

CLINICAL PRACTICE AND TEACHING OF REPAIR OF RESIN COMPOSITE RESTORATIONS IN DENTAL INSTITUTIONS OF ISLAMABAD AND RAWALPINDI

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ABSTRACT

Repair or replacement are two established methods for treating defective restorations, In recent years, shifting trends towards minimal invasive dentistry have made repair a preferred option worldwide. A 13 item questionnaire was distributed online after approval by the ethical committee of Rawal Institute Of Health Sciences, to faculty members of all dental institutions of Islamabad and Rawalpindi on 2nd July 2020 through Google forms. Verbal consent for participation in the survey was taken by members. Responses were taken on age, qualifications, clinical settings, years in teaching and personal experience with composite repair procedures, when a repair is indicated and what advantage it has, scientific limitations, patient-related limiting factors in the decision-making process for repair. Data analysis was done with Spss 22.7 out of 8 dental institutes faculty members with a mean age group of 34±5 responded to the survey with the preference for repair by 96.7% faculty members with majority teaching repair procedures to their students. Partial loss of tooth structure was the major cause of repair with the advantage of tooth preservation if the repair option was opted

Repair is an established treatment concept among faculty members of Islamabad and Rawalpindi. Standardized guidelines need to be developed with a mutual collaboration of faculty members at the national and international level regarding repair

Keywords: Dental restoration repair, composite resins, dental restoration failure, dental restoration permanent.

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INTRODUCTION

Cavitated lesions in dentistry are a common problem with a chief complaint related to pain, function and esthetics. These lesions are restored with different restorative materials among which composites and amalgam are reported frequently in use. Nowadays, composites are preferred more as compared to amalgam because of the number of advantages in terms of conservation, esthetics and reinforcement of tooth

structure. But these composite restorations of teeth have a particular life span in turn leading to defect in restorations. Defective dental restorations can either be repaired or replaced. Repairing restoration is the shallow replacement of a defective tooth area without removing the whole restoration which has no signs clinically or radiographically of failure whereas restoration replacement is placing a new fresh restorative material after complete removal of the previous old one.^{1,2,3}

Replacement of whole tooth restorations is not economical and often results in the sacrifice of sound tooth structure, degeneration of the dental pulp, increase the pace of re restoration cycle with gradual loss of the tooth filling material. With advances in adhesive dentistry, 'reparative dentistry' is becoming an important area of minimally invasive dentistry. With these strategies, there will be the preservation of the structure of the tooth, adjunctive support, and a decrease in microleakage with decrease sensitivity. Repairing an existing area of restoration increases

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its mechanical properties and durability. However, the criteria for opting for such interventions and its decision-making remain subjective on the part of the treating restorative clinician.^{2,4}

During the past few years, conserving tooth structure with a minimally invasive approach has become a learned concept in various areas of restorative dentistry. Implementation of these minimal approaches concepts in Pakistan however, shows variability in daily dental practices. Variability is not only the result of tooth and patient-related factors but also of the factors related to operators like their education, skill development provided by the restorative dentistry faculty and senior instructors with clinical experience in this specific restorative field.^{2,3,5,6}

Wilson et al preferred replacement as the last applicable treatment option of restoration which is failed or near to failure. But according to Kanzow et al, composite restoration repair frequency is 98.5% in Europe. The main reasons for repair were ditches or defects in the marginal area (100%), followed by recurrent caries (69%) reported by Brunton et al. One local study from Lahore reported that as a clinician when clinical experience increases, there will be more preference towards repair concept and teaching. Hassan and colleagues reported repair preference of 90% by Karachi faculty and senior instructors with 40 percent stating that they teach such procedures to their students.^{3,5,6,7,16}

Opting between the decision of replacing or repairing a defective composite restoration tends to be based on what clinicians have been taught and inculcated in them as students by senior faculty and instructors.

As no such survey was documented in the past in the Federal state of Pakistan, so this survey investigated the current status of the teaching of repair techniques for direct composite restorations in dental schools of Islamabad and Rawalpindi. The purpose of this study was to evaluate whether Islamabad and Rawalpindi dental colleges' faculties take repair as a sound concept for treating defective restorations and under what clinical capacity this option is opted and taught to students.

METHODOLOGY

After approval by the ethical committee of Rawal Institute Of Health Sciences, a questionnaire-based internet survey (comprising of 13 items) was distributed online for data collection to the faculty members of the operative/restorative department with the fellowship of the College of Physicians and Surgeons Pakistan and senior demonstrators of all dental institutions of Islamabad and Rawalpindi on 2nd July 2020 through Google forms. Verbal consent for participation in the survey was taken by members. One week time period was given to faculty members for survey completion. Participants who could not complete this questionnaire within a week were given a reminder along with one more week. At the end of July, no further reminders

were sent. A modified version of this questionnaire had already applied for a survey in Karachi². There, it was subject to an internal validation process, which revealed a substantial test-retest reliability. The questionnaire investigated respondents' information regarding their age, qualifications, clinical settings, years in teaching and personal experience with composite repair procedures, scientific limitations, patient-related limiting factors in the decision-making process. The questionnaire investigated the reasons and advantages for performing and teaching such repair procedures skills and the nature of the instructions (theoretical, practical, preclinical, or clinical).

Collected data was then analyzed through SPSS version 20.0. The mean and Standard Deviation of quantitative variables such as age, years in teaching, and practice were determined. Percentage-based responses were calculated on the number of faculty members in the operative/restorative department and dental institutions in Islamabad and Rawalpindi that responded. The frequency distribution of the entire variables was determined. Descriptive analysis was then carried out on each question variable.

RESULTS

Seven out of 8 dental institutes of Islamabad and Rawalpindi participated in the survey with a response rate of 90%. The majority of the respondents were from senior faculty with postgraduate qualification 70% as compared to clinical demonstrators 30% with the mean age group of 34±5 and clinical experience of teaching and practice of 4 years as shown in Figure 1,2

Among respondents Table 1,2 show responses regarding workplace setting and advisability and teaching of composite repair

As faculty opinion main mode of teaching should be preclinical for students with partial loss of restoration as the reason for repair Figure 3,4

The main advantage of performing composite restoration repair is the preservation of the remaining tooth structure. Lack of predictability of the outcome of repair is selected as one the reason by faculty if they are not preferring repair and replacing the restorations instead with patient occlusal relationship and existing oral hygiene both as limiting factor. Figure 5,6,7

DISCUSSION

A 13-item google survey-based questionnaire was mailed online to the faculty of operative dentistry in 8 dental colleges in Islamabad and Rawalpindi (Pakistan). As with all questionnaire-based surveys, reliability risks of responses exist in this survey too. The survey asked regarding repair of direct composite, its teaching to dental students, and factors on which this treatment is opted. Faculty members of 7 dental colleges of Islamabad and Rawalpindi participated in the survey with a mean age group of 34±5 members.

TABLE 1: WORKPLACE SETTING OF PARTICIPANTS

Workplace setting	Frequency	Percent
Academic	12	40.0
Both	18	60.0
Total	30	100.0

TABLE 2: ADVISABILITY AND TEACHING OF COMPOSITE RESTORATION REPAIR

Repair preference and teaching questions	Response Rate n=30(%)	
	Yes	No
Advisability on composite restoration repair	29(96.7%)	1(3.3%)
The teaching of procedures to students	17(56.7%)	13(43.3%)

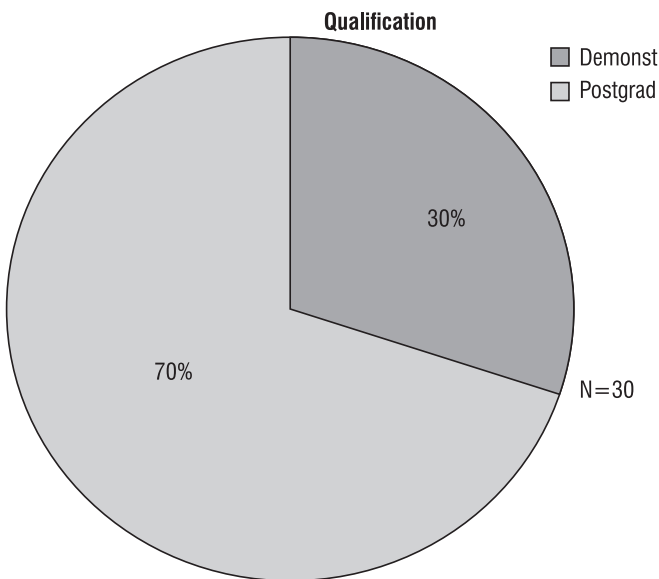


Fig 1: Qualification of the participants

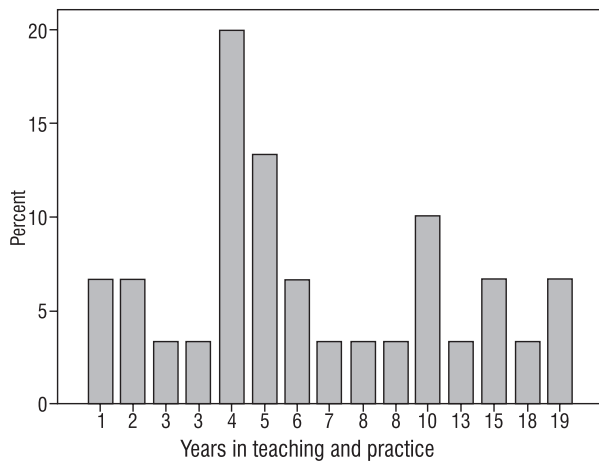


Fig 2: Clinical experience of teaching and practice

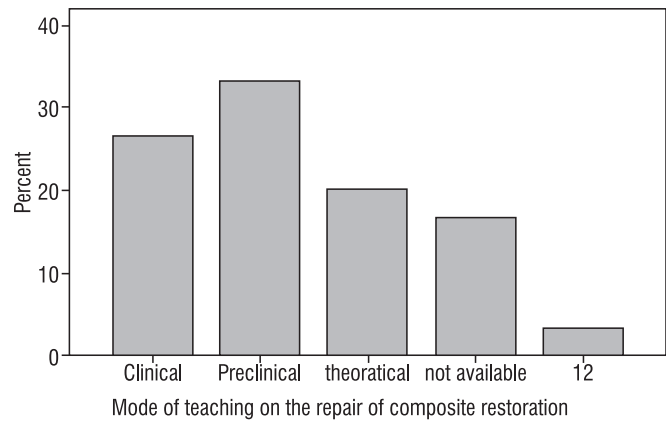


Fig 3: Mode of teaching on the repair of composite restoration

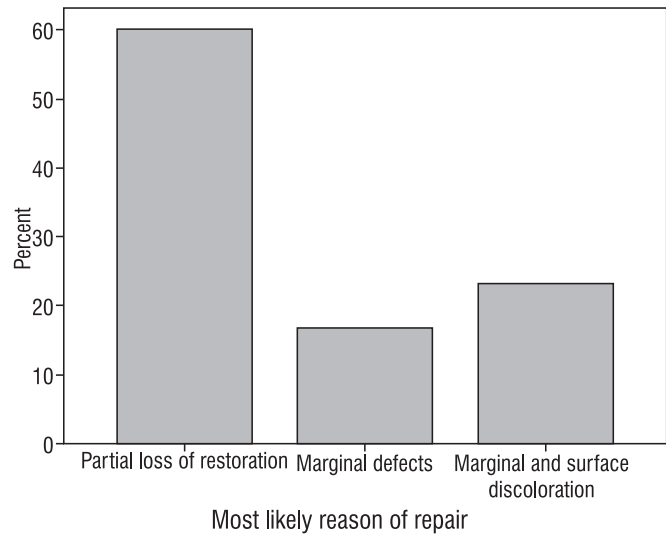


Fig 4: Most likely reason of repair of composite restoration

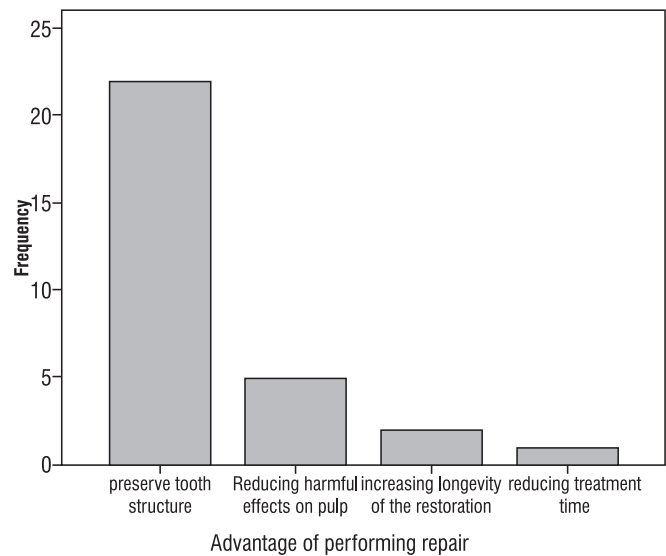


Fig 5: Advantage of performing and teaching composite repair

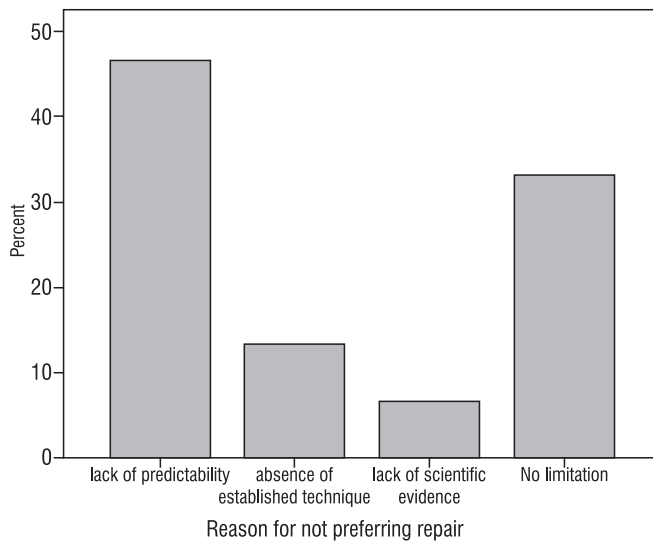


Fig 6: Reason for not preferring repair

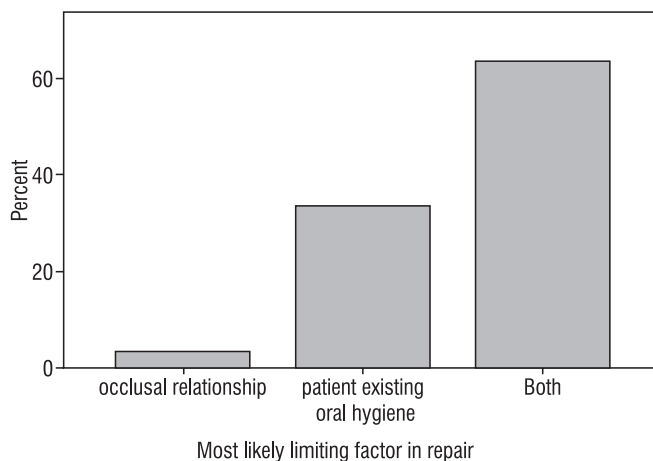


Fig 7: Limiting factor in repair

In one of the past studies conducted in Norway, faculty members' age varied from 25 to 77 years (mean 41.8, SD 12.4) with older faculty dentists seem to favor repair compared with the younger dentists⁸. While few past studies showed that young dentists opted for repair options more ($p < 0.01$).⁹ However present survey findings showed that repair is the preferred option in middle age group 34 ± 5 not only among dentist of Islamabad and Rawalpindi but it was also supported by surveys conducted in Lahore and Karachi^{2,3}

In the present survey, most respondents had a clinical experience of 4 years or more. Past studies with experienced faculty in the restorative and operative dentistry domain showed that as learning skills of the dentist increases (3-8 years) preference for repair as a treatment option also increased ($p=0.003$) as well as practically performed repair as a treatment ($p=0.028$) which is in accordance with a presented study in terms of repair as the preferred option.^{9,10} There is also a close agreement between the data presented here and those collected in Karachi with few percentage differences²

This survey exclusively investigated the repair

of composite restorations, however, one point of consideration for not including other material's defective restoration like old amalgam was that these restorations can be minimally repaired too with composites but their trends are more towards replacement rather than repair. Moreover, occupational hazards of mercury could also shift the treatment trends to completely replace defective amalgam fillings.^{11,12} This corresponds with Norwegian dentists faculty members preferences for the repair of these defective restorations.⁹

Islamabad and Rawalpindi faculty members who preferred repair are working in both academic and private settings whereas few internationally published past studies showed that it is opted option on the majority level by employees in Government dental institutes ($p < 0.01$)^{9,21}

This survey reported 96.7% of respondents who had chosen repair as a treatment option rather than replacement whereas Anam and colloquies reported 18% of respondents who had chosen repair in their clinical setups with the reason being that they were not made familiar with repair concept at the undergraduate level.^{3,13} Repair is not preferred by Turkish dentists.¹⁴ However it is an established concept in France.¹⁵

Most faculty members according to this survey were teaching repair in dental institutions of Islamabad and Rawalpindi, approximately about 96.7% rather than replacement. Few past systemic reviews and meta-analyses reported that globally 83.3% (73.6-90.0%) schools of dentistry taught repairs.^{12,13,16,20} Restorative faculty in 88% of dental schools in the United stated and Canada reported teaching of composite repair techniques as part of dental curriculum.¹⁷

This survey reported that preclinical should be the medium of teaching students regarding repair with the option which was opted by faculty members in the questionnaire. Clinical level teaching was reported by Twenty-seven (73 percent) out of 37 schools, while only three schools (8 percent) reported that it was included in conservative lectures as part of junior operative courses which is in agreement with the present survey.^{1,18}

Defective restorations can either be due to fracture of restoration or tooth or in some cases both. According to Kanzow et.al defective restorations with mechanical fractures with failures of function are repaired more frequently than restorations with secondary caries, which is in agreement with this study saying the partial loss of restoration as likely reason for repair by 60% faculty^{1,6,11}. Lahore based study by Anam fayyaz and other colloquies disagrees with our results with 74 participants reporting secondary caries as the main reason for repair which was the carious loss of tooth structure rather than restoration fracture^{3,14,16,19}

The major advantage of repair according to the present survey is tooth structure preservation which corresponds to Anam fayyaz et al and Kanzow results^{3,6,18}. Few past studies show the difference of opinion

with color improvement as the main advantage²⁰

The resin bonded composite restoration makes the use of a bonding agent which causes the mechanical retention of material with tooth if these restorations get defective they are repaired with surface conditioners and few studies reported on the use of silane. Philipp and Annette's survey contributed in this regard in past studies^{4,20}. Future studies should be more focused with the surveys on the use of surface treatments too for repair and faculty knowledge regarding its techniques and usage.

Most respondents in the current survey had chosen, lack of predictability for not preferring repair as it's always unpredicted to say whether the filling will stay for a long time or not. This assessment is confirmed by the Kanzow with the rate of the lifespan of repairs lower than that of newly made restorations⁴. Gordan et al. and others reviewed the data published regarding the repair of composite restorations and concluded that repairing restorations increases tooth life with increased mechanical properties. These restorations showed marginal wear after 7 years.^{8,9,10,13,21} Where as Maria A et al showed 94.1% respondents satisfied with the predicted result of repair after 1 year.¹⁰

CONCLUSION

Repair is an established treatment concept among faculty members of Islamabad and Rawalpindi. The decision between replacing or repairing a defective composite restoration tends to be based on what clinicians have been taught. However, standardized guidelines need to be developed in collaboration by faculty members of operative and restorative dentistry within all main cities of Pakistan at undergraduate and continuing education levels.

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Discussion, proof reading, data collection

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Overall reviewing and help with the survey concept