

# ASSESSMENT OF DIFFICULTIES ENCOUNTERED DURING CLINICAL PROCEDURES IN COMPLETE DENTURE FABRICATION

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## **ABSTRACT**

**Aim:** To assess the difficulties encountered during clinical procedures in complete denture fabrication among undergraduates.

**Material and methods:** The present study was conducted among dental graduates across various dental colleges using a questionnaire. The questions were related to clinical procedures in the fabrication of complete dentures. A total of 26 questions based on the clinical techniques in the fabrication of complete dentures were included. The questionnaire was sent to students of various colleges using an online sharing medium. 140 responses were received from students from various colleges. The data obtained was tabulated in SPSS for windows, version 20. Descriptive statistics were analysed. Chi-square test was done to analyse association between responses to various questions.

**Results:** It was found that the most difficult procedure was jaw relation(55.7%) followed by border moulding(31.4%). The reason for such results could be the technique sensitivity of these procedures and the limited clinical exposure to these procedures at undergraduate level.

**Conclusion:** The data obtained from the study shows the problems faced by the practitioners during the fabrication of complete dentures. Principles and procedures that a practitioner learns in school have a widespread effect. Hence, dental educators have a heavy responsibility to inculcate the skill in their students to carry out the best possible treatment for their patients. However, there is a lack of knowledge on the problems faced from the

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*practitioners end. More surveys need to be conducted on dental graduates in different regions to evaluate the problems and improve the dental education in various institutes.*

***Keywords:** Complete denture, complete denture fabrication, complete denture problems, complete denture difficulties.*

## **I. INTRODUCTION**

Complete denture prosthodontics refers to that body of knowledge and skills pertaining to the restoration of the edentulous arch with a complete denture(1). It is a popular treatment option for replacement of missing teeth in geriatric patients for a variety of reasons. In countries with a high amount of geriatric patients, it is mandatory for a dental clinician to have working knowledge on complete denture procedures. Therefore, it is included in the curriculum in all dental schools. It is one of the most technique sensitive procedures taught to dental students through the course of their study, with a high chance of errors in the final prosthesis(2–5).

There are multiple textbooks from various authors as well as video tutorials available regarding the fabrication of complete dentures. Rapidly changing social, economic, scientific and technical elements influence prosthodontic education to a great extent. Yet, students might have some difficulty in understanding and performing certain procedures.

There is limited scientific evidence on procedural difficulties in fabricating a complete denture. Therefore, this study will help dental educators to improve the quality of training of dental graduates.

## **II. MATERIALS AND METHODS**

The study was conducted among the undergraduate students, 3<sup>rd</sup> year, final year and interns, of various colleges. A questionnaire was prepared in google forms and validated by 6 postgraduate students of the Department of Prosthodontics, Saveetha Dental College. Ethical approval was obtained from SRB, Saveetha Dental College.

A total of 26 questions based on the clinical techniques in the fabrication of complete dentures were included. The questionnaire was sent to students of various colleges using an online sharing medium (Table 1).. 140 responses were received from students from various colleges. The data obtained was tabulated in SPSS for windows, version 20. Descriptive statistics were analysed. Chi-square test was done to analyse association between responses to various questions.

**Table 1** - Represents the questionnaire given

1	Gender	<ol style="list-style-type: none"> <li>1. Female</li> <li>2. Male</li> </ol>
2	Name of the institution	
3	How many complete dentures have you done?	<ol style="list-style-type: none"> <li>1. 1-3</li> <li>2. 4-6</li> <li>3. 7-9</li> <li>4. 10 or more</li> </ol>
4	How many times did you have to repeat a particular procedure?	<ol style="list-style-type: none"> <li>1. 1 to 2 times</li> <li>2. 3 to 4 times</li> <li>3. More than 4 times</li> <li>4. Never</li> </ol>
5	What material did you use for making a primary impression?	<ol style="list-style-type: none"> <li>1. Impression compound</li> <li>2. Alginate</li> <li>3. Putty</li> </ol>
6	How do you perceive making a primary impression?	<ol style="list-style-type: none"> <li>1. Very easy</li> <li>2. Somewhat easy</li> <li>3. Neither easy nor difficult</li> <li>4. Somewhat difficult</li> <li>5. Very difficult</li> </ol>

7	What material did you use for border moulding?	<ol style="list-style-type: none"><li>1. Green stick compound</li><li>2. Mono phase</li><li>3. Putty</li><li>4. Heavy body</li></ol>
8	How do you perceive border moulding?	<ol style="list-style-type: none"><li>1. Very easy</li><li>2. Somewhat easy</li><li>3. Neither easy nor difficult</li><li>4. Somewhat difficult</li><li>5. Very difficult</li></ol>
9	What material did you making a secondary impression?	<ol style="list-style-type: none"><li>1. Zinc oxide eugenol</li><li>2. Light body</li><li>3. Medium body</li></ol>
10	How do you perceive making a secondary impression?	<ol style="list-style-type: none"><li>1. Very easy</li><li>2. Somewhat easy</li><li>3. Neither easy nor difficult</li><li>4. Somewhat difficult</li><li>5. Very difficult</li></ol>
11	How do you perceive modifying occlusal rims during jaw relation?	<ol style="list-style-type: none"><li>1. Very easy</li><li>2. Somewhat easy</li><li>3. Neither easy nor difficult</li><li>4. Somewhat difficult</li><li>5. Very difficult</li></ol>
12	Have you used a face bow?	<ol style="list-style-type: none"><li>1. Yes</li></ol>

		2. No
13	If yes, How do you perceive using a face bow? (Out of the 36 who said yes)	<ol style="list-style-type: none"> <li>1. Very easy</li> <li>2. Somewhat easy</li> <li>3. Neither easy nor difficult</li> <li>4. Somewhat difficult</li> <li>5. Very difficult</li> </ol>
14	How do you perceive vertical jaw relation?	<ol style="list-style-type: none"> <li>1. Very easy</li> <li>2. Somewhat easy</li> <li>3. Neither easy nor difficult</li> <li>4. Somewhat difficult</li> <li>5. Very difficult</li> </ol>
15	How do you perceive horizontal jaw relation(centric relation)?	<ol style="list-style-type: none"> <li>1. Very easy</li> <li>2. Somewhat easy</li> <li>3. Neither easy nor difficult</li> <li>4. Somewhat difficult</li> <li>5. Very difficult</li> </ol>
16	What method did you use to stabilise the occlusal rims in centric relation?	<ol style="list-style-type: none"> <li>1. Nick and notch method</li> <li>2. Stapler pins</li> <li>3. Fusing the wax</li> <li>4. Zinc oxide eugenol</li> </ol>
17	What method do you use for teeth selection?	<ol style="list-style-type: none"> <li>1. Visual</li> <li>2. Teeth moulds</li> <li>3. Using casts</li> </ol>

		4. Facial landmarks
18	Brand of teeth used	<ol style="list-style-type: none"> <li>1. Acryrock</li> <li>2. Primadent</li> <li>3. Ivoclar</li> <li>4. Dentsply</li> </ol>
19	Rate the difficulty in evaluating phonetics during try-in	<ol style="list-style-type: none"> <li>1. Very easy</li> <li>2. Somewhat easy</li> <li>3. Neither easy nor difficult</li> <li>4. Somewhat difficult</li> <li>5. Very difficult</li> </ol>
20	Rate the difficulty in evaluating esthetics during try-in	<ol style="list-style-type: none"> <li>1. Very easy</li> <li>2. Somewhat easy</li> <li>3. Neither easy nor difficult</li> <li>4. Somewhat difficult</li> <li>5. Very difficult</li> </ol>
21	Rate the difficulty in evaluating occlusion during try-in	<ol style="list-style-type: none"> <li>1. Very easy</li> <li>2. Somewhat easy</li> <li>3. Neither easy nor difficult</li> <li>4. Somewhat difficult</li> <li>5. Very difficult</li> </ol>
22	Did you have errors in occlusion during try-in	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>

23	How do you perceive insertion?	<ol style="list-style-type: none"> <li>1. Very easy</li> <li>2. Somewhat easy</li> <li>3. Neither easy nor difficult</li> <li>4. Somewhat difficult</li> <li>5. Very difficult</li> </ol>
24	How often is the patient satisfied with the denture?	<ol style="list-style-type: none"> <li>1. Everytime</li> <li>2. Half the time</li> <li>3. Never</li> </ol>
25	How often are you satisfied with the denture?	<ol style="list-style-type: none"> <li>1. Everytime</li> <li>2. Half the time</li> <li>3. Never</li> </ol>
26	What according to you is the most difficult procedure?	<ol style="list-style-type: none"> <li>1. Primary impression</li> <li>2. Border moulding</li> <li>3. Secondary impression</li> <li>4. Jaw relation</li> <li>5. Try in</li> <li>6. Insertion</li> </ol>

### III. RESULTS AND DISCUSSION:

In the present study 140 responses were obtained out of which 32.9% were males and 67.1% were females. 32.1% had fabricated 1-3 dentures, 53.6% had fabricated 4-6 dentures, 5% had fabricated 7-9 dentures and 9.3% had fabricated 10 or more dentures (Table 2).

**Table 2** - Represents the frequency of responses obtained from the survey

1	Gender	Female	46 (32.9%)
		Male	94 (67.1%)
2	Name of the institution		
3	How many complete dentures have you done?	1-3	45 (32.1%)
		4-6	75 (53.6%)
		7-9	7 (5%)
		10 or more	13 (9.3%)
4	How many times did you have to repeat a particular procedure?	1 to 2 times	97 (69.3%)
		3 to 4 times	21 (15%)
		More than 4 times	4 (2.9%)
		Never	18 (12.9%)
5	What material did you use for making a primary impression?	Impression compound	68 (48.6%)
		Alginate	
		Putty	71 (50.7%)
			1 (0.7%)
6	How do you perceive making a primary impression?	Very easy	12 (8.6%)
		Somewhat easy	75 (53.6%)
		Neither easy nor difficult	39 (27.9%)
		Somewhat difficult	12 (8.6%)



		Very difficult	2 (1.4%)
7	What material did you use for border moulding?	Green stick compound Mono phase Putty Heavy body	135 (96.4%)  0 (0%) 3 (2.1%) 2 (1.4%)
8	How do you perceive border moulding?	Very easy Somewhat easy Neither easy nor difficult Somewhat difficult Very difficult	10 (7.1%) 47 (33.6%) 43 (30.7%) 33 (23.6%) 7 (5%)
9	What material did you making a secondary impression?	Zinc oxide eugenol Light body Medium body	70 (50%)  69 (49.3%) 1 (0.7%)
10	How do you perceive making a secondary impression?	Very easy Somewhat easy Neither easy nor difficult Somewhat difficult Very difficult	30 (21.4%) 50 (35.7%) 35 (25%) 22 (15.7%) 3 (2.1%)
11	How do you perceive modifying occlusal rims during jaw relation?	Very easy	10 (7.1%)

		Somewhat easy Neither easy nor difficult Somewhat difficult Very difficult	45 (32.1%) 31 (22.1%) 45 (32.1%) 9 (6.4%)
12	Have you used a face bow?	Yes No	36 (25.7%) 104 (74.3%)
13	If yes, How do you perceive using a face bow? (Out of the 36 who said yes)	Very easy Somewhat easy Neither easy nor difficult Somewhat difficult Very difficult	4 (11.1%) 6 (16.7%) 2 (5.56%) 12 (33.3%) 12 (33.3%)
14	How do you perceive vertical jaw relation?	Very easy Somewhat easy Neither easy nor difficult Somewhat difficult Very difficult	12 (8.6%) 59 (42.1%) 34 (24.3%) 32 (22.9%) 3 (2.1%)
15	How do you perceive horizontal jaw relation(centric relation)?	Very easy Somewhat easy Neither easy nor difficult Somewhat difficult	6 (4.3%) 43 (30.7%) 39 (27.9%) 45 (32.1%)

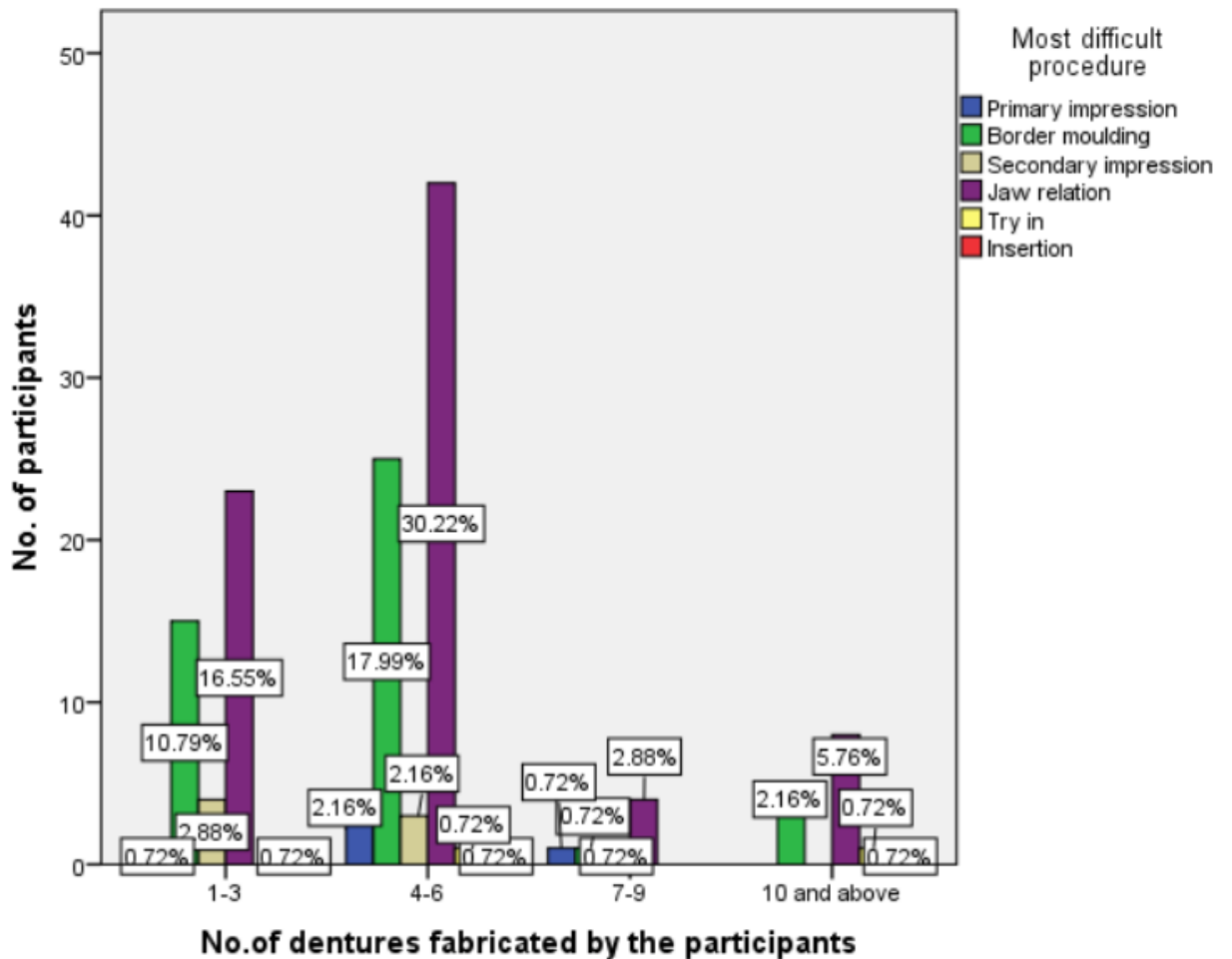
		Very difficult	7 (5%)
16	What method did you use to stabilise the occlusal rims in centric relation?	Nick and notch method Stapler pins Fusing the wax Zinc oxide eugenol	80 (57.1%) 44 (31.4%) 16 (11.4%) 0 (0%)
17	What method do you use for teeth selection?	Visual Teeth moulds Using casts Facial landmarks	112 (80%) 5 (3.6%) 7 (5%) 16 (11.4%)
18	Brand of teeth used	Acryrock Primadent Ivoclar Dentsply	83 (59.3%) 42 (30%) 5 (3.6%) 10 (7.1%)
19	Rate the difficulty in evaluating phonetics during try-in	Very easy Somewhat easy Neither easy nor difficult Somewhat difficult Very difficult	7 (5%) 67 (47.9%) 42 (30%) 21 (15%) 3 (2.1%)
20	Rate the difficulty in evaluating esthetics during try-in	Very easy Somewhat easy	12 (8.6%) 67 (47.9%)

		Neither easy nor difficult Somewhat difficult Very difficult	39 (27.9%) 20 (14.3%) 2 (1.4%)
21	Rate the difficulty in evaluating occlusion during try-in	Very easy Somewhat easy Neither easy nor difficult Somewhat difficult Very difficult	7 (5%) 60 (42.9%) 39 (27.9%) 32 (22.9%) 2 (1.4%)
22	Did you have errors in occlusion during try-in	Yes No	90 (64.3%) 50 (35.7%)
23	How do you perceive insertion?	Very easy Somewhat easy Neither easy nor difficult Somewhat difficult Very difficult	12 (8.6%) 62 (44.3%) 47 (33.6%) 17 (12.1%) 2 (1.4%)
24	How often is the patient satisfied with the denture?	Everytime Half the time Never	60 (42.9%) 77 (55%) 3 (2.1%)
25	How often are you satisfied with the denture?	Everytime Half the time	39 (27.9%) 92 (65.7%)

		Never	9 (6.4%)
26	What according to you is the most difficult procedure?	Primary impression	
		Border moulding	5 (3.6%)
		Secondary impression	44 (31.4%)
		Jaw relation	
		Try in	8 (5.7%)
		Insertion	78 (55.7%)
			2 (1.4%)
			3 (2.1%)

**Table 3** - Represents the association between No.of dentures fabricated by the participants and the most difficult procedure according to them. Significance level was set at  $P < 0.05$

S No			No.of dentures fabricated by the participants
1	Most difficult procedure	Chi-square	14.522
		df	20
		P value	.803



**Figure 1** - Bar chart represents the association between No.of dentures fabricated by the participants and the most difficult procedure according to them. X-axis represents No.of dentures fabricated by the participants and Y-axis represents the most difficult procedure according to them. Jaw relation is reported as the most difficult procedure in all the groups. However, it is not statistically significant. (Pearson's chi square value = 14.522, df = 20, P value = 0.803 (>0.05)).

The purpose of this study is to evaluate the difficulties encountered during clinical procedures in complete denture fabrication among undergraduates.

Complete denture fabrication is one the most common treatments done in patients, especially in the geriatric community for a variety of reasons. It is also the only noninvasive method of tooth replacement(6-8).

In countries with a high percentage of geriatric patients, it is mandatory for a dental clinician to have a working knowledge on complete denture procedures. Therefore, it is included in the curriculum in all dental schools. It is one of the most technique sensitive procedures taught to dental students through the course of their study, with a high chance of errors in the final prosthesis(3).

In the present study, 50.7% reported using alginate for taking primary impression. This is in accordance with Harrison et al and Hyde et al who found alginate to be the most favoured material for primary impression(9,10). This is because of ease of manipulation, low cost, the hydrophilic nature, and ease of pouring of alginate(11).

From this study it is found that green stick compound is commonly used for border moulding. This is in accordance with surveys done by Levin et al and Jagers et al(4,12). This preference is due to the ease of manipulation, reversible property, and low cost of the material([Mahalaxmi 2020](#)).

50% of the population used ZOE and 49.3% used light body as secondary impression material. A study done by Jagers et al stated that 62% preferred ZOE as first choice material and 50% preferred light body as a second choice material(12). Another study by Petropoulos et al, most of the population used elastomeric impression materials and nobody preferred ZOE(13).

In the present study, 55.7% of the graduate students replied that jaw relation is the most difficult procedure and 31.4% replied that border moulding was the most difficult procedure. This could be a result of the technique sensitive procedures done during border moulding and jaw relation. This is in accordance with Bembalgi et al, where they found that 85.42% found difficulty in recording horizontal jaw relation(14).

80% of the population preferred visual methods for teeth selection in the present study. This is in accordance with Bembalgi et al, where the majority used SPA factors to select teeth. However, a study done by Harrison et al, majority used old dentures for teeth selection(9,14).

McCord et al and Abhimanyu Deora et al reported the various problems encountered with the dentures(15,16). Duncan JP et al describe an abbreviated impression technique for undergraduate curriculum(17).Dodge CA discussed the problems encountered by the patient on use of overdentures(18). Woelfel JB talked about the technical procedures frequently overlooked during denture processing that causes denture failure(19).

According to Fenlon et al, satisfaction was influenced significantly by accuracy of jaw relations, which in turn is significantly influenced by mandibular denture security and mandibular anatomy(20).

Adequate knowledge on the procedure and causes of failure would ensure that the graduate students can retain and recall the knowledge as and when needed. Problems encountered with these procedures may lead to problems in the denture. Sometimes it might even lead to denture failure. If these problems are addressed at a graduate level, the quality of treatment given to the patient can be improved.

Limitations of this study include small sample size. The results were quantitative approach and correlation based analysis, which limited the evaluation of cause-effect relationship among the evaluated variables

#### **IV. CONCLUSION:**

The data obtained from the study shows the problems faced by the practitioners during the fabrication of complete dentures. Principles and procedures that a practitioner learns in school have a widespread effect. Hence, dental educators have a heavy responsibility to inculcate the responsibility in their students to carry out the best possible treatment for their patients.

Students should give more feedback information. This should further be used to identify the problematic areas which should be rectified. However, there is a lack of knowledge on the problems faced from the practitioners end. More surveys need to be conducted on dental graduates in different regions to evaluate the problems and improve the dental education in various institutes.

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