

TEACHING AND PRACTICE OF REPAIR OF RESIN COMPOSITE RESTORATIONS IN DENTAL INSTITUTIONS OF KARACHI



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OBJECTIVE : 1. To determine the proportion of dental institutions' faculty teaching repair of composite restorations to dental students (undergraduate).

2. To evaluate the factors that affect the decision making process of Resin Composite restoration repair.

METHODOLOGY: An 11 item questionnaire was presented to the faculty members of all the dental institutions in Karachi. Nine out of ten dental institutions participated in the survey and a total of 38 faculty members from the department of Operative Dentistry filled the questionnaire.

RESULTS: About 90% of the respondents stated that composite repair is advisable whereas 70% of the respondents stated that they have performed such type of interventions and have achieved success. Around 40% stated that they teach such procedures to students and 60% stated that the course of instruction is at clinical level.

CONCLUSION: 1. The findings of the present study indicate that the teaching of the repair of defective composites has found a place in primary dental degree curricula in almost all the dental institutions in the Karachi.

2. Occlusal relationship and patient's existing oral hygiene appeared to be the most important factors in decision making process.

KEY WORDS: composite, resin, repair, replacement, survey, restoration, composite defects.

INTRODUCTION

Composite restorations suffer a lot of mechanical insult during their service as they undergo deterioration and wear. These insults can be attributed to several factors e.g. polymerization shrinkage, high coefficients of thermal expansion, low abrasion resistance, patient's oral hygiene and inappropriate placement techniques.¹ Due to these reasons, one of the most frequent procedures performed in practice is the replacement of resin composite.^{2,3} It is a dilemma for a practicing dentist to choose between repair and replacement of defective composite restorations. Even today, where the adhesive dentistry has marked its success, repairing composite restorations is still not taken as a predictable procedure. Nevertheless, there is an increasing trend of composite applications in restorative

dentistry.

Complete replacement of existing restorations with minor defects places the teeth on additional harm. Nonetheless, the challenge is to distinguish the interface between the composite restoration and the tooth.⁴ This invariably leads to unnecessary cutting of the healthy tooth structure which is against the concept of minimal intervention. Therefore, following the basic concept of preventing the Re-restoration cycle is of utmost importance and must be followed wherever possible.

As a substitute to restoration replacement, partial replacement of a composite restoration has significant advantages. Most importantly, it allows preservation of that portion of a composite restoration which presents no evidence of failure on diagnostic exam. Presently, there are no well-established guidelines in literature on pertinent criteria and measures required for a composite repair. Conversely, a few publications and texts do consider the repair of defective composite as a justifiable substitute to the replacement of defective restorations.^{5,6,15,16}

However, partially lost fissure sealant's repair is an established technique in the present literature. Repairing composite restorations can be addressed as an overlooked topic and is yet to be recognized an established procedure. Dentists are accustomed to the fact that the resin composite restorations that are below the standard quality

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should be replaced.^{2,3}

The rationale of this study was to investigate whether dental institutions in Karachi taught students to repair resin composite restorations and the grounds on which it is being taught. Secondly, it also served to evaluate the factors that affect the decision making process behind replacement and/or repair.

METHODOLOGY

After ethical clearance from the Hospital's Ethical Review Board (1638-Sur-ERC-10) and obtaining informed consent; on June 2010 a survey questionnaire (comprising of 11 items) was distributed to the faculty members of operative/restorative department of all dental institutions of Karachi. Faculty members were given one week to complete the survey questionnaire. Participants who could not complete this questionnaire within a week's time were given a reminder along with one more week. After end of July, no further reminders were sent and the collected data was analyzed through SPSS version 17.0.

The questionnaire requested information regarding participant's personal experience with composite repair procedures, scientific limitations, patient related limiting factors in decision making process and success with such procedures. The questionnaire also sought most valid reason and indications for performing and teaching such repair procedures, existing method of teaching and anticipated life of composite restoration repairs.

The responses were calculated as percentages based on the number of faculty members in operative/restorative department and dental institutions in the Karachi that responded. Frequency distribution of the entire variables was determined. Mean and Standard Deviation of quantitative variables such as age, years in teaching and practice was determined. Descriptive analysis was then carried out on each question variable.

RESULTS

Nine out of ten dental institutions participated in the survey; hence the overall response rate was 90%. About ninety percent stated that composite repair is advisable whereas 73% stated that they have performed such type of interventions and have achieved success. Majority of the survey participants had postgraduate qualifications (63%) as compared to Lecturers (37%).(Table 1) No differences in opinion were found between dentists in private practice (55%) to those who work in academic setting only (45%). (Table III)

Around 46% stated that they teach such procedures to students and 63% stated that the course of instruction is at clinical level and 16% taught at pre-clinical level.(Table IV) The main reasons reported for teaching resin composite repair was to preserve of the tooth structure (79%) followed by reducing probable damage to pulp (11%).(Table II)

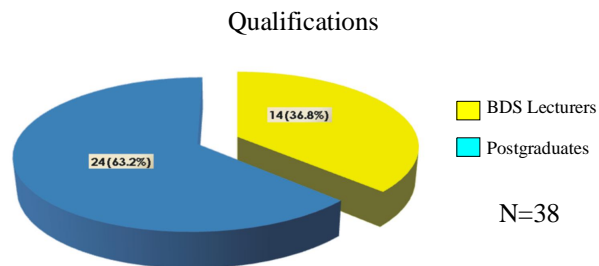


Table 1: Qualifications of participants

The chart shows the distribution of lecturers who have no advanced clinical training with the faculty members who have some form of advanced clinical training.

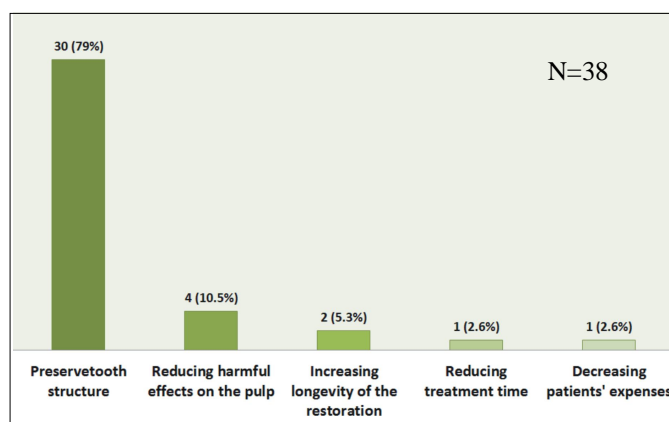


Table II: Reason for teaching repair of defective restorations

The table shows the percentage of respondents teaching resin composite repair clinically on the basis of their preferred reason.

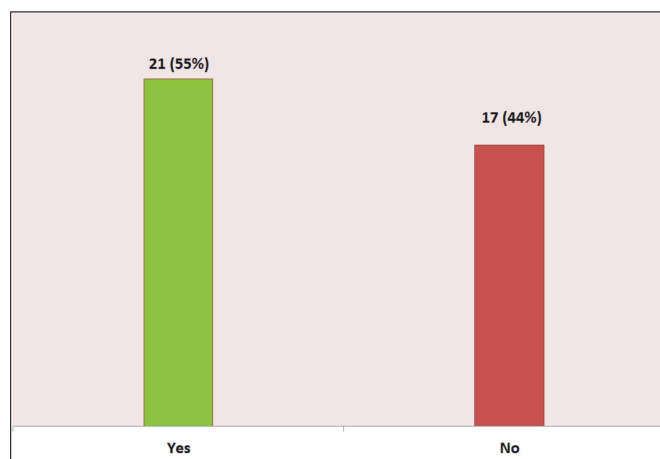


Table III: Participants involved in private practice

The table shows the percentage of private practitioners who undertake resin composite reparative procedures in their dental clinics as a legitimate alternative to resin composite replacement.

More than 60% agreed that the repaired restoration

interface to old

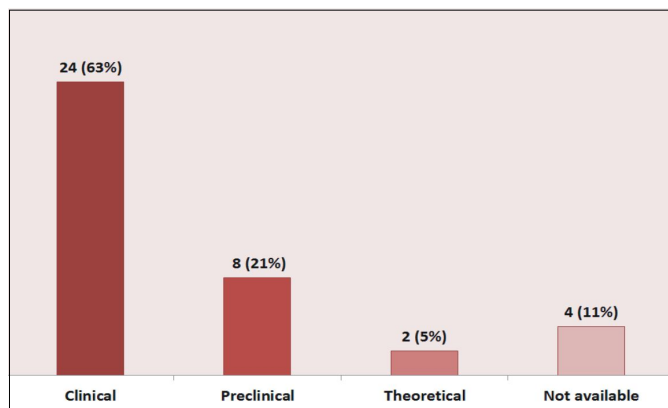


Table III: Mode of teaching repair of composite restoration

The table shows the existing mode of teaching preferred by various respondents among dental institutions.

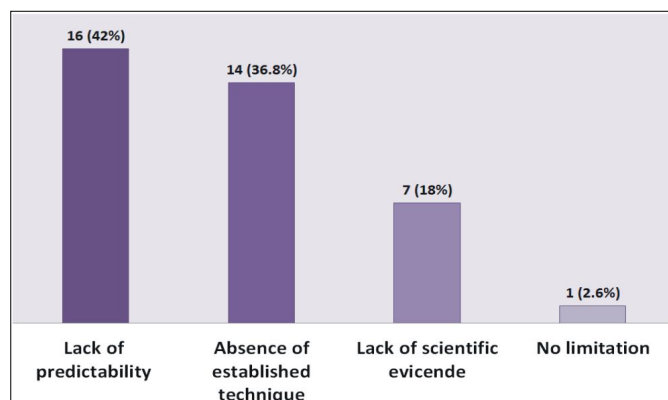


Table V: Reasons given by participants for not including teaching of resin composite repair in academic teaching

The table shows the reasons chosen by respondents for not including the teaching of resin composite repair in formal academic lectures.

Summary of findings	% of Respondents in Karachi (n = 38)
Performed & achieved success	73.7
Teaching Repair to students	76.3
Leak free joint	68.5
Occlusal relationship as a limiting factor	42.1
Patient's existing oral hygiene as a limiting factor	39.5
Partial loss of restoration as primary indication	34.2
Marginal defects as primary indication	21.1
Repair as a definitive measure (>12months)	73.7

Table VI: Summary of findings of our survey

The above table shows the percentage among respondents who agree to all the mentioned factors.

Restoration provides a leak free joint. However forty percent stated that lack of predictability is the main scientific limiting factor in decision making and more than forty percent stated that occlusal relationship is the most important consideration while planning a repair procedure. (Table V) Most likely indication were Partial loss of restoration (34%) and Marginal defects (21%), followed by Marginal and Surface discoloration (18%). Upto (73%) considered such repair measures as definitive. (Table VI)

DISCUSSION

There is a constantly evolving trend of composite use in restorative dentistry especially in the posterior teeth. Even though adhesive dentistry has improved significantly, replacement of defective resin composite restoration is still an ongoing problem. Replacing resin composite restoration (due to the presence of localized defects), places the tooth on additional harm and is against the concept of minimum intervention. In addition, it becomes challenging even for an experienced dentist to identify the interface between the old composite restoration and the tooth.⁴ The rationale of this study was to investigate whether dental institutions in Karachi taught students to repair resin composite restorations and the grounds on which it is being taught. Secondly, it also served to evaluate the factors that affect the decision making process behind replacement and/or repair.

We inquired from our participants regarding their view on resin composite repair and whether they have performed such procedures in their clinical practice. About ninety percent stated that repair of defective composite is advisable in most of the scenarios whereas around seventy percent of the total participants stated that they have actually performed such type of interventions and have achieved success. In addition, majority of the dental institutions in Karachi stated that they teach repair of defective resin composite restorations to undergraduate students. This teaching was based more on clinical judgment than on scientific support.

The main reasons reported for teaching resin composite repair was to perform minimal intervention that helps in preservation of the tooth structure (79%) and secondly, to reduce potential damage to pulp (11%).^{7, 10, 11} This indicates that most of the respondents consider minimal intervention to be of primary importance as compared to reducing procedure time or taking it as a cost effective measure. These reasons are similar to the views reported in other internationally conducted surveys in 2000 and 2001.^{8, 9} There are other studies which have shown preservation of tooth structure when repair have been taken as the form of intervention.¹²⁻¹⁴

Most of the participants in Karachi were still reluctant to include teaching of such techniques in formal academic teaching. This was due to the fact that up to forty two percent (42%) of the participants stated that lack of

predictability followed by absence of an established technique for resin composite repair (37%), are the main scientific reasons for not providing course of instruction through formal academic lectures. Therefore it is important to change views of the teaching faculty in order to incorporate such teachings into curricula of dental institutions. To have such changes in views; more research is needed on the issue of resin composite repair. Currently, there are only proposed methods available to repair defective composites.

We also considered private practice as an important factor that could affect the decision making process. This is because some of the faculty members of dental institutions are not private practitioners and therefore do not have actual clinical experience with such composite repair procedures. There were no differences found in opinion regarding repair of composite restorations between dentists in private practice (55%) to those who work in academic setting only (45%). Both the groups considered composite repair to be a legitimate alternative to composite restoration replacement. We also asked our participants to express their level of qualification that is either they hold a bachelor's degree or have some form of postgraduate qualification. Interestingly, majority of the participants informed that they had postgraduate qualifications (63%) whereas up to thirty seven percent (37%) of the participants were on position of Lecturer. In our view, the level of qualification i.e. advanced training in restorative dentistry gives an edge to the clinician in providing comprehensive management of restorative problems. This may in turn affect the decision making process of the operator for managing defective resin composite restorations as well.

More than half (63%) of the participants stated that, although the teaching is not done in the form of formal academic lectures, the course of instruction remains only at clinical level (final year dental students. Whereas very few (15%) of the total participants reported that they teach repair of resin composite only at pre-clinical level (third year dental students). These opinions differ from the opinion given by the participants in similar international surveys where the teaching of resin composite repair is included in formal academic teaching.^{8,9} This may be due to the fact that clinical judgment plays a key role in managing defective composites when choosing between replacement and repair. Another perspective could be that at clinical level almost all of the students are clinically competent enough to understand the management of resin composite. But even then it would be wise to incorporate teaching of repair in formal academic lectures so that a firm base of knowledge is established before clinical application.

The overall response rate in Karachi city turned out to be 90%. Similarly, fifteen (100%) of British and Irish dental schools, twenty four (75%) of 32 German dental schools and nine (82%) of 11 Scandinavian dental schools

responded to the European survey, for an overall response rate of 83%. Likewise, fifty two (81%) of 64 North American dental schools responded to their survey, hence the response rate was 81%.^{8,9} Therefore the response rate of our survey is comparable with international surveys.

This should also be noted that the surveys conducted internationally are country based. In contrast, this survey is based on Karachi city which is a particular limitation. Even though it gives a good view in regard to composite repair being practiced and taught by the faculty members of various institutions of Karachi. Therefore the study focuses on the dental institutions as well as on the dental institutions' faculty members on an individual basis working in the Operative Dentistry departments.

On the other hand an advantage of this study is that more than one participant within the same institution were given the opportunity to express their view based on their experience and clinical judgment. This would provide an in depth view based on individual opinions as compared to individual institutions.

Almost all the participants and Institutions were still reluctant to include teaching of such techniques in formal academic teaching. This was due to the fact that upto forty two percent (42%) of the participants stated that lack of predictability followed by absence of an established technique for resin composite repair (37%), are the main reasons for not providing course of instruction through formal academic lectures. This finding is different from the views expressed by majority in other surveys where Teaching of Defective composite is included in formal academic teaching. Repairing resin composite restorations for small defects is a justifiable alternative to complete replacement. This is also supported by the evidence which has shown that majority of the defects are localized in nature, for example, secondary caries.¹ Therefore it is important to change views of the teaching faculty in order to incorporate such teachings into curricula of dental institutions in Karachi.

More than half (63%) of the participants stated that, although the teaching is not done in the form of formal academic lectures, the course of instruction remains only at clinical level (final year dental students. Whereas very few (15%) of the total participants reported that they teach repair of resin composite only at pre-clinical level (third year dental students). This decision actually reflects the importance of experience in the decision making process for defective resin composite repair. This is also similar to the findings in international surveys where teaching of repair of defective composites is influenced primarily by the clinical experience as compared to the evidence. This decision making process based on only experience should be converted into a combined approach i.e. decision making based on evidence and clinical experience.

Most likely indication advocated by the participants for repair of defective composite was Partial loss of

restoration (34%) and Marginal defects (21%), followed by Marginal and Surface/Superficial discoloration (18%). In such of defects, there is an increased likelihood that the remaining intact resin composite restoration will be sound. In such cases, however, decision making can be challenging when it comes to repairing a partially lost functional cusp that was previously built with resin composite. Whereas, marginal defects and superficial discoloration can be a good indication to perform such repair interventions. The reason being that such defects are localized and are usually limited to the surface of the restoration only.

Other factors chosen by the respondents that need to be evaluated were occlusal relationship (42%) followed by patient's existing oral hygiene (40%) while planning a repair procedure. We also asked our participants whether they agree that the repaired interface with the aged resin composite provides a leak free joint and more than sixty percent (66%) believed that the repaired restoration interface to old restoration provides a leak free joint.

Majority of the dental institutions (90%), consider repair as a legitimate alternative to complete replacement of resin composite restorations. Even though, a consensus is lacking in favor of the best repair protocol. These findings are in line with the findings of international surveys conducted in North American and European dental schools.^{8,9} The only exception is German dental schools in Europe. More than half fifty percent of German dental schools do not consider repair procedure as a reliable technique especially when secondary caries are present.⁸ Almost seventy five percent of the participants in Karachi considered such repair measures a definitive treatment modality that would last at least 12 months. On the other hand, in North America, there was an agreement among respondents that the expected longevity of repaired resin composite is up to 4 years.

In our survey, we did not ask our participants the type of material preferred for repair of resin composite. This was due to the fact that personal preference instead of the material's evidence based selection will favor its use. Whereas, in the European and North American survey conducted in 2000 and 2001 respectively, the majority of the participants advocated the use of hybrid resin composite for the repair of defective resin composite restorations.^{8,9}

This survey shows that, although the repair of defective resin composites is recognized by majority of the dental institutions as a legitimate alternative to resin composite complete replacement, there is still a strong need for clinical trials to reach a consensus for the best repair method. Such clinical trials will also help in the establishment of clinical guidelines that are necessary for an evidence based approach. A particular limitation of this study was that it only shows the views of teaching faculty members of dental institutions of Karachi only. Therefore,

it is desirable that the study should be conducted at a national level to know the views of other teaching faculty members at various institutions throughout the country. In addition, there must be well planned follow-ups to monitor patients after commencing reparative procedures. It is also recommended that further research on this topic should be carried out to establish guidelines that would serve as evidence based approach for defective resin composite repair. The results of this study show that the teaching of the repair of defective resin composites is being taught clinically in almost all the dental institutions of Karachi.

CONCLUSION

1. The findings of the present study indicate that the teaching of the repair of defective resin composites has found a place in dental degree programs in almost all the dental institutions in the Karachi.
2. Occlusal relationship and patient's existing oral hygiene appeared to be the most important factors in decision making process of repairing old resin composite restorations.

This article may serve as a stepping stone in Pakistan towards such new techniques that may assist students and clinicians to be more conservative of tooth structure while encountering defective yet functional resin composite restorations.

Although the decision to repair old composite restorations is debatable but considering the above mentioned factors during the decision making process could serve as a basic guide to such interventions. Nevertheless, well controlled clinical trials are required to reach a definite conclusion for repairing defective resin composite restorations.

Conflicts of interests:

The authors state that there are no conflicts of interest related to this study.

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