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ASSESSING THE ERRORS OCCURS DURING THE PROCESSING ON TEMPORARY PARTIAL DENTURE

S. V. Rupashri ^{*1} and V. Suresh ²

Department of BDS ¹, Department of Prosthodontics ², Saveetha Dental College, Chennai - 600077, Tamil Nadu, India.

ABSTRACT: **Aim:** To study the errors during processing on temporary partial denture. **Objectives:** To assess the errors during processing on temporary partial denture done by Saveetha Dental College students. **Materials and Methods:** A questionnaire for assessing the errors in processing temporary partial denture containing 24 questions are administered. The participants are dental students from Saveetha Dental College. **Background:** Temporary partial dentures are for patients who are missing some of their teeth on a particular arch. Certain kinds of removal partial dentures can be used as permanent tooth replacement system especially for people who aren't candidates for dental implants or fixed bridges. However the same rigidity and thickness that gives these rigid TPDs their durability can make them uncomfortable to wear, while the acrylic material they are made of is capable of staining and breaking. Overtime, the TPDs are prone to become loose-and they are also easy to flip in and out with the tongue. RPDs must be removed regularly for throughout the cleaning. Partial dentures make it easier for you to speak and chew. They help maintain the shape of your face and help prevent remaining teeth from shifting. **Reason:** To throw the light on the errors during the processing of temporary partial denture.

Keywords: Temporary, Denture, Teeth, Errors

Correspondence to Author:

S. V. Rupashri

Department of BDS, Saveetha Dental College, Chennai - 600077, Tamil Nadu, India.

E-mail: rupavenkat13@gmail.com

INTRODUCTION: Temporary partial denture is “A dental prosthesis to be used for a short interval of time for aesthetics, mastication, occlusal support or convenience or to condition the patient to the acceptance of an artificial substitute for missing natural teeth until more definitive prosthetic therapy can be provided”.

There are three types of temporary partial dentures. They are:

1. Transitional partial denture.
2. Interim partial denture.
3. Treatment partial denture.

Transitional partial denture is “A removable partial denture serving as a temporary prosthesis to which artificial teeth will be replaced after post-extraction tissue changes have occurred. Interim partial denture is “A transitional denture may become an interim denture when all of the natural teeth have been removed from the dental arch”. Transitional dentures are used when the prognosis of the

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remaining teeth is poor. An interim denture is given if the patient is not suitable for definitive treatment (at that time). In other words, the clinician knows the prognosis but the patient is not ready for final treatment. The interim denture is worn till the patient becomes suitable for definitive prosthesis. Interim denture is also used as an intermediate therapy until the permanent prosthesis is fabricated.

After fabricating these dentures are used as spare dentures. The major factor is that these dentures produce adverse tissue reaction if worn continuously for more than a month. Treatment partial denture is "A dental prosthesis used for the purpose of treating or conditioning the tissues which are called upon to support and retain a denture base". The stages in processing the temporary partial denture are slightly more complex compared to those followed in complete denture. The steps involved in fabrication of a TPD are similar to those followed in complete denture except for few additional procedures. The results of many errors made during the fabrication of removable partial denture may not be recognizable when they occur¹. In this study let us see the errors during processing on temporary partial denture.

MATERIALS AND METHODS: A questionnaire for assessing the errors in processing temporary partial denture was prepared. The participants who undertook the survey are undergraduate students of dental college. A total of 24 questions were asked to 200 students. Individuality was assured when the subjects filled the survey. The questionnaire was filled in the paper and pen method. After the data collection, the statistical measurements are done. The questionnaire included:

- What technique did you used to construct the temporary denture base?
- Was your Temporary denture base having uniform thickness?
- Were you able to separate the flasking components on post dewaxing?
- While post dewaxing did you find any separation of acrylic teeth from the mould?
- What type of the separating media was used in your flasking procedure?
- Did you apply the separating medium for post dewaxing?
- Did you measure volumetrically polymer to monomer ratio?
- During the physical stages of the polymerisation was the porcelain jar?
- Do you understand the term trial closure?
- Did you use manual press or Hydraulic pneumatic press:
- Did you wait for bench curing to happen?
- What type of the curing cycle did you used for?
- Retrivality of the heat cure denture from the mould was?
- During retrieving of your denture base was there any fracture present in denture?
- Did your denture have any type of the porosities?
- During polishing did you experience any fracture of the denture base or the teeth got separated from the denture base?
- Did your permanent final denture base had the same thickness as that of your temporary denture base?
- Did you find any resin tags?
- Was the denture polishable and had glossy mirror like surface in Post polishing procedure?
- Was your cast fitting into the flask?
- Once retrieved the RPD the trimming at the scalloped region was done
- During flasking did you block out the dentulous part.
- While retrieving the permanent denture did you experience dentulous part of the mould breaking?
- Which is easy to flask?

RESULTS:

1. What technique did you used to construct the temporary denture base?

A	Doves technique	114
B	Sprinklon technique	72
C	Used shellac base plate or modelling wax	14

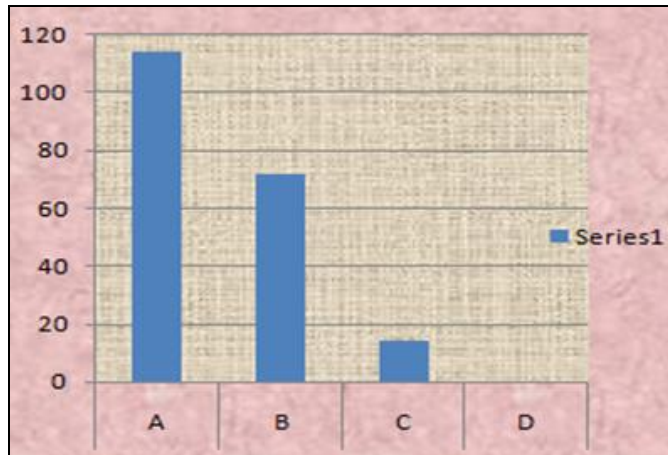


FIG. 1: TECHNIQUE USED

According to the participants 57% of them used doves technique than sprinklon technique. 72% of them used sprinklon technique to construct temporary denture base. Whereas the shellac base plate or modelling wax technique is the least used (14%).

2. Was your temporary denture base having uniform thickness?

A	Yes	166
B	No	34

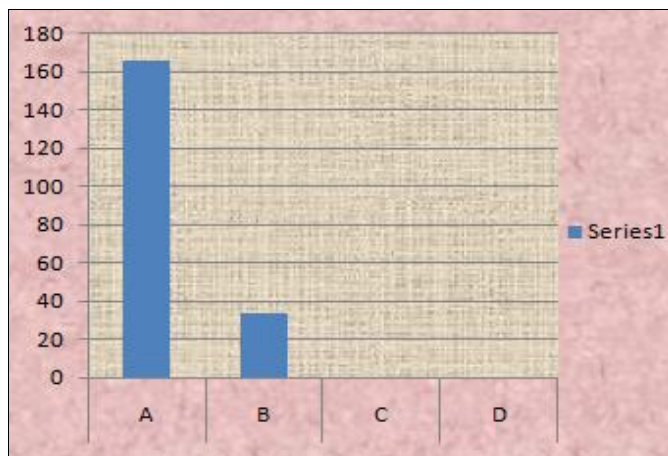


FIG. 2: TEMPORARY DENTURE

Regarding the uniform thickness of temporary denture base 83% of the students had uniform thickness in their denture and 17% of them had non uniform thickness.

3. Were you able to separate the flasking components on post dewaxing?

A	Easily	90
B	Difficult	78
C	Mould broke during the separation of flask	32

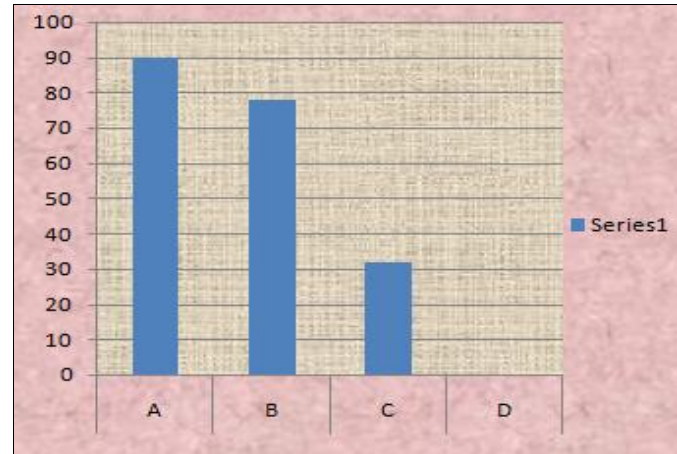


FIG. 3: SEPARATE THE FLASKING COMPONENTS

When questioned about the flasking components on post waxing 45% of the students were able to separate the flasking components easily, and 39% were difficult to separate the flask, and 16% of the students break the mould during the separation of the flask during post waxing.

4. While post dewaxing did you find any separation of acrylic teeth from the mould?

A	Yes less than 5 teeth	95
B	Yes greater than 5 teeth	70
C	Didn't find any separation	35

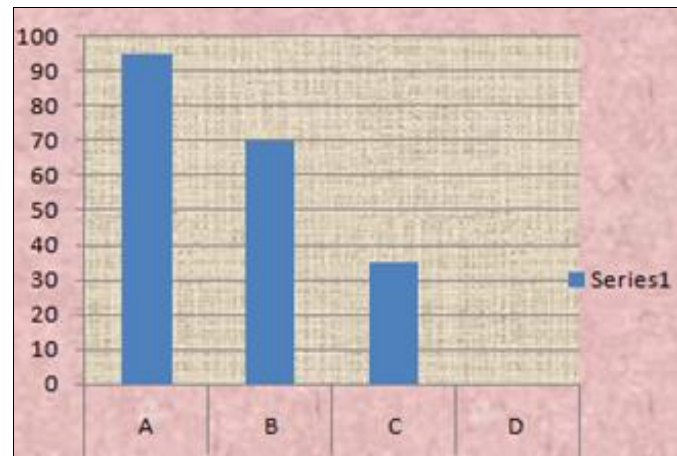


FIG. 4: SEPARATION OF ACRYLIC TEETH

When surveyed about the separation of the teeth from the mould, during post dewaxing 47.5% were find less than 5 teeth from the mould, and 35% were find greater than 5 teeth separated from the

mould, and 17.5% of the students were didn't find any teeth separated from the mould.

5. What type of separating media was used in your flasking procedure?

A	Could mold seal	110
B	Petroleum jelly	77
C	Any foils	13

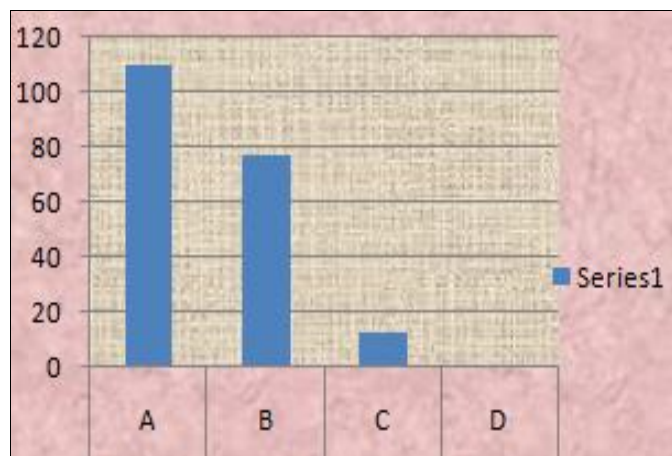


FIG. 5: FLASKING PROCEDURE

Among the respondents 55% of students used could mould seal as a separating media for flasking procedure, and 38.5% were used petroleum jelly as a separating media and 6.5% were used any other foils for flasking procedure.

6. Did you apply the separating medium for post dewaxing?

A	Immediately	71
B	Allow the mould to attain room temperature and then apply	129

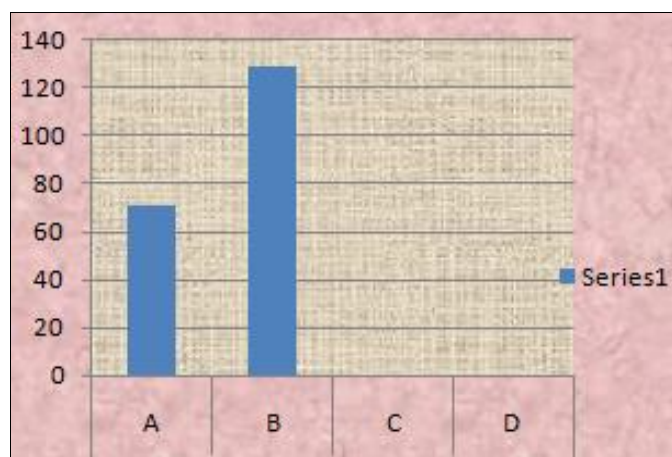


FIG. 6: SEPARATING MEDIUM FOR POST DEWAXING

When questioned about the separating media for post dewaxing 35.5% were immediately apply the

separating media and 64.5% were allowed the mould to attain the room temperature and apply the separating media.

7. Did you measure volumetrically polymer to monomer ratio?

A	yes	140
B	No	60

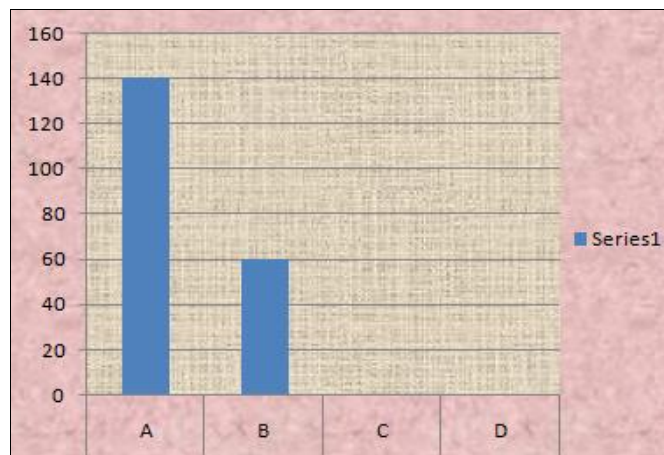


FIG. 7: VOLUMETRICALLY POLYMER TO MONOMER RATIO

When surveyed only 70% were measured the volumetric polymer to monomer ratio other 30% were not measured the polymer to monomer ratio.

8. During the physical stages of the polymerisation was the porcelain jar?

A	closed	155
B	Opened	45

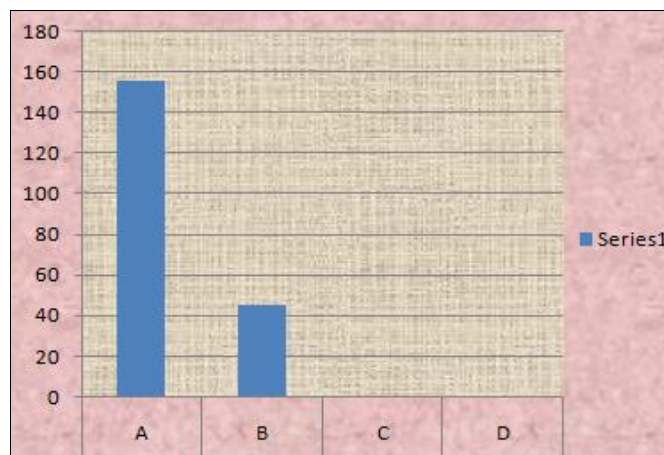


FIG. 8: PHYSICAL STAGES OF THE POLYMERISATION

When surveyed 77.5% of the students were closed the porcelain jar during the physical stages of the polymerisation, and 22.5% were opened the

porcelain jar during the physical stages of the polymerisation.

9. Do you understand the term trial closure?

A	Yes	29
B	No	171

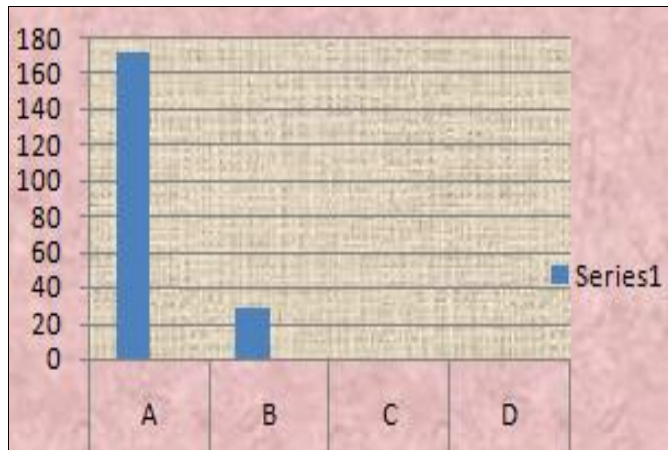


FIG. 9: UNDERSTAND THE TERM TRIAL CLOSURE

When questioned 85.5% of the students does not understand the term trial closure method, and only 14.5% of the students understand the term trial closure method.

10. Did you use manual press or hydrolic neumatic press?

A	Manual press	152
B	Hydrolic neumatic press	48

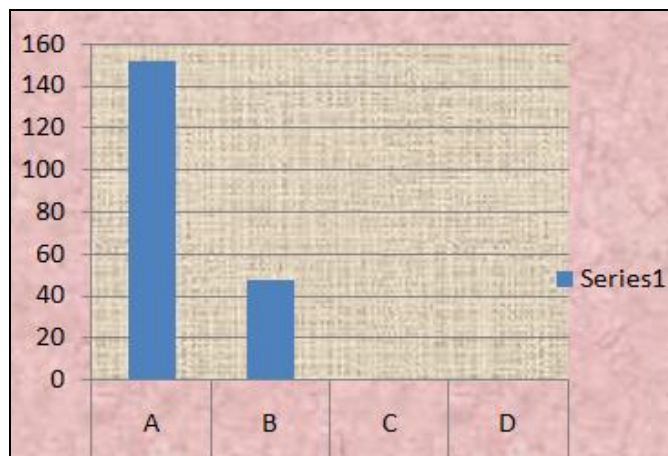


FIG. 10: MANUAL PRESS

When surveyed 76% of the students were used manual press and remaining 24% were used hydrolic neumatic press.

11. Did you wait for bench curing to happen?

A	Yes	185
B	No	15

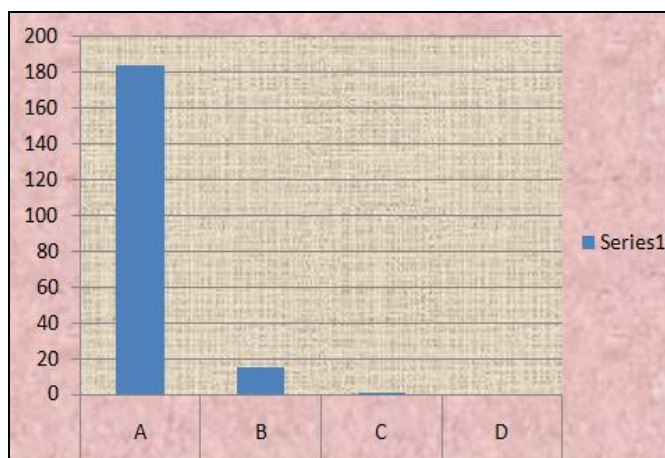


FIG. 11: BENCH CURING TO HAPPEN

When questioned about the bench curing 92.5% of the students wait for bench curing to occur and 7.5% of the students wait for bench curing to happen.

12. What type of the curing cycle did you used?

A	Long curing cycle	104
B	Short curing cycle	52
C	Don't know	45

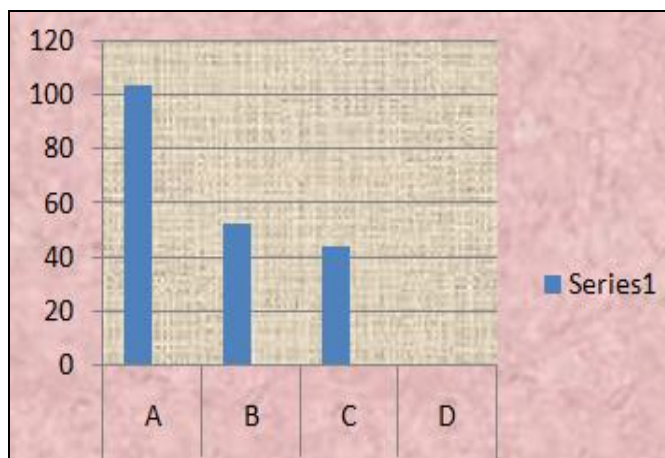


FIG. 12: CURING CYCLE

Among the respondents 52% of the students used long curing cycle and 26% of the students used short curing cycle and 33% of the students were don't know about the curing cycle.

13. Retrievalability of the heat cure denture from the mould was?

A	Easy	44
B	Very easy	30
C	Tough	117
D	Very tough	9

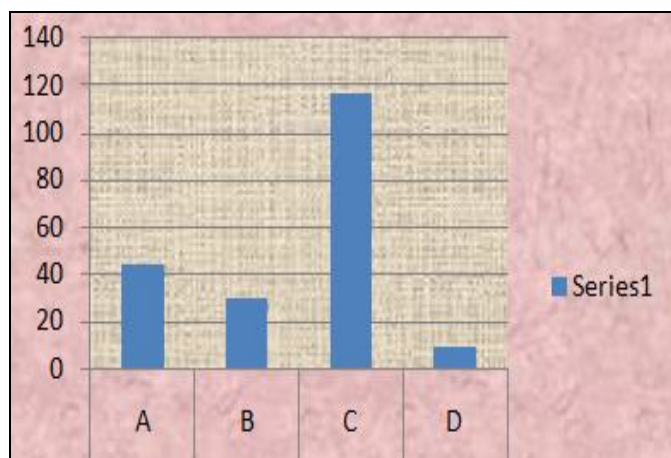


FIG. 13: RETRIEVABILITY OF THE HEAT CURE DENTURE

When surveyed 22% of the students were found easy to retrieve the heat cure denture from the mould, 15% of the students were found very easy to retrieve the heat cure denture from the mould, and 58.5% of the students were found tough to retrieve the heat cure denture from the mould, and remaining 4.5% were found very tough to retrieve the heat Cure denture from the mould.

14. During retrieving of your denture base was there any fracture present in the denture?

A	Yes, there was fracture	48
B	No, there was no fracture	152

15. Did your denture have any type of the porosities?

A	Internal	43
B	External	59
C	Both	25
D	None	73

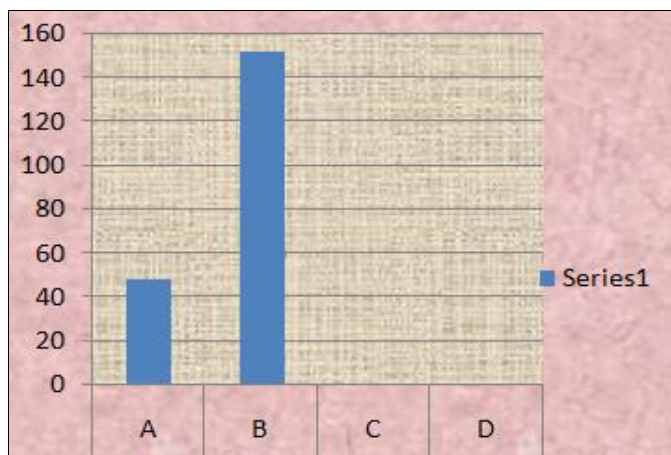


FIG. 14: DENTURE BASE

When questioned 24% of the students were occur fracture during the retrieving of their denture base

and 76% of the students did not occur fracture during the retrieving of the denture base for TPD.

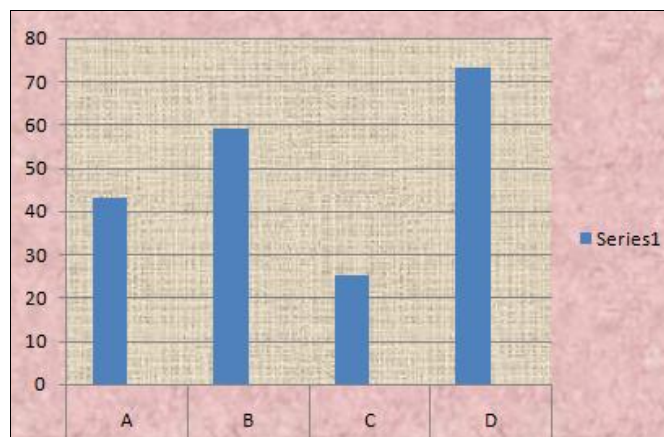


FIG. 15: TYPE OF THE POROSITIES

When surveyed 21.5% of the students had a internal porosities in the denture and, 29.5% of the students had a external porosities in the denture, and 12.5% of the students had both internal and external porosities in the denture and remaining 36.5% of the students had don't have both internal and external porosities.

16. During polishing do you experience any fracture of the denture or the teeth got separated from the denture base?

A	Yes	100
B	No	100

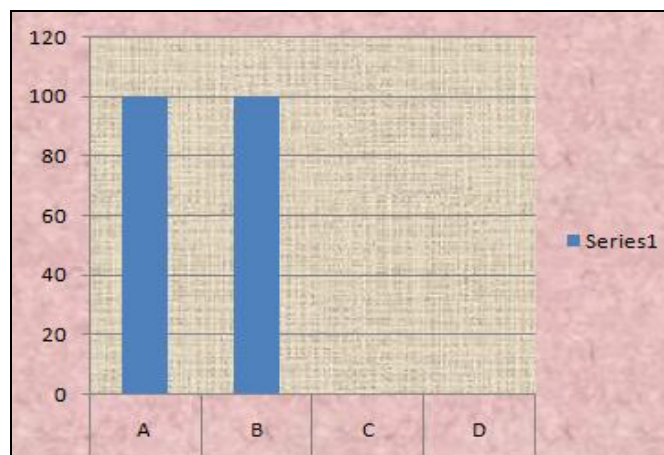


FIG. 16: FRACTURE OF THE DENTURE

When surveyed 50% of the students of the experience fracture of the denture base during polishing and their teeth get separated from the mould, and 50% of the students did not experience any fracture of the denture base during polishing and their teeth did not get separated from the mould.

17. Did your permanent final denture base had the same thickness as that of your temporary denture base?

A	Yes	147
B	No- thicker than the temporary denture base	43
C	No-thinner than the temporary denture base	10

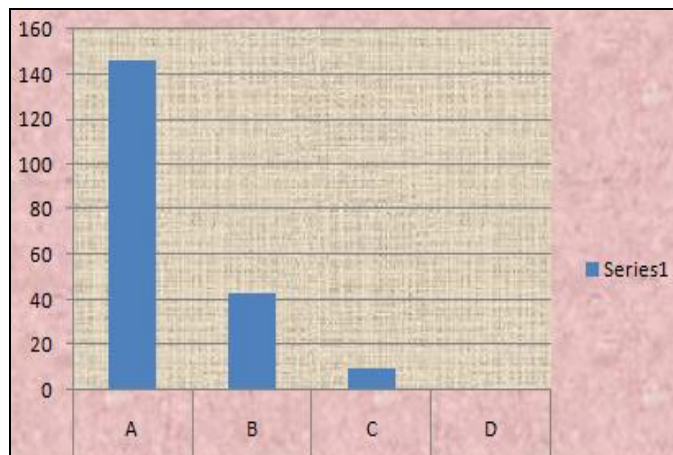


FIG. 17: FINAL DENTURE BASE

Among the respondents 73.5% of the students permanent final denture base had the same thickness as that of the temporary denture base, and 21.5% of the students permanent final denture base does not have the same thickness of the temporary denture base, 5% of the students permanent final denture base has thinner than that of the temporary denture base.

18. Did you find any resin tags?

A	Yes it was present in between the teeth	147
B	Yes it was present on the intactile surface	43
C	It was present in all the surfaces	10

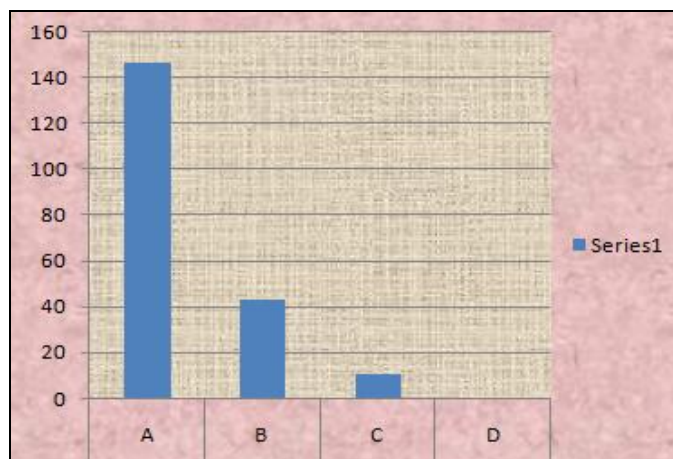


FIG. 18: RESIN TAGS

When surveyed 73.5% of the students find the resin tags between the teeth, and 21.5% of the students

find between the intactile surface, and remaining 5% were find their resin tags in all the surface of the teeth.

19. Was the denture polishable and had glossy mirror like surface in post polishing procedure?

A	Yes	131
B	No	41
C	Tried the polishing technique but didn't have polishing appearance	27
D	Polishing is not important	1

20. Was your cast fitting into the flask?

A	Comfortable	142
B	Not comfortable	15
C	Had to trim the cast to make it fix into the flask	43
D	Didn't bother to look if it's fitting or not	0

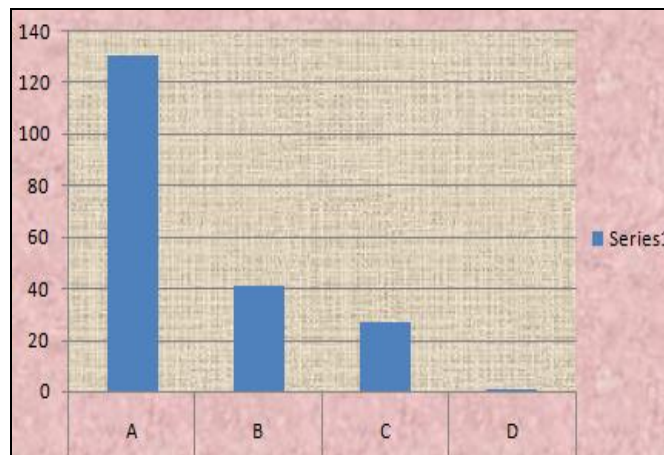


FIG. 19: POST POLISHING PROCEDURE

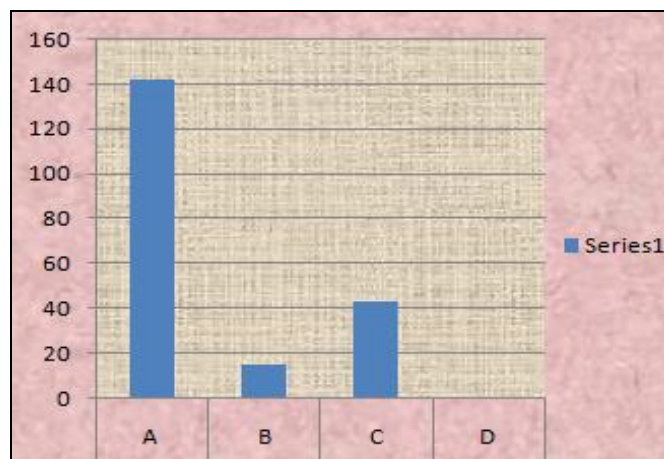


FIG. 20: CAST FITTING

Among the respondents 65.5% of the students denture had a polishable and glossy mirror like surface during post polishing procedure and 20.5% of the students does not experienced any polishable

and glossy mirror like surface during the post polishing procedure, and 14% of the students tried the polishing technique but they didn't have any polishing appearance and 0.5% of them insisted that polishing is not important.

When surveyed 71% of the students experienced comfortable fitting of cast into the flask and 7.5% of them found it uncomfortable, 43% of the students had to trim the cast to fix into the flask.

21. Once the TPD is retrieved, the trimming at the scalloped region was done?

A	Superiorly to scallops	155
B	Directly on the scallop; and enlarge the size of scallop	45

22. During flasking did you block out the dentulous part?

A	Yes	115
B	No	85

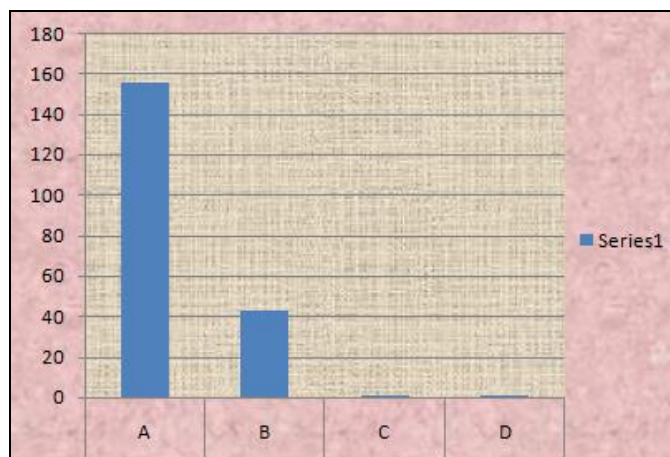


FIG. 21: TRIMMING AT THE SCALLOPED REGION

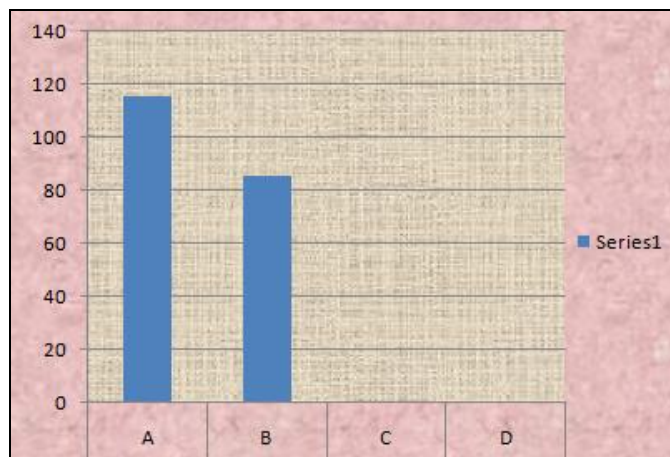


FIG. 22: DENTULOUS PART

When questioned about the trimming of retrieved TPD at the scalloped region 77.5% of the students

trimmed superior to the scallop region and 22.5% of them trimmed directly on the scallop, and enlarge the size of scallop.

Among the respondents 57.5% of the students blocked out the dentulous part during flasking and 42.5% of the students didn't block out the dentulous part in TPD.

23. While retrieving the permanent denture, did you experience dentulous part of the mould breaking?

A	Yes	49
B	No	151

24. Which is easy to flask?

A	Complete denture	104
B	Temporary partial denture	96

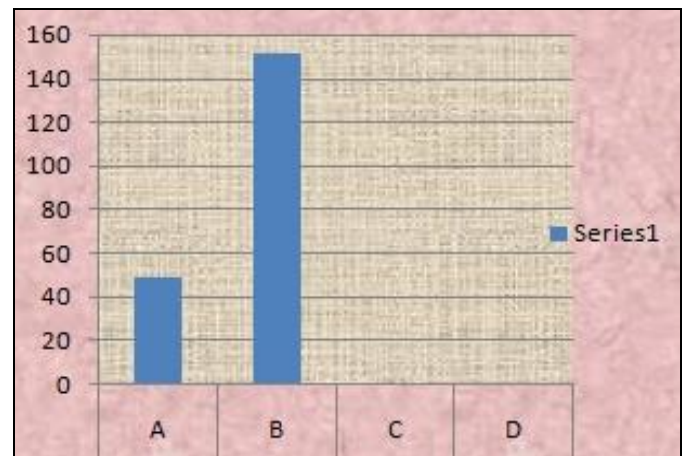


FIG. 23: DENTULOUS PART

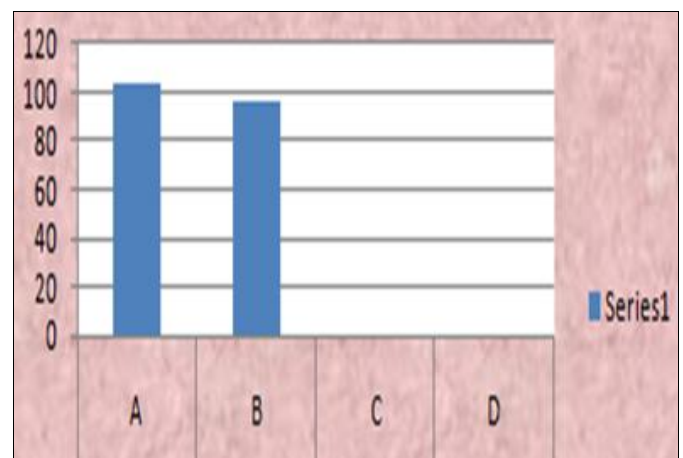


FIG. 24: EASY TO FLASK

Among the respondents 24.5% of the participants experienced dentulous part of the mould breaking during retrieving the permanent denture and 75.7% of them does not experience the breakage.

During the survey 70% of the students finds the flasking of complete denture is easy than temporary partial denture and 30% of them finds temporary partial denture is easy to flask than the complete denture.

DISCUSSION: RPD construction depends on lot of diagnostic and well thought out plan. The success of RPD is definitely associated with engaging the prosthesis in the desirable undercuts and reliving the prosthesis at the unfavourable undercuts. Before constructing any type of an RPD, for example: cast partial denture, treatment partial denture, immediate partial denture or temporary partial denture the definitive cast should be surveyed, analysed and marked. In this study, close to 43% of the students did not block the undercuts while processing the RPD. This could lead to lot of guide plane errors and since it is an temporary partial denture, the acrylic guide planes requires lot of chair side time to correct. Sometimes this may even lead to over correction of the guide planes causing spacing between the teeth and the guide plane. The same error if it is done during the construction of cast partial denture it becomes impossible either to correct or to give the metal framework seated intra orally ².

70% of the students felt that the complete denture is easy to construct than the construction of temporary partial denture. The issues of students in constructing a removable partial denture varied from flask size to fit the removable partial denture to final retrieval of the RPD. 16% of the mould were broken during post dewaxing stage. More than 47% felt the separation of teeth from the mould post dewaxing. 58% of the students felt excess difficulty in removing the proceed denture from the mould. 29% of the students reported external porosities and 21% of them reported being thicker than the wax up stage. These errors were reflected on the polish-ability of the final RPD. Close to 34% of the students reported to have non glossy surface appearance of the final denture base. This finding was in relavance with the study conducted by Milan kuhar that: "Presence of large pores or porosities can be linked to a surface polishability" ³.

The non use of trial closure during denture processing and difficulty in accommodating the

RPD cast into a flask could lead to thickened denture flanges, thickened denture borders, increase in vertical dimension, improve closure of the flasks and subsequent processing errors. The compression moulding technique as used by the students used more of manual press (76%) rather than neumatic press. There are lot of denture processing techniques such as: microwave, injection moulded and light activated ones.

But compression moulding being the simplest of all techniques is followed more, if the right steps are not followed, then the accuracy of the processed denture can be questionable. Takamata's study has shown "stress induced during processing can be to definitive distortion of the dentures" ⁴. According to Nathan E. Robison: Denture tooth fracture or debonding remains a common problem in removable prosthodontics. He resulted that "When good bonding was achieved, the strength of the structure (denture tooth/base resin combination) was determined by the strength of the denture teeth, which may be affected by the processing technique" ⁵.

In this study 24% of the students reported fracture of the removable partial denture during the retrieval. Close to 50% of them found the cast either not comfortable or had to trim the cast to fix into the flask. Conventional laboratory polishing was found to produce the smoothest surface of denture base acrylic resin ⁶. Failing to properly coat the bottom of the base of the cast with a separating medium will make it very difficult to separate the cast from the articulator mounting. Attempts to separate the cast may result in broken and destroyed indices ^{7, 8}. Solution is Paint only the bottom surface of the cast with clear stone-separating medium. Petroleum jelly also will work, but it must be used sparingly ^{9, 8}.

CONCLUSION: The dental graduate students tend to bypass the surveying procedure and blocking of undercuts during RPD constructions. This study also highlights the processing error and a possible reason got the error during RPD construction. The importance of the removable partial denture design planning has to be stressed at the diagnostic level itself.

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CONFLICT OF INTEREST: Nil

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