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A study of impression materials and techniques practiced for fixed prosthodontics by the general practitioners and prosthodontists in Coimbatore – Tamilnadu: A cross sectional study

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Abstract:
Background*: Few studies have been conducted to assess trends in fixed partial dentures practiced by private dental practitioners in Coimbatore. According to many studies, most dentists using commercial dental laboratories make very unsatisfactory tooth preparations and send impressions that are very inaccurate*
Materials and Methods: *A grand total of 160 questionnaires, each comprising 15 questions, were distributed to diverse practitioners in Coimbatore. Out of this batch, a remarkable 142 questionnaires were duly completed.*
Results*: The findings indicated that the majority of dental professionals utilize alginate for diagnostic impressions, with 88.2% employing gingival cord for retraction. Additionally, some practitioners opt for rotary curettage, followed by 55% who utilize addition silicone in a 50% single mix monophase technique. Furthermore, 40% prefer a dual mix with spacer for the final impression, while 65% provide provisional prosthesis prior to the completion of the final restoration.*
Conclusion: *Based on the findings of the study, it was determined that a majority of dental professionals utilize alginate, while close to 55% of dentists opt for addition silicone when making final impressions. Among those using addition silicone, 50% employ the single mix monophase technique, with nearly 65% also offering provisional prostheses. Therefore, it is essential to utilize the appropriate technique, materials, and equipment to ensure the long-term success of fixed partial dentures.*
Key Word*: **Fixed partial dentures, Impression materials, Impression techniques, Gingival retraction***

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I. Introduction

The twentieth century was a witness to significant transformations in global life expectancy, and the twenty-first century is poised to continue this progress in both developed and developing nations. Throughout history, a variety of impression materials and techniques have been utilized, each with its own advantages and disadvantages, catering to specific circumstances.

It is crucial to thoroughly evaluate the fundamental steps involved in fixed prosthodontic procedures, as they are widely utilized for dental rehabilitation. Understanding the intricacies of this important branch of dentistry and the methods employed is essential for dental professionals. Their knowledge of the materials and techniques used greatly influences the successful outcome of dental treatments. One key aspect is the ability to identify and analyze inaccurate impressions, as well as knowing how to prevent them, as this plays a vital role in achieving successful treatment. To gain insights into the impression materials and techniques employed by dentists in Coimbatore, a questionnaire-based survey was conducted.

II. Material And Methods

A survey comprising of 15 questions was developed to evaluate the understanding of impression techniques, materials used in fixed partial dentures, gingival retraction techniques, and the prevalence of providing provisional prosthesis after tooth preparation. The survey also aimed to identify the shortcomings observed by dental practitioners in Coimbatore. This Google form survey link was distributed to 160 private dental practitioners in Coimbatore, irrespective of their age, gender, or experience level via whatsapp and email. Dentists who wished to participate in this research were asked to complete and submit the Google form. The questionnaire provided clear instructions on the purpose of the survey and how to respond to the questions. The sample size was 142. The sample size was calculated using OpenEpi software. Assuming that the confidence level was 95%.The sample size actually obtained for the study was 142.Study data obtained will be entered to Microsoft Excel

Software, which then will be exported to Statistical package for Social Sciences (SPSS) version 25, IBM Statistics, USA

Questionnaire:

Gender of the participant:

a) Male
b) Female
c) Prefer not to say

Qualification of the dental practitioner:

a) BDS
b) MDS
c) Postgraduate student
d) Diploma/fellowship

Email id:

Area of specialization:

a) Prosthodontics
b) Endodontics
c) Orthodontics
d) Pedodontics
e) Oral surgery
f) Periodontics
g) Oral medicine and radiology
h) Oral pathology

Years of practice

1. Do you make diagnostic impression for all fixed prosthodontics?
   a) Yes
   b) No
2. If yes, which material is used for making diagnostic impression
   a) Alginate
   b) Agar
   c) Agar-alginate
3. Do you prefer pre-operative radiograph for abutment teeth evaluation
   a) Always
   b) Rare
   c) Often
   d) Never
4. Do you do vitality test for abutment teeth
   a) Always
   b) Rare
   c) Often
   d) Never

5. Which type of impression material do you often use for the final impression
   a) Alginate
   b) Agar
   c) Agar-alginate
   d) Addition silicone
   e) Condensation silicone
   f) Polyether
   g) Polysulfide
6. If you use elastomeric impression materials, which type of impression techniques do you use?
   a) Single mix monophase technique
   b) Multiple mix
   c) Dual mix with spacer
   d) Dual mix without spacer
7. Which type of impression tray do you use for final impression
   a) Complete arch stock tray
   b) Sectional tray
   c) Dual arch tray

d) Custom made acrylic tray
e) Complete arch tray

8. Do you do interocclusal records(bite) for multiple teeth replacement
   a) Yes
   b) No
9. If yes, which material do you use
   a) Plaster
   b) Dental wax
   c) Putty like elastomers
   d) Zinc oxide eugenol
   e) Autopolymerising resins
10. Do you do retraction for soft tissue displacement before you make the impression?
   a) Always
   b) Rare
   c) Often
   d) Never
11. If yes, which gingival retraction technique do you follow
   a) Gingival retraction cord
   b) Electrosurgery
   c) Laser
   d) Rotary curettage
   e) Other
12. Do you pour the cast in clinic?
   a) Yes
   b) No

13. If yes, which material is used for pouring the cast
   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)
14. Do you do Provisional or temporary crown or bridge after finishing the preparation
   a) Yes
   b) No
   c) Maybe
15. If yes, please specify the material used for making provisional restorations after tooth preparation.

III. Result

A total of 160 surveys were distributed to various private dental practitioners across different areas of Coimbatore, with 145 responses received. Among the respondents, 65% were postgraduate students, 20% held undergraduate degrees, and 10% were specialists in various dental fields. The clinical experience of the participants varied from 1 to 3 years. When it came to making diagnostic impressions before tooth preparation, 80% were in favor of the procedure, while 20% did not take diagnostic impressions beforehand. The preferred material for diagnostic impression was alginate. Additionally, 65% of practitioners always opted for preoperative radiographs for abutment teeth evaluation, and 40% always conducted vitality tests. The survey also revealed that 20% of practitioners practiced gingival retraction, with 88.2% using gingival retraction cord techniques. For final impressions after tooth preparation, 55% preferred addition silicone, while 45% used other materials such as condensation silicone, alginate, and polyether. In terms of elastomeric impression techniques, 50% utilized the single mix monophase technique, 40% used dual mix with spacer, and 10% used dual mix without spacer. Regarding cast pouring, 80% poured casts in their clinics, with 50% using type IV dental stone, 38.9% using type III dental stone, and 20% not pouring casts in the clinic. Furthermore, 90% of practitioners took interocclusal bite records for multiple teeth replacement, with 75% using dental waxes and 25% using putty-like elastomers for interocclusal records. Finally, the survey indicated that 65% practitioners provided provisional prosthesis after tooth preparation for all patients using acrylic material.

IV. Discussion

The field of prosthetic dentistry has experienced significant advancements in recent years. Fixed prosthodontic treatment offers a high level of satisfaction for both patients and dentists in primary care. The main goal of fixed prosthesis is to restore the form, function, and overall health of the masticatory unit, ensuring long-

lasting results. These factors are influenced by the quality of clinical procedures, the standards of laboratory work, and the oral condition of the patient. The fabrication of study models and evaluation of the abutment play a crucial role in diagnosing and planning treatment for fixed partial denture restorations. This step helps assess the planned treatment outcome and determine if any additional treatment is necessary before proceeding with the fixed partial denture treatment.[3,4]

The management of soft tissues surrounding the teeth is the most challenging aspect of fixed dental prosthesis. In order to create an accurate final impression, it is crucial to properly displace the gingiva and ensure a uniform finish line and proper margin recording. Various techniques, such as cord techniques, paste technique, and the use of hemostatic agents, can be employed for gingival retraction. However, the use of an electrocautery unit before impression making may lead to mucosal necrosis and loss of osseous structure.[5,15]

When it comes to impression materials, elastomeric materials are considered superior due to their excellent properties. They offer advantages in both clinical and laboratory procedures, including a long working time that allows for easy manipulation, good tear strength, and excellent flow properties before setting. Additionally, they exhibit high flexibility, making it easier to remove the material from undercuts.[6]

Among the elastomeric materials, addition silicone stands out with its superior elastic recovery, pleasant odor, and good anti-staining properties. It can also be poured even after a week of making the impression, allowing for multiple pours if needed. However, it is important to note that addition silicone is more expensive than polysulfide and can be difficult to remove from undercuts if not properly locked in place.[1,6]

Commonly used materials include condensation silicones, known for their clean and pleasant odor to patients, high elasticity, and faster setting time controlled by an accelerator. While irreversible hydrocolloids are popular, they tear easily and have limited detail production with increased deformation rates. The putty wash technique in impression techniques offers superior accuracy due to its ability to compensate for dimensional changes on setting. Time limits during impression pouring are variable and manipulative. Provisional prosthesis fabrication is crucial for proper function, aesthetics, and mechanical properties to avoid marginal discrepancy and periodontal inflammation during final cementation of the prosthesis.[13]

V. Conclusion

Based on the findings of this study, it can be concluded that dentists in Coimbatore show a strong preference for specific materials when it comes to primary or secondary impressions and gingival retraction options. It was observed that most dentists consistently adhere to recommended impression materials and techniques. Standard procedures, such as using alginate for diagnostic impressions, retraction cord for gingival retraction, and polyvinyl-siloxane material for final impressions are commonly followed by the majority of dentists. However, there is a need to further educate and guide dentists on the use of different materials with varying properties to enhance their knowledge and proficiency. It is recommended that dental casts be poured in dental clinics, following the manufacturer's instructions regarding the recommended time for pouring the cast to prevent distortion. Clear communication with the laboratory is essential when sending impressions for laboratory work. Die stones are preferred over dental stone, and provisional restorations should be provided after tooth preparation. Regular recall examinations are crucial, particularly for patients with fixed dental prostheses. Patients should have a clear understanding of the limitations of fixed prostheses before treatment begins. The long-term success of fixed partial denture treatment relies on the use of ideal materials, techniques, and equipment. Failure to follow all ideal procedures can result in compromised fit of the final prosthesis and treatment failure.

References

[1]. Campbell SD, Sozio RB. Evaluation of the fit and strength of an all-ceramic fixed partial denture. Journal of Prosthetic Dentistry. 1988 Mar 1;59(3):301-6.
[2]. Mohamed AB, Abu-Bakr NH. Assessment of crown and bridge work quality among Sudanese dental practitioners. The Journal of Indian Prosthodontic Society. 2010 Mar;10:53-6.
[3]. Sedky NA. Evaluation of practice of cross infection control for dental impressions among laboratory technicians and prosthodontists in KSA. International journal of infection control. 2014 Jul 12;10(3).
[4]. Pruden II WH. The role of study casts in diagnosis and treatment planning. The Journal of Prosthetic Dentistry. 1960 Jul 1;10(4):707-10.
[5]. Talabani RM. Influence of abutment evaluation on designing of fixed partial denture: A clinical study. Int J Oral Health Med Res. 2016;3:2395-7387.
[6]. Wee AG, Aquilino SA, Schneider RL. Strategies to achieve fit in implant prosthodontics: a review of the literature. International Journal of Prosthodontics. 1999 Mar 1;12(2).
[7]. Keerthna M, Dhanraj M, Jain AR. Knowledge on impression techniques and materials used in fixed partial dentures-A survey among dental practitioners in Chennai. Drug Invention Today. 2018 May 1;10(5):703-6.

[8]. Prasad NS, Francis NT, Paul AM, Maheendran A, AyishaHishan K, Shebina B. A survey of commonly used impression materials and techniques for fixed partial denture among dentists in Malabar region–Kerala: A cross sectional study.
[9]. Pai SA, Gopan K, Ramachandra K, Gujjar SB, Karthik K. Interocclusal recording materials: A review. Journal of Advanced Clinical and Research Insights. 2019;6(1):20-3.
[10]. Charan J, Biswas T. How to calculate sample size for different study designs in medical research?. Indian journal of psychological medicine. 2013 Apr;35(2):121-6.
[11]. Karunakar S, Othman W, Mohammed S, Narendra B, Rahul S. Survey of impression materials and techniques used for fixed partial prosthesis fabrication among the dental practitioners-A pilot study in Makkah region of Saudi Arabia. Int J Adv Res. 2019;7:815-24.
[12]. Moldi A, Gala V, Puranik S, Karan S, Deshpande S, Neela N. Survey of impression materials and techniques in fixed partial dentures among the practitioners in India. International Scholarly Research Notices. 2013;2013(1):430214.
[13]. Chiramana S, Dev RR, Banka M, Pssv S, Rao K, Chvn SK. Provisional Restoration in Prosthodontics: A Review. Journal of advanced medical and dental sciences research. 2019 May 1;7(5):46-51.
[14]. Anusavice KJ, Shen C, Rawls HR, editors. Phillips' science of dental materials. Elsevier Health Sciences; 2012 Sep 27.
[15]. Jenkins SJ, Lynch CD, Sloan AJ, Gilmour AS. Quality of prescription and fabrication of single-unit crowns by general dental practitioners in Wales. Journal of Oral Rehabilitation. 2009 Feb;36(2):150-6.
[16]. Pellecchia R, Kang KH, Hirayama H. Fixed partial denture supported by all-ceramic copings: a clinical report. The Journal of prosthetic dentistry. 2004 Sep 1;92(3):220-3.