Alqattan et al., Dent Health Curr Res 2016, 2:1
http://dx.doi.org/10.4172/2470-0886.1000113

Dental Health: Current Research

Research Article A SCITECHNOL JOURNAL

Impression Techniques and Materials for Complete Denture Construction

Wajdy A Alqattan[1], Haidar A Alalawi[2]* and Zahid A Khan[2]

Abstract

Aim: The study aim was to assess present practice concerning impression techniques and materials used for making complete denture in Saudi Arabia.

Materials and Methods: This study was conducted between December 2013 and February 2014 through self-administered survey. The survey tested practice rather than information in complete denture impression techniques and materials. The Self-administered survey tested 22 questions associated with straight forward complete denture construction and 8 Demographic questions. Statistical analyses were performed using the SPSS (Statistical Package for the Social Sciences).

Results: 111 individuals responded to the survey. The response rate was 37%. 56.4% of respondents provide complete dentures regularly in their practice. 91.7% routinely use Irreversible hydrocolloid (Alginate) for preliminary impressions. 83.3% used Custom made (acrylic) tray for making final impression.72.9% did not store the acrylic special tray in water to avoid warpage. 52.4% of practitioners prefer Polyvinyl Siloxane for final impression making. 45.6% used Selective pressure technique for making final impression, while 32.0% used Muco-compressive technique and 22.3% mucostatic technique. Implant supported over denture was most frequently discussed treatment plan options other than conventional complete denture.

Conclusions: There were significant differences toward specific materials or techniques, which revealed different clinical preferences in construction of conventional complete dentures. This study shows the dominance of use of irreversible hydrocolloid in primary impressions making, which coincide with normal practices all over the world.

Keywords

Impression; Techniques; Materials; Complete; Denture; Dental; Saudi Arabia

Introduction

Edentulism is a common problem in geriatric population over 65 years old. In order to restore function and esthetic of edentulous patient complete denture could be provided [1]. Impression making is a critical step in fabrication of complete denture [2]. There are several factors that contribute in successful impression making such as technique used, type of the material, and patient situation. Different techniques for making complete denture impression are given in text books and literature, showing diversity of options. Selection of the proper technique depends on the clinical situation, materials availability, clinician knowledge and experience. The most recognized primary impression materials are alginate and impression compound international according to [3,4]. Grant AA, 1994 presented 3 primary impression materials and a total of 7 techniques for final impressions. Different clinicians offer different solutions to the same problem [5].

Literature review shows that in UK showed that alginate is the most commonly used material for primary impression [6]. In US survey indicates variability in materials and techniques used by prosthodontists for final impressions for the fabrication of complete dentures [7]. There are no local studies done addressing this issue.

The aim of this study was to evaluate current common clinical practice concerning impression materials and techniques used for complete denture fabrication by general dental practitioners (GDP) and specialists in Saudi Arabia.

Materials and Methods

This is a cross-sectional study. This study was conducted between December 2013 and February 2014 through self-administered surveys. The survey was sent to a random sample of 300 dentists from the Saudi Dental Society (SDS) Data Base.

A self-administered survey testing 22 questions associated with straight forward complete denture construction and 8 Demographic questions. The following information was collected: Demographic Information such as gender, age, nationality, Graduation College, working place, working position, working region, and years of practice. Also, the other part of the survey collected the following information regarding complete denture impression materials and techniques: frequency of providing complete denture, history taking methods, primary impression making, primary impression materials, waiting time until pouring alginate impression, type of materials for pouring alginate impression, type of tray used for final impression making, use of laboratory constructed tray, type of materials used for final impression making, special tray handle specification, storing media for acrylic special tray, use of stopper for special tray, waiting time for making final impression for patient with existing complete denture, disinfection materials types, final impression techniques, posterior palatal seal recording method, and alternative treatment plan for conventional complete denture.

Statistical analyses were performed using the SPSS (Statistical Package for the Social Sciences) data analysis software package version 18.0 and a P-value of less than 0.05 was considered significantly different. The study was approved by the Ethics Committee of the College of Dentistry, University of Dammam.

Results

Study subjects were 111 individuals. The response rate was 37%. Figure 1 describes the distribution of participants in different Saudi Arabia main regions. 56.4% of respondents provide complete dentures regularly in their practice. 67.0% take case history orally and 33% through written format. 91.7% routinely use Irreversible hydrocolloid (Alginate) for preliminary impressions and 8.3% prefer to use Impression compound. 86.9% of the study subjects pour

***Corresponding author:** Haidar A Alalawi, College of dentistry, University of Dammam, Kingdome of Saudi Arabia, E-mail: haalalawi@uod.edu.sa

Received: December 18, 2015 **Accepted:** January 25, 2016 **Published:** March 04, 2016

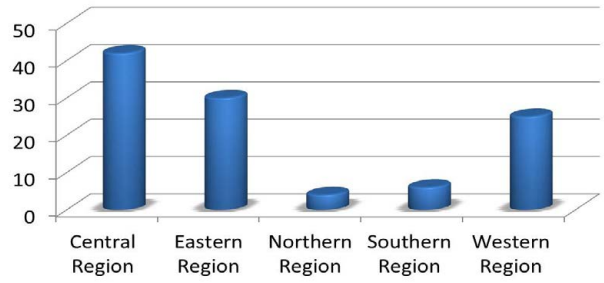

Figure 1: Distribution of participants in different Saudi Arabia main regions.

alginate impressions within 15 minutes; on the other hand 13.1% wait more than one hour to pour the alginate impressions. Dental stone was used by 68.5% of practitioners to pour alginate impressions, and 31.5% used dental plaster. 83.3% of the study subjects used Custom made (acrylic) tray for making final impression. 43.1% of practitioners who used special tray prefer 1.5 mm spaced, non-perforated acrylic resin tray. 98.15 of the study subjects use acrylic resin (52.4% Light-cured acrylic resin and 45.7% Self-cured acrylic resin) while only 1.9% of them use Shellac material. Regarding the handle of special tray 50.8% prefer "L" shaped handle, 35.6% "Stub" shaped in center, 10.2% "Stub" shaped in premolar, and 3.4% No handles. 72.9% Types of special tray used for final impression making are summarized in Table 1. 72.9% did not store the acrylic special tray in water to avoid warpage and only 27.1% did store it. 74.8% use stopper for special tray. 35% wait 24 hours for making final impression for patient already exists with complete denture, 34.0% will do immediate impressions, and 31.0% wait more than 24 hours. 52.4% of practitioners prefer polyvinyl siloxane for final impression making. Materials preferences for final complete denture impression are summarized in Figure 2. Regarding disinfection of the impression 95.3% of respondents regularly disinfect their impressions in advance to referring it to the laboratory. Materials used for disinfection of impressions are summarized in Table 2. 45.6% used Selective pressure technique for making final impression, while 32.0% used Muco-compressive technique and 22.3% mucostatic technique. 72.1% of the practitioners use physiological method (intra-oral technique) to record posterior palatal seal while 27.9 of them use arbitrary scraping method (extra-oral technique). Implant supported over denture (Hybrid denture) was most frequently discussed treatment plan options rather than conventional complete denture with 75.5%.

Discussion

Recording the edentulous anatomical structures via impression making is critical step in success of complete denture. Miscellaneous materials and techniques are available for making impression for complete denture fabrication [8]. Similarly, the results of this study in Saudi Arabia shows differences in materials and techniques used by general dentists and specialists for final impressions for fabrication of complete dentures. Complete denture retention, support, and stability are the main aims of successful impression [9]. Following manufacturing instructions for each impression material result in accurate replica of denture bearing area [10]. Alginate material is the most commonly used primary impression material for complete denture [3]. In our survey 91.7% of the respondents use irreversible hydrocolloid (alginate) for making primary impressions. In UK 99% of dental graduate preferred to use alginate impression as primary impression material [6]. In USA 74% preferred alginate to record primary impression [11]. In northern India 71% used alginate as primary impression material [2]. In contrast, in Pakistan 93% they preferred to use impression compound as primary impression material [12]. The concept of molding the periphery of a complete denture has been accepted for long period of time [13-17]. In this survey, custom molded (acrylic) trays used by 83.3% for making final impressions in complete denture. There are several final impression materials for complete denture, and the selection of the proper material depends on the dentist understanding of concept and principle [8,11,18-20]. Final impression could be made using zinc oxide eugenol paste, hydrocolloid or a non-aqueous elastomer [21]. Significant differences were observed regarding the choice of material used to make final impression. In our results, 52.4% of the practitioner's preferred polyvinyl siloxane for making final impressions, followed by ZOE 20%, polyether 15.2% alginate 7.6% and polysulfide 3.8% respectively. Literature review endorsed using existing elastomeric impression materials such as polyvinyl siloxane and polyether for secondary impression making [7,22,23]. In a survey conducted in UK 29% practitioners' preferred ZOE paste as final impression material while as 13% preferred elastomers. In the same study it was seen that 94% of the practitioners preferred alginate for making secondary impressions [6]. In a randomized controlled trial Hyde et al. found that patients preferred dentures made from silicone impressions over dentures constructed from alginate impressions and patients preferred the experience of having impressions taken in silicone with no preference for the taste of either material. Also, they reported better quality of life after wearing dentures made from silicone impressions. Comfort, stability, and efficiency for chewing were more for dentures made from silicone impressions before adjustment [24]. In Pakistan 97% of dentists used ZOE as a material for final impression making [12]. In a recent study conducted in India it was reported that 73% of respondents use ZOE for making final impression, while as 19% use elastomers, and 8% use alginate [2]. Following disinfection protocols for impressions demonstrate unaffected accuracy and acceptable stability of polyether and addition silicone materials is maintained [25-28]. 95.3% of respondents reported disinfecting the impression before sending it to the laboratory, while as only 4.7% did not. Majority 45.6% of the respondents use selective pressure technique for making final impression. The second most used technique is muco-compressive technique used by 32% respondents. 22.3% of respondents used mucostatic technique which is similar to previous studies [29,30]. The use of custom tray for final impression is a vital step in complete denture. In this survey 52% of respondents use VLC composite material for making custom trays, while 45.7% use self-cure acrylic resin. Only 1.9% use shellac as material for custom tray. This finding coincides with the finding in US which showed that 98% of school use custom tray for making final impression for complete denture [30]. In UK they found that 75% of general dentist use custom tray [6]. In North India observed that 85% of practitioner use custom tray [2]. 72.1% of the practitioners use physiological method (intra-

Table 1: Type of special tray used for final impression making.

Type of Special Tray	Percent
1.5 mm spaced, non-perforated	43.1%
1.5 mm spaced, perforated	23.5%
3 mm spaced, non-perforated	6.9%
3 mm spaced, perforated	2.9%
Close fitting, non-perforated	19.6%
Close fitting, perforated	3.9%

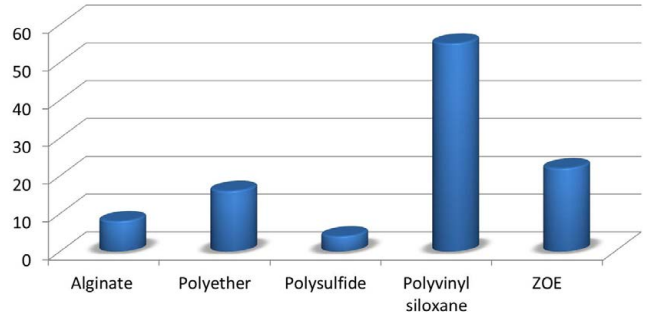

Figure 2: Materials routinely use for final complete denture impression.

Table 2: Materials used for disinfection of impressions.

Disinfectant	Percent
Alcohol	18.2%
Bleach	2 %
Gluteraldehyde	33.3%
Rinse under tap water	22.2%
Rinse under tap water and Alcohol	6.1%
Rinse under tap water and Bleach	3%
Rinse under tap water and Gluteraldehyde	15.2%

oral technique) to record posterior palatal seal while 27.9 of them use arbitrary scraping method (extra-oral technique).

Conclusions

There were significant differences toward specific materials or techniques, which revealed different clinical preferences in construction of conventional complete dentures. This study shows the dominance of use of irreversible hydrocolloid (alginate) in primary impressions making, which coincide with normal practices all over the world. This study also showed that most of practitioners use polyvinyl siloxane as final impression material also most of the practitioners use VLC cured trays for carrying the final impression.

Conflicts of Interest

No conflicts of interest to declared.

References

1. Schwindling FS, Bomicke W, Hassel AJ, Rammelsberg P, Stober T (2014) Randomized clinical evaluation of a light-cured base material for complete dentures. Clin Oral Investig 18: 1457-1465.
2. Kakatkar VR (2013) Complete denture impression techniques practiced by private dental practitioners: a survey. J Indian Prosthodont Soc13: 233-235.
3. Basker RM DJ, Tomlin HR (1976) Prosthetic treatment of the edentulous patient. (3rd edtn.), Macmillan Press, London.
4. Fenn HRB, MacGregor AR (1989) Fenn, Liddelow, and Gimsons' clinical dental prosthetics.(3rd edtn.), London.
5. Grant AA HJ, McCord JF (1994) Complete prosthodontics, problems diagnosis and management. London: Wolfe.
6. Hyde TP, McCord JF (1999) Survey of prosthodontic impression procedures for complete dentures in general dental practice in the United Kingdom. J Prosthet Dent 81: 295-299.
7. Petrie CS, Walker MP, Williams K (2005) A survey of U.S. prosthodontists and dental schools on the current materials and methods for final impressions for complete denture prosthodontics. J Prosthodont 14: 253-262.
8. Zarb GA, Bolender C, Hickey C (1985) Boucher's prosthodontics treatment for edentulous patients. St. Louis, MO: Mosby.
9. Arthur O, Rahn JRI, Plummer KD (2009) Textbook of Complete Dentures. (6th edtn.), PMPH-USA.
10. Stephen J, Bonsor GP (2012) A Clinical Guide to Applied Dental Materials. Elsevier Health Sciences.
11. Petropoulos VC, Rashedi B (2005) Complete denture education in U.S. dental schools. J Prosthodont 14: 191-197.
12. Amjad H JK, Muhammad F (2014) Impression techniques and materials used for fabrication of complete denture. A survey. Pakistan Oral AND Dent J 34.
13. Zinner ID, Sherman H (1981) An analysis of the development of complete denture impression techniques. J Prosthet Dent 46: 242-249.
14. Troendle GR, Troendle K (1992) The use of injectable polyvinylsiloxane as medium for border-molding denture impressions. J Prosthodont 1: 121-123.
15. Principles, concepts, and practices in prosthodontics-1994 (1995) Academy of Prosthodontics. J Prosthet Dent 73: 73-94.
16. Pyle MA (1999) An impression technique for severely resorbed mandibles in geriatric patients. J Am Dent Assoc 130: 255-256.
17. Drago CJ (2003) A retrospective comparison of two definitive impression techniques and their associated post insertion adjustments in complete denture prosthodontics. J Prosthodont 12: 192-197.
18. Lang BR (1994) A review of traditional therapies in complete dentures. J Prosthet Dent 72: 538-542.
19. Boucher CO (2004) Complete denture prosthodontics--the state of the art. 1975. J Prosthet Dent 92: 309-315.
20. Al-Ahmad A, Masri R, Driscoll CF, von Fraunhofer J, Romberg E (2006) Pressure generated on a simulated mandibular oral analog by impression materials in custom trays of different design. J Prosthodont 15: 95-101.
21. Anusavice KJ (2003) Phillips' Science of Dental Materials. (11th edtn.), Elsevier Health Sciences.
22. Chee WW, Donovan TE (1992) Polyvinyl siloxane impression materials: a review of properties and techniques. J prosthet dent 68: 728-732.
23. McCord JF, McNally LM, Smith PW, Grey NJ (2005) Does the nature of the definitive impression material influence the outcome of (mandibular) complete dentures? Eur J Prosthodont Restor Dent 13: 105-108.
24. Hyde TP, Craddock HL, Gray JC, Pavitt SH, Hulme C, et al. (2014) A randomized controlled trial of complete denture impression materials. J Dent 42: 895-901.
25. Kern M, Rathmer RM, Strub JR (1993) Three-dimensional investigation of the accuracy of impression materials after disinfection. J Prosthet Dent 70: 449-456.
26. Adabo GL, Zanarotti E, Fonseca RG, Cruz CA (1999) Effect of disinfectant agents on dimensional stability of elastomeric impression materials. J Prosthet Dent 81: 621-624.
27. Lepe X, Johnson GH, Berg JC, Aw TC, Stroh GS (2002) Wettability, imbibition, and mass change of disinfected low-viscosity impression materials. J Prosthet Dent 88: 268-276.
28. Wadhwani CP, Johnson GH, Lepe X, Raigrodski AJ (2005) Accuracy of newly formulated fast-setting elastomeric impression materials. J Prosthet Dent 93: 530-539.
29. Levin B, Sauer JL Jr (1969) Results of a survey of complete denture procedures taught in American and Canadian dental schools. J Prosthet Dent 22: 171-177.
30. Petropoulos VC, Rashedi B (2003) Current concepts and techniques in complete denture final impression procedures. J Prosthodont 12: 280-7.

Author Affiliation

Top

[1]*Dammam central hospital, Ministry of health, Kingdome of Saudi Arabia*

[2]*College of dentistry, University of Dammam, Kingdome of Saudi Arabia*