

Assessment of clinical skills of students in fixed partial denture

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ABSTRACT

Aim: The aim of this study is analyze the confidence level of the students regarding the steps toward fabrication of fixed partial dentures. **Background:** Fixed partial dentures are dental prosthesis that are listen, screwed, or mechanically attached or securely retained to the natural teeth. Many fixed partial dentures (FPDs) have been used to replace missing teeth. Preparation of the fixed partial denture varies with the preference and comfort level of the dentist. With each step toward fabrication of fixed partial denture, there are certain challenges which are faced by the students. **Materials and Methods:** A survey was constructed using 12 structured closed-ended questions and was distributed among the 3rd year, 4th year, and interns of Saveetha Dental College. The students were asked regarding the confidence level regarding the steps in the fabrication of FPDs. **Results:** A total of 43 females and 57 males were selected. Each question was rated with a scale of 0–10. A mean score was obtained for each of the question. The mean score for each question was found to be >5. The highest scoring was for the cementation of FPD, following that was it is the evaluating the marginal fit during metal try-in. Both of these procedures were scored >8. The procedure that has gotten the least scoring in preservation of pulp was 6.0 and gingival attachment scored 6.70. An average score of 6.45 was scored for protecting the adjacent teeth from iatrogenic damage. The remaining procedures students score about 7. **Conclusion:** Overall confidence level of the students is above average; however, the reinforcement should be done to ensure that the students will be confident in fabricating FPDs.

KEY WORDS: Confidence, Fabrication, Fixed partial denture, Skills, Students

INTRODUCTION

Dental curriculum is developed to improve the knowledge, skills, attitude, and professional values before beginning the career as a practicing dentist.^[1] Dental education is a 4-year curriculum which differs from other professions. It is important for students to develop fine motor skills which are as important as knowledge gained in dental education. Students are trained during the preclinical stage to develop these skills. The dental pre-clinical techniques help in developing these skills which require hand-to-eye coordination and fine motor dexterity. The students are trained using manikins which have synthetic teeth and cheeks, these are to mimic a patients. This provides a more realistic setting for learning and

practise of clinical skills of students.^[2-6] Pre-clinical training is also ethical and extremely important for patient safety. A good pre-clinical training helps students for a smooth transition from a pre-clinical to a clinical situation. This transitional stage is said to be highly stressful, and this could be due to the difference in environment, the need to apply their knowledge and skills to real patient problems, and the need to adopt various learning strategies as well as to meet the performance expectations.

The loss of removal of one or more of the natural teeth may result in disabilities in daily living activities such as impaired eating, speaking, or social embarrassment^[7,8] Thus, the patient will need for a prosthesis. This is determined by a sort of functional, esthetic, physiological, and social impacts due to tooth loss. This is where the role of a dentist is important as to replace the missing teeth. There are various treatment modalities to replace missing teeth. Most

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often, patients will prefer to have a fixed option of a prosthesis as it helps to restore the patients' normal function, speech, esthetics, as well as health. A fixed prosthesis can be used to restore single or multiple teeth. Fixed partial denture (FPD) is a type of fixed prosthesis which uses the support of the adjacent teeth for support.^[7,9] It has been said that the patients tend to have a greater need and desire for replacement of missing tooth at the time of tooth loss.^[7]

Students are taught to provide FPDs to patients when no other fixed prosthesis options are available. Most studied would not have any difficulty in the didactic part of their education and they are quite familiar with them; however, the practical part of the dental course which prepares the students to be able to treat patients clinically is a new experience for most students.^[10] It has become an important part of the undergraduate teaching program in most institutions, and students are taught step by step regarding the steps toward FPD fabrication, starting from tooth preparation until cementation of the FPD. The level of awareness of students regarding FPD should also be assessed. Students should be well trained on each and every step toward the fabrication of FPD. Hence, this study was conducted to determine the level of confidence among the dental students regarding FPD procedures.

MATERIALS AND METHODS

In this present study, 100 students were participated from Saveetha Dental College. A 12-item self-administrated, structured closed-ended questionnaire was used to collect the data [Table 1]. The questions

Table 1: Questionnaire

No	Question	Mean score
1	How confident are you tooth preparation?	7.14
2	How confident are you protecting the enamel adjacent teeth from iatrogenic damage ?	6.45
3	How confident are you protecting the gingiva and adjuvant soft tissues ?	7.00
4	How confident are you in preserving the pulp?	6.00
5	How confident are you protecting the tongue during tooth preparation?	7.50
6	How confident are you in establishing a finish line?	7.20
7	How confident are you in gingival attachment?	6.70
8	How confident are you in impression making of FPD?	7.70
9	How confident are you delivering a provisional restoration?	7.60
10	How confident are you in evaluating marginal fit during metal try-in?	8.45
11	How confident are you in shade matching?	6.14
12	How confident are you in cementation of FPD?	8.81

were regarding step by step procedure toward FPD fabrication, from tooth preparation until cementation. Level of confidence was rated using a scale from 0 to 10; 0 being the least confident and 10 being the most confident. The questionnaire was validated before application and reliability were also assessed. The final score was obtained using the average value of each question.

RESULTS

A total of 100 dental students were included in the study. The participants included 3rd year, final year, and interns of Saveetha Dental College. A total of 43 females and 57 males were included. Each question was rated with a scale of 0–10. A mean score was obtained for each of the question. Chart 1 shows the mean scores provided by the students for each of the questions asked in the questionnaire.

In the present study, the mean score for each question was found to be >5 which shows that all the participants on this study have a confidence level above average. It was found that the procedure which was found to have the highest scoring was for the cementation of FPD. Following that it is evaluating the marginal fit during metal try-in. Both of these procedures were scored >8.

The procedure that has gotten the least scoring in preservation of pulp. The average score for this procedure was 6.00. Students had a low confidence level in gingival attachment as well, 6.70. An average score of 6.45 was scored for the students' confidence level in protecting the adjacent teeth from iatrogenic damage. The remaining procedures students score about 7.

DISCUSSION

This study was aimed to assess the confidence level of students in their skills toward fabrication of FPD. Students are taught the steps toward fixed partial denture during the pre-clinical years. At this time, the students are conducting these procedures on Typodont Model which mimics an actual patient. However, once the students enter the clinical years, they are exposed to patients that vary in features. These features tend to make it a bit difficult for the dentist to fabricate a fixed partial denture.

Students often face difficulties in the preparation on fixed partial dentures. There has been a study conducted which assessed the difficulty which is faced by the students in preparing a three-unit FPD clinically and preclinically.^[2] It was found that most of the students considered themselves to have better tooth preparations preclinically when compared to performing tooth preparation on patients. As during the preclinical years, the students are only subjected

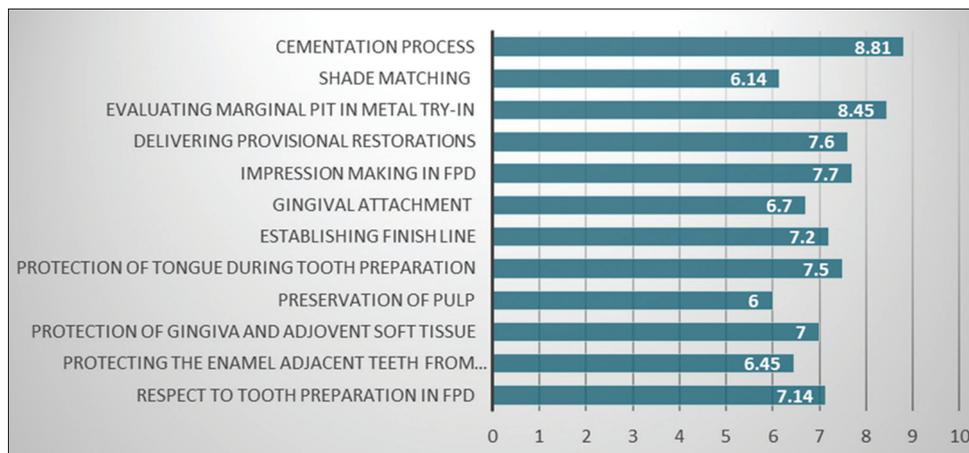


Chart 1: Mean score distribution

to a Typodont Model. When handling a patient, patient movement and his/her disturbance during the procedure can cause difficulty for the dentist. However, even though the students are subjected to various types of patients, it was found in our study that the students have a good confidence level in tooth preparation. As the mean score was 7.14. Often, tooth preparation is considered to be a difficult step toward FPD fabrication as there are various steps into obtaining a good tooth prep.

Pulp exposure is often a complication during tooth preparation. It differs from patient to patient. It is important to evaluate the abutment teeth before proceeding with a fixed prosthesis. There are prevalences of pulpal exposure during tooth preparation. There has been an article which studied the prevalence's of pulpal exposure and was found that central incisors accounted for the majority of pulpal exposure (35.5%) in the maxilla, whereas canines accounted for the majority of pulpal exposure (32.6%) in the mandible.^[1] In our study, it was found that the students score their confidence level of 6 when asked whether they were confidence in preventing pulp exposure during tooth preparation. The students could have had cases where the pulp was exposed during tooth preparation or the students would have had to conduct an intentional root canal treatment on the vital abutment teeth. Thus, tooth preparation should be kept to a minimum to avoid damage to the pulp, especially in young patients^[11,12] Davis *et al.*^[13] suggested that pulpal response to tooth preparation is a major concern in fixed prosthodontics. This research has suggested that 2 mm or more of remaining dentin is critical for protecting pulp, following tooth preparation.^[13] There has been cases documented stating pulpal degeneration occurs many years after tooth preparation especially when it occurs on freshly sectioned dentinal tubules.^[14-16] Before starting tooth preparation, the morphology of the dental pulp chamber should be checked. The pulp size should be evaluated radiographically.^[16]

Iatrogenic damage to an adjacent tooth is commonly done by dentist. It is a very common error. Damage to the proximal contacts during tooth preparation. It is said that, even though the damaged contact areas are reshaped and polished, the tooth is susceptible to dental carries. Based on our study, an average score of 6.45 was scored. This shows the level of confidence that the students have for protecting the adjacent teeth during tooth preparation. During the pre-clinical years, students are taught to ensure that the adjacent teeth are protected and not damaged. There are a few ways to prevent or minimize the damage to the adjacent teeth during tooth preparation. A metal matrix can be placed around the adjacent tooth for protection; however, this method is not followed as it can perforate and cause enamel damage. The most preferred method is to use the proximal enamel of the tooth being prepared. The contact areas are wider than at the cemento-enamel junction (CEJ). A thick tapered diamond can be passed within the proximal contact area, as this will leave a slight lip or fin of enamel. This prevents any excessive tooth reduction or undesirable angulation of the instrument.^[14]

Another iatrogenic damage is to the soft tissues. As the tooth is surrounded with different soft tissue structures, these are prone to damage as well. Soft tissues such as tongue and cheek are also susceptible to damage on tooth preparation. Students who participated in this study have shown to have a high confidence level toward protecting the soft tissues to be high. They are confident that they can protect gingiva, soft tissues as well as tongue from damage. Damage to the tongue can be prevented by careful retraction with an aspiration tip, mouth mirror, or flanged saliva ejector. The tongue is often susceptible to damage, especially when the tooth is being prepared on the lingual side; thus, care should be taken when preparing mandibular molars.^[14]

Impression making is an important step toward producing the fixed prosthesis. It is to replicate or

reproduce the tooth that is prepared. It provides information about the prepared teeth, surrounding teeth, and associated soft tissues. Damage to the soft tissues can occur if the impression material extends subgingivally. Students have shown to have a high confidence level of impression making after tooth preparation, 7.70. Student may not realize, but the gingival sulcus and the junctional epithelium may be damaged during impression making.^[17] Damage to the junctional epithelium may cause an inflammatory lesion in the gingiva. This will eventually lead to gingival recession, migration of the junctional epithelium, and permanent bone loss.^[18] A retraction cord is often used to separate the prepared tooth from the gingival sulcus. Retraction cord can also harm the attachment apparatus around the tooth structure.^[19] On impression making, it is always important to handle the junctional epithelium and attachment of supra crestal fibers with care to prevent damage.^[20] The impression technique often used by students in fabricating the fixed prosthesis is using putty wash technique. This technique is done after tooth preparation. This impression technique is very accurate which is more than multiple mix.^[21,22]

Students are found to be confident in providing provisional restorations. The temporary restorations should be adequate and protect the prepared tooth from excessive occlusal force. The temporary crowns should not be overextended and should not be underextended. If the temporary crown is overextended or underextended, it can cause permanent damage in the oral cavity.^[14] Shade matching was found to be a challenge for students before sending the prosthesis for fabrication after metal try-in. Undergraduate students have to understand the various aspects to consider before selecting a shade for the patient. Shade selection involves picking a tab from a shade guide and having the prosthesis done according to that color. Shade guides will determine the tooth shade accurately.^[23] There are drawbacks to using shade guides include the clinician error. The students may not know how to select a proper shade for the patient. Besides that, it could be due to the light which is reflected and transmitted through a shade guide tab giving its translucency. Color of the shade guides varies from manufacturers.^[23]

Once casting is done and the metal structure of the FPD is obtained, and it should be checked on the patient. The metal structure should be adapted to the prepared tooth.^[24] It is important to check the accuracy of fitting of the fixed prosthesis. Ill-fitting prosthesis can cause mechanical failures of the prosthesis. Adaptation of the prosthesis should be evaluated by the clinician.^[25] Finally, once all the steps are done, the last step is to cement the fixed prosthesis. The prosthesis needs the aid of a luting cement to be retentive and remain on the

tooth. Resin cement is often used. They are capable of micromechanical attachment to both enamel and dentin.^[26] A case report found the use of dual-cure resin cement (Enforce) for cementation of a three-unit fixed partial denture. This cement was found to have strong chemical-curing components.^[27,28] Excess material was allowed to flow out through the marginal areas and was subjected to light curing for 5 s. Hardening of the excess materials allows easy removal. It is stated that glass ionomer cement is less technique sensitive in their use than resin cement. This step is a very quick and easy step in fabrication of FPDs that explains the high confidence level of students is cementation of FPDs.

CONCLUSION

Overall, the students have shown to have a good confidence level in the fabrication of FPDs. Students can overcome their lack of confidence by exposing themselves to more cases to fabricate FPD. The more exposure the students have, the more confident they will be.

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