminary impression. Currently, alginate is universally used impression material for primary impression.<sup>26</sup>There has been arise in the usage of high viscosity alginate among practioners in US, UK, India and Pakistan.<sup>25</sup>

In the current survey all the respondents performed both primary and final impressions. The custom tray was border-molded prior to final impression procedure. This finding coincides with the findings from previous surveys.<sup>15,21-23</sup> The most preferred material for the fabrication of custom trays was autopolymerizing acrylic resin (96.7%). These findings are in agreement with earlier studies.<sup>15,16,21</sup> 58.3% preferred to construct the custom tray a few days prior to making final impression. These results are in agreement with from former studies.<sup>22,23</sup>

In present survey, the most widely used border molding material was modeling plastic impression compound (95%). The results are in agreement with the previous studies.<sup>15-17, 19-21</sup> A majority of the respondents (78.3%) revealed that they followed selective pressure impression philosophy which is consistent with the findings of previous studies.<sup>15,17,20,22,26</sup>

Evidences indicate that there exist noticeable differences in the choice of final impression materials in different geographic regions. Analysis of the surveys conducted in the western countries reveals that metallic oxide pastes have fallen from popularity and there is predilection in use of elastomeric impression materials; initially polysulfide and recently polyvinylsiloxanes.<sup>15,16,20,22</sup>In striking contrast to this result, majority of respondents in the current survey used zinc oxide eugenol impression paste for final impression. This

finding coincided with the findings from studies conducted among practioners in South East Asia.<sup>23,27</sup> The possible explanation for the preferred use of zinc oxide eugenol in this region could be its cost effectiveness and the difference in teaching and training in dental schools.

## CONCLUSION

Although this survey showed inconsistencies in complete denture impression procedures and choice of available impression materials among Kashmiri prosthodontists, the results showed following interesting trends:

1. Majority of respondents used irreversible hydrocolloids in a stock metal trays for preliminary impressions.
2. Vast majority of prosthodontists performed sectional border molding in autopolymerising acrylic resin custom trays using modeling plastic impression compound
3. The largely used impression philosophy among majority of respondents was selective pressure technique.
4. The material of choice for final impression was zinc oxide eugenol impression paste.

## REFERENCES

1. Devan MM. Basic principles in impression making. *J Prosthet Dent.* 2005;93:503-8.
2. Rao S, Chowdhary R, Mahoorkar S. A systematic review of impression technique for conventional complete denture. *J Ind Prosthodont Soc.* 2010;10:105-11.
3. Sharry J. Complete Denture Prosthodontics (3rd ed.). New York: McGraw-Hill, 1974:191-211.
4. Halperin AR, Graser GN, Rogoff GS. Mastering the art of Complete Dentures (1st ed.). Chicago: Quintessence 1988:31-34.
5. Davis DM. Developing an analogue for the maxillary denture-bearing area. In Zarb GA, Bolender CL, Carlsson GE, editors. Boucher's prosthodontic treatment for edentulous patients (11th ed.). St. Louis, MO: Mosby; 1997. p. 141-61.
6. Smutko GE. Making edentulous impressions. In Winkler S, editors. Essentials of Complete Denture Prosthodontics (2nd ed.). Littleton, MA: PSG Publishing Company; 1988. p. 88-102.
7. Felton DA, Cooper LF, Scurria MS. Predictable impression procedures for complete dentures. *Dent Clin North Am.* 1996;40:39-51.
8. Chaffee NR, Cooper LF, Felton DA. A technique for border molding edentulous impressions using vinyl polysiloxane material. *J Prosthodont.* 1999;8:129-34.
9. Loh PL. An alternative for making master impressions for complete dentures. *J Am Dent Assoc.* 1997;128:1436-37.
10. Chee WW, Donovan TE. Polyvinylsiloxane impression materials: a review of properties and techniques. *J Prosthet Dent.* 1992;68:728-32.
11. Johnson GH. Impression materials. In Craig RG, Powers JM, editors. Restorative Dental Materials (11th ed.). St. Louis, MO: Mosby-Year Book; 2002. p. 348-68.
12. Mandikos MN. Polyvinylsiloxane impression materials: an update on clinical use. *Aust Dent J.* 1998;43:428-34.
13. Shen C. Impression Materials. In Anusavice KJ, editors. Phillips' Science of Dental Materials (11th ed.). Philadelphia: Saunders; 2003. p. 210-30.
14. Buckley GA. Diagnostic factors in the choice of impression materials and methods. *J Prosthet Dent.* 1955;5:149-61.
15. Petrie CS, Walker MP, Williams K. A survey of U.S. Prosthodontists and dental schools on the current materials and methods for final impressions for complete denture prosthodontics. *J Prosthodont.* 1955;14:253-62.
16. Hyde TP, McCord JF. Survey of prosthodontic impression procedures for complete dentures in general dental practice in the United Kingdom. *J Prosthet Dent.* 1999;81:295-99.
17. Levin B, Sauer JL. Results of a survey of complete denture procedures taught in American and Canadian dental schools. *J Prosthet Dent.* 1969;22:171-77.
18. Jagers JH, Javid NS, Colaizzi FA. Complete denture curriculum survey of dental schools in the United States. *J Prosthet Dent.* 1985;53:736-39.
19. Taylor TD, Aquilino SA, Matthews AC. Prosthodontic survey Part II: removable prosthodontic curriculum survey. *J Prosthet Dent.* 1984;52:747-49.
20. Vicki CP. Current concepts and techniques in complete denture final impression procedures. *J Prosthodont.* 2003;12:280-87.
21. Arbree NS, Fleck S, Askinas SW. The results of a brief survey of complete denture prosthodontic techniques in predoctoral programs in North American Dental Schools. *J Prosthodont.* 2005;5:219-225.
22. Mehra M, Vahidi F, Berg RW. A complete denture impression technique survey of postdoctoral prosthodontic programs in the United States. *J Prosthodont.* 2014;23:320-27.
23. Samejo I, Butt AM, Sahito MA. A survey on current impression techniques and Materials used for complete denture fabrication by private dental practitioners in Sindh. *Pak Oral Dent J.* 2016;36:144-47.
24. Alqattan WA, Alalawi HA, Khan ZA. Impression techniques and materials for complete denture construction. *Dent Health Curr Res.* 2016; 2:1-3.
25. Koodaryan R, Hafezeqoran A. Attitude of dental practitioners towards complete denture impression procedures. *Biomed Pharma J.* 2016;9: 345-48.
26. Zarb G, Hobkirk J, Eckert S, Jacob R. Prosthodontic treatment for edentulous patients (13th ed.). St. Louis, MO: Mosby; 2014. p. 171-75.
27. Kakatkar VR. Complete denture impression techniques practiced by private dental practitioners. *J Indian Prosthodont Soc.* 2013;13: 233-35.