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Original Research Article

FACTORS AFFECTING THE CHOICE OF AMALGAM OR COMPOSITE FOR POSTERIOR DENTAL RESTORATIONS IN STUDENTS OF ISLAMIC INTERNATIONAL DENTAL COLLEGE (IIDC)

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Abstract: *Restorative materials such as composite and amalgam are widely used in dental practice. Various factors, including ease of use, handling, and patient preference, influence dental students' preferences for these materials. Understanding these factors is important for curriculum development and clinical practice in dental education.* ***Objective:*** *This study aimed to evaluate the preference of dental students at Islamabad Institute of Dental Sciences (IIDC) between composite and amalgam for restorative procedures and to identify the factors influencing this choice.* ***Methods:*** *A questionnaire-based cross-sectional study was conducted at IIDC Hospital. A total of 76 questionnaires were distributed to 3rd and final-year dental students. The data were collected and statistically analyzed using SPSS version 23. Descriptive statistics were used to summarize the data, and factors influencing material choice were analyzed.* ***Results:*** *Of the students surveyed, 90.8% preferred composite for its easier cavity preparation, while 9.2% favored amalgam. 61.8% of students considered composite easier to handle, whereas 38.2% believed amalgam was easier. 81.6% of students selected composite as their material of choice, and 53.9% considered composite a better substitute for amalgam. Meanwhile, 46.1% thought amalgam was a superior alternative to composite. Regarding patient preference, 84.2% of students reported that patients preferred composite, while 14.5% believed patients favored amalgam.* ***Conclusion:*** *This study's results indicate that most dental students at IIDC prefer composite over amalgam for posterior restorations. This preference is likely influenced by the ease of use, handling properties, and patient preference for composite. The clinical training environment of the dental institute may also play a role in shaping these preferences.*

Keywords: Composite, Amalgam, Dental Students, Restorative Materials, Patient Preference

Introduction

Direct restoration of teeth has significantly changed since the 1980s (1). Two frequently used restorative materials for restoring posterior teeth are amalgam and composite (2). Amalgam has been a material of choice for Class I and II defects for over 100 years. Its use and success rates are well documented (3). It has good durability and compressive strength. It is usually insoluble in oral fluids and adapts easily to the cavity walls. Due to its increased fracture resistance and high abrasion resistance, it is still the material of choice for extensive posterior occlusal restoration. Factors that lead to a change in amalgam's status include a minimally invasive approach in the prevention and control of caries, formulation of new restorative materials and techniques for tooth repair, mercury toxicity, and increased aesthetic demands (1).

The use of particulate filler composite resins for restoring posterior teeth has increased significantly over the last decade (1, 2). Many clinical studies show composite restorations have performed favorably (2). The advantages of composite restoration include a more natural appearance, good bonding to the tooth structure, and conservative tooth preparation. In considerable occlusal posterior restoration, maximum strength is required, so the use of composite is declined. Polymerization shrinkage of composite (resin-based) causes marginal leakage and leads to secondary caries (4).

The management of caries-affected posterior teeth has changed considerably with advances in composites, favoring a minimally invasive approach (1, 3). Amalgam is slowly being replaced by composite as a posterior filling material in private practices due to patients preferring more esthetic fillings and also because of the dentist's minimally invasive approach (1, 4). The minimally invasive approach aims to conserve as much tooth structure as possible while restoring the teeth to their normal shape and contour to maintain their function.

The choice of amalgam and composite as a posterior filling material depends on many factors: the time available, the patient's esthetic demands, the time taken to do the filling, and the durability perception of both materials (5). Much research has been done to evaluate why clinicians prefer using either material (6). However, there is very little data on students' choice of material and the reasons for choosing one specific material.

Since the dilemma of selecting suitable posterior restorative material on the basis of clinical performance as an amalgam substitute in large cavities remains, we, therefore, decided to conduct a cross-sectional questionnaire based study that aims at investigating the student's choice of material between amalgam and composite resin as a posterior restorative material and the factors which lead to this choice.

Methodology

A questionnaire-based cross-sectional study, which was approved by the ethical committee of the Institutes Review Board (IRB) of Riphah International University, was performed at the Islamic International Dental Hospital from June to December 2019.

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The WHO calculator was used to determine the sample size of the study. A total sample size of 76 was calculated. The data collection was carried out by random distribution of 76 questionnaires among the 3rd year and final-year students.
The questionnaire was taken from a study carried out by Pani SC et al. (7)
The questionnaires were given to the students, who were found as a group and in their departments when they were free. They were given these forms by hand. Some were collected on the spot, and some were collected after some time. After data collection, the results were statistically analyzed using the SPSS 2015 (version 23) software.

Results

The following results were obtained after the calculations.
According to our research, 55.3% believed composite was the topic of interest, while 44.7% of students felt that more lectures were given on amalgam. Also, 59.2% of students thought that study on composite is more comprehensive than amalgam, while 40.8% chose amalgam.
Our results also showed that 90.8% of students preferred composite for easy cavity preparation, while 9.2% thought cavity preparation for amalgam is easier. 61.8% preferred composite to be easily handled material, whereas 38.2% of students believed amalgam was easy to handle. However, when the question regarding preparing class 1 restorations was asked, 81.6% of students considered amalgam, while 18.4% of students considered composite.
According to our study, 81.6% of students preferred composite as the material of choice, while 18.4% of students chose amalgam. 53.9% of students considered composite as a good substitute for amalgam, while 46.1% of students considered amalgam a better substitute for composite. 73.7% of students preferred composite over amalgam, while 26.3% of students preferred amalgam. According to our research, 84.2% of students reported that composite is preferred by patients more often. In comparison, 14.5% of students reported that patients prefer amalgam over composite.55.3% of students believed that amalgam has more significant drawbacks concerning composite, while 44.7% of students believed that composite has more significant drawbacks when compared with amalgam.
Our results also showed that 56.6% of students preferred amalgam for having better properties than composite, while 43.4% of students preferred composite over amalgam. 84.2% of students choose amalgam over composite in terms of cost, while only 15.8% choose composite. Also, 53.9% of students were more likely to state that amalgam would last longer than composite in the mouth of the cooperative patient, while 46.1% of students believed that composite stays longer than amalgam fillings. It was also seen that 51.3% of students think that amalgam should not be replaced, whereas 47.4% of students felt that amalgam usage in dental practice should be discontinued entirely.
The following graph shows the responses of the participants to the questions asked in the questionnaire in terms of percentage.

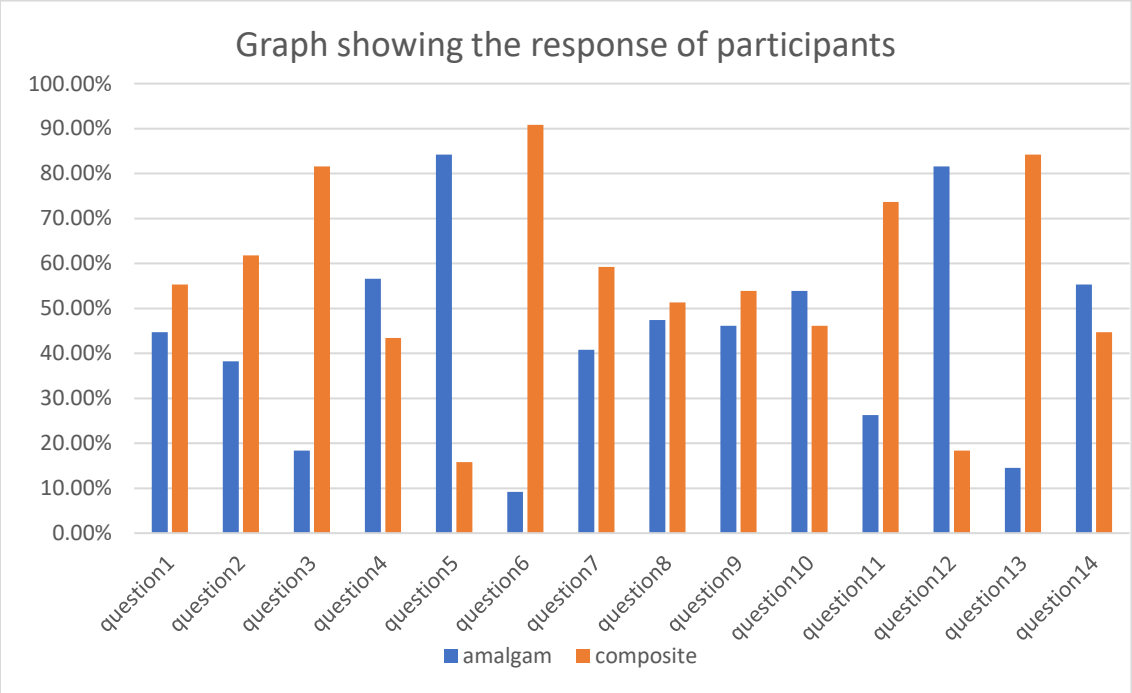

Fig. 1: Response of Participants

Discussion

The educational plan of IIDC is directed to focus on both amalgam and composite. Still, according to our research, 44.7% students believed that more lectures were given on amalgam while 55.3% believed that composite was the topic of interest during lectures. Given this reality, a potential purpose behind this difference among thoughts of students of IIDC could be the idea of the clinical environment in which they practiced. Our results were similar to the study done by Pani SC et al. (7).
The IIDC students were conflicted about their inclination of material, which is essentially more for composite resin restorations over amalgam. While one can value the ease of the students with the utilization of composite resin, an

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absence of inclination towards using amalgam is a point of concern, as shown by the results of our study that only 38.2% of students believed that amalgam was easy to handle while on the other hand 61.8% preferred composite to be easily handled material, which were similar to the results shown by a study done by Pani SC et al. (7). The reason for this similarity in results might be due to the clinical environment in which they practiced.

Dental amalgam has always been a cheaper option in the past compared to the composite, which is one factor for its preference as seen in our study. 84.2% of students chose amalgam over composite in terms of cost, while only 15.8% chose composite. The ongoing advancements in composite resin, as well as the increasing cost of silver, have brought both materials to the same level (8-11). However, the durability of amalgam restoration is a contributing factor for preferring amalgam over composite (12, 13). As seen in our study, 56.6% of students preferred amalgam for having better properties than composite, while 43.4% of students preferred composite over amalgam.

Whether composite will ever replace amalgam remains and the adoption of "amalgam free" practice is not yet accepted worldwide (14). This can be due to the concerns about mercury toxicity, being one of the greatest hurdles (15, 16). Excessive tooth preparation was also a contributing factors for preferring composite over amalgam. According to our research, 90.8% of students preferred composite for easy cavity preparation, while 9.2% of students thought that cavity preparation for amalgam is easier over composite. Similarly, when the question regarding the preparation of class 1 restoration was included in our study, 81.6% of students considered amalgam, while 18.4% of students considered composite.

Literature reveals several studies on the importance of sufficient knowledge in students about the use of posterior composite due to its increasing popularity worldwide (17-20). Our research showed that 59.2% of students thought that studying on composite is more comprehensive than amalgam, while 40.8% of students chose amalgam.

While the idea of an "amalgam"- free dental school has been floated in literature (14) amalgam still holds a strong preference in a country like Pakistan, where amalgam-free practice doesn't seem to be a reality in the near future. As seen in our study, 47.4% of of students believed that amalgam usage in dental practice should be completely discontinued, while 51.3% of students believed that amalgam should not be replaced.

In our study, we found that students of IIDC considered composite more than amalgam, as 73.7% of students preferred composite over amalgam, while only 26.3% of students preferred amalgam. Similarly, 53.9% of students considered composite as a good substitute for amalgam, while 46.1% of students considered amalgam a better substitute for composite. Also, 81.6% of students preferred composite as the material of choice.

Our results suggested that although we had sufficient knowledge about the durability of amalgam and its cost effectiveness, The students still gave preference to composite. Our study also showed that although the students believed that composite restorations can stay longer in the presence of good oral hygiene concerns about its longevity still remain. According to our research, 53.9% of students were more likely to state that amalgam would last longer than composite in the mouth of cooperative patients,. In comparison, 46.1% of students believed that composite stays longer than amalgam fillings.

The preference for composite over amalgam among the patients as documented in several studies (21-24). It was interesting to observe the same trend in the students of IIDC as, according to our research, 84.2% of students reported that composite is preferred by patients more often while 14.5% students reported that patients prefer amalgam over composite. This trend was similar to the studies documented from many European and American dental practices (10, 17, 18, 20, 25, 26). Although IIDC has a free facility of amalgam fillings, the patients pay for composite. Still, it was interesting to note the presence of preference for composite over amalgam among the patients. The reason for this preference can be the esthetic concerns of today's population

Dental amalgam has been used for centuries. However, its use has become debatable, with the availability of posterior composite resins being an equally competent alternative material (8, 27). According to our study, 55.3% of students believed that amalgam has more significant drawbacks concerning composite, while 44.7% of students believed that composite has more significant drawbacks when compared with amalgam.

It is important to consider the limitations of our study, which included performing research on students from only one institute. This may result from the provision of guidance provided by faculty and the facilities available to students during clinical work. We believe that there will be variation in results if a range of educational institutes were included in our research with an appropriate sample size.

Conclusion

Our findings concluded that our students seem to be able to work confidently with posterior composite resins. However, the reason and confidence behind this preference may vary based on the nature of the clinical setup of the dental institutes, which might be an indirect contributing factor towards the type of restorative material being used or preferred. The discoveries of this study recommend to educate students about situations where they need to convince patients according to their need for treatment and affordability. Similar studies in the future can be carried out in different institutes, including government and private dental institutes as well as private dental practices, which will help us to understand the perception of our dentists towards using any specific restorative material.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-TCGA-02/22)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

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Conception of Study, Final approval of manuscript.
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Manuscript revisions, critical input.
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Data entry and data analysis, as well as drafting the article.

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