AWARENESS OF THE IMPORTANCE OF CONTACT AND CONTOUR IN DENTISTRY- A SURVEY

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Abstract:

Aim: To conduct a survey on the awareness of the importance of contact and contour amongst dentists.

Materials and Method: The survey was conducted amongst 100 dental practitioners in Chennai through a questionnaire wherein the dentists were asked questions pertaining to class 2 amalgam and composite restorations.

Result: A total of 100 survey samples were filled of which 29 were undergraduates and 71 were postgraduate dental practitioners. All the 100 survey samples were filled and evaluated in this study. This reveals that the topic is of considerable interest to the practitioners. 100% of undergraduates and 91% of postgraduates practice amalgam class 2 restorations, out of which 76% of undergraduates and 66% of postgraduates have encountered failed restorations. The longevity of the amalgam restorations was found to be 5-10 years on an average and composite restorations were said to be 1-3 years.

Conclusion: Amongst the dentists in Chennai, it was concluded that though almost all the dentists practice amalgam class 2 restorations, only the postgraduates have knowledge about composite class 2 restorations. The preferred matrix band was Tofflemire for amalgam restorations and Mylar strip for composite restorations. Almost all of them use wedges and polish their restorations. Failure of restorations is common and the commonest failure is fracture for which the preferential re-treatment is re-filling using amalgam. Survival rate of amalgam was mostly 5-10 years and composite restorations was 1-3 years. Conventional composites were being used more when compared to the others. In conclusion, dentists should have a wide knowledge about the various methods of restoration, materials available and the latest advancements in dentistry to perform successful procedures that benefit both the dentist and the patient.
Introduction:

The current dental practice exhibits a vast difference owing to the change in scenario between private practice and practice in an institution. It also differs with the method taught to students of different educational institutions and also with each individual. In endodontic restorative procedures, there has been a lot of failures recorded. With the increasing demand for dentists in the twenty first century and with the evolution of new materials, it is difficult to pinpoint one ideal method of practice. Faulty dental restorations and prostheses are common causes of gingival inflammation and periodontal destruction. This survey aims at studying the knowledge of the dentists, their method of practice, the failures that they encounter during restorations and the material that they prefer to use for their treatment.

Materials and Methods:

The survey was conducted amongst practitioners of Chennai. A 100 survey samples were filled of which 29 were undergraduates and 71 were postgraduate dental practitioners. The questionnaire asked for the age of the dentist, their educational qualification and for their specialty. The dentists were asked questions pertaining to class 2 amalgam and composite restorations. The questionnaire involving the various aspects of class 2 restorations comprising of 15 questions with multiple choice answers were framed and distributed to 100 dental practitioners [table 1]

Table 1: Questionnaire sample

1) Where will you find contact point?
   a) permanent teeth
   b) primary teeth
   c) replaced/restored teeth

2) Do you practice restorations for class II cavity?
   a) yes
   b) no

3) Which type of matrix band is used for class II restorations?
   a) Mylar strip
   b) Tofflemire
   c) no matrix
d) Others....(specify)

4) Do you place a wedge while doing class II restorations?
   a) yes
   b) no

5) How much time do you require to perform a class II restoration?
   a) <10 mins
   b) 10-20 mins
   c) >20 mins

6) Do you polish your amalgam restorations?
   a) yes
   b) no

7) Have you encountered any failures during restoration of class II?
   a) yes.....(proceed to qs 8)
   b) no.....(proceed to qs 10)

8) If yes, what is the type of failure?
   a) pain
   b) fractured restoration
   c) frequent food accumulation
   d) discolouration
   e) all the above

9) In case of fractured restoration what will be the line of treatment?
   a) RCT
   b) re-filling
   c) vital crown
   d) Others....(specify)

10) What is the survival rate of class II amalgam?
a) 1-3 years
b) 3-5 years
c) 5-10 years
d) >10 years

11) Do you practice class II composite?
   a) yes.... Continue
   b) no.....thank you for answering

12) Do you use the same matrix band for class II composite as in that for amalgam?
   a) yes
   b) no... Specify

13) Which type of composite do you use for class II composite restoration?
   a) micro filled
   b) Conventional
   c) Nanofilled
   d) Flowable

14) How do you polish class II composite restorations?
   a) no polish
   b) rubber cup + polishing paste
   C) others.... Specify

15) What is the survival rate of class II composite?
   a) 1-3 years
   b) 3-5 years
   c) 5-10 years
   d) >10 years

Results: All the 100 survey samples were filled and evaluated in this study. This reveals that the topic is of considerable interest to the practitioners.
According to the results obtained, 62.1% of undergraduates and 68% of postgraduates have answered that contact point is seen in permanent teeth; 10.3% of undergraduates and 4.2% of postgraduates have answered restored/replaced teeth; 27.7% of undergraduates and 27.8% of postgraduates have answered primary teeth.

Out of the 29 undergraduates, 100% of them have answered that they practice class 2 restorations. Out of the 71 postgraduates, 90.1% practice class 2 restorations. Out of these, 100% of undergraduates place wedges whereas only 96% of postgraduates place wedges.

Regarding the type of matrix band used, majority of the practitioners have opted for tofflemire matrix band. The postgraduates have answered that they use automatrix and pre-contoured bands for class 2 restorations as well. The statistics are seen in Table 2.

Table 2: Type of matrix band used.

<table>
<thead>
<tr>
<th>QUALIFICATION</th>
<th>MYLAR STRIP</th>
<th>TOFFLEMIRE</th>
<th>NO MATRIX</th>
<th>OTHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDS</td>
<td>3.4%</td>
<td>96.6%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MDS</td>
<td>40.5%</td>
<td>46.5%</td>
<td>4.2%</td>
<td>8.8%</td>
</tr>
</tbody>
</table>

Regarding the time taken to perform a class 2 restoration, 3.4% of undergraduates and 8.4% of postgraduates require less than 10 minutes; 83% of undergraduates and 69% of postgraduates require 10-20 minutes; 13.6% of undergraduates and 22.6% of postgraduates require more than 20 minutes.

86% of undergraduates and 81.7% of postgraduates polish amalgam restorations whereas 14% of undergraduates and 18.3% of postgraduates do not polish amalgam restorations.

Regarding failures during restorations, 76% of the undergraduates have said that they do encounter failures out of which 58% have fractured restorations, 10.3% have encountered pain, 3.4% have encountered discoloration and 20.3% have frequent food accumulation and 8% have encountered all the above failures. In case of fractured restorations, 37.9% do RCT, 51.7% do re-filling and 10.4% opt for vital crown. 66.2% of postgraduates undergo failures in restorations amongst which 32.4% have pain, 40.1% encounter fractured restorations, 4.1% have food accumulation 8.4% have discoloration and 15% encounter all of them. In case of fractured restorations, 39.5% do RCT, 42.2% do re-filling, 18.3% place a vital crown.
According to most of the dental practitioners, the survival rate of amalgam is around 5-10 years. The statistics are seen in Table 3.

**Table 3: survival rate of amalgam.**

<table>
<thead>
<tr>
<th>QUALIFICATION</th>
<th>1-3 YEARS</th>
<th>3-5 YEARS</th>
<th>5-10 YEARS</th>
<th>&gt;10 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDS</td>
<td>0</td>
<td>31%</td>
<td>58.6%</td>
<td>10.4%</td>
</tr>
<tr>
<td>MDS</td>
<td>5.6%</td>
<td>18.3%</td>
<td>57.7%</td>
<td>18.4%</td>
</tr>
</tbody>
</table>

None of the undergraduate dentists practice class 2 composite whereas 45% of postgraduates practice it. Out of these practitioners, 42% of them use the same matrix band for all types of class 2 restorations whereas 51% of them use mylar strip for composite class 2 restorations. The remaining 7% haven’t mentioned the type of matrix band that they use.

Each practitioner uses a different type of composite for class 2 restoration. They are seen in Table 4.

**Table 4: type of composite used**

Regarding polishing of composite restorations, 51% have said that they polish using rubber cup and polishing paste, 21% said that they do not polish and remaining 28% said that they use other agents like astrol, polishing kit and bonding agent.

According to most of the dental practitioners, the survival rate of composite is around 1-3 years. The statistics are seen in Table 5.

**Table 5: survival rate of composite.**

<table>
<thead>
<tr>
<th>QUALIFICATION</th>
<th>1-3 YEARS</th>
<th>3-5 YEARS</th>
<th>5-10 YEARS</th>
<th>&gt;10 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDS</td>
<td>49.4%</td>
<td>38%</td>
<td>8.4%</td>
<td>4.2%</td>
</tr>
</tbody>
</table>
Discussion:

In dental colleges, the students are subjected to various treatment methods and modalities available or recommended for a particular case but in clinical practice, the perception of practitioners varies from case to case. The choice of treatment varies and the cause may be cost, time, method or material etc. This survey was carried out to see the practitioners point of view regarding class 2 restorations. The most important aspect of any class 2 restoration is obtaining the contact and contour of the tooth irrespective of the material and method. The importance of a proximal contact is both supportive and protective in nature. The contact between two teeth supports the interproximal papillae. Contact points in natural teeth wear with time due to the forces of mastication and must be replaced during restoration of the teeth. Inadequate contacts may result in plaque accumulation and incipient dental caries (IC), aggravating food impactions that damage the interproximal tissues, drifting of adjacent teeth, and root proximity issues.

In this survey, an average of 95% of practitioners practice class 2 restorations. A majority of the undergraduate dentists and about half of the postgraduates use Tofflemire matrix system. While effective in sealing the preparation, Tofflemire matrices provide little help in creating proper interproximal contact, both in the shape and position of the contact or the actual strength of contact, all of which influence the potential for food impaction.

Wedge placement is an important step in class 2 restorations which is often missed out. An average of 98% of dentists in this survey have answered that they use wedges during class 2 restorations. The re-establishment of the correct interproximal contact and convex contour requires a properly contoured matrix which is stabilized and adapted gingivally with a properly inserted and contoured wedge.

Polishing of amalgam restorations are done by 84% of the dentists who have answered the survey. Though polishing of amalgam is necessary, Amalgam produced the highest temperature rises at the pulp, while composite and glass ionomer were no different than the untreated tooth. Aluminum oxide discs produced the largest temperature rise, wet pumice with a brush the least. To ensure a positive outcome for Class II composite restorations, dentists must overcome such factors as open interproximal contacts, poor anatomical contour, inadequate marginal seal, postoperative sensitivity, marginal staining, recurrent caries, and fracture. The type of failure encountered the most by the dentists in this survey is fracture of restorations. According to Feilzer et al, the higher the C-factor, the higher the stress generated (eg: Classes I and II). With greater stress comes the greater risk of fracture of the restoration.
Re-treatment and/or replacement of failed restorations have been shown to constitute as much as fifty percent of the volume of restorative work performed.  

As the outcomes for teeth with an incomplete fracture can be consequential, resulting in the need for major restoration, RCT, or extraction, the development of a crack poses a significant problem to patients and dentists. In making treatment decisions, dentists have to take into consideration all the treatment alternatives and materials available, besides several other patient- and dentist-related factors. The factors that influence decision making in dentistry have been classified as dentist-, practice- and patient-related. Dentist factors include age, experience, skills, knowledge, and treatment preferences. Differences in dentists’ educational background and differing levels of work experience are also influential in the process. Practice-related factors include type, location, and size of practice, while patient-related factors include oral hygiene, diet, fluoride exposure, insurance, preferences, medications and diseases. As an example, cost of treatment was found to be more dominant than oral health status and patient preference in influencing treatment choice.

The longevity of dental restorations is dependent on many factors, including those related to materials, the dentist, and the patient. The main reasons for restoration failure are secondary caries, fracture of the bulk of the restoration or of the tooth, and marginal deficiencies and wear. Several clinical studies have demonstrated that high-copper amalgams can provide satisfactory performance for more than 12 years. Robbins and Summitt, who found a 50% survival rate of 11.5 years. High-copper amalgams have higher survival rates than conventional amalgams. In accordance to these statistics, most of the dental practitioners in this survey have answered an average of 5-10 years. Matrix systems vary between amalgam and resin composite restorations. Class 2 restorations that need a matrix band require rebuilding of the marginal ridge, proximal contact, and a large portion of the interproximal surface. Proper reconstruction of this surface is based largely on the shape of the matrix band and the accuracy of its placement. Class 2 composite restorations were found to be practiced only by postgraduates in this survey. Amongst them, more than half have answered that they prefer mylar strip. According to Chuang et al, of all matrix systems available, none is faster or predictable than the use of sectional matrices. According to Loomans et al, the use of a contoured matrix results in a stronger marginal ridge.

Type of composite used for the composite restoration varies widely amongst the dentists with the highest being conventional composite and the lowest being nano filled. Karthik et al have stated that shrinkage of flowable composites can compromise the success of the restoration and contribute to a poor marginal seal, microleakage, microfracture, and
Polishing of composite restorations is an important step in the treatment. The creation of ideal surface polish of a composite restoration can improve the aesthetics and the longevity of restoration by reducing stain potential, biofilm accumulation, gingival inflammation, and minimizing the wear. Survival rates of composite restoration was said to be 1-3 years on an average. In a study made by C.J.Collins et al, at 8 years, composite restorations in posterior teeth had failed at a rate two to three times that of amalgam restorations. The most common types of failure were bulk fracture and secondary caries at the margin. According to Mjor and Moorhead, the median age of the replaced amalgam restoration was 15 years and that of composite restoration was 8 years.

Conclusion:

Amongst the dentists in Chennai, it was concluded that though almost all the dentists practice amalgam class 2 restorations, only the postgraduates have knowledge about composite class 2 restorations. The preferred matrix band was tofflemire for amalgam restorations and mylar strip for composite restorations. Almost all of them use wedges and polish their restorations. Failure of restorations is common and the commonest failure is fracture for which the preferential re-treatment is re-filling using amalgam. Survival rate of amalgam was mostly 5-10 years and composite restorations was 1-3 years. Conventional composites were being used more when compared to the others. In conclusion, dentists should have a wide knowledge about the various methods of restoration, materials available and the latest advancements in dentistry to perform successful procedures that benefit both the dentist and the patient.

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