Teaching and Practice of Repair of Dental Amalgam Restorations in Dental Institutions of Karachi

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Abstract: Replacement of defective amalgam restorations was the only option endorsed by tradition; however, repairing the restoration would offer a more conservative approach in certain situations. To determine the proportion of faculty advocating the teaching of repair of defective amalgam restorations to students within the dental institutions of Karachi. To explore the factors that may modify the decision making process of defective restoration’s repair. An 11 item questionnaire was provided to the faculty of Restorative Dentistry of dental institutions in Karachi. Nine out of ten dental institutions participated in the survey. The responses were calculated as percentages. Up to 65% of the respondents claimed that the repair of amalgam is advisable and achievable, while 47.5% of the respondents further stated that they have achieved success with such interventions. Similarly, 60% of the respondents further agreed that they teach the repair of amalgam to their dental students. The reasons for performing repair were to preserve the remaining tooth structure (by 60%) and to reduce the damage to the pulp (20%). Our overall response rate was 90% (as 9 of 10 dental institutions participated). The response rate and findings of this survey is similar to the findings of our previously conducted survey on resin composite and resin modified glass ionomer. In this survey, almost half of the respondents agreed that they have achieved success with amalgam repair. A huge proportion of dental faculties also teach amalgam repair. The reasons for repair are preservation of tooth structure and reduction of damaging effects on the pulp. Patient’s oral hygiene and occlusion appeared to be the most critical factors that are considered during case selection. The present survey provides an insight to the teachings and practices of amalgam repair in the dental institutions of Karachi. Furthermore, it also highlights the factors that are considered to play a crucial role while choosing amalgam repair as the form of intervention.

Keywords: amalgam, repair, replacement, defects.

Introduction

By tradition, replacement of defective amalgam restorations was the only option endorsed; however, repairing the restoration would offer a more conservative approach in certain situations. Moreover replacing defective amalgam restoration would lead to additional cutting of tooth structure. (1)

Advocating the repair of a defective yet functional amalgam restoration can serve as a viable option. There are many examples where correction of an existing restoration can be performed. These include at least 11 distinct conditions when amalgam restorations are evaluated even when performing replacement. These include amalgam blues, proximal overhangs, Marginal discrepancies, ditching, voids, and fracture lines, lines between abutting restorations to amalgam, improper anatomic contour, localized recurrent caries/defects and improper occlusal contacts. (2)

The options recommended for correction of the above mentioned defects comprise of sealing with the help of a fissure sealant, repairing only the defective portion of amalgam and placing a new one with or within the existing restoration,
refinishing to re-contour the restoration and finally, complete replacement where there is a high risk that may result in further breakdown. (3) In a 12-year study that compared composite and amalgam survival, it was found that large composite restorations have a higher survival rate than amalgam restorations in some patient groups, although amalgam has better survival for three-surface restorations in high-risk patients. (4) Therefore, there is a high probability that amalgam restorations would perform poorly in their course of service and hence, would require more corrective procedures than any other restorative material.

The rationale behind this survey is similar to the rationale of our previous surveys. (5) The objective of the current survey was to determine if amalgam repairs are being performed by the dentists and being taught in the curriculum in the dental institutions of Karachi.

MATERIALS AND METHODS

In 2010, a third survey in series was conducted. This survey was based on the teaching and practice of dental amalgam repair. The structure of this survey was similar to the previous surveys conducted on the repair of resin composite and resin modified glass ionomer restorations. Once again, questionnaires comprising of several items were disseminated amongst the faculty of operative/restorative dentistry department in the dental institutions of Karachi. We provided one to two weeks to the survey participants to complete the questionnaire. Once the questionnaires were collected, data analysis was performed using SPSS version 19.0.

We sought information regarding the repair of dental amalgam restorations from the faculty members. The questions included the respondent’s experience with defective amalgam restorations, the philosophical belief behind repairing restorations, teaching of such repair interventions to the dental students and the scientific factors which influence their decision making when encountered with such a dilemma of replacement vs. repair of a defective yet functional restoration. Moreover, we asked our respondents the valid reasons for repair and the factors which may alter the treatment planning e.g. patient related factors. The selections by the respondents were computed as percentages. Frequency distribution of the entire variables was determined and the mean and standard deviation of the quantitative variables such as age, years in teaching and practice was determined. Also, descriptive analysis was carried out on each variable to study the responses.

RESULTS

We evaluated our data based on a total 40 respondents who participated in this survey. The respondents belonged to the different dental institutions within Karachi. Out of a total 10 dental institutions (available in 2010), nine dental institutions participated in this survey. Up to 65% of the respondents believed that the repair of amalgam restorations is advisable and achievable. Up to 47.5% of the respondents further stated that they have performed such reparative procedures on dental amalgam restorations and have achieved success. Similarly, 60% of the respondents further agreed that they teach the repair of dental amalgam restorations to their dental students. The existing mode of teaching to the students remained at clinical level (40%), and theoretical level (as chosen by 20% of the respondents). Furthermore, the valid reasons for performing restoration repair were to preserve the remaining tooth structure (selected by 60% of the respondents) and to reduce the damaging effects on the dental pulp (20%). These reasons are in line with the findings of our previous surveys on the repair of resin composite and resin modified glass ionomer restorations (5).

The scientific limiting factors affecting the decision making process were the absence of established technique (47.5%) and the lack of predictability (35%). Further to this, up to 55% of the respondents showed disagreement on the reproducibility of a leak free joint between such old and new abutting (repaired) restorations. Additionally, occlusal relationship and patients...
existing oral hygiene were considered to be the most critical factors in the decision making process while choosing between restoration replacement vs. repair. Up to 50% of the respondents still believed that the service life of a repaired amalgam restoration (in the absence of confounding factors) is definitive i.e. it would last for more than a year’s time. Up to 27.5% respondents agreed that the longevity of repaired amalgam is transitional i.e. it would last more than 6 months but less than a less, while 17.5% take it as a temporary measure (lasting 4-6 weeks only).

Our overall response rate was 90% based on the fact that nine out of ten dental institutions in Karachi participated in this survey. The response rate and findings of this survey is similar to the findings of our previously conducted survey on resin composite.

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![Academic level of respondents](image)

FIG.1: Academic level (qualifications) of the respondents (n=40).

![Experience with such interventions](image)

FIG.2: Shows the experience of respondents with amalgam repair. It also shows the percentage of those who have never performed amalgam repair (n=40).

Downloaded from www.jrdindia.org
Reason for performing Amalgam repair

- Preserving tooth structure: 24 (60%)
- Increasing longevity of restoration: 4 (10%)
- Reducing damaging of occlusal relationship: 3 (7.5%)
- Reducing patient’s complaints: 8 (20%)
- Do not know: 1 (2.5%)

Reasons of not using Amalgam repair

- Lack of predictability: 14 (35%)
- Absence of established technique: 19 (47.5%)
- Lack of scientific evidence: 7 (17.5%)

Factors that may affect the case selection

- Patient’s existing occlusal relationship: 23 (57.5%)
- Occlusal relationship: 11 (27.5%)
- Parafonctional habits: 6 (15%)

Estimated service span of repaired amalgam

- Temporary measure: 2 (5%)
- Transitional measure: 7 (17.5%)
- Definitive measure: 11 (27.5%)
- Not applicable: 20 (50%)

DISCUSSION

Conservative dentistry justifies the repair of defective amalgam restorations. (6-7) Although, there are studies which report low bond strength.
between the old and new amalgam restorations. (8-13) This low bond strength can be overcome by addition of retentive features such as dovetails, pins and grooves into the existing amalgam restoration. (14-18) One study also reported the importance of surface roughening as an essential step to increase bonding between the old and new amalgam restoration. The use of a diamond bur has shown to produce an adequate roughened surface to enhance this bonding between the new and set amalgam. (19)

As stated earlier, the objective of this survey was to determine the number of faculty members teaching the repair of amalgam restorations to their students. Moreover, we were interested to know the factors that are considered while undertaking such interventions. Based on the findings of this survey, up to 65% of the respondents were proponent of amalgam restoration repair. Almost 48% of the respondents further claimed that they have performed repair of amalgam restorations in some situations and have achieved success. While 35% of the respondents stated that they do not endorse amalgam repair. In addition to this, 17.5% of the respondents stated that they have carried out amalgam repair but were unable to achieve success. In our opinion, the failure may be based on case selection and technique employed by the clinicians to perform repair of restorations. We asked our respondents whether they teach such conservation procedures to their students. Surprisingly, up to 60% of the respondents agreed that they teach such forms of intervention to their students. Around 35% of the respondents stated that they do not teach such procedures to their students while, the remaining 5% were not aware of such restoration repair interventions. Even though many respondents have shown reservation undertaking the practice and teaching of amalgam repair, they still showed interest in teaching such interventions in the next five years (agreed upon by 60% of the respondents).

As identified by our respondents, the valid reasons for performing repair of amalgam restorations were preservation of existing tooth structure (60%) and reducing damaging effects on the dental pulp. (20%) These reasons are consistent to the findings of our previous surveys that were on the repair of resin composite and resin modified glass ionomer restorations. In our opinion, the above mentioned reasons are legitimate as preservation of tooth structure will maintain the integrity of the tooth, reduce the chances of restoring the tooth with a crown, minimize the chances of a potential pulp exposure and limit the amount of heat generated during the operative procedure. To support these findings, there are studies that have shown conservation of the existing tooth structure when restoration repair has been performed instead of restoration replacement. (12-14) The other factors identified by the respondents for repairing amalgam restorations were to increase the longevity of restoration (10%), and reduce the patient’s expenses (7.5%). Around 2.5% of the respondents were unable to identify their most valid reason for amalgam restoration repair.

The present mode of teaching to the students was at clinical level primarily (as agreed by 40% of the respondents). While, 17.5% of the respondents were teaching amalgam repair at the preclinical level followed by 22.5% who were teaching it at the theoretical level. Up to 22.5% of the respondents stated that they do not endorse teaching of amalgam repair in any form at present. This may be due to the fact that the respondents feel that there is not enough evidence available to support the concept of amalgam restoration repair. In addition, we further asked our respondents the reason for not including teaching of repair of amalgam restorations in the formal academic teaching. Up to 47.5% of the respondents agreed that the absence of established technique is the main scientific limiting factor for not including repair of amalgam restorations in the dental curricula. Lack of predictability (35%) of such procedures was the second most common reason chosen by the respondents followed by the lack of scientific evidence (17.5%). In the same context, more than half (55%) of the respondents showed assertion that the interface...
between the new and old amalgam does not reproduce a leak-free joint and is susceptible to microleakage and hence, failure. However, up to 25% of the respondents assumed that the interface is leak-free if proper technique is employed. The remaining 20% of the respondents chose not to comment on the restoration interface. We further asked our respondents to identify the important factors that are considered while choosing repair as the form of intervention. The respondents specified that patient’s occlusal relationship (57%) and the existing oral hygiene (27.5%) were the two most critical factors considered in the case selection. On enquiring the anticipated service of the repaired amalgam restoration, we found that half of the respondents (50%) took repaired amalgam as a definitive measure that would last more than a year. Conversely, 27.5% of the respondents took it as a transitional measure that would last more than six months but less than a year. While up to 17.5% of the respondents agreed that the repaired amalgam restoration is a temporary measure being able to last four to six weeks only. The percentages show the responses chosen by respondents as their legitimate reason for performing repairs. These reasons are comparable to the observations reported in our previous surveys as well as in other internationally conducted surveys on resin composite repair in 2000 and 2001. (20-21) Repairing amalgam for small defects appears to be a reasonable alternative to complete replacement. This is because evidence has shown that the majority of defects are localized in nature, such as secondary caries. (22) As high-lightened in our previous surveys, we need to endorse tooth conservation techniques in order to incorporate them into the dental curricula of Karachi. Moreover as observed in this survey, the respondents feel that repair type interventions need to be backed by more scientific evidence before incorporating them into routine practice and teaching. Moreover, there are no well established guidelines and techniques available to legitimize restoration repair at present.

In our city Karachi, the response rate achieved is 90%, as 9 out of 10 dental schools have participated. This response rate is equivalent to the response rate achieved in our previously conducted surveys on resin composite (5) and resin modified glass ionomer restoration repair. Moreover, the response rate in all our surveys is well comparable to the internationally conducted similar surveys where fifteen of British (100%) and Irish dental schools, 24 of 32 German dental schools (75%) and 9 of 11 Scandinavian dental schools (82%) responded to their European survey, for an overall response rate of 83%. Likewise, 52 (81%) of 64 North American dental schools responded to their survey, therefore their response rate achieved was 81%. (20-21) In this survey, we were unable to find a conclusive opinion regarding the practice and teaching of amalgam repair. As mentioned earlier, there is lack of evidence and guidelines which serve to be the main limiting factors behind not incorporating such interventions in the formal academic course of undergraduate dentistry. However, the clinicians who undertake such repair procedures can document their cases and publish case reports at best. In time, this would help answering the dilemma that is to “replace or restore” a defective yet functional restoration.

CONCLUSIONS

• Up to 65% of the respondents asserted that the repair of amalgam is achievable in certain situations.
• Almost half of the respondents (47.5%) informed that they have achieved success with amalgam repair.
• A large proportion of dental faculty member (up to 60%) teach the repair of defective amalgam restorations.
• Patient’s existing oral hygiene and occlusal relationship appeared to be the most critical factors that are considered during case selection for performing amalgam repair.
• The valid reasons for repair are preservation of tooth structure (as identified by 60% of the respondents) and reduction of
damaging effects on the dental pulp (by 20% of the respondents).

REFERENCES


