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KNOWLEDGE, ATTITUDE AND PRACTICE SURVEY REGARDING CLASS II COMPOSITE RESTORATION AMONG DENTAL STUDENTS

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Abstract

Composite resins are currently the most popular of all tooth coloured restorative materials, *which completely replaced silicate cement and acrylic resin as esthetic restorative material. The aim of this KAP survey was to assess the level of awareness and clinical practice among the undergraduate students regarding class II composite restoration. An online survey was done with the structured questionnaire based on knowledge, attitude, practice among the dental students and it was distributed among 100 undergraduate students via electronic media. Data entry was done in the Excel sheet and SPSS software was used to analyze the data. The majority of the participants were interns (45%), Statistical analysis, Chi square test was used to assess the association between the year of study and the responses. And the results are depicted in the form of a bar chart. The results showed that dental students have fair knowledge on restoration of class II composite. There is a need for awareness on recent material characteristics and restoration techniques for undergraduate dental students on class II composite restorations in order to achieve desired results and esthetics within a stipulated time.*

Keywords: *Class II caries; Composite; Dental students; Questionnaire survey.*

Introduction

The modern world we live in puts so much importance on appearances. Appearance is believed to contribute to professional success. A pleasant face and pearly white smile breed confidence, and are often considered as parameters for youth and vitality. Dentists have been entrusted with the job of restoring smiles from time immemorial [1]. Introduction of polymerizing resins in the 1950s opened up new avenues for the dentists and ever since remain one of the most popular treatments in dentistry [2].

Composites are restorative materials which will bond well to the conditioned tooth surface. Being tooth colored, they are used to give a natural life-like appearance to the restored teeth.

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Tooth preparation is very minimal when compared to amalgam preparations due to its micromechanical retention [3,4]. Composite resins became the unanimous choice for anterior restorations but failed miserably for

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restoring Class II caries. Marginal leakage, secondary caries, poor load bearing ability, high wear rate and inability to restore the contact were considered limitations of composite resins as class II restorative material [5]. Resins and adhesive technology have made rapid strides from those initial days and now offer numerous alternatives [6]. The advances in materials and techniques (etching techniques, sectional matrix band, nanofil composites) have paved the way for dentists to use it in Class II restorations

A modern dental practitioner is spoilt for choices when it comes to selecting the treatments and materials. This is because a practitioner often finds it difficult to balance his past (his training), his present (demands of his patients according to the prevalent trends) and his future (compulsion to keep pace with the advances). Good training advises a clinician to be discrete as heeding to all the patient's demands or endorsing all the advances wouldn't be in the best interest of the patient [7]. Past surveys have revealed that the selection of material and treatment also depend upon certain general perception of the society and fraternity [7] .

Surveys based on pre-piloted questionnaires are very useful in gauging these perceptions. Surveys are simple and cost effective for cohort studies and designed to cover large regions in a short period of time. Perceptions of restorations have changed a lot over the years. Amalgam was promoted for a while till there were apprehensions on its toxicity and its ill effect on the human body [8]. Toxicity of amalgam still continues to be debated in the academic circles. There have been studies vouching for and against amalgam. International opinion still remains very much divided on this issue. Composite resins were overwhelmingly welcomed in this backdrop. After the initial euphoria it had been realized that this new material demanded a unique type of protocol So, specific methods of tooth preparation and conditioning was proposed [9].

Dentists found out that the new material was much more technique sensitive than amalgam. Questions raised on the suitability of resins to restore deep carious lesions on account of the effect of residual monomers on underlying pulp. Similar concerns were also raised on the appropriateness of composite resins to restore class II restorations due to their poor load bearing ability and high wear rate [10]. Despite several studies in favor of composite, our general practitioners and clinicians still have several apprehensions and misconceptions about using composite resins for class II restorations [11]. Furthermore, no research has been done on the opinions and knowledge of dentists practicing in chennai regarding class II composite restorations.

Previously our team had conducted numerous studies which include in vitro studies [12–17], review [18–21], survey [22,23], clinical trial [24–26].Now we are focussing on retrospective studies The aim of this KAP survey was to assess the level of awareness and clinical practice among the undergraduate students regarding class II composite restoration.

MATERIALS AND METHODS

An online survey was done with the structured questionnaire based on knowledge, attitude, practice survey among the dental students about class II composite restoration. Ethical permission and approval for the project was obtained from the Institutional Review Board of Saveetha Institute of Medical and Technical Sciences, Chennai, India on Date 25/04/2020. This cross sectional survey was conducted among dental undergraduate students. A structured questionnaire consisting of 13 questions was shared online and 100 responses were obtained. Data entry was made in the Excel sheet, SPSS software was used to analyze the data. The descriptive statistics were used to determine the responses given by the participants. Statistical analysis, Chi square test was used to assess the association between the year of study and the responses. And the results are depicted in the form of a bar chart [Figure 1-13].

RESULTS

In the present study 75% of the participants selected IOPA bitewing as the preferred radiographic method for diagnosing class II caries, the next majority of the participants selected OPG. Nearly 85% of the participants preferred rubber dam as a method of isolation for class II composite restoration. Irrespective of the Remaining Dentin Thickness, most of the participants preferred calcium hydroxide as a pulp protecting base.

Here, 78% of the participants use total etch technique and 22% use selective etch technique for etchant application. 87% of the participants said they use tofflemire as a matrix band of choice for restoring class II composite[fig 8]. About 68% of the study participants said they will use tetric N Ceram brand of composite, the remaining 32% used 3M and shofu[fig 10]

Total of 65% of the study participants said they will cure the composite for 20 seconds and 24% of the subjects will cure the composite for 30 seconds[fig 12]. Nearly 85% of the study participants said they will do finishing and polishing of the composite immediately and 15% said they will do it 3 to 7 days post operatively.

DISCUSSION

The success of a composite restoration depends on various clinical conditions like condition of operating field, type of composite and bonding system, different design of tooth preparation, method of filling the cavity (incremental/ bulk), time and type of finishing and polishing of composite restoration. The main cause of restoration replacement was composite shade discoloration (63.8%) followed by marginal staining (50%), unsatisfactory restoration anatomy (50%), marginal fracture (14.9%), painful symptoms (8.5%), fractured restoration body (4.3%), dental fracture (1.1%) and total displacement of the restoration (1.1%). Marginal staining and composite shade discoloration contrasting with dental structure were related to the presence of caries. According to a survey, the major reason for the first time placement of restorations was primary caries, while that for replacement of restoration was secondary caries (36.2%), followed by endodontic root canal therapy (22.2%), discoloration of the restoration (14.4%), restoration failures (13.4%), composite restoration fracture (11.3%), pain or sensitivity (2.4%) [27].

The composite resin contracts by about 1.5% to 5% and the mode of polymerization of composite resin is free radical polymerization. Significant polymerization shrinkage results in gap formation, secondary caries, marginal leakage and post-operative sensitivity. The incremental layering technique of composites for restoration have been recognized as the technique of choice to minimize polymerization shrinkage stresses [28], The incremental filling technique yielded significantly lower cuspal deflection than the bulk filling technique in a previous study Results of the survey showed that 95% dentists used incremental layering technique [29].

Traditionally Mylar strips, Tofflemire band and retainer, Ivory 1 and 8 band and retainer have been used for developing contact and contour in lesions involving proximal walls. But now we have better matrix systems like Palodent plus (Dentsply), Sectional matrix plus retainer system (3M), V 3 rings (Triodent), Optra matrix (Ivoclar) specially designed to assist clinicians in creating precise automatically shaped contact points in cavities involving proximal walls. In our survey we found Tofflemire band and retainer as the most popular among dentists [30].

According to a survey done in 2010, 63% did not use a rubber dam for any restorative procedures.[31] In our survey, we found that 85% of the dentists use rubber dam as a method of isolation, less than 15% of dental students use cotton rolls and suction tips as a method of isolation.

In our study majority of the participants preferred calcium hydroxide when the remaining dentin thickness is 0.5 mm to 1mm the results correlated with the study done by asaad javaid et al in which majority of the students selected calcium hydroxide as material of choice[32]. A study done by Anitha rao et al found that the MTA fillapex group displayed higher resistance to dislodgement within groups containing 1.50 mm and 2.25 mm remaining dentin thickness [33] . They explained that it is because of increased number of dentine tubules there can be a greater number of taglike structures and a better marginal seal but in our study majority of the students selected calcium hydroxide when the RDT is 1 to 2 mm.

Roland frankenberger et al studied various etching techniques for class II cavities and found dentin bonding in class II cavities is more effective when selective etch technique is used but in our study majority of the students selected total etch technique while performing class 2 cavity restoration [34] .

Light output needs to be checked routinely in order to obtain durable results. Hegde V conducted a clinical survey of the output intensity of 200 light curing units in dental offices across Maharashtra and found only 10% LED units and 2% QTH curing units had good intensities (>400 mW/cm 2) [35]. Miyazaki M et al in a similar study found that the light intensities of the curing units used in private practice were lower than expected [36]. Martin FE (Australia) in a survey reported that nearly 50% of dentists had never checked the light output of their units and over one half of the light curing units were not functioning satisfactorily [37]. Baek CJ studied the effects of light intensity and light-curing time on the degree of polymerization of dental composite resins and found that light-curing composite resins with higher energy density was beneficial to acquiring higher micro-hardness values and lower coefficients of thermal expansion [38].

Coelho Santos MJ studied effect of light curing method on volumetric polymerization shrinkage of resin composites and found that in hybrid composite (Z-100), continuous output with higher intensity light resulted in significantly higher shrinkage than continuous output with conventional intensity light method and pulse-delay output [4]. Jose R David studied effect of curing time on curing efficiency and found significant increase in micro-hardness values for all light curing composite when exposure time was increased from 20 to 40 seconds.[39] In our survey we found that 65% of respondents cured for 20 seconds, 20% of cured for 30 seconds.

Finishing and polishing of composite resins enhances the esthetics as well as increases the longevity of the restoration. The survival rate of composite resin was found to be 91.7% at 5 years and 82.2% at 10 years. For amalgam the survival was 89.6% at 5 years and 79.2% at 10 years [40]. Lopes GC et al studied effect of finishing time and techniques on marginal sealing ability of two composite restorative materials and found that for microfilled composite restorations on dentin margins, delayed wet finishing with diamond burs resulted in significantly lower microleakage scores and Hybrid composite restorations had equivalent levels of microleakage regardless of the finishing method.[41] In our study,we found that about 85% respondents finished and polished composite resins post operatively immediately after the restoration and about 15% did it 3 to 7 days post operatively. The most popular systems used to finish and polish composite resins is Shofu supersnap (55%).

CONCLUSION

Within the limitations of the study, we have concluded that students have fair knowledge about restoration of class II composite. There is a need for awareness on recent material characteristics and restoration techniques for undergraduate dental students on class II composite restorations in order to achieve desired results and esthetics within a stipulated time.

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AUTHOR CONTRIBUTIONS:

All authors have equal contribution in bringing out this research work.

CONFLICT OF INTEREST:

This research project is self funded and it is not sponsored or aided by any third party. There is no conflict of interest.

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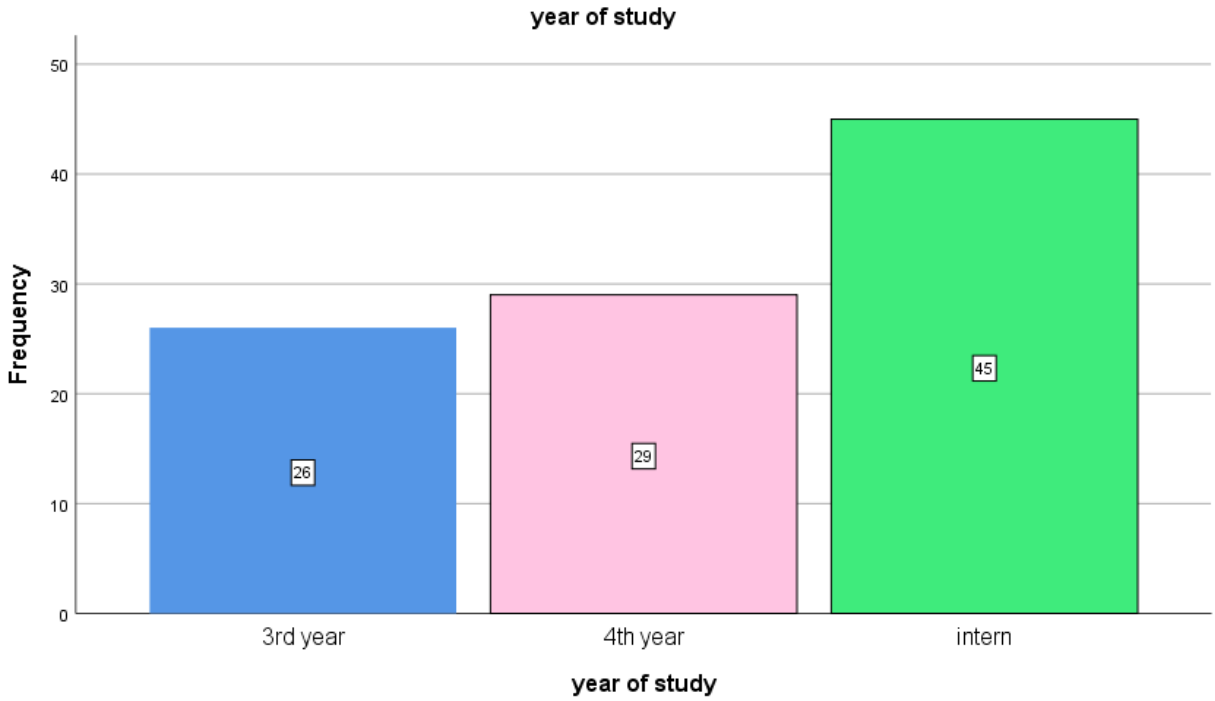

Fig 1: Bar graph represents the number of respondents and year of study. X axis represents the year of study and Y axis represents number of respondents. Majority of the respondent were Interns (45%) followed by Final year (29%) and Third year(26%).

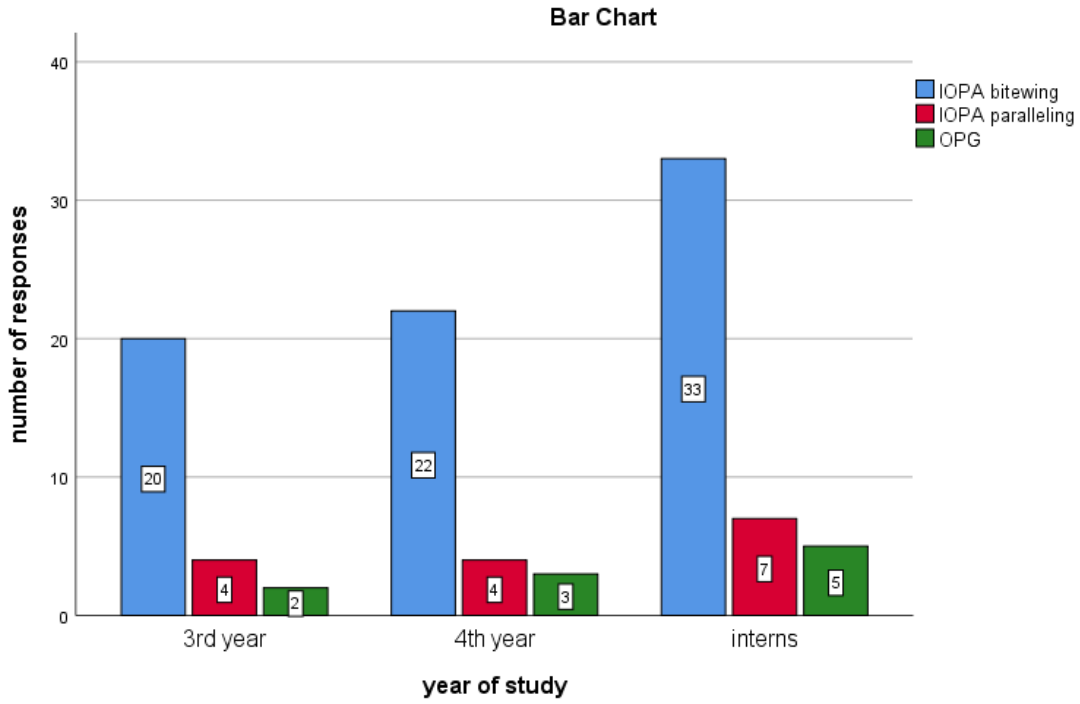

Fig 2: Bar graph represents the association between year of study and responses to the question "What radiographic method do you prefer while diagnosing class II dental caries". X axis represents the year of study and Y axis represents number of respondents. Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.240, ($p>0.05$)].Most of the participants were aware of Bitewing radiograph for radiographic diagnosis of class II dental caries.

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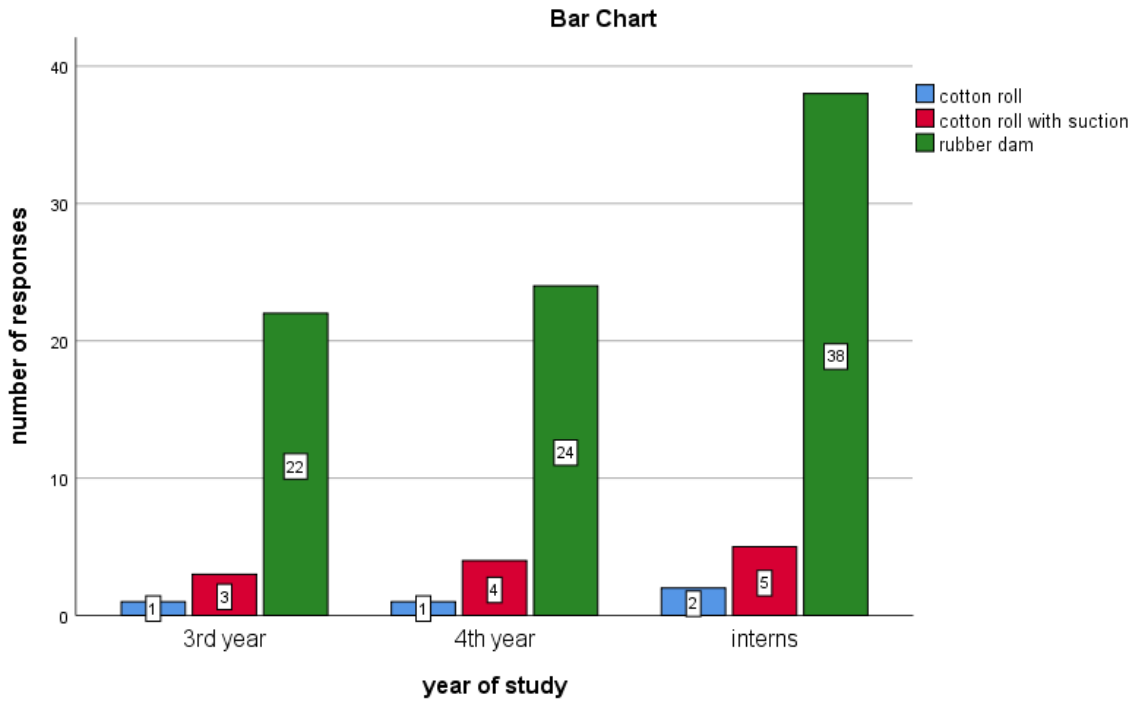

Fig 3: Bar graph represents the association between year of study and responses to the question "Method of isolation while restoring class II composite" X axis represents the year of study and Y axis represents number of respondents .Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.457, (p>0.05)]. The majority of the students preferred rubber dam as a method of isolation while restoring class II composite.

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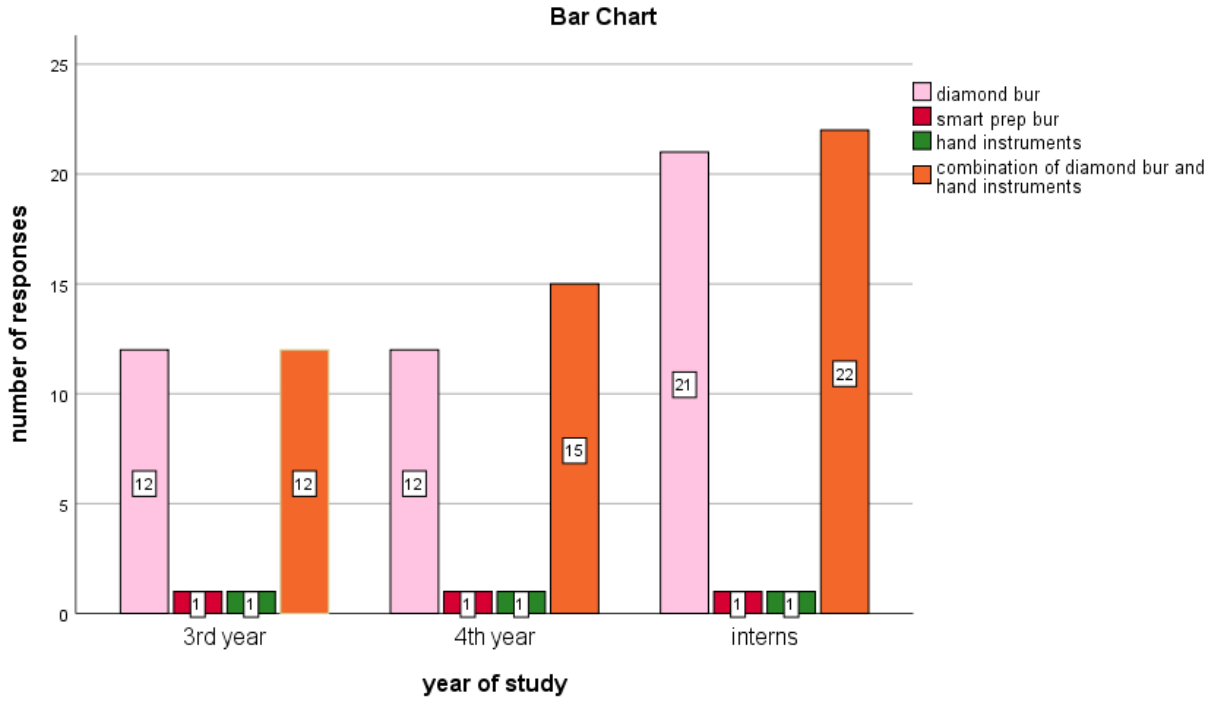

Fig 4: Bar graph represents the association between year of study and responses to the question "caries excavation done using". X axis represents the year of study and Y axis represents number of respondents. Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.310, ($p>0.05$)]. Majority of the students preferred using a combination of diamond bur and hand instruments for excavating class II caries.

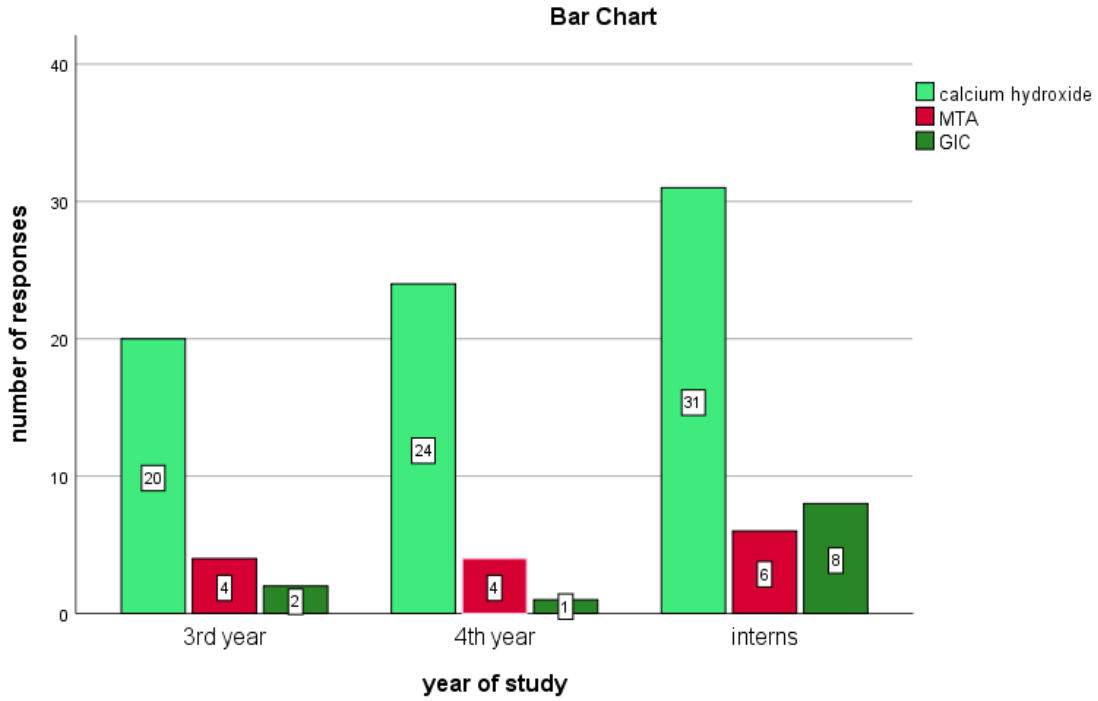

Fig 5: Bar graph represents the association between year of study and responses to the question "Which pulp protecting base do you prefer when RDT is 0.5 to 1mm" X axis represents the year of study and Y axis represents number of respondents . Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.285, ($p>0.05$)]. Majority of the students selected calcium hydroxide as a pulp protecting base when RDT is 0.5-1mm.

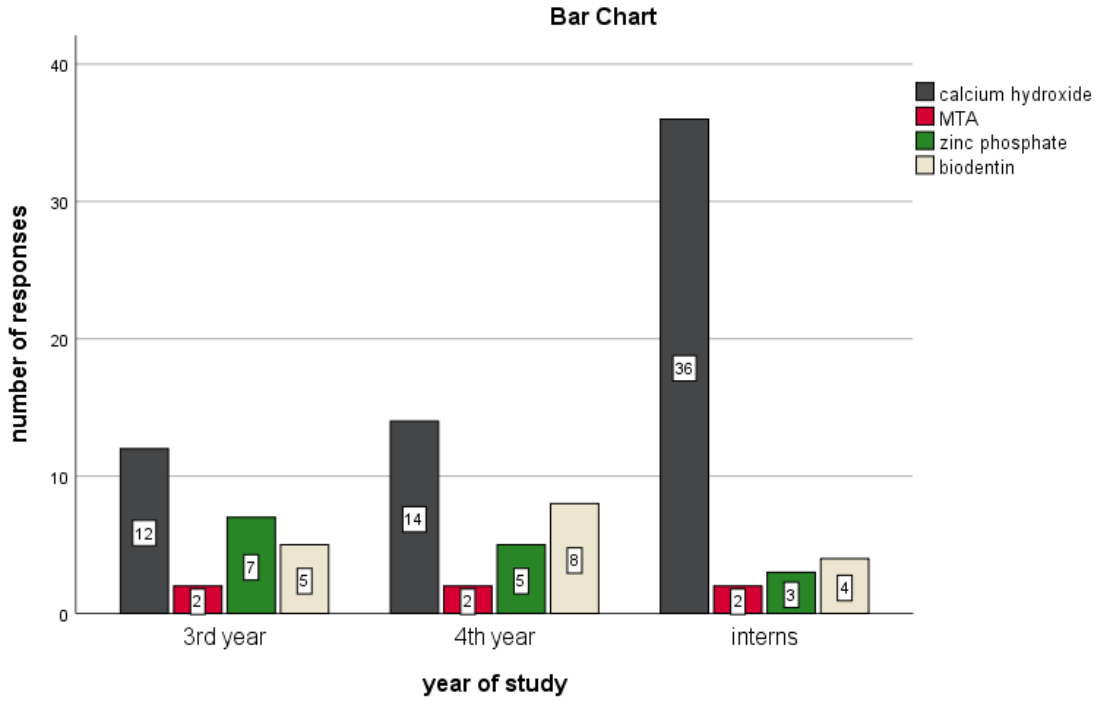

Fig 6: Bar graph represents the association between year of study and responses to the question. "Which pulp protecting base do you prefer when RDT is 1 to 2 mm" X axis represents the year of study and Y axis represents number of respondents.Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.989, ($p>0.05$)]. Majority of the students selected calcium hydroxide as a pulp protecting base when RDT is 1-2mm.

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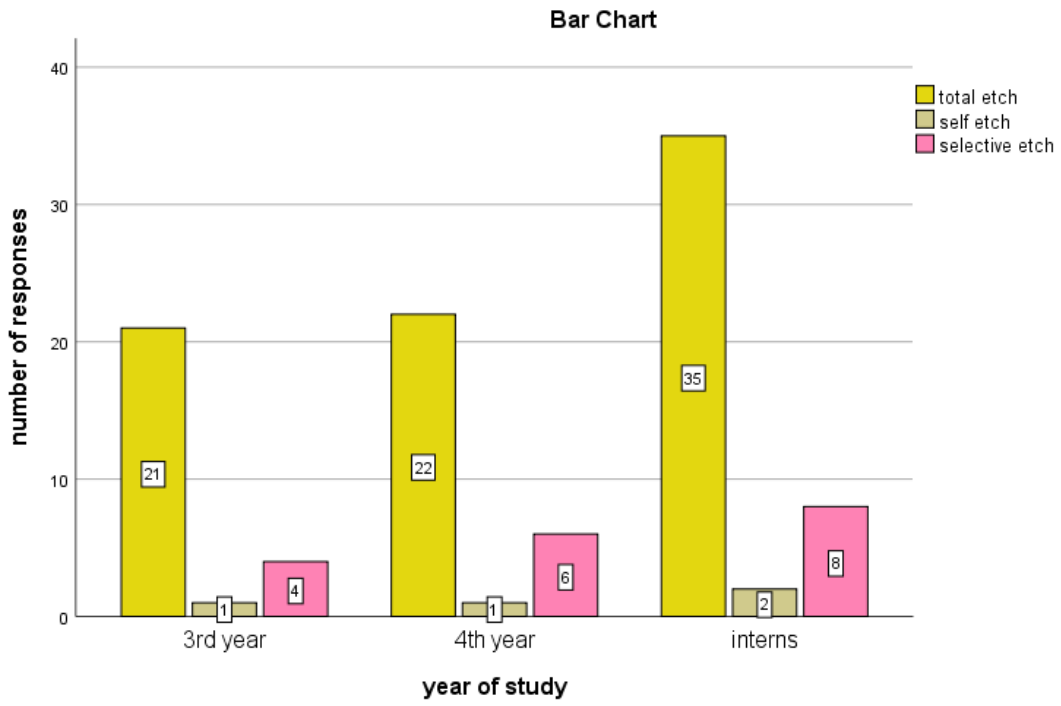

Fig 7: Bar graph represents the association between year of study and responses to the question. "What type of etching technique do you use?" X axis represents the year of study and Y axis represents number of respondents. Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.185, (p>0.05)]. Majority of the students preferred Total etch technique.

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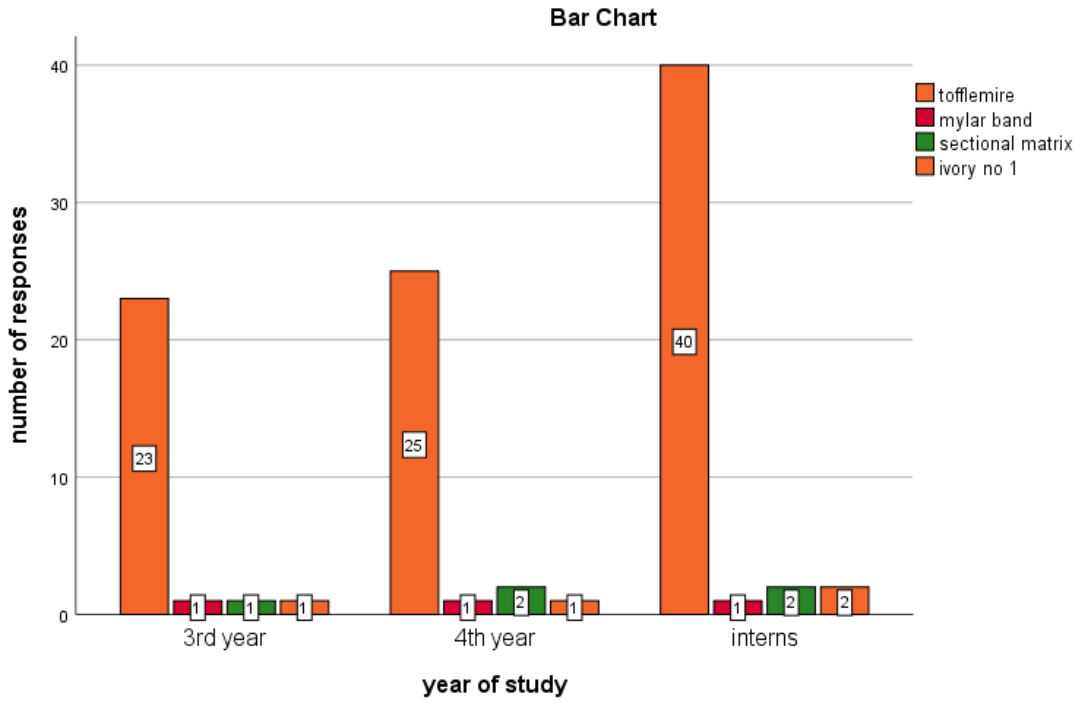

Fig 8: Bar graph represents the association between year of study and responses to the question. "Matrix band of choice while restoring class 2 composite" X axis represents the year of study and Y axis represents number of respondents. Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.959, ($p>0.05$)]. Majority of the students preferred the tofflemire matrix band for restoring class II composite.

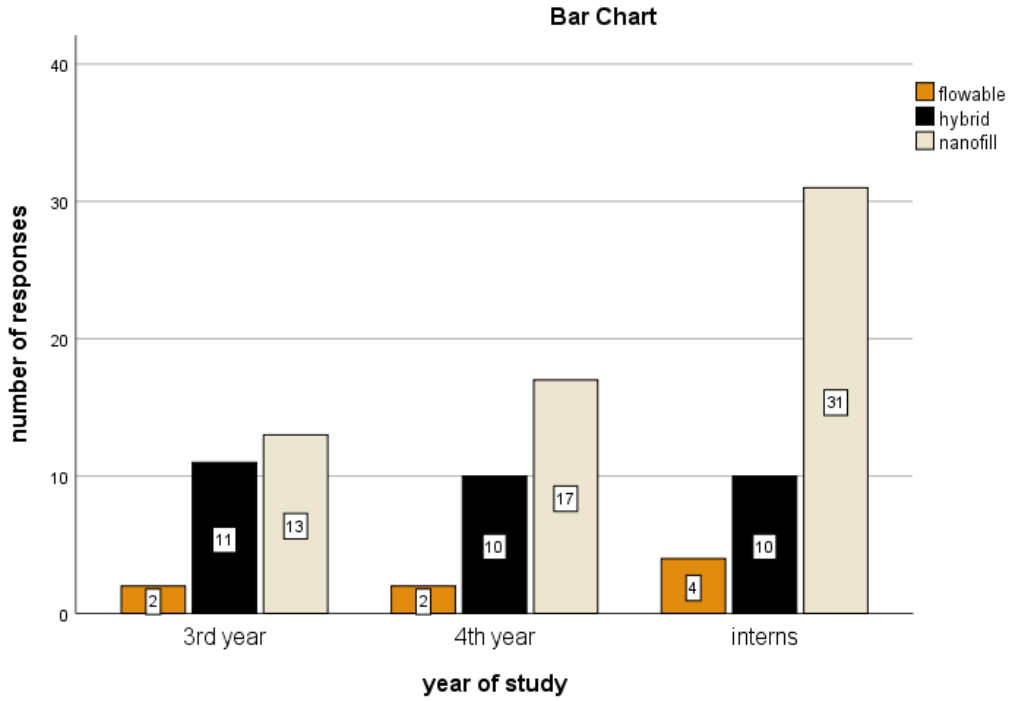

Fig 9: Bar graph represents the association between year of study and responses to the question. "which type of composite material do you use?" X axis represents the year of study and Y axis represents number of respondents. Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.756, (p>0.05)]. Majority of the students use flowable instruments for restoring class II composite.

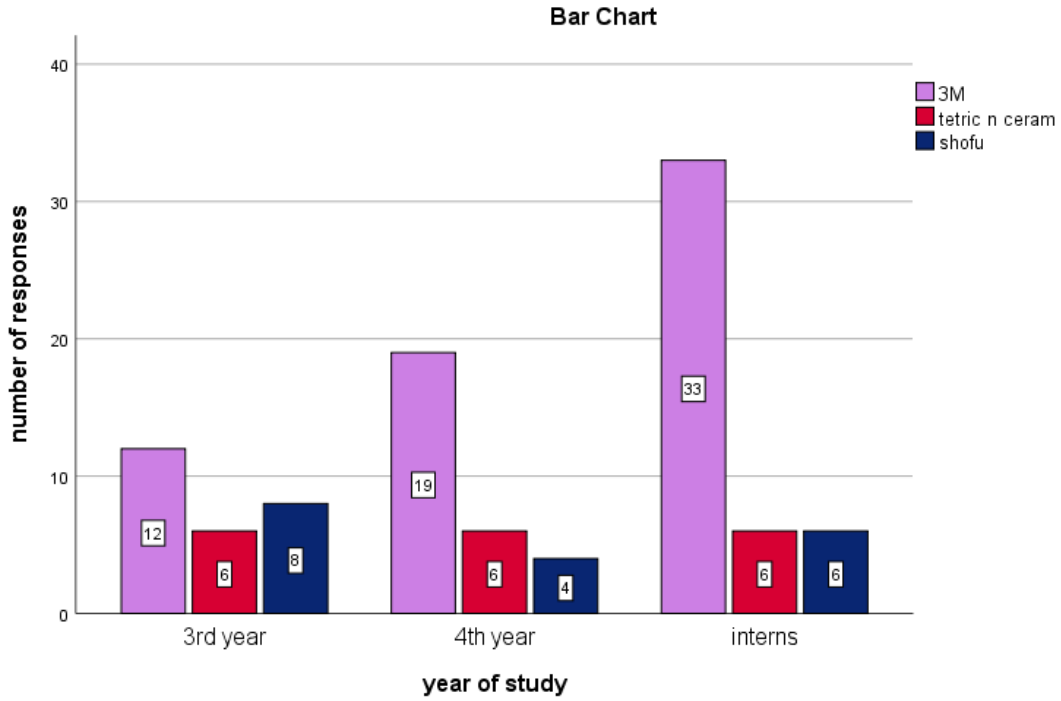

Fig 10: Bar graph represents the association between year of study and responses to the question. "which brand of composite is most commonly used" X axis represents the year of study and Y axis represents number of respondents. Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.245, (p>0.05)]. Majority of the students prefer 3M composite for restoring class II composite.

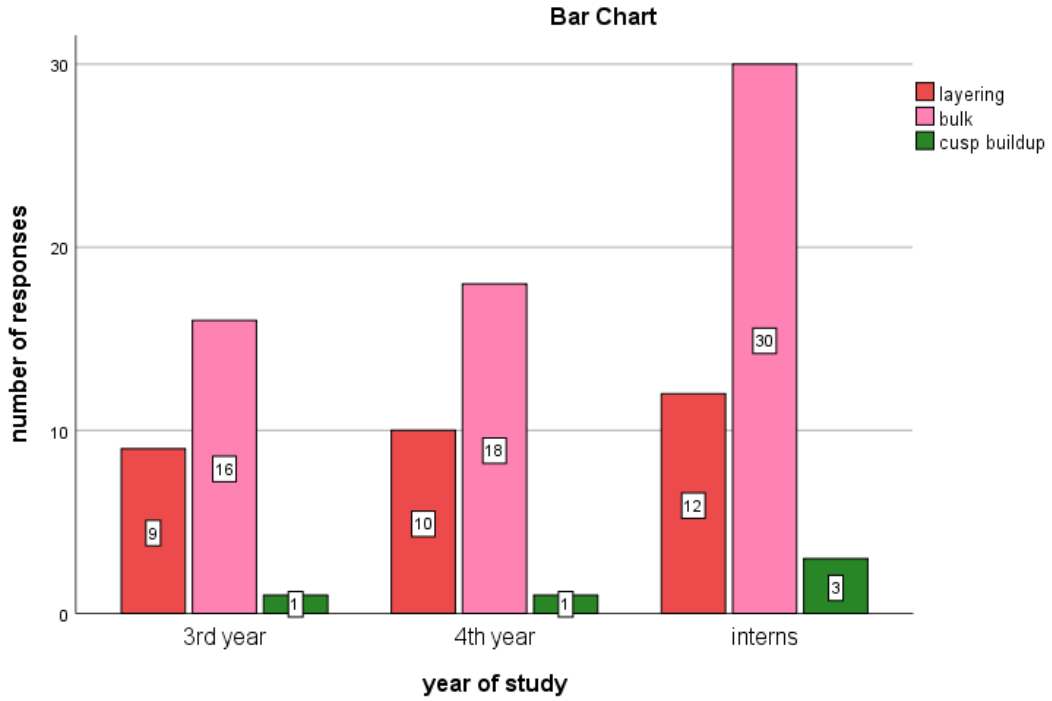

Fig 11: Bar graph represents the association between year of study and responses to the question. "what technique do you prefer for composite placement" X axis represents the year of study and Y axis represents number of respondents .Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.384, ($p>0.05$)]. Majority of the students prefer bulk layering technique.

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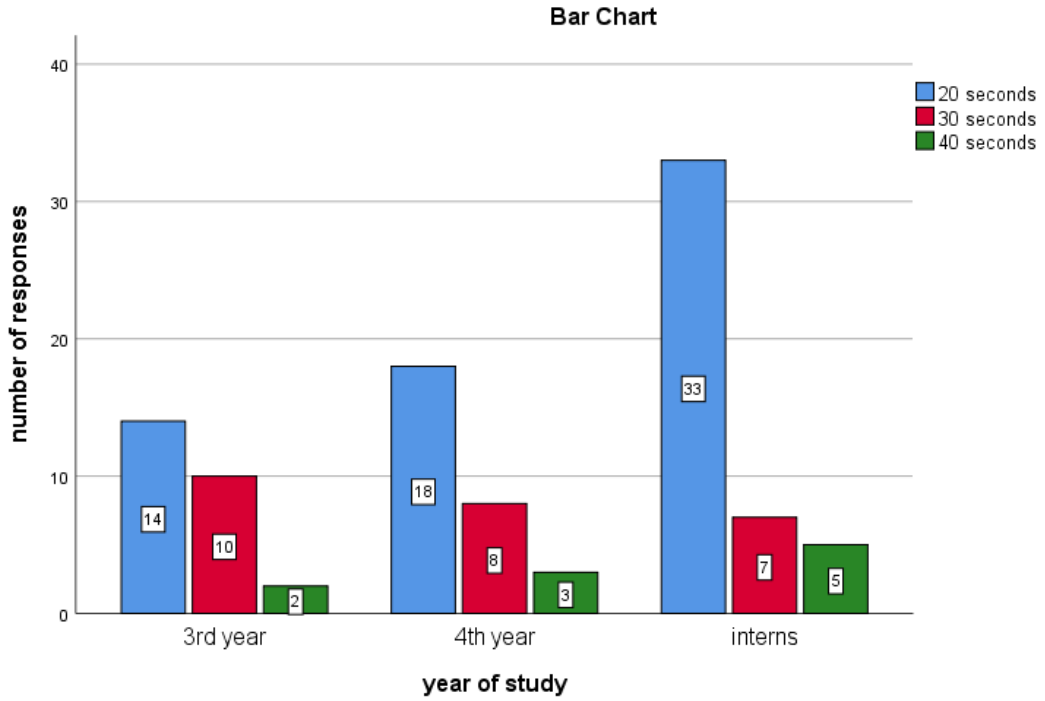

Fig 12: Bar graph represents the association between year of study and responses to the question. "How long do you cure composites?" X axis represents the year of study and Y axis represents number of respondents. Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.578, ($p>0.05$)]. However, the majority of the students prefer curing for 20 seconds.

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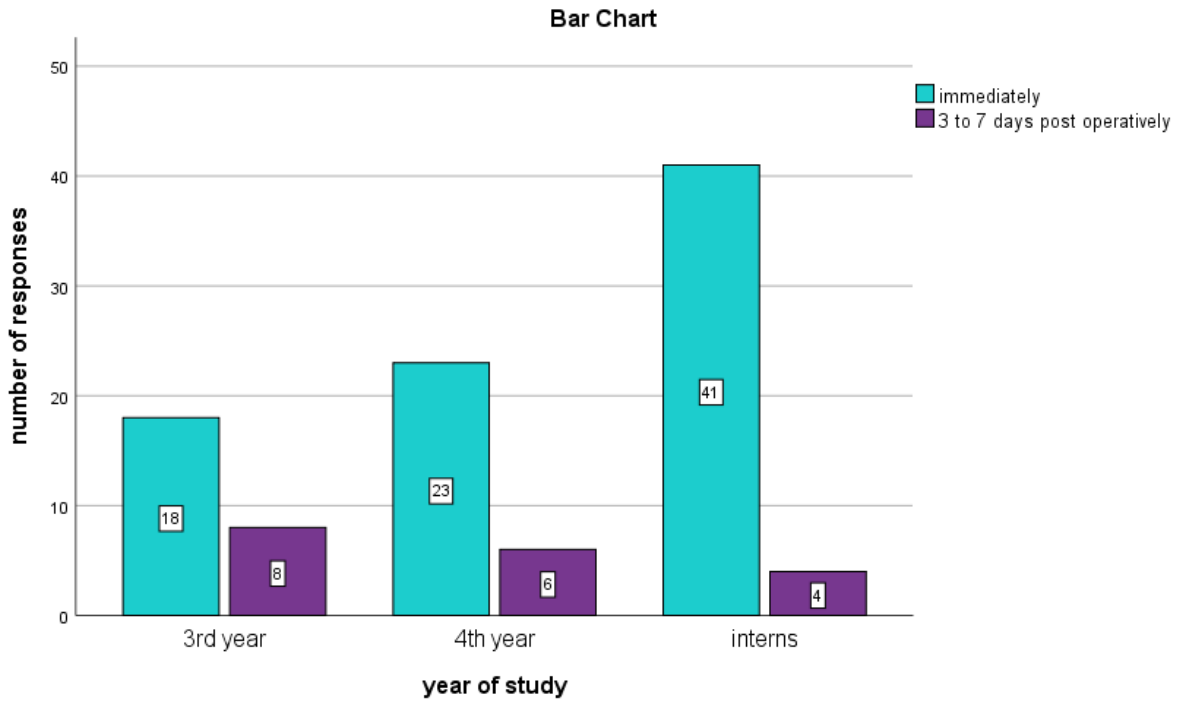

Fig 13: Bar graph represents the association between year of study and responses to the question. "when you do the finishing and polishing of the composite" X axis represents the year of study and Y axis represents number of respondents .Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.875, ($p>0.05$)]. Majority of the students completes finishing and polishing immediately after restoring class II composite.

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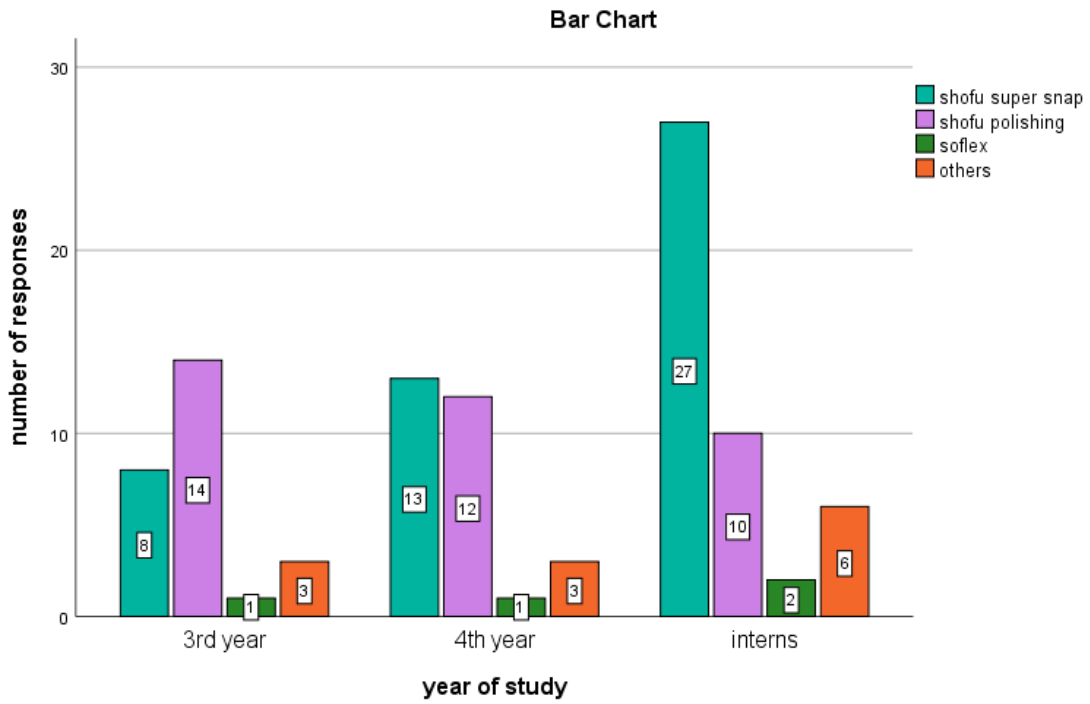

Fig 14 : Bar graph represents the association between year of study and responses to the question. "Materials used for finishing and polishing of the composite" X axis represents the year of study and Y axis represents number of respondents. Chi square test shows no statistical difference in responses between years of study. [Pearson chi square p value = 0.154, (p>0.05)]. Most of the students prefer shofu super snap polishing kit.

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