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**ORIGINAL ARTICLE**

# Factors Affecting the Material Choice for Restoration in Posterior Teeth

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## ABSTRACT

**Aim:** To determine the factors affecting the selection of material of choice in posterior teeth.
**Methods:** Descriptive cross-sectional study done June-December 2015 at Liaquat University of Medical and Health Sciences, Jamshoro. Individuals who refused to participate in the study were eliminated from the sample. Each dentist signed an informed consent form. Personal data were entered on a proforma/consent form. The data collection tool was a Proforma/Questionnaire with all required questions. Dentists were personally briefed on the study's objectives and the importance of their participation. Informed permission forms were gathered one week later. Not returning the questionnaires after two professional visits was deemed participant loss. The analysis employed descriptive statistics and SPSS version 17.0.
**Results:** 200 people responded to the survey. 70% advised amalgam for posterior tooth repair, 28% recommended composite, and 2% recommended Glass Ionomer. In this study, 65% selected amalgam, 34% preferred composite, and 1% preferred glass ionomer. In this series, 60% of people selected amalgam, followed by composite (37%), and glass ionomer (3%). In this series, 60% chose amalgam, while 40% chose composite. No glass ionomer In this study, 55% of participants advocated composite, 40% recommended amalgam, and 5% recommended GIC. Patients' preferences impacted material selection for posterior restorations in this study: 55% chose amalgam, 35% composite, and 10% glass ionomer. Most participants (60%) picked composite for moisture management, followed by amalgam (35%), and GIC (5%).
**Conclusion:** Most posterior teeth restorations involve amalgam fillings. Determinants include strength, durability, color match and dental structure preservation. Amalgam was connected to strength, while composite saved tooth structure.
**Keywords:** Amalgam; Composite; Material Choice; Pakistani Dentists

## INTRODUCTION

In ordinary clinical practice, restorative dentistry accounts for most of the workload. In cases when teeth are missing or carious lesions need to be restored, patients and practitioners have a variety of options[1]. The selection of an indirect and direct restorative material includes dentist criteria, case selection and carious lesion characteristics, among other things. After all these years, direct restorations are still the best option for treating posterior caries because they are less expensive than indirect ones and have a similar life expectancy as well[2].

Amalgams have a longer survival period, reduced postoperative sensitivity for complex restorations, and are not technique sensitive. However, amalgam can be easily broken into thin bits. It is not adherent to tooth structure and contains mercury. Contrary, metals (amalgam, mercury, and gold) may cause electrical current, galvanic activity, and increased mercury vapor levels in oral tissues[3,4]. Because amalgam does not match the tooth color, most patients dislike metallic restorations. Although the use of Amalgam is declining, US dental schools still encourage its use as the best material.[5] Amalgam is the most versatile dental restorative material. It accounts for almost 75% of all restorative materials used by dentists worldwide[6]. Dental amalgam is still the most often used restorative material in developing countries, however its use is dropping rapidly elsewhere. Amalgam was utilized for roughly 150 years in America. Due to its drawbacks, amalgam was used in 80% of all restorations 30 years ago[7]. A few nations in Europe have banned amalgam use. Norway has banned amalgam since January 2008. The Swedish government has limited the usage of amalgam over the last decade. As amalgam is not advised for youngsters, Denmark has a phased-out policy. In France, 5% of restoration is amalgam. The Netherlands has a low amalgam usage of 10%. However, the US PHC, ADA, CDC, and WHO have all approved amalgam with rigorous waste management protocols. In South Asia, such as Indonesia, composites and Glass ionomer have replaced amalgam. However, this is not due to increased public knowledge of mercury toxicity or regulatory issues, but rather to increased demand for aesthetic repair[8–11].

In 2010, Pakistani Dental professionals conducted a study to assess amalgam and its waste disposal in Pakistan and found that 92.5% of dentists still use amalgam regularly. Patient economic constraints mandate this decision (87%). However, just 46.4% of dentists believe it is an environmental hazard[12]. The resin composites have minimal heat conductivity and no galvanic reactions, but they also have cytotoxicity and estrogenic activity. 9 It is the most often used sealant[13]. It prevents pits and cracks via micro-retention created by tags during enamel acid etching. Glass ionomers are widely used in dentistry. Unlike other restorative materials, glass ionomers can be retained in cavities without bonding agents. They are biocompatible. Their main flaw is a lack of strength and durability[14]. This study is significant because to recent increases in dental disorders and advancements in posterior tooth replacement procedures and materials. The investigation is required due to the recent growth in dental disorders and the dentists' attitude towards materials and which material is currently being used in Pakistan.

Objective of the study was to determine the factors affecting the selection of material of choice in posterior teeth.

## MATERIALS & METHODS

This was a descriptive cross-sectional study after approval from IRB conducted from June to December 2015 in the Department of Operative Dentistry and Endodontics, Liaquat University of Medical and Health Sciences, Jamshoro. Inclusion criteria for the sample included registered private dental practitioners, faculty, and postgraduate residents at the department of operative dentistry, while individuals who did not consent to the study were excluded.

Each dental surgeon signed a written informed consent. Each participant's personal information was recorded on a proforma/consent form. The data gathering instrument was a Proforma/Questionnaire that included all necessary questions. Consent forms were personally delivered to each dentist's office, and dentists were briefed on the relevance of their involvement and the study's objectives. After one week, surveys were collected

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with the signed informed consent form. Participants' loss was considered when the questionnaires were not returned after two visits by the professionals. SPSS version 17.0 was used to conduct the analysis, and descriptive statistics were used.

## RESULTS

Total of 200 participants completed survey forms. 70% of study participants recommended amalgam for posterior tooth restoration, 28% recommended composite, and 2% recommended Glass Ionomer. In this study, 65 of individuals chose amalgam as their preferred material, 34% to chose composite, and 1% chose glass ionomer as their preferred material. In this series, 60% of individuals chose amalgam as their preferred material, followed by composite (3%) and glass ionomer (3%). In this series, 60% of participants chose amalgam as the best material, whereas 40% chose composite. No glass ionomer chosen. In this study, 55% of participants recommended composite for cosmetic reasons, 40% recommended amalgam, and 5% recommended GIC. In this study, patients' preferences influenced material selection for posterior restorations: 55% chose amalgam, 35% composite, and 10% chose glass ionomer. Most participants (60%) chose composite for moisture management, while 35% chose amalgam for posterior tooth restoration, and 5% chose GIC (Table ). Table 2 showing factors affecting the choice of restorative material.

Table 1: Choice of Material

| | Restoration Material | Frequency | Frequency |
|---|---|---|---|
| Choice of Direct Restorative Material | Amalgam | 140 | 70% |
| | Composite | 56 | 28% |
| | Glass Ionomer | 4 | 2% |
| Influence of Site of Mouth | Amalgam | 130 | 65% |
| | Composite | 68 | 34% |
| | Glass Ionomer | 2 | 1% |
| Size of Cavity | Amalgam | 120 | 60% |
| | Composite | 74 | 37% |
| | Glass Ionomer | 06 | 3% |
| Age of Patient | Amalgam | 120 | 60% |
| | Composite | 80 | 40% |
| | Glass Ionomer | 0 | 0% |
| Esthetic Demand | Amalgam | 80 | 40% |
| | Composite | 110 | 55% |
| | Glass Ionomer | 10 | 5% |
| Patient Choice | Amalgam | 110 | 55% |
| | Composite | 70 | 35% |
| | Glass Ionomer | 20 | 10% |
| Moisture Control | Amalgam | 70 | 35% |
| | Composite | 120 | 60% |
| | Glass Ionomer | 10 | 5% |

Table 2: Factors affecting choice of material

| Material Choice | Factors | | | | P Value |
|---|---|---|---|---|---|
| | Strength | Durability | Color Matching | Conservative | |
| Amalgam | 126 | 14 | 0 | 0 | 0.000 |
| Composite | 0 | 06 | 02 | 48 | 0.000 |
| Glass ionomer | 0 | 0 | 4 | 0 | 0.000 |

## DISCUSSION

In this study, general practitioners and postgraduate students at Liaquat Medical University Hospital evaluated the elements that influence their choice of restorative material for posterior tooth restorations appointments according to general practitioners' and postgraduate students' perspectives. Amalgam and composites are the most popular posterior tooth restorations among the survey participants. A small number of European universities likewise came up with similar outcomes.[15] For posterior tooth restorations, composites are the most popular substitute for amalgam. When it comes to posterior tooth restorations, amalgam is the ideal choice because it is strong and long lasting. However, composites are becoming more popular as better resin-reinforced composites become available[16].

Seventy percent of survey participants offered amalgam as a primary option for restoring posterior teeth, whereas 28% of practitioners recommended composite and only 2% of participants proposed Glass ionomer as an option for restoring posterior teeth. According to Moeen et al[17], amalgam was the most used restorative material (58.9%), followed by composite (25.6%) in patients. Amalgam was used in 53.9% of restorations provided by vocational dental practitioners and their trainers in the UK. Resin composites were used in 29.8% of restorations, while glass ionomer cement was used in 16.3%, showing a similar pattern[18]. Dentists may have trust in amalgam restorations based on the prevalence of amalgam use in the prior research[19]. The most cost-effective material for situations where looks aren't as important as functionality is amalgam[20].

In this survey, 65% of participants recommended amalgam as the most common choice of material, while 34% recommended composite as the best option based on the mouth's location. Rabi et al[21] also found that the location of the oral cavity when choosing amalgam for RPT was critical, with 89.8% of trial participants making this decision. Only 56.52% of participants believe that location affects the use of composites when polled about composites. When looking at this series of cases based on age, 60% of participants chose amalgam as their preferred material choice, while 40% of individuals recommended composite. Rabi T et al.166 also found that for 37.6% of patients, age had no influence on amalgam selection, while for 43.4% of patients, age had no influence on amalgam selection.

In this study, patients' preferences had a significant impact on the material selection for posterior restorations. Amalgam was preferred by 55% of participants, whereas composite was preferred by 35%. Similarly, Rabi et al[21] found that most participants believed that the decision of the patients should be taken into account, and the choice of composites was made by 46.3% of patients for posterior tooth replacement. Nearly the same percentage of students (47.8%) thought that the patients' preferences influenced their decision to use amalgam for posterior tooth repair. 57% of individuals recommended amalgam as the material of choice for patient safety, whereas 40% of people recommended composite as the best option. Mercury released from amalgam fillings has been scrutinized, and it has been argued that it may have harmful health effects if consumed in large quantities. According to Rabi et al[21] the safety of the amalgam had a greater impact on the participants' decision-making, therefore 49.28% of them selected it. As far as hazardous effects of amalgam have been discovered, there have been no significant events.

Most participants in our study (60%) thought that composite was the best material to use as a moisture control for restoring the back teeth. We found that 85.51% of students agreed with Rabi T et al. The same finding was made by numerous other researchers as well. It is the hydrophobic material and composite, according to Stephen J. Bonsor, that play an important role in controlling the moisture in teeth. While the placement of restorations on the sub-gingival margins may be important in the restoration of composite.

When it came to aesthetic demands, 55% of the participants recommended composite, while 40% recommended amalgam as the restoration of choice for aesthetic situations. Patients who request composite restorations for their posterior teeth do so primarily for aesthetic reasons. The fear of mercury toxicity from amalgam advertised on the internet or in published sources may

influence their decision to use composites.[22] Studies have shown that the use of amalgam restorations has no negative health effects.[23] One of the most important considerations for our esteemed colleagues when selecting posterior composites in this study was the patients' desire for aesthetics. Patients' aesthetic demands for posterior composite restorations were reported by participants to be 99%, 96% and 89%, respectively, in previous published information and opinion[23,24].

## CONCLUSION

If you need to restore a tooth's back teeth, chances are you'll use amalgam fillings. Factors including strength, durability, color matching, and tooth structure conservation all play a role in the final decision. For the most part, strength was linked to amalgam, while tooth structure conservation was linked to composite. More research is needed to contribute to the already large body of knowledge.

**Conflict of interest:** Nil

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