

A SURVEY ON CURRENT IMPRESSION TECHNIQUES AND MATERIALS USED FOR COMPLETE DENTURE FABRICATION PRACTICED BY PRIVATE DENTAL PRACTITIONERS IN SINDH

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ABSTRACT

The purpose of the study was to evaluate which impression materials and techniques are used by private dental practitioners for fabrication of complete denture in Sindh, Pakistan.

In this cross-sectional study, structured questionnaires consisting of 10 questions regarding complete denture impression materials and techniques was prepared and randomly distributed among 150 dentists in Sindh, Pakistan.

The response rate was (85%) in this survey. (78%) practitioners used stock metal tray for primary impressions. The irreversible hydrocolloid was the material of choice for preliminary impression by (76%). Custom tray for final impression by (89%). Self cure acrylic resins was the most commonly used material for the custom tray fabrication by (92%). Custom tray was made few days prior to make final impression by (82%). Close-fitting trays was preferred by (75%). Mucocompressive technique was the most predominant impression philosophy (77%). The most common materials of Choice for border molding and final impressions were modeling plastic impression compound (90%) and zinc oxide eugenol paste (89%) respectively.

Concerns and issues regarding the non-use of latest impression materials and techniques related to complete denture impressions as well as a lack of understanding of the related concepts of participants were observed.

Key Words: Survey, Complete Denture, Impression Techniques, Impression Materials, Private Dental Practitioner.

INTRODUCTION

Now-a-days, there is much consideration among dentists and health care planners that tooth loss, edentulism, and desire for complete dentures will decline in the future as a result of advancements in preventive dentistry.¹ Nevertheless, a prolonged life time and an enormous increase in the number of older adults are also anticipated in the future. Therefore, the necessity and

demand for complete dentures may be increased.² Even though implant therapy is a substitute for edentulous patients, the long-term treatment duration, increased cost and possible associated systematic disorders may increase the need for conventional complete dentures.³ The fabrication of conventional complete dentures is an indirect dental prosthetic process.⁴ Early in the treatment sequence, a similarity of oral conditions must be developed to proceed with denture construction. The degree to which this similarity accurately represents a detailed simulation of oral conditions, both anatomically and mechanically, regulates in large part the quality of the treatment outcome.⁵ In complete denture fabrication procedure multi-step process probably incorporates erroneousness in the final prosthesis. Hence, multiple reports have been reported justifying the different impression materials and techniques used for the success of complete denture fabrication in different clinical situations.⁶ Impression making is an essential step for complete denture construction. Success of complete dentures

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Received for Publication: February 2, 2016
Received: March 11, 2016
Approved: March 12, 2016

mainly depends on precision of impression.⁷ Based on the particular condition, dentist wants to select impression materials and techniques for success of complete denture fabrication. Impression making is still widely debatable area of complete denture construction.⁸ The complete denture impression procedures are essential in that they impart a border seal with proper extensions that result in a stable and retentive denture base.⁹ In addition, several techniques for complete denture impressions are employed subject to the clinical situation, grouped as, mucostatic, mucocompressive and selective pressure. One important aspect of this oral simulation involves making impressions of the denture-bearing and peripheral structures and fabricating the dental casts. Techniques used to make dental impressions of edentulous patients have been known to the profession for many decades.¹⁰ Traditionally, Preliminary impression of edentulous mouth is recorded using stock trays and custom trays are used for final impressions.⁸ The design and spacing of spacer for custom tray depends on final impression material.¹¹ Custom impression trays may be designed using chemical-activated resins or light-activated resins.¹² Impression compound has long been taught for primary impression for complete denture in undergraduate curriculum; nevertheless, support for the use of alginate material has been reported.¹³ Selective pressure technique was the most predominant impression philosophy along with use of low fusing impression compound border molding have been reported in survey conducted in the dental schools of United States. Zinc oxide eugenol paste has traditionally been recommended for final impression.¹⁴ However, recently, elastomeric impression materials have also been considered appropriate for functional border molding and final impression.¹⁵ In the last decade, the use of newer elastomeric materials such as polyvinylsiloxane and polyether for final impressions has been recommended by several investigators to replace the relatively older and more traditional materials. The basis for using newer elastomeric materials for final impressions is their improved physical and mechanical properties including superior detail reproducibility, improved dimensional accuracy and stability, excellent elastic recovery, ease of handling and multiple casts can be produced from the same impression.¹⁶

Many surveys on complete denture procedures have been conducted in the past. These surveys have been conducted in the schools, laboratories and general prosthodontic practitioners in United Kingdom and United States.^{4,6-9,11,13,14} Only a few such surveys have been done in Pakistan.¹⁷ There is no sufficient information available regarding the various techniques and materials utilized by private dental practitioners.

Therefore, this study was conducted to know which materials and techniques are used by private dental

practitioners regarding complete denture fabrication.

METHODOLOGY

A cross sectional study was conducted among general private dental practitioners in Sindh, Pakistan. A questionnaire was prepared and randomly distributed among 150 private dental practitioners by hand, email and through courier practicing in main cities of Sindh, Pakistan. The contact details of the dentists were collected from Pakistan Dental Association. The questionnaire was comprised of ten multiple choice questions regarding impression techniques and materials used in the fabrication of complete denture.

RESULTS

The results are summarized in Table 1.

DISCUSSION

Impression making is a critical step in denture fabrication.¹⁸ Impressions are made with a wide variety of materials and techniques.⁶ The objectives of an impression are to provide retention, support and stability for the denture.⁷

In present study (78%) practitioners used stock metal trays for preliminary impressions. This is in contrast to a recent survey of post-doctoral program of dental schools in the United States, where in almost equal preference for both metal and plastic trays were found.⁷ Although any tray can be used, consistently successful results tend to be produced when rigid trays of appropriate extension are used.¹⁹

The most commonly used preliminary impression material in this survey was irreversible hydrocolloid by (76%). This is in agreement with a previous surveys conducted in India, United States and United Kingdom.^{4,9,14,20,21} This is in contrast to a recent survey conducted in Pakistan, where (93%) practitioners used impression compound for primary impression.¹⁷ Therefore, one possible explanation for the preferred use of impression compound and alginate in the studies could be the difference in teaching and training of pre-doctoral students.

It was found in the current survey (89%) of the practitioners used custom trays. This finding coincides with the findings from a previous surveys.^{4,6,18} This study showed that (92%) practitioners used self-cure (chemical cure) acrylic resin for making custom trays. These findings are in agreement with other surveys.^{4,10,11,18,20} Present study revealed that (82%) practitioners fabricated custom trays a few days before the procedure. This finding coincided with the findings from a previous studies.^{7,21} In this study (76%) practitioners did not use spacers. This is in contrast with a previous Survey conducted in India and United States.^{6,18,21}

TABLE 1: PARTICIPANT RESPONSES IN RELATION TO COMPLETE DENTURE IMPRESSION MATERIALS AND TECHNIQUES

Questions	Response options	Respondents % (no)
1- What type of tray do you use for making primary impression?	Stock metal tray	78.90(101)
	Stock plastic tray	21.09(27)
2- Which material do you use for primary impressions?	Imp. Compound	19.53(25)
	Alginate	76.56(98)
	Elastomeric putty	3.9(5)
3- Which type of tray do you use for final impressions	Plastic stock	7.81(10)
	Metal stock	2.34(3)
	Custom	89.84(115)
4- Which material do you use for custom tray fabrication	Autopolymerizing acrylic resins	92.18(118)
	Light cure acrylic resin	3.12(4)
	Heat processed acrylic resins	4.68(6)
5- When do you fabricate the custom tray? (to prevent distortion)	Few Days before the Procedure	82.81(106)
	Few Hours before the Procedure	17.18(22)
6- Do you use a spacer in the design of the custom tray?	Yes	24.21(31)
	No	75.78(97)
7- Which material do you use for border molding the final impression?	Modeling Plastic Impression Compound (Green Stick)	90.62(116)
	Polyether	5.46(7)
	Polyvinylsiloxane	3.90(5)
8- Which technique do you use for final impression?	Selective pressure	22.65(29)
	Pressure(mucocompressive)	77.34(99)
	Minimally pressure(mucostatic)	0(0)
9- Do you place the relief holes prior to making final impression?	Yes	21.09(27)
	No	78.90(101)
10- Which material do you use for final impression?	Zinc Oxide Eugenol Paste/ Non- Eugenol Paste	89.06 (114)
	Polyvinylsiloxane	3.90(5)
	Alginate	4.68(6)
	Polysulphide	2.34(3)

When no spacer is used, increased pressure could lead to excessive alveolar bone resorption and pressure on sharp bony ridges leads to pain. During mastication, dentures which fit well be likely to rebound when the tissue proceed their normal resting state.²²

In present survey (90%) practitioners used low fusing impression compound for border molding. The results of present study are consistent with the previous studies.^{6,7,8,11,14,20,22,23}

In current study (77%) practitioners used muco-compressive impression technique for final impression. This is in contrast with previous surveys where Selective pressure technique was the predominantly

used impression philosophy.^{6,8,18,22} This might be due to either the practitioners during their clinical training were not taught or they were not confident in having the skills and experiences.

In this study (85%) practitioners did not place vent holes which is in contrast with a survey conducted in United States in 2003.⁶ The purpose of drilling holes in the tray is to allow the final impression material and air to escape and reduce pressure on the tissues and avoid voids in final impression.²²

In current study (89%) practitioners used zinc oxide eugenol/ non eugenol pastes for making final impressions. This is in agreement with past surveys.^{18,10} There

is a striking contrast of this result with the trend in the United States. Chronological study of the surveys in the United States reveal that metallic oxide pastes have, fallen from popularity and been taken over by the use of elastomeric impression materials; initially polysulfide and recently polyvinylsiloxanes.^{4,6-8,11,20,24,25} Some advantages of using elastomeric impression materials are ease of handling and manipulation, dimensional stability, adequate working and setting times, and improvement in properties of these materials.^{6-8,11}

CONCLUSION

Concerns and issues regarding the non-use of latest impression materials and techniques related to complete denture impressions as well as a lack of understanding of the related concepts of participants were observed. Use of strategies for rectification of these is emphasized.

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| 2 Aamir Mehmood Butt: | Contribution in study: Data collection and Critical Review of whole manuscript |
| 3 Muhammad Ameen Sahito: | Contribution in study: Data collection and Data entry |