KNOWLEDGE, ATTITUDE AND PRACTICE SURVEY ON REPAIR OR REPLACEMENT OF DEFECTIVE COMPOSITE RESTORATION AMONG DENTAL UNDERGRADUATES

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Abstract

Introduction and Aim: One of the most common clinical conditions in general dentistry is the appearance of patients with dental restorations that have slight flaws. Repairing such restorations rather than replacing them is becoming more common as a feasible alternative to replacing the damaged restoration. The main aim of the study was to assess the knowledge, attitude and practice of repair or replacement of defective composite restoration among dental undergraduates.

Materials and methods: A survey was designed to analyse the result. The questionnaire was prepared in Google Forms (online survey link) and was distributed to 100 dental undergraduate students. The responses were then collected and statistically analysed using SPSS software version 22.0. Descriptive statistics and Chi square test was done to study the association. The level of significance was set at p<0.05.

Results: 69.90% of the participants were aware of repair or replacement of composite and 57.28% had knowledge about the indications and techniques of composite repair. There was no significant association of year of study with awareness and knowledge on indications and techniques of repair of composite (p value> 0.05).

Conclusion: Within the limitations of this study, we can conclude that the majority of the dental undergraduates had adequate knowledge and awareness on the repair and replacement of defective composite restorations, and the majority knew about the indication and techniques used to replace a defective composite restoration.

KEYWORDS: Awareness; Knowledge; Repair; Replacement; Composite; Innovative technique.

RUNNING TITLE: Repair or replacement of defective composite restorations

INTRODUCTION

Every day most of the dental practitioners devote a large portion of their clinical time examining existing restorations (1). When a restoration is deemed defective by physicians, there are four common scenarios: 1. the restoration has been fractured; 2. the restoration's margin has been ditched; 3. the restoration's margin has caries; or 4) the restoration's margin has been stained.

According to modern dental philosophy, repair of defective restoration will always be considered as a treatment option (2,3). Repair has become increasing throughout the decade as a new concept of new minimal invasive dentistry [MID]. Minimal invasive dentistry is a new form of dentistry which mainly aims for the preservation of the natural tooth in such cases where the extraction or artificial replacement of the tooth is avoided (4). When deciding on treatment options for a defective restoration dentists are faced with multiple options like replacement, repair , sealant , polishing or no treatment. Despite these options, most dentists decide to replace an existing restoration that deviates from the idea, regardless of its location and longevity.

Dental restoration, dental fillings, or simply fillings, are treatments used to restore the function, integrity, and morphology of missing tooth structure resulting from caries or external trauma as well as to the replacement of such structure supported by dental implants (5,6). They are of two broad types—*direct* and *indirect*—and are further classified by location and size. A root canal treatment, for example, is a restorative technique used to fill the space where the dental pulp normally resides (7). The management of composite restorations with localized defects is a common challenge in clinical practice. While some restorations will inevitably require replacement, it has been suggested that some deteriorating, yet serviceable, restorations may be given extended longevity through the use of repair procedures (8),(9). This comparatively more conservative approach to the management of defective restorations, if appropriate, has the potential to be less costly in terms of time and financial resources, less traumatic for patients, less likely to result in iatrogenic damage, possibly obviate the need for the use of local anaesthesia and be more conservative of tooth tissue (10).

It is clearly preferable, therefore, to perform a restoration repair (ie partial replacement of the composite restoration allowing preservation of that portion of the composite restoration (10,11) which presents no clinical or radiographic evidence of failure) as an alternative to restoration replacement (removal of an entire composite restoration followed by the placement of a new composite restoration) wherever possible. It is accepted that removal of part of the restoration without the aid of magnification loupes can further result in removal of sound tissue and subsequent increase in the size of the cavity. Refurbishment procedure typically involves the refinishing or refreshing the restoration, with or without recontouring. Refinishing may be limited to the margin of the restoration, while resurfacing may involve part or all of the exposed surface of the restoration.

The choice of repair or replacement is greatly dependent on the clinical condition, patients' needs and clinicians' expertise. Not many studies have been done previously to evaluate the knowledge of undergraduates on the repair or replacement of composites. Our team has extensive knowledge and research experience that has translate into high quality publications $(12-21)_{a}(22-25)_{a}(26-30)_{a}(31)$. The main aim of the study is to assess the Knowledge, attitude and practice survey on repair or placement of defective composite restoration among dental undergraduates

MATERIALS AND METHODS:

Study Design

A survey was conducted among dental undergraduates to evaluate their knowledge and awareness on repair and replacement of defective composite restorations. The sample size of the study was 103. The participants did the survey voluntarily and no incentives were given to them. Ethical approval and informed consent from the participants were obtained. The study was conducted in the month of February 2021.

Survey Instrument

The survey instrument which was a questionnaire prepared after extensive review of the existing literature. The questionnaire was reviewed and amendments were made to improve clarity of the questions to eliminate ambiguous responses. The questionnaire consisted of a total of 10 questions. The questionnaire was shared to the dental undergraduates.

Data Analysis

Only completed surveys were taken for analysis and the incompleted surveys were eliminated. All the responses obtained were tabulated and reliability of the data was checked. The responses were then collected and statistically analysed using SPSS software version 22.0. Descriptive statistics and Chi square test was done to study the association. The level of significance was set at p<0.05.

QUESTIONS	Responses	Percentage %
1. Year of study		
3rd year	46	44.7%
4th year	44	42.7%
Intern	13	12.6%
2. Gender		
Male	61	59.2%
Female	42	40.8%
3.Are you aware of repair and replacement in composite		
Yes	72	69.9%
No	31	30.1%
4.Most common indication of composite repair		
Discolouration	21	20.4%
loss of composite	44	42.7%
secondary caries	31	30.1%
Fracture of restoration	7	6.8%
5.Major advantage of repair of composites according to you		
Cost effective	48	46.6%
Less time consuming than replacement	40	38.8%
Increased longevity of repaired restoration	15	14.6%

Table 1: Represents the questionnaire with the responses

 6. Have you been taught about indication and techniques of composite repair during BDS 		
Yes	59	57.3%
No	31	30.1%
Maybe	13	12.6%
7.Have you repaired a defective composite restoration?		
Yes	68	66
No	35	34
8.Which is minimally invasive		
Repair	64	57.6%
Replacement	39	42.4%
9. Which is more time consuming ?		
Repair	65	57.8%
Replacement	38	42.2%
10. The presence of secondary caries in a previously restored tooth with composite is an indication for		
Repair	58	56.3%
Replacement	40	38.8%
Don't know	5	4.9%
Patient's preference should be considered	-	-

during repair or replacement of composite restoration.		
Yes	79	76.7%
No	24	23.3%
11. The longevity of a tooth restored with composite is more in case of		
Repair	55	41.7%
Replacement	43	53.4%
Don't know	5	4.9%

RESULTS AND DISCUSSION:



FIGURE 1: The pie chart represents the frequency percentage of knowledge among study participants regarding the most common indication of composite repair. 42.72% said partial loss of restoration (beige), 30.10% said secondary caries (green), 20.39% opted for discolouration (blue) and 6.80% for fracture of restoration (purple).



FIGURE 2: The pie chart represents the knowledge among study participants regarding the advantages of composite repair. Majority of participants (46.60%) said it was cost efficient (blue), 38.83% said it was less time consuming than replacement (green), 14.56% said increased longevity of repaired restoration (beige).



FIGURE 3: Ths pie chart represents the frequency percentage of participants who have been taught about the indication and techniques of composite repair during their undergraduate study. 57.28% answered yes (blue), 30.10% said no (green) and 12.62% said maybe (beige).



Figure 4: Bar chart represents the association between the year of study and awareness on repair and replacement of composite. X axis represents year of study and Y axis represents number of responses. Blue denotes yes and Green denotes no. Majority of the participants were aware of repair and replacement of composite in all the 3 groups. This association was not statistically significant (Chi square test; p value= 0.629>.05 - not significant).



FIGURE 5 : Bar chart represents the association between the year of study and awareness on the major advantage of repair of composites. X axis represents year of study and Y axis represents number of responses. Blue denotes cost effectiveness, Green denotes less time consuming and Beige denotes increased longevity. Majority of the third and final years said it's cost effective while the interns said it's less time consuming. This association was not statistically significant (Chi square test; p value= 0.473>0.05 - not significant).



FIGURE 6 : Bar chart represents the association between the year of study and response to whether the participants have been taught about indications and techniques for repair of composite during BDS. X axis represents year of study and Y axis represents number of responses. Blue denotes yes, Green denotes no and Beige denotes maybe. Majority of the third and final years responded yes while the interns responded no. This association was not statistically significant (Chi square test; p value= 0.071>0.05 - not significant).

From the research survey done, the results were carefully statistically analysed and the results were tabulated using the SPSS software.

Majority of the study participants (44.66%) were 3rd year, 42.72% from 4th year and 12.62% of them were interns. 59.22% of the participants were females while the rest 40.78% were males (**Table 1**). Clinician factors, material properties and patient factors are to be considered for repair or replacement of defective restoration.

In **Figure 1** the pie chart depicts the awareness among the participants about the most common indication for composite repair and the majority of the participants that is 42.72% said partial loss of composite is the most common indicator of composite repair and 30.10% of the participants said secondary caries arising after restoration are the most common cause or indication for compost repair, 20.39% of the population said discolouration is one of the most common indicator for composite restoration and the rest of the population that is 6.80% of the participants said that fracture of the restoration is the most common indicator for composite restoration. **Figure 2** the pie chart depicts the knowledge on the major advantage of repair of composite, majority of the participants that is 46.60% of the participants say the major advantage as cost efficient, 38.83% of the participants opted that repair is less time consuming when compared to replacement and the rest of the population that is 14.56% of the population said the major advantage of the repair is the increased longevity of repaired restoration. **Figure 3** The pie chart depicts the frequency percentage of participants who have been taught about the indication and techniques of composite repair during their undergraduate study. majority

of the participants that is 57.82% of the participants say that they were thought about the indication and technique of composite repair , 30.10% of the participants said that they were not thought about the indication and techniques of composite repair and the rest of the population that is 12.62% of the population said maybe they had taught about the indication and techniques of composite repair.

In **Figure 4** the association of graph between the year of study and awareness of repair and replacement of composite 37.86% of third years, 24.27% of fourth year and 7.77% of interns said yes, 6.80% of third years 18.45% of fourth years and 4.85% of interns said no. The graph showed the p value of 0.629 which is greater than the value 0.05 which shows the graph is not significant. In **Figure 5** The association of graph between the year of study and awareness of advantage of repair of composite 28.16% of third years, 18.56% of fourth years and 8.74% of interns said less time consuming than replacement and 1.94% of 3rd years 9.71% of 4th years and 2.91% of interns said increased in longevity. The graph showed the p value of 0.473 which is greater than the value 0.05 which shows the graph is not significant.

In **Figure 6** The association of graph between the year of study and whether indication and technique of repair 35.92% of third years, 14.76% of fourth year and 4.85% of interns said yes , 6.80% of third years 116.50 % of fourth years and 6.80% of interns said no and 1.94 % of third years 9.71% of fourth years and 2.91% of interns said maybe .The graph showed the p value of 0.071 which is greater than the value 0.05 which shows the graph is not significant.

69.90% of the participants were aware of repair or replacement of composite. Majority of the study participants (57.28%) had knowledge about the indications and techniques of composite repair and were taught about it in their undergraduate course. Majority of the study participants (42.7%) felt that the main indication for repair is loss of composite and 66% of participants have repaired a defective restoration. Majority of participants consider repair of composite to be minimally invasive (57.6%) although more time consuming (57.8%). However, a majority of the participants (54.37%)considered replacement of composite gave longer longevity to the tooth than repair, which has been proven wrong in several other studies (**Table 1**). A review on the repair of composite restorations concluded that repaired restorations had higher survival rate and superior longevity when compared to restorations which remained untreated and these restorations showed marginal wear after 7 years.

Many previous studies have been done on repair or replacement of defective composite restoration. A similar study done by Paul A Burnton (32) on repair and replacement of defective composite restoration and from the study results majority of the participants were aware of repair and replacement of composite restoration and showed similar outcome when compared to this study which showed that 69.00% of the participants were aware of repair and replacement of detective composite restoration.

Another study by Al-Badri (33) on repair vs replacement of defective restoration: a survey among dentist showed a similar result on if taught about repair and restoration during BDS and 59.2% weren't taught about repair and in our study 57.28% were aware of repair and were taught about it during BDS.

Although the participants had a fair knowledge on repair of composites, standardised guidelines need to be developed and further clinical long-term studies should be carried out. The

limitations of this study include the small sample size and geographic isolation of participants. The study can be done by including a larger student population and general practitioners in the future to both assess and impart knowledge on repair of composite restorations.

CONCLUSION:

Within the limitations of this study, we can conclude that the majority of the dental undergraduates had adequate knowledge and awareness on the repair and replacement of defective composite restorations, and the majority knew about the indication and techniques used to replace a defective composite restoration.

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