

Errors in Complete Denture Fabrication during Pre-clinical Learning by Dental Students in Chitwan

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ABSTRACT



Introduction: Preclinical dental skills are necessary for the dental students and it is also a prerequisite for the success of a competency based dental curriculum. This will enhance the future clinical practice. Dental students also experience difficulties during the transition from preclinical posting to clinical practice. Hence, this study was aimed to assess the errors in preclinical complete denture fabrication by the dental students in Chitwan.

Materials and methods: A descriptive cross-sectional study was conducted among the dental students of Chitwan from January 2021 to April 2021. Seventy Ideal Complete Dentures fabricated by undergraduate dental students were evaluated on basis of parameters like porosity in master cast, adaptation and porosity in record bases, occlusion rim, mounting, axial inclination of anterior and posterior teeth, horizontal & vertical glass plate relationship, occlusion, carving. The data collected were analyzed for frequency and percentage of occurrence.

Results: The most common error made by preclinical students was lateral glass plate relationship (51.4% in our study) followed by fabrication of occlusion rim (48.5%). The least common error was in porosity of master cast about 10%.

Conclusion: There is high possibility of incorporating error during complete denture fabrication by undergraduate dental students. The study focuses the need to explore the modification of teaching learning methods of prosthodontics with the use of simulators and visual aids.

Keywords: Complete denture, laboratory, practical, preclinical, teaching

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INTRODUCTION

Dental education is basically comprised of both theoretical and practical aspects. The first and second year of dental education is focused in preclinical

skills in a simulated laboratory where students are taught the practical skills that can help in their clinical

years.¹ The dental curriculum also entails that the students acquire necessary skills in the preclinical years before they practice on the patients. However, during the transfer from preclinical to clinical years the students also experience stress and anxiety. However, practicing in the simulated environment help them achieve manual dexterity and confidence.^{2,3}

The fabrication of complete denture in prosthodontics also requires extensive theoretical knowledge and preclinical practice in dental laboratory. Even after completing several steps there are chances of errors from recording impression till transfer of denture to the patients mouth and even in the post treatment visits. The errors during fabrication process can cause deleterious effects to the oral structures such as oral mucosa and temporomandibular joint. These errors can be reduced by accurate recording of impression and fabrication of complete denture by carefully maintaining each and every step in dental laboratory. Studies related to errors during impression recording has been performed in Nepal,⁴ however, errors during each and every steps of complete denture fabrication have not been performed. Hence, this study was aimed to assess the errors in complete denture fabrication during the preclinical learning by the dental students in Chitwan.

MATERIALS AND METHODS

A descriptive cross-sectional study was planned and carried out at among the preclinical dental students of Chitwan from January 2021 to April 2021. The study was approved by the ethical committee of Chitwan Medical College-Institutional Review Committee (Ref No: CMC-IRC/077/078-092). This study included the evaluation of the seventy ideal complete dentures fabricated by students of second year as a part of preclinical exercise under their regular academic curriculum. Prior to the fabrication of complete denture, the students were taught about the subject as per curriculum and the demonstration of every step of fabrication was given. The complete denture fabrication was done on maxillary and mandibular ideal master cast with teeth arranged in Class I canine and molar relation.

During various stages of complete denture fabrication, the common types of error made by preclinical students were assessed on basis of parameters like porosity in master cast, adaptation and porosity in record bases, occlusion rim, mounting, axial inclination of anterior and posterior teeth, horizontal & vertical glass plate relationship, occlusion, carving. The evaluation was done by two investigators at two separate times. The data collected were analyzed with SPSS version 20 with descriptive statistics (frequency and percentage).

RESULTS

In this study, nine different types of errors were evaluated in the complete denture fabricated by preclinical dental students of second year in Chitwan. While analyzing the types of error, the most common error made by preclinical students was lateral glass plate relationship about 36 (51.4%) followed by fabrication of occlusion rim (34, 48.5%). The other common errors were found in horizontal glass plate relationship (28, 40%), anterior and posterior axial inclination of teeth (24, 34.2% and 21, 30% respectively). The least common error was in porosity of master cast (7, 10%) (Table 1). Some of the errors are illustrated by figures (Figure 1-4).

Table 1: Types of errors observed during preclinical prosthodontic practice

S N	Types of Errors	Frequency	Percent
1.	Porosity in master cast	7	10%
2.	Adaptation of record base	18	25.7%
3.	Porosity in record base	20	28.5%
4.	Mounting	4	5.7%
5.	Occlusion rim	34	48.5%
6.	Axial Inclination of teeth		
	a. Anterior	24	34.2%
	b. Posterior	21	30%
7.	Glass Plate relationship		
	a. Horizontal	28	40%
	b. Lateral	36	51.4%
8.	Occlusion (Class I molar)	8	11.4%
9.	Carving	17	24.2%



Figure 1: Lateral glass plate relation



Figure 2: Horizontal glass plate relation



Figure 3: Occlusion



Figure 4: Carving

DISCUSSION

Dentistry is combination of art and science and this key component is an essential in the prosthodontics where the undergraduate students engage in exhaustive preclinical practice and then clinical practices in the whole undergraduate programme.⁵ In majority of the dental colleges in India, during the first and second year the students are engaged in preclinical while the remaining of the dental education is completed as clinical works dealing with the patients. The dental curriculum of Nepal is also designed in the same fashion. This type of education is mainly designed so that before having preliminary contact with the patients, the dental students get acquainted with the basic clinical skills in the laboratory beforehand or with the help of simulators (Phantom head). Thus, they are in the preclinical laboratory where they are taught the basic prosthodontic skills such as fabrication of removable partial and complete dentures. This practice in the laboratory enables them to gain necessary skills,

competency so that they become able to work on patients.⁶⁻⁸

Dental education is regarded as complex subject requiring pedagogical teaching and learning experience. The dental students are bound to have proficient theoretical knowledge, preclinical skills and then the interpersonal skills due to which they are always in high levels of stress. Kumar et al have reported that the students experienced stress during the transition from second year to the third year.⁶

Fabrication of denture is a meticulous process involving several steps. Each step is technique sensitive and several errors are also encountered. In the present study error was observed in almost all the steps of fabrication of complete denture. In a different study performed on the errors in complete denture impressions, Sharma et al reported lack of exposure of all the tissue stops as the most common errors, the second error was the presence of voids.⁴ Nikolopoulou F and Chrysostomidis A observed that most of the errors

were encountered during occlusion and the lack of posterior palatal seal.⁹ The difference between present study and the later studies was that the present study observed errors during the various steps of complete denture fabrication, while the later studies incorporated single steps.^{4,9}

Sukotjo et al in their study observed that the duration of the preclinical and laboratory exercises also invited stress among the dental students.¹⁰ Majority of the participants reported that the visual teaching methods helped the students in prosthodontics.¹¹ This also concluded that the way of teaching learning methods also affected the student's anxiety and enhanced the skills acquisition.

Modification of the teaching learning approaches have been introduced and tried. Different types of simulators have been used so enhance the skills.^{3,12} In addition, the educational videos were also used. This also played role similar to the teacher.¹³ Different styles of teaching learning practices were also exercised among dental students. Bennadi et al reported that the dental students accepted the multimodal teaching learning method.¹⁴ In another study, skill labs were used in which majority of participants preferred skill labs.¹⁵ Suvinen et al also reported that students favoured more on clinical

simulation than the conventional preclinical teaching learning method.¹⁶

To enhance the teaching learning practice, few authors proposed that providing the students with edentulous patient exposure in the early stage of undergraduation of dental career could encourage the students in complete denture fabrication.^{16,17} This method has also been tried at the College of Dentistry at the University of Illinois at Chicago among the second-year students.⁷ This has been very fruitful among the dental students than the conventional technique.^{18,19}

This study also has limitations. First of all the study was conducted in Chitwan, so the results thus obtained cannot be generalized to whole population and was conducted in small sample. Further study is recommended taking all the dental colleges in Nepal.

CONCLUSION

Within the limitations of the study, the present study highlights on the common mistakes done by dental students during their preclinical exercises. Prosthodontics is really a complex subject which has to be amalgamated with both clinical exposure and use of advanced visual methods in light with the theoretical knowledge. Hence modification of the teaching learning method is required.

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