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Repair Vs Replacement of Dislodged Restorations

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Abstract

Background: Recent developments in repair restoration have encouraged minimally invasive treatment approaches for the preservation of natural teeth, protection of the residual tooth structure, improved marginal seal, and ultimately increased longevity of restorations.

Aim: To assess the Hyderabad dentists' approach towards the treatment for defective direct restorations

Materials and method: A convenient number of dentists practising in and around Hyderabad were approached directly or through mail for their participation. A survey questionnaire (consisting 15 questions) that inquired about the attitude and practices of treating a defective direct restoration was designed based on the previous literature.

Results: More than half of them came across the defective restorations, and among them, 94.4% of them prefer to replace and only 5.6% of them repair it. Majority of the dentists prefer to use composite material for the replacement of restoration. The restorative-related conditions that led the dentist to consider for repair are partial loss of restoration (66.7%) and non-carious marginal defect (61.1%), while the patient

related condition was limited patient finances (77.8%). Around 60% of the dentists consider to repair the defect once before they opt for the replacement. The most common causes for ignoring the repair of restoration are negative personal experience (66.7%) and lack of knowledge of appropriate surface treatment (16.7%).

Conclusion: most of the dentist prefer to go for replacement than repair, especially due to lack of repair success and lack of sufficient knowledge. Further, the condition that led the dentist to opt for repair were mainly of functional failures.

Keywords: Restorations, longevity, encouraged, convenient

Introduction

Dental caries, the most prevalent public health issue in the world, affects 621 million children and 2.4 billion persons with permanent dentition.[1] Dental restorations are the most often used treatments for these carious lesions, but their durability is a constant source of worry. The main causes of failure of restorations installed are secondary caries, fracture, marginal degeneration, discoloration, and wear, according to a variety of studies on the clinical survival of restorations.[2] The replacement of direct restorations makes up 50% to 70% of all dental treatments.[3]

Dentists may choose between a variety of treatment choices when dealing with a damaged restoration, such as replacement, repair, sealant, polishing, or no treatment. No matter where it is or how long it has been there, it is customarily recommended to replace a damaged restoration. However, this has the drawbacks of needlessly removing healthy tooth tissue, causing pulpal injury, and being expensive. Recent developments have encouraged minimally invasive treatment approaches for the preservation of natural teeth, protection of the residual tooth structure, improved marginal seal, and ultimately increased longevity of restorations.[4]

The restoration, which adheres to minimum intervention dentistry (MID), limits the size of the restorative intervention and lowers the risk of pulpal problems, and has produced encouraging results. It is referred to as a "modern approach." When necessary, adhesive restorative material may also be added during the repair intervention, along with monitoring, sealing, polishing, and finishing the old restoration. The benefits of this procedure include shorter treatment times, lower patient costs, high patient acceptability, no need for local anaesthesia as long as the repair is not significant, and a lower chance of iatrogenic harm to neighbouring teeth. Patients' capacity to maintain proper oral hygiene and tooth-specific factors are among the factors that influence the decision to repair rather than replace damaged restorations.

According to Tyas et al[5], some dentists view repair procedures as "patchwork dentistry," which may be one of the reasons why they do not view repair as a long-term therapeutic option. Researchers have studied the variables that affect a dentist's decision to repair or replace dental restorations and found that tooth-specific factors (such as the type of restoration material), patient factors (such as age), and dentist factors (such as the dentist who originally placed the restoration) were all connected to the decision.[6-10] This group of dentists has a propensity for surgical intervention, replacing the restoration (75%) as opposed to doing more conservative corrections (25%).

The quality of repairs has improved over the past 20 years as a result of an increase in evidence-based recommendations, studies conducted in dental schools, and increasing awareness of the need to repair damaged restorations among dentists and patients worldwide[11].

Studies on the long-term effectiveness and behaviour of replacement and repair in the deciduous dentition, however, still offer conflicting results. In order to better understand how dentists, handle damaged direct restorations, the current study sought to perform a cross-sectional study.

Materials and method

The present cross-sectional study was conducted among convenient sample of dentists practicing in Hyderabad city to assess their approach towards the treatment for defective direct restorations. All the dentists practising in and around Hyderabad were approached directly or through mail for their participation. Anonymity and confidentiality of respondents were maintained, and participation was voluntarily. Dentists who did not give consent or incompletely filled questionnaires were excluded. An email was sent to the dentists containing our study's aim and the survey link; a reminder email was sent to non-respondents 1 week later. Survey links were programmed to expire 2 weeks after survey deployment.

A survey questionnaire (consisting 15 questions) that inquired about the attitude and practices of treating a defective direct restoration was designed based on the previous literature and distributed to dentists (Table-1).

Table 1: Questionnaire

1.Type of practititoner

a. General practitioner (BDS & MDS)

b. Speciality practitioner (Endo don tics and pedo don tics)

c. Post Graduates

2. In what kind of practice setting do you work

a. Academic institution

b. Private practice

3.How many years of work experience do you have in clinical dentistry?

a. <5 years

b. 5-10years

c. 10-15 years

d. 15-20 years

e. >20years

4.How often do you come across patients with defective restorations?

a. Very rare

b. Moderately

c. Frequently

5.How do you treat a defective or dislodged restoration?

a. Repair

b. Replacement

6.What do you think is the most common reason for the failure of the restoration

a. Operator related factors

b. Patient related factors

c. Material related factors

d. Other

7. What are the Restoration-Related Conditions you consider for repair of the restoration

a. Non carious marginal defect

b. Partial loss or fracture of the restoration

c. Crown margin repair due to carious lesion

d. Secondary caries

e. Crown margin repair due to open margin

f. Marginal discoloration

g. Tooth fracture adjacent to an intact or stable restoration

h. Superficial non margin surface color correction

i. Wear of the restoration

j. Bulk fracture of the restoration

8.What are the Non-Restoration-Related Conditions (For Example, Patient-Related

Factors) you consider for the repair of the restoration.

a. Limited patient finances

b. Compromised health status
c. High risk of developing caries
d. Behaviour management
e. Poor oral hygiene
f. Irregular compliance with recall dental appointment.

9.Will you perform any surface treatment before repairing defective or dislodged restoration?

a. Yes
b. No

10.How many Restoration Repairs do you like to Attempt Before Replacement.

a. 0
b. 1
c. 2
d. More than 3

11.What is your attitudes toward the decision to repair defective restorations.

a. Repair Is a Minimally Invasive Procedure
b. Repair May Reduce Pulpal Irritation Risks
c. Repair May Not Require Local Anaesthesia
d. Repair Is More Affordable
e. Repair Takes Less Time

12.What materials do you prefer for the replacement of the restoration.

a. Composite
b. Amalgam
c. GIC
d. None
e. Other
f. Specify if any other.

13.What are reasons to forego a restoration repair.

a. Lack of Repair Success or Negative Personal Experience
b. Negative Feedback from Other Dentists
c. Lack of Knowledge of Appropriate Surface Treatment
d. Insufficient Training or Experience
e. Other
f. Specify if any other.

14.What is your attitude Toward Defective Restoration Placed by Another Practitioner

a. Does not influence my decision
b. Replace the restoration
c. Repair the restoration
d.

15. What is your perception of the Longevity of Repair Versus Replacement

a. Comparable (no difference)
b. Replacement lasts longer
c. Don’t know
d. Repair lasts longer.

The survey items were pre-tested for ambiguity, content validity, reliability and clarity. The questionnaire used in the study was divided into two section: first section obtains the information regarding their type and kind of practice and their year of experience in their field. The second section draw the information regarding their method of choice in treating the defective restorations, reasons for failure of restorations, the restorative and non-restorative-related conditions they consider while repair of restoration, their perception and attitude towards the decision to repair defective restoration along with longevity of repair Vs replacement, material they prefer for repair or replacement and the reasons to ignore a restoration repair.

The data was entered into excel sheet and then subjected for statistical analysis using Statistical Package for Social Sciences Software (SPSS version 12.0)

Results

A total of 100 dentists were approached for participation in the survey, 89 dentists have responded, among which 4 responses were excluded due to incompletely filled questionnaire. Half of the study dentists were post graduate students (50%), and the remaining half comprised of speciality practitioners (44.4%) and general practitioners (5.6%). Further, based on their kind of practice, majority of them were into private practice (77.8%), with small percentage of them into academics (22.2%). Around 3/4th of them had experience of <5years and 27.8% of them with 5-10 years.

With regards to their exposure to defective dental restorations, more than half of them come across the defective restorations moderately (55.6%) and 38.9% of them frequently. Among them, 94.4% of them prefer to replace the defective restoration and only 5.6% of them repair it (Figure-1). Majority of the dentists prefer to use composite material for the replacement of restoration. More than 50% of them consider operator related factors are the most common reason for the failure of restoration and few felt as patient and material related factors. (Figure-2)

The restorative-related conditions that led the dentist to consider for repair of restoration are partial loss of restoration (66.7%), non-carious marginal defect (61.1%), non-margin surface colour correction (44.4%), wear of restoration (44.4%), tooth fracture adjacent to restoration (38.9%), margin defect due to caries (27.8%), crown margin repair (27.8%), marginal discoloration (27.8%) and secondary caries (22.2%). The Non-restorative-related conditions that made the dentist to choose for the repair of restoration are limited patient finances (77.8%), irregular recall compliance (66.7%), compromised health status (44.4%), poor oral hygiene (44.4%), behaviour management (44.4%) and high risk of caries development (38.9%). (Figure 3 and 4)

Around 60% of the dentists consider to repair the defective restoration once before they opt for the replacement as most of them consider repair as the minimal invasive procedure (55.6%), repair may reduce pulpal irritation (27.8%), and repair is more affordable (16.7%). The most common causes for ignoring the repair of restoration are negative personal experience (66.7%), lack of knowledge of appropriate surface treatment (16.7%) and insufficient training or experience (11.1%) (Figure 5 and 6). Majority of the dentists perceive that the restoration replacement lasts longer (83.3%), while only 5.6% of them as repair lasts longer.

Discussion

In the past, a whole new restoration has been used to treat damaged dental work. Since repair reduces the size of the restoration intervention and the potential for complications, it is increasingly regarded as state-of-the-art.[12] Early research, however, indicated that a sizable portion of dentists do not practise repair.[9,13,14] It is not apparent if there is a widespread disconnect between clinical practise and scientific data, and if so, what factors influence dentists' decisions on repairs. Thus, the present study aimed to assess the Hyderabad dentists' approach towards the treatment for defective direct restorations.

In line with the literature, around 30 to 60% of dentists moderately to frequently encounter defective dental restoration. Among them, 95% of dentists prefer to go for replacement of defective restoration, though repair has become an integral part of minimal invasive dentistry, which might be due to lack of specific treatment protocol guidelines, limited information on the long-term clinical outcome or lack of evidence-based training of dentists. These findings are in line with the

results from the United States Dental Practice-Based Research Network[7-9] and by Fayyaz et a[15] among Lahore dentists, where replacement of faulty restorations was regarded as a preferred alternative. In contrast to the above finding, a systematic review and metanalyses by Kanzow et al[16], reported higher proportion of dentists perform repair (71.5%). Also, Kattan et al[11], da-Costa et al[17] and Maria et al[18] also observed that more than 3/4th of the dentists perform repair. These differences might be due to the teaching of advances in dentistry in dental school and increased acceptance of repair restoration by the dentists.

Among the restorative related conditions, that are suitable for repair were mainly functional failure i.e., partial loss of restoration and non-carious marginal defect than biological (secondary caries) or aesthetic conditions (discolorations). Similar functional failures were also reported among US dentists by Kattan et al[11], German dentists by Kanzow et al[19] and in American Dental Association Clinical Evaluators Panel survey by da-Costa et al[17]. In contrast to these, Gordon et al[7], Fayyaz et al[15] and Brunton et al[20] reported that secondary caries accounted for the reason to undergo for repair. Due to the difficulties and unpredictability associated with treating other issues including secondary caries, marginal defects, or crown margin repairs, a dentist may decide to replace the restoration rather than attempt to fix it.

According to the survey, in the patient related conditions, limited patient finances made the dentists to opt for repair of the restoration, and these findings are in similar to the previous study among US dentists.[11] Maria and colleagues[18] stated that high risk of caries and irregular patient recall compliance were the reasons for the replacement, and replacement risk and low cost were the reasons for repair. Medical complications and treatment costs also contributed for the decision of repair in studies by Blum et al[21] and Opdam et al[22]. However, the choice of whether to repair or replace is frequently arbitrary and dependent on the expertise, experience, and references of the clinician.

Majority of the dentists tend to repair the defective restoration at least once prior to replacement, as it is the minimal invasive procedure and reduces the pulpal insult. This promotion of minimal invasive dentistry in terms of repair is an important factor in a study by Nassar et al[23]. Kanzow et al[16] and Brunton et al[20] also stated that these are the common reasons for teaching the repair restoration in their respective dental schools. However, previous studies[7,11,19] reported that repair is done to extend the longevity of restoration. Lack of repair success might be one of the reasons for avoidance of multiple repair attempts.

Dentist who does not practice the repair of defective restoration stated that their previous negative experience and lack of appropriate knowledge as the reasons. Similar findings were observed among US dentists.[11] Knowledge and skill were the factors that affected the willingness of German dentists to repair.[19] Additional social factors, the context of the environment, and resources also appeared to have an impact on the decision to repair. However, it is possible to hypothesise that case selection and the availability of general guidelines have an impact on repair success.

Composite was the most common material used by the dentist for repair process and majority of them perform surface treatment before repairing the defective or dislodged restoration, as it increases the bond strength of composites. Similarly, Kanzow et al[19], Casagrande et al[12] and da-Costa et al[17] reported frequent use of composites and various techniques and materials for preconditioning of repair surface. Also, few recommend the use of an

adhesive bonding system on the treated substrate surface to enhance the interfacial bond strength.[24,25] Further, Nassar et al[23] reported that most of the teaching schools use flowable composites for repair, which need to be avoided due to its low filler content and increased polymerization shrinkage, thereby increases the risk of microleakage.

Most of the dentist showed a negative attitude towards defective restoration by replacing it rather than repair, in conditions when the restoration is placed by another practitioner or clinician. Gordon et al[8] also observed that ‘‘dentist who placed the original restoration’’ influenced the repair/replacement decision. Only a very small number of respondents disagreed with Maria et al[18] observation that it was simpler to decide to make a repair if the original restoration had been done by the same dentist. In fact, prior research[8,26] has demonstrated that dentists are more inclined to replace a restoration that was put in by a different dentist. However, it is reasonable to anticipate that dentists will choose to fix a restoration in order to increase its lifespan when dealing with damaged restorations that were implanted by them.

In the current study, majority of the dentists perceive that replacement lasts longer than repair. Similar, but comparably lower percentage of dentists (32.9%) reported the same in a study among US dentists.[11] However, clinical evidence show that the minimal invasive technique has higher longevity than replacement after 2, 4 and 10 years.[27-29] Further, systematic review and metanalysis by Garbim et al[30] observed similar longevity of both techniques. However, Nasar et al[23] and previous studies in other countries[20, 31-33], the predicted longevity of repair varied widely.

With the results of the present study findings, it is concluded that the dentist encounters a large number of defective restorations, they would prefer to go for replacement than repair, especially due to lack of repair success and lack of sufficient knowledge. Further, the most common condition that led the dentist to opt for repair were mainly of functional failures. Despite being minimally invasive, inexpensive, and well-liked by patients, there is still no agreement on best practises for restoration repair. In order to produce standards for the repair of composites, this inquiry and other similar investigations conducted elsewhere highlighted the need for carefully monitored clinical trials on repairs. Such standards would be helpful in educating clinical restorative/operative dentists, which would improve current instruction and encourage the inclusion of repair instruction in more schools.

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Legend Figure

Figure 1: Options to treat defective restorations.

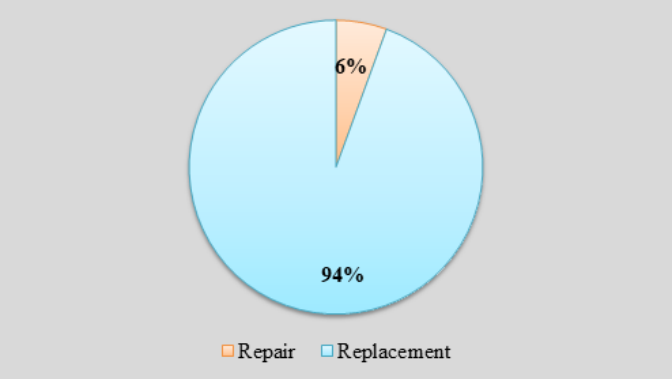

Figure 2: Common reasons for failure of restorations

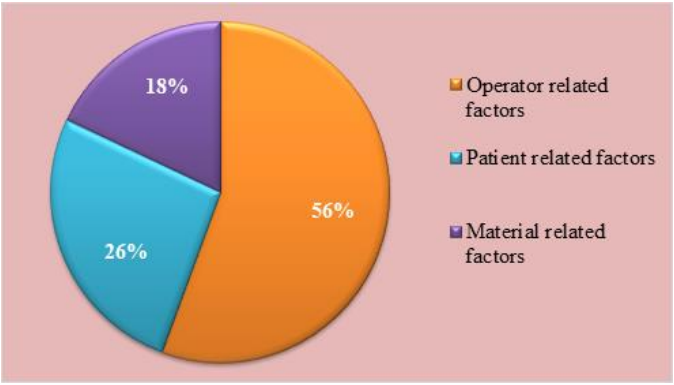

Table 1: Restorative related factors for repair of restoration

Restorative related factors	N	%
Non-carious marginal defect	11	61.1
Partial loss of restoration	12	66.7
Crown margin repair due to caries	5	27.8
Secondary caries	4	22.2

Crown margin repair due to open margin	5	27.8
Marginal discoloration	5	27.8
Tooth fracture adjacent to intact restoration	7	38.9
Superficial non-margin surface color restoration	8	44.4
Wear of restoration	8	44.4
Bulk fracture of restoration	0	0

Table 2: Non- Restorative related factors for repair of restoration

Non-Restorative related factors	n	%
Limited patient finances	14	77.8
Compromised health status	8	44.4
High risk of developing caries	7	38.9
Behaviour management	8	44.4
Poor oral hygiene	8	44.4
Irregular patient recall compliance	12	66.7

Figure 3: Conditions to consider for repair of defective restoration.

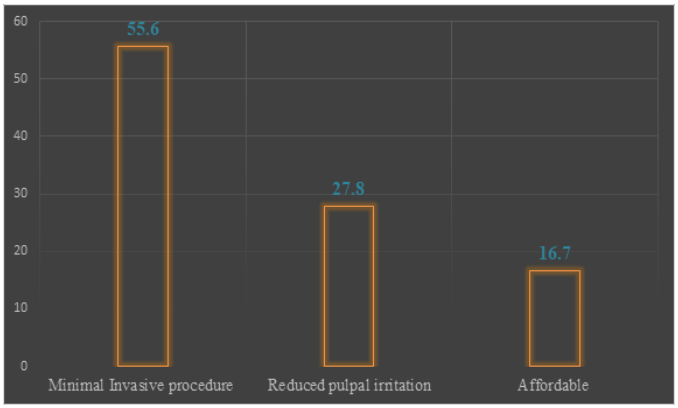

Figure 4: Reasons for ignoring repair of defective restoration