



## Original Article

# Evaluation of Intern Students Knowledge of Complete Denture Impression Practice in Benghazi University

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### ABSTRACT:

**Objectives:** The aim of treatment with complete denture is to restore function and esthetics and maintain patient health. Making an accurate impression is a very critical factor for success or failure of the complete dentures. The aim of this study is to evaluate the knowledge of intern dental students about procedures followed in impression practice for complete denture construction in the city of Benghazi.

**Materials and method:** This descriptive cross-sectional study was done amongst dental intern students in Benghazi city, Libya. A total of 120 students were selected randomly. A survey was conducted through a printed standard questionnaire with 13 multiple-choice questions, only 81 questionnaires returned. Data from the completed questionnaires were collected and analyzed, the statistical analysis was done using SPSS statistical software version 23 (SPSS, IBM, Armonk, NY, USA).

**Results:** Low knowledge scores were found regarding the final impression material, the tray fabrication steps (spacer and relieve holes) and the timing of previous denture discontinuation prior to the primary impression step. Also, a low level of knowledge was found regarding the stage of posterior palatal seal establishment. The scores for all the questions were calculated and tabulated; the scores 1,2 and 3 are low knowledge (57%), good knowledge (43%) and excellent knowledge 0% respectively.

**Conclusion:** The percentage of low knowledge level was significantly higher than expected, as observed in the overall results indicating that there are procedures and information about complete denture impression practice that remains unknown to the interns, which influence the denture satisfaction of the patient. Changes in the undergraduate education system to focus on these aspects may facilitate the interns to gain more knowledge regarding complete denture impression procedures especially final impression.

**Keywords:** *knowledge, impression, technique, intern, final, primary.*

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### INTRODUCTION:

The main aim of treatment with complete denture is to restore function and esthetics and maintain patient health<sup>1</sup>. Making an accurate impression is a critical factor for either success or failure of the complete

denture. A primary impression is made with an irreversible hydrocolloid (alginate) in a stock perforated tray and a final impression is recorded using a custom tray, usually made of acrylic resin. According to clinical preferences there are many materials for the

final impression like zinc oxide and eugenol (ZOE) paste, poly-sulphide rubber, polyether, polyvinylsiloxane and alginate. Application of the simplified technique should be restricted to well-formed and moderate edentulous foundations, since modification of stock metal trays to conform to resorbed or excessively flabby edentulous ridges will be difficult<sup>2,3</sup>. An abbreviated impression technique help to decrease the number of patient appointments, without increasing the number of adjustment or relining procedures<sup>4</sup>.

The teaching process in Benghazi university involves theoretical part which covers primary and final impression materials and techniques used in complete denture construction for patients with well-developed dental arches and also patients with compromised foundations like resorbed, knife-edge and flappy ridges. The practical part in the clinic involves the practice with alginate and impression compound (cake) as primary impression materials according to the presence of bony undercuts, stock metal trays are used in this step which should be perforated with use of alginate material and non-perforated with impression compound. Special trays are constructed on study cast with light or self-cure acrylic resin without spacer and stoppers because ZOE is the most commonly used material when there is no undercut, perforations are not made in this technique. Special tray with spacer and stopper will be constructed when elastomeric impression material is used due to the presence of undercut, the mechanism of adhesion of the material to the tray usually depends on perforating special tray more than using adhesive. The aim of this study was to evaluate the knowledge of intern dental students about procedures followed in impression practice for complete denture construction at the faculty of dentistry in Benghazi university.

**MATERIALS AND METHODS:** A descriptive cross-sectional study was conducted amongst dental intern students in Benghazi, Libya. A total of 120 students were selected randomly. A survey was conducted through a printed standard questionnaire with 13 multiple-choice questions regarding the materials and techniques used in impression practice and the questionnaire was scored according to the impression technique school followed by removable prosthodontic department in Benghazi university. Data from the

returned 81 completed questionnaires were collected and analyzed, the statistical analysis was done using SPSS statistical software. This work carried out under the approval of institutional ethical committee (0154) in university of Benghazi, Libya.

**RESULTS:** Dental students' knowledge, attitudes, and practice of steps followed in complete denture were well reflected in the study's specific sample (dental students), 81 interns of both sexes and 23-25 years old were enrolled in the current study. The percentage of various scores for each question was calculated and tabulated. The following results were the implications of the scores 1 and 2 (low knowledge, excellent knowledge). (**Table.1**) (**figure.1**)

**Diagnosis of an edentulous patient** all the intern students included in this study (100%) were taking patient history and performing oral examination.

**impression making:** 36(44.4%) of the intern students were asking the patients to discontinue the use of previous denture 48-72 hours before making an impression, 30(37%) less than 48 hours, and 15(18.5%) No discontinuation of the previous denture. Many intern students in our study 58 (71.6%) were using Irreversible hydrocolloid for making a primary impression, 17(21%) were using Impression compound, and 6(7.4%) were using Putty elastomeric impression material. In this study 76(93.8%) of the students were making final impression for complete denture fabrication, while 5 (6.2%) were not.

**Custom tray fabrication:** The percentage of the intern students whose giving tissue stop while custom tray fabrication were 61(75.3%), and the reminder 20(24.7%) were not giving tissue stop.

The material that many of our intern student were using 57(70.4%) for custom tray fabrication was light cure resin material, 19 (23.5%) were using self-cure resin material, 3(3.7%) were using shellac base plate, only one student was using vacuum forming sheet, and one student was using the old denture as custom tray.

**Border molding and final impression:** 78(96.3%) were performing border molding prior to final impression, while 3(3.7%) were not.

The material used to carry out border molding procedure prior to final impression by the majority of

our intern students 69 (85.2%) was Low fusing compound (green stick), 8(9.9%) were using elastomeric impression material, 3 (3.7%) were using low self-cure resin, and one student was using zinc oxide eugenol impression paste.

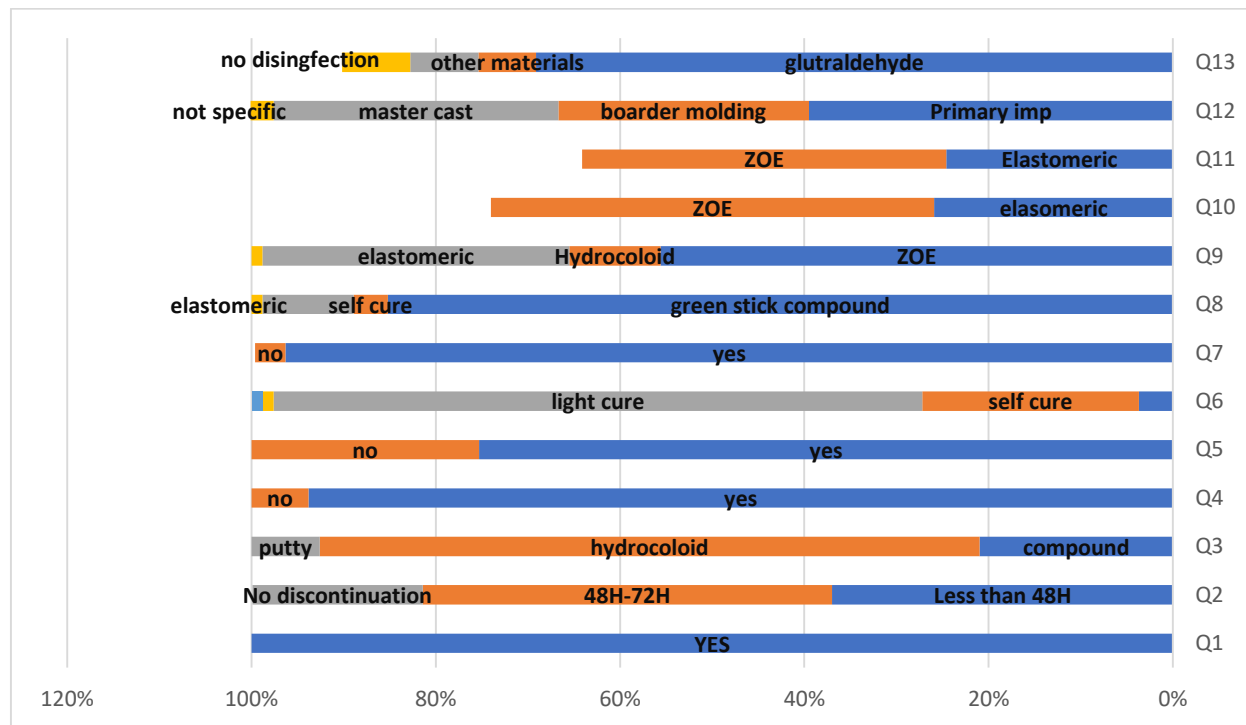
**Taking the final impression:** 45(55.6%) of the intern students were using Zinc oxide eugenol impression paste, at the same time 32 and 39 intern students were making relieve holes and providing spacer while they

using zinc oxide eugenol as a final impression material respectively , 27(33.3%) were using elastomeric impression material, at the same time 20 and 21 of the intern students whose using elastomeric impression material as final impression were making relieve holes and providing spacer respectively. 8(9.9%) were using Irreversible hydrocolloid, only one student was using tissue conditioners as final impression material.

**Table 1: Sample Questionnaire**

| Questions                                                                                                                               | Excellent knowledge<br>(the right answer) | Low<br>knowledge<br>(other than<br>the right<br>answer) |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------|
| 1.Before starting with the complete denture fabrication procedure, do you take the patient's case history and perform oral examination? | 81 (100%)                                 | 0                                                       |
| 2 .How much time before making an impression do you ask the patient to discontinue the use of previous denture ?                        | 34 (42%)                                  | 47 (58%)                                                |
| 3 .Which material do you use for making a primary impression ?                                                                          | 59 (72.8%)                                | 2(27.2%)                                                |
| 4 .Do you make a final impression for a complete denture?                                                                               | 76 (93.8%)                                | 5(6.2%)                                                 |
| 5 .Do you give tissue stop while fabricating the custom tray ?                                                                          | 61(75.3%)                                 | 19 (23.5%)                                              |
| 6 .Which material do you use for fabrication of custom tray ?                                                                           | 57(70.4%)                                 | 24(29.6%)                                               |
| 7 .Do you carry out border molding procedure ?                                                                                          | 78 (96.3%)                                | 3(3.7%)                                                 |
| 8 . Which material do you use to carry out border molding procedure prior to final impression ?                                         | 69(85.2%)                                 | 12(14.8%)                                               |
| 9.Which material do you use for making the final impression ?                                                                           | ZOE45(55.5%)<br>Elastomeric27(33.3%)      | 9(11.1%)                                                |
| 10. Do you provide a spacer while fabricating a custom tray?                                                                            | Elastomeric 21(25.9%)                     | ZOE<br>39(48.1%)                                        |
| 11. Do you make relief holes in the custom tray before making the wash impression?                                                      | Elastomeric 20 (24.6%)                    | ZOE 32<br>(39.5%)                                       |
| 12 .At what stage do you establish the posterior palatal seal ?                                                                         | 22(27.2%)                                 | 59(72.8%)                                               |
| 13. Which agent do you use for disinfecting the impression?                                                                             | 56(69.1%)                                 | 25(30.9%)                                               |

In the Primary impression stage many of the intern students 32(39.5%) did establish the posterior palatal seal, 25(30.9%) on the master cast stage, 22(27.2%) at the border molding stage, two of our students were not specific regarding posterior palatal seal



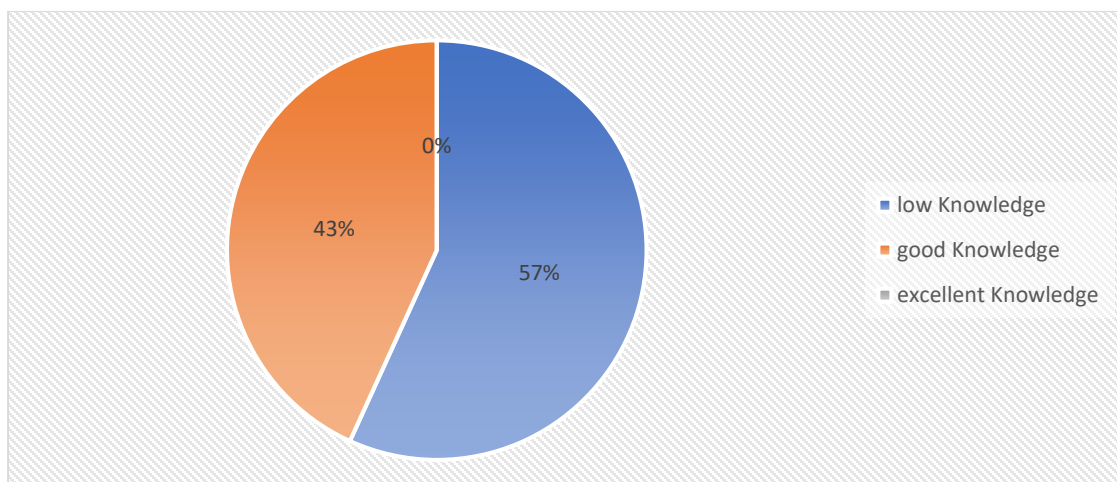
**Figure 1:** The bar chart shows percentage of interns against respective questions

**disinfecting the impression:** 56(69.1%) of the intern student were using Glutaraldehyde material for disinfection of their final impression prior sending it to the technician, 5(6.2%) were using Iodophors, 6(7.4%) were using Chlorine compounds, 8(9.9%) were using Phenolics, and 6(7.4%) were not disinfecting their impressions. Comparatively examining the outcomes, the intern's Low knowledge scores was found regarding the final impression material and the tray fabrication steps (spacer and relieve holes)

also the timing of previous denture discontinuation prior to the primary impression step, A low level of knowledge was found in the stage of posterior palatal seal establishment.

various scores for all of the questions was calculated and tabulated. the scores 1,2 and 3 (low knowledge and good knowledge and excellent knowledge respectively). The percentage of individual scores obtained were 57%, 43%, 0% . (Figure 2)





**Figure2: Percentage of individual scores**

## DISCUSSION:

Patients who need replacement dentures require a detailed history, clinical examination, and panoramic radiograph that may reveal findings in edentulous arches like: retained root fragments, impacted teeth, foreign bodies, radiolucencies, radiopacities, mental foramina at or near the crest of the residual alveolar ridge, and maxillary sinus pneumatization and approximation to the crest of the residual alveolar ridge<sup>5,6</sup>. Examination of the degree of muscular activity and the region of denture extension without displacement is important for selection of impression technique<sup>7</sup>. All the intern students included in this study (100%) were taking patient history and were performing oral examination, 44.4% of the intern students were asking the patients to discontinue the use of previous denture 48-72 hours before making an impression, 37% less than 48 hours, 18.5% No discontinuation of the previous denture.

Impression materials are divided into non-elastic or elastic, non-elastic materials are rigid when set and therefore exhibit very little elasticity and any significant deformation to the impressions results in permanent deformation, impression compound and Zinc-oxide eugenol are examples of rigid non-elastic impression material<sup>8-10</sup>. Primary impressions for dentures are made most commonly with alginate material which is

inexpensive and can produce impressions with reasonable surface details but it has poor dimensional stability, poor tear strength, distortion if unsupported, requires good mixing otherwise air bubbles result, and minimum 3mm thickness required. Primary impressions for complete dentures, border molding of trays can be made with impression compound, the impression can be reheated and modified. It is muco-compressive, good for full impressions with no flabby ridge, it should be avoided with deep undercuts as it is very rigid, it has poor dimensional stability and poor reproduction of surface detail<sup>8-10</sup>. The corrective technique for making the preliminary impression is quick, simple and reliable, in which the defects of the primary impression with compound can be corrected with the use of alginate, the impression compound provides better support for the alginate impression material, and the under extended borders in the impression compound are corrected in the alginate impression hence it can also be called as "corrective primary impression technique". The over-extended areas of the compound impression can be identified, marked and corrected in the custom tray<sup>11</sup>. 71.6% of intern students in our study were using irreversible hydrocolloid for making a primary impression, 21% were using impression compound, and 7.4% were using Putty elastomeric impression material.

The main objective in custom tray construction is to provide a rigid tray for retention of the impression

material and offering distinct clinical accuracy compared to the stock tray. Dimensional changes due to polymerization of elastomeric impression materials are proportional to the thickness of the material, a uniform thickness of material can be achieved by designing and using custom tray, therefore dimensional accuracy and stability can be provided<sup>12-14</sup>. The wax spacer which is used directly under the visible light-cured resin material may leave a wax residue remaining in the tray causing contamination that may interfere with adhesion of elastomeric impression materials to the impression tray leading to distortion in the impression. Therefore, tray surface should be cleaned using boiling water, pressurized steam or a wax remover. Burnishing tin foil over the wax spacer may be recommended to avoid this contamination<sup>15</sup>. The retention of impression material to the tray during removal of the set impression from the oral cavity is necessary, adhesion between impression material and tray can be improved by perforating or roughening of the custom tray surface with tungsten carbide burs and application of adhesive solutions for at least 15 minutes<sup>16,18</sup>. In this study 93.8% of the students were making final impression for complete denture fabrication, while 6.2% were not. 75.3% of the intern students said that custom tray fabricated with spacer and tissue stops, and the reminder 24.7% did not use spacer and tissue stops. According to the followed school for making final impression in Benghazi university custom tray should be made with spacer and stoppers only if elastomeric impression material was used.

The material that many of our intern student were using 70.4% for custom tray fabrication was light cure resin material, 23.5% were using self-cure resin material, 3.7% said that they were using shellac base plate, only one student was using vacuum forming sheet, and one student was using the old denture as custom tray.

The conventional method that uses modelling plastic impression compound and zinc oxide eugenol impression paste is the most popular materials used for complete denture impression because of their fast setting, reproducing fine details, easy handling and having no significant dimensional changes subsequent to hardening, but its short manipulation time that it hardens quickly in the mouth and does not remain in a plastic stage till the functional movements are completed<sup>16,17</sup>. Elastomeric impression material has

been recommended for border molding and final impressions as it can be used for single step border molding using putty and it accurately records the fine details during final impression using light body. polyvinylsiloxane putty and light-body impression material are well suited for making complete denture impressions especially in the hands of an inexperienced operator<sup>17,18</sup>. In this survey 78(96.3%) were performing border molding prior to final impression, while 3(3.7%) were not. The material used to carry out border molding procedure prior to final impression by the majority of our intern students 69 (85.2%) was Low fusing compound (green stick), 8(9.9%) were using Elastomeric impression material, 3 (3.7%) were using low self-cure resin, and one student was using zinc oxide eugenol impression paste. for making the final impression 45(55.6%) of the intern students were using Zinc oxide eugenol impression paste, at the same time 32 and 39 intern students were making relieve holes and providing spacer while they using zinc oxide eugenol as a final impression material respectively , 27(33.3%) were using Elastomeric impression material, at the same time 20 and 21 of the intern students whose using elastomeric impression material as final impression were making relieve holes and providing spacer respectively. 8(9.9%) were using Irreversible hydrocolloid, only one student was using Tissue conditioners as final impression material.

Glutaraldehyde is called chemo-sterilizer, it is a high level disinfectant because it is a broad spectrum chemical agent with fast killing capability, it can destroy all types of micro-organisms including bacterial and fungal spores, tubercle bacilli and viruses. It is a colorless liquid with pungent odor. It has many health hazards including irritation to skin, eyes and respiratory tract<sup>19,20</sup>.

In this study 69.1% of the intern student said that Glutaraldehyde material is ideal for disinfecting final impression prior sending it to the technician, 6.2% said that Iodophors are better for disinfecting, 7.4% of students said Chlorine compounds are used , 9.9% of them support using Phenolics, and 7.4% were not disinfecting their impressions.

**CONCLUSION:** The percentage of low knowledge level was significantly higher than expected as observed in the overall results indicating that there are procedures and

information about complete denture impression practice that remains unknown to the interns which influence the denture satisfaction of the patient. Changes in the undergraduate education system to focus on these aspects may facilitate the interns to gain more knowledge of complete denture impression procedures especially final impression.

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