

Knowledge on impression techniques and materials used in fixed partial dentures - A survey among dental practitioners in Chennai

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ABSTRACT

Background: Few studies have been done in Chennai to assess the trends of fixed partial denture practice done by private dental practitioners. According to many studies conducted, most of the dentists using commercial dental laboratories performed very unsatisfying tooth preparation and sent impressions that are unusable in nature. **Aim:** This study aims to integrate and evaluate the knowledge on impression techniques and materials used in fixed partial dentures among dental practitioners in Chennai. **Materials and Methods:** A total of 150 questionnaires each consisting of 21 questions were sent to various practitioners in Chennai, out of which 100 questionnaires were filled. **Results:** The results showed that 93% dental practitioners use irreversible hydrocolloid for diagnostic impression and 7% use other materials with 90.7% using gingival retraction cord plainly and 9.3% using other methods like electrocautery, laser methods to accurately record the final impression followed by which is 88% addition silicone in 66% putty reline/dual mix technique without spacer followed by 14% using monophasic technique with 86% providing provisional prosthesis before the final prosthesis. Furthermore, the reason of shortcomings was noted as 73% for laboratory error, clinical error, patients' mental attitude, and oral hygiene practice were also noted. **Conclusion:** From the study results, the following conclusions were drawn. 93% of dental practitioners use irreversible hydrocolloid, 88% of them use addition silicone for final impressions in 66% putty reline/dual mix technique without spacer with almost 86% providing the provisional prosthesis. Thus, the appropriate technique, material, and armamentarium are required for long-term success for fixed partial denture.

KEY WORDS: Fixed partial denture, Gingival retraction, Impression materials, Impression techniques, Provisional prosthesis

INTRODUCTION

Prosthodontics as a specialty has evolved abundantly in the past few years. The materials and methods of fabricating fixed partial dentures keep evolving with more accuracy in day to day practice.^[5] The success of fixed prosthodontics treatment is dependent on many factors such as selection of patients, diagnosis and treatment planning, impression making, cementation of prosthesis, communication with the dental laboratory, satisfaction of the patients, and proper follow-up.^[1] As in general, most of the dental practitioners pay more attention to patient's flow, cost, and treatment time.^[2] A mutual knowledge of the

individual limitations plays a key role in developing a clinical judgment and a thorough knowledge of understanding the procedures.^[3]

Few studies have been done in Chennai to assess the trends of fixed partial denture practice done by private dental practitioners. According to many studies conducted, most of the dentists using commercial dental laboratories performed very unsatisfying tooth preparation and sent impressions that are unusable in nature.^[6]

This survey with 19 questionnaires each was designed to assess and evaluate the knowledge on impression techniques and materials used in fixed partial dentures, along with additional information on gingival retraction techniques and prevalence of providing provisional prosthesis after tooth preparation along

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with the shortcomings observed during the treatment.

MATERIALS AND METHODS

A questionnaire consisting of 19 questions was prepared to assess and evaluate the knowledge on impression techniques and materials used in fixed partial dentures, along with additional information on gingival retraction techniques and prevalence of providing provisional prosthesis after tooth preparation along with the shortcomings observed during the treatment by dental practitioners in Chennai. This questionnaire was sent to 150 private dental practitioners in Chennai regardless of age, sex, and experience. The questionnaire was sent through e-mails. Clear instructions were given in the questionnaire form about the aim of this survey and answering the questions. Name, contact details, mail id, place, and educational qualification of the participants were kept very confidential.

Questionnaire

1. Name of the practitioner:
2. Educational qualification:
 - a. BDS
 - b. MDS
3. Email id of the practitioner:
4. If undergoing or completed postgraduation please specify the subject
5. Years of experience:
6. Do you routinely make diagnostic impressions before tooth preparation?
 - a. Yes
 - b. No
7. If yes what impression material do you routinely employ to make diagnostic impressions before tooth preparation?
 - a. Irreversible hydrocolloid (alginate)
 - b. If others, please specify
8. Do you practice gingival retraction?
 - a. Yes
 - b. No
9. If you employ gingival retraction cord, how is it used?
 - a. Gingival retraction cord
 - b. Electrosurgery
 - c. Laser
 - d. Rotary curettage
 - e. Others please specify
10. If you employ gingival retraction cord, how is it used? Plain
 - a. With chemical
11. If chemical is used, please specify which one is used
12. Which material do you routinely use for making an impression after tooth preparation?
 - a. Addition silicone
 - b. Condensation silicone
 - c. Polysulfide
 - d. Polyether
 - e. Irreversible hydrocolloid (alginate)
 - f. Reversible hydrocolloid (agar)
 - g. Agar-alginate combination
 - h. Others please specify
13. If you are using elastomeric impression materials, then which one do you prefer?
 - a. Single mix (monophase technique)
 - b. Putty reline/dual mix technique with spacer
 - c. Putty reline/dual mix technique without spacer
 - d. Multiple mix technique
14. Do you pour casts in the clinic?
 - a. Yes
 - b. No
15. If yes, within how much time after making impression?
16. If no, within how much time you send the impression to laboratory?
17. With which material the cast is poured?
 - a. Dental plaster (Type II)
 - b. Dental stone (Type III)
 - c. Dental stone high strength (Type IV)
 - d. Dental stone high strength high expansion (Type V)
 - e. If others, please specify
18. Do you give provisional prosthesis after tooth preparation for all the patients?
 - a. Yes
 - b. No
19. If yes, please specify the material used for making provisional restorations after tooth preparation?
20. What do you think is the reason for all the shortcomings observed in the FPD treatment?
 - a. Clinical error
 - b. Laboratory error
 - c. Patient's mental attitude
 - d. Improper oral hygiene maintenance
 - e. All of the above
 - f. No shortcomings observed

RESULTS

A total of 150 questionnaires were sent to different private dental practitioners of various parts of Chennai, out of which 100 responded. Among the 100 practitioners, 43% respondents were practitioners with undergraduate degree followed by 53% specialists of various dental departments. The clinical experience of the respondents ranged from 1 to 2 years of experience. On assessing the procedure of making diagnostic impressions before tooth preparation, 92% were positive about it and rest 8% did not take diagnostic impression before the procedure. The commonly used material of choice for diagnostics seemed to be 93% irreversible hydrocolloid (alginate). Among the practitioners, the prevalence of gingival retraction practice was assessed to be 85% practicing gingival retraction methods with

90.7% of them practicing gingival retraction cord techniques. To the techniques, they employ in gingival retraction methods 85.9% used it plainly and 14.1% in combination with chemical mostly 36.4% using adrenaline. The material of choice used for making of secondary impression after tooth preparation ranks for about 88% practitioners using addition silicone for its superior properties followed by 7% using other materials including alginate, condensation silicone, polysulfide, and polyether materials. This survey also emphasizes that among the practitioners involved in this survey who employ elastomeric impression materials in their practice 66% accounts for putty relined/dual mix technique with spacer followed by 20% single mix (monophase technique) and 14% multiple mix technique. In their practice, they were also enquired about pouring of casts in their clinics after impressions are made for which 89% responded positively and remaining 11% who do not pour casts in clinic with 87% pouring dental stone high strength Type IV. On the details established on the survey regarding, they provide provisional prosthesis after tooth preparation for all the patients who undergo fixed partial denture to which 86% responded positively with 18.8% using acrylic material. Finally, 73% practitioners responded that clinical error, laboratory error, practitioners' mental attitude, and improper oral hygiene maintenance were the major cause of all the shortcomings observed in the treatment with 13% that no shortcomings were observed during the treatment in their practice.

DISCUSSION

Dentistry is an art and science that should go hand in hand for a successful dental treatment. Impression making is a vital step in any dental procedure requiring a prosthetic rehabilitation.^[7] Impressions are made with a wide variety of materials and techniques. The diagnostic models on assessing will give the treatment outcome that is planned and any other treatment if required before proceeding with the fixed partial denture treatment.^[8] The result of this survey shows that most commonly used material of choice is alginate which is an irreversible hydrocolloid. Alginate has been preferred more because of their ease in using and low-cost factor.^[9]

The most challenging part of the fixed dental prosthesis involves the management of soft tissues surrounding the teeth.^[10] For fabricating an accurate final impression, appropriate and proper reversible gingival displacement are required with utmost care to the soft tissue for recording the proper margin with a uniform finish line and the remaining unprepared tooth surface.^[11] There were many techniques that can be used for retraction of gingiva which is used in conjunction with cord techniques, paste technique,

and both used simultaneously with hemostatic agents.^[12] Along with these techniques for better tissue removal, an electrocautery unit can be used before impression making but carries a disadvantage with it as the mucosal necrosis and loss of osseous structure along with it.^[14]

Elastomeric impression materials have excellent and superior properties compared to others in use.^[13] It has many advantages from clinical to laboratory procedures such as long working time that is easily manipulated for a better recording, good tear strength, and excellent flow property before it sets and high flexibility for easier removal of the material from the undercuts.^[15] Addition silicone has the best elastic recovery among all the materials used with pleasant odors, good anti-staining property and can be poured even after 1 week of making with multiple pours possible.^[16] The few disadvantages of this addition silicone material involve the matter of cost which is 2 times expensive than polysulfide and are difficult to remove from the undercuts if it is locked improperly.^[17]

The other common materials used are condensation silicones that have properties such as clean and pleasant odor to the patients which are highly elastic in nature with a faster setting time controlled by an accelerator in its manufacturing content.^[15,18] Although the irreversible hydrocolloids are commonly preferred, it has many shortcomings like it tears easily, very limited production of details with increased rates of deformation.^[16]

Among the impression techniques used in this treatment, putty wash technique seems to have superior accuracy than the other multiple mix and single mix. Because the putty wash technique compensates for dimensional changes on setting.^[19] One of the factors that are manipulative in nature is the time limit that is highly variable in nature till the impression is poured.^[17] The provisional prosthesis needs to be fabricated to serve its function in all the forms of function, esthetics, and mechanical properties. If the provisional prosthesis is avoided and not taken care of it may lead to marginal discrepancy and periodontal inflammation at the final cementation of the prosthesis.^[4,20]

A survey shows that many practitioners prefer the material for cast pouring as dental stone Type III because it is less costly. However, studies in literature show that casts poured with die stones, i.e., high strength stones are seemed to have high strength and greater abrasion resistance.^[19] Data collected from practitioners regarding the shortcomings observed in their practice were mostly reasoned to be because of laboratory errors, but the actual is due to not properly following the proper protocol during the steps

performed clinically.^[18]

CONCLUSION

It is concluded that among the total dental practitioners, 93% use irreversible hydrocolloid with 88% using addition silicone for final impression in 66% putty reline/dual mix technique without spacer with almost 86% providing the provisional prosthesis. Thus, the appropriate technique, material, and armamentarium are required for long-term success for fixed partial denture.

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