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Assessment of Reasons and Rate of Failure in Patients Reporting with Dislodged Anterior Restoration-A Retrospective Data Analysis in University Setup

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ABSTRACT

Introduction: It was discovered that restorations placed by more experienced doctors had a longer lifespan . Aside from all existing evidence on composite restoration survival, the majority of investigations have been conducted in a controlled environment. The aim of the present study is to assess reasons and rate of failure in patients reporting with dislodged anterior restoration

Materials and methods: The present study was conducted in the Department of Conservative Dentistry & Endodontics. We assessed the patient's records and analysed data of 2000 patients. Patients who have undergone anterior restoration were initially screened. Among these the patients with complaints of dislodged restoration were analysed. The data is tabulated using excel and analysed with SPSS.

Results: In the present study, the majority of the patients reported that restoration survival rate was less than 5 years (58%), ($p<0.05$). Patients with moderate and low caries risk had complaints of dislodged restoration which is 34% and 32% respectively. Most common reason for failure of restoration is fracture (50%) followed by secondary caries (33%) and para functional habits (16%).

Conclusion: This study revealed that fracture is the main cause of restoration failure in patients with moderate and low risk of caries along with survival rate of restoration less than 5 years.

Key words: Fracture, Anterior restoration, Dislodgement, Caries, innovative technology, Dental innovation

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INTRODUCTION

In studies with long-term follow-ups, composite resin is regarded as a suitable restorative material for direct restorations in front and posterior teeth, both in permanent and deciduous dentitions, with excellent survival rates and satisfactory clinical performance [1]. Indeed, even with these effective endurance rates, an extensive extent of season of dental specialists in dental practice and of understudies in dental schools is given to supplanting reclamations [2]. To fix those rebuilding efforts is every now and again dependent on alleviating auxiliary caries injuries, both trying to recognize the caries itself and to reestablish negligible imperfections that might support injury advancement [3].

There has been a lot of research done on the lifespan of composite restorations in the back teeth [3,4]. Caries development and fracture in posterior teeth are the most common causes of restoration failure, with secondary caries being the most common cause of composite restoration failures in high-caries-risk patients [3–6]. This has far-reaching consequences for the lifespan of impacted teeth as well as health-care costs. Composite resin is widely used in anterior restorations as well; nevertheless, data on the long-term durability of composite restorations in anterior teeth is still scarce [7]. The survival rates of anterior teeth have been found to be even higher than in posterior teeth, yet

the main reason for composite restoration failures is due to aesthetic reasons [8].

It was discovered that restorations placed by more experienced doctors had a longer lifespan. Aside from all existing evidence on composite restoration survival, the majority of investigations have been conducted in a controlled environment [9]. The majority of the evidence on the long-term durability of composite restorations in the literature comes from trials in which skilled and trained dentists implanted the restorations in low-risk patients with a high socioeconomic status [9,10]. As a result, the annual failure rate that was examined could not be extrapolated to a realistic reality. The scenario is created in dental clinics with experienced dentists as operators, and in low-risk patients in the majority of retrospective investigations [9–11]. Furthermore, restorations are frequently put by skilled and extensively trained operators in controlled clinical studies, following precise inclusion criteria and under rigorous and calibrated settings [12]. Annual failure rates of posterior composite resin restorations were calculated in controlled clinical trials to range between 0 and 9% after 5 years [13]. Furthermore, given the limitations of conducting randomized controlled trials, data on restoration survival obtained from retrospective clinical studies involving a larger group of patients has proven to be successful, as they are less expensive and better suited to studying the long-term survival of a significant amount of restoration [13,14].

Data on the success rate of resin composite restorations implanted by dental school undergraduates is currently scarce. Because students are inexperienced, the durability of composite resin restorations may be harmed in dentistry schools, where students must build their abilities throughout the programme [14]. Although dental students have been observed to be capable of placing resin composite restorations in posterior teeth with an acceptable mean annual failure rate, investigations with novice operators have shown greater yearly failure rates (1.7 percent to 2.8) when compared to experienced dentists (1.0 percent to 1.5 percent) [15].

The teaching of posterior and anterior composite restorations is a well-established feature of undergraduate dental students and therapy training in dental schools around the world. The aim of this retrospective study was to assess reasons for failure, and factors influencing survival of posterior and anterior composite resin restorations placed by dental students in university setup, given the trend toward using direct composite resin for restoration and the lack of evidence on the survival rate of resin composite restorations placed by students.

MATERIALS AND METHODS

Study design and study setting

The present study was conducted in a university setting (Saveetha dental college and hospitals, Chennai, India). Thus the data available is of patients from the same geographic location and have similar ethnicity. The retrospective study was carried out with the help of digital case records of patients who reported to the hospital. Ethical clearance to conduct this study was obtained from the Scientific Review Board of the hospital.

Sampling

Data of 8,000 patients were reviewed and then extracted. All patients with dislodged anterior restoration in the given duration of time period were evaluated. Only relevant data was included to minimize sampling bias. Simple random sampling method was carried out. Cross verification of data for error was done by presence of additional reviewers and by photographic evaluation. Incomplete data collection was excluded from the study.

Data collection

A single calibrated examiner evaluated the digital case records of patients who reported to Saveetha Dental College. For the present study, inclusion criteria were data of patients who underwent root canal treatment. Data obtained were age, gender, reasons for dislodgement, survival rate of restoration and caries risk. All obtained data were tabulated into Microsoft excel documents.

Statistical analysis

The collected data was tabulated and analysed with Statistical Package for Social Sciences for Windows, version 20.0 (SPSS Inc., Vancouver style) and results were obtained. Categorical variables were expressed in frequency and percentage. Chi square test was used to test association between categorical variables. Chi square tests were carried out using age, gender and as independent variables and dependent variables. The statistical analysis was done by pearson chi square test. P value < 0.05 was considered statistically significant.

RESULTS

All the required data was collected and analysed using SPSS software. Equal percentages of 33.3% of the patients belonged to the age group between 18 to 35 years, 36 to 55 years and above 55 years (Figure 1).

Figure 1: Bar graph shows frequency of survival rate of restoration. X-axis denotes the survival rate of restoration, Y-axis denotes the percentage of patients with dislodged restoration. Majority of the patients have given the history of less than 5 years of the (58%) and few patients' restoration was retained more than 5 years (42%).

In this study we observed that the majority of the patients have given the history of less than 5 years of the dislodged restoration (58%) and few patients restoration was retained more than 5 years (42%) (Figure 2).

Association between age and survival rate tend to show that age group between 18 to 35 years showed to have high survival rate of the restoration which is around 15% and less than 5 years accounted for about 18% when compared with age group between 36 to 55 years and above 55 years which is 13% and less than 5 years accounted for about 20% (Figure 3).

Patients with moderate caries risk tend to show frequent dislodged restoration i.e. 34% when compared with patients with high and low risk caries which accounted for 32% (Figure 4).

When correlation between caries risk and survival rate was analysed it showed that patients with moderate and low caries risk tend to show survival rate of restoration of more than 5 years (20% and 18% respectively) and survival rate of less than five years is recorded which is around 14%. Patients with high risk caries tend to show 19% of survival rate for more than 5 years and 13% of survival rate of less than 5 years (Figure 5).

Most common reasons for failure of restoration is mostly due to fracture which is 50% followed by secondary

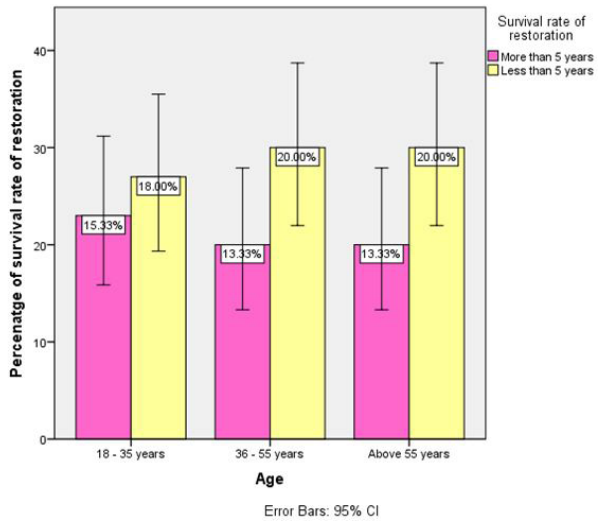

Figure 2: Bar graph shows association between age and percentage of survival rate of restoration. X-axis denotes age, Y-axis denotes the percentage of survival rate of restoration. Age group between 18 to 35 years showed to have high survival rate of the restoration which is around 15% and less than 5 years accounted for about 18% when compared with age group between 36 to 55 years and above 55 years which is 13% and less than 5 years accounted for about 20%.

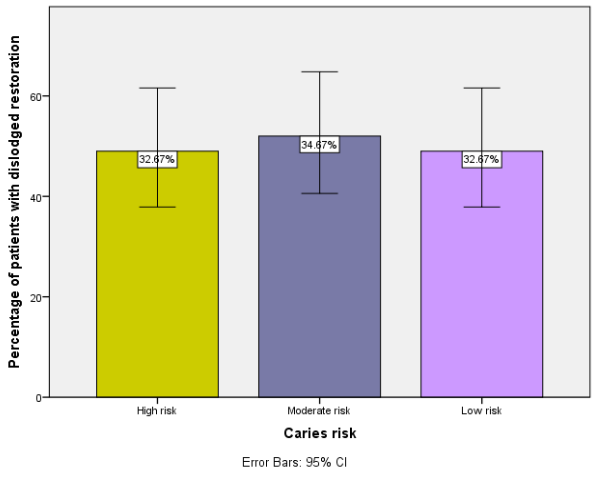

Figure 3: Bar graph shows frequency of caries risk. X-axis denotes the caries risk, Y-axis denotes the percentage of patients with dislodged restoration. Patients with moderate caries risk tend to show frequent dislodged restoration i.e. 34% when compared with patients with high and low risk caries which accounted for 32%.

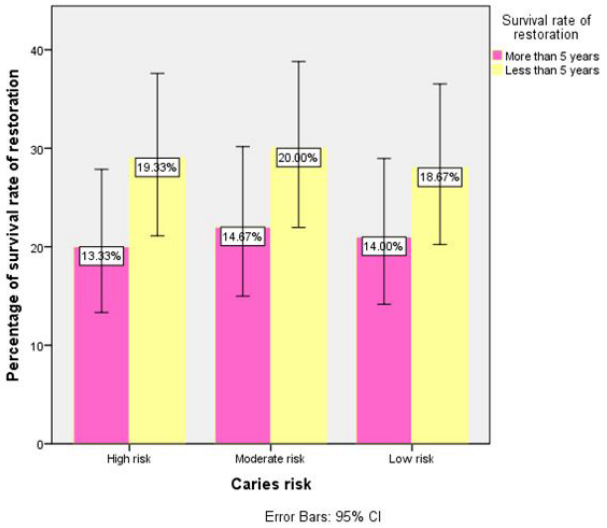

Figure 4: Bar graph shows association between caries risk and percentage of survival rate of restoration. X-axis denotes caries risk; Y-axis denotes the percentage of survival rate of restoration. Patients with moderate and low caries risk tend to show survival rate of restoration of more than 5 years (20% and 18% respectively) and survival rate of less than five years is recorded which is around 14%. Patients with high risk caries tend to show 19% of survival rate for more than 5 years and 13% of survival rate of less than 5 years.

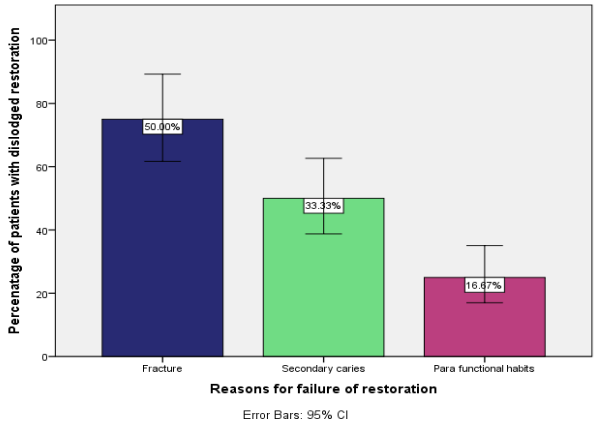

Figure 5: Bar graph shows frequency of reasons for failure of restoration. X-axis denotes the reasons for failure, Y-axis denotes the percentage of patients with dislodged restoration. Most common reasons for failure of restoration is mostly due to fracture which is 50% followed by secondary caries 33% and para functional habits 16%.

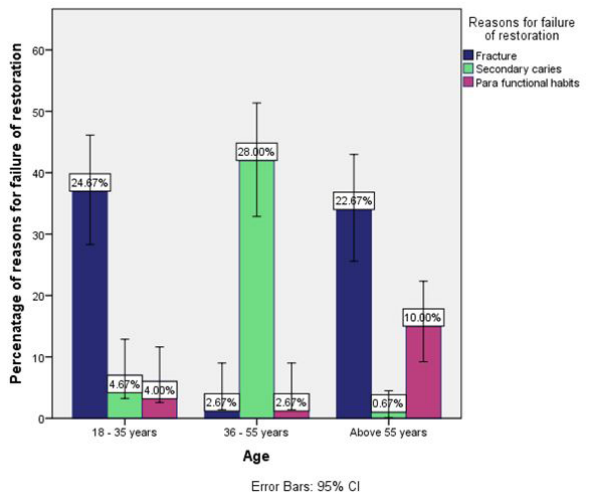

Figure 6 : Bar graph shows association between Age and percentage of reasons for failure of restoration. X-axis denotes age, Y-axis denotes the percentage of reasons for failure of restoration. age group between 18 to 35 years showed that most common failure is fracture which is 24%, secondary caries 4.6% and para functional habits 4%; age group between 36 to 55 years showed that secondary caries is the most common reason for failure of restoration which is 28% and 2.67% accounted for both fracture and para functional habits. Patients with age group above 55 years of age showed fracture is the most common cause for restoration failure ie., 22% compared with secondary caries 0.67% and para functional habits 10%.

caries 33% and para functional habits 16% (Figure 6).

DISCUSSION

Association between age and reasons for failure of restoration showed that age group between 18 to 35 years showed that most common failure is fracture which is 24%, secondary caries 4.6% and para functional habits 4%; age group between 36 to 55 years showed that secondary caries is the most common reason for failure of restoration which is 28% and 2.67% accounted for both fracture and para functional habits. Patients with age group above 55 years of age showed fracture is the most common cause for restoration failure ie., 22% compared with secondary caries 0.67% and para functional habits 10%.

According to recent studies conducted it is shown that average survival rate of restoration is around 10 years on an average, this study also considered that less the surfaces involved in restoration more is the survival rate whereas in present study the survival rate of restoration was recorded around 5 years [16–18]. Most common causes for failure of restoration is fracture, secondary caries, and parafunctional habits like bruxism, nail biting habit are the most commonly reported causes of failure [19–21].The cause of the failure of the restoration was recorded and certain criteria like marginal adaptation, marginal staining, surface staining, post operative sensitivity, superficial brightness, translucency and colour, fracture, anatomic form and preservation of tooth vitality and integrity are also checked in certain studies [22,23]. However, the difference in longevity of restoration is mainly due to the manipulation of the material and the adaptation of material.

Composite restorations are still thought to be more sensitive to secondary caries in high-risk patients [22–25]. It is suggested that the adhesive interface may have an impact on caries formation. Secondary caries, in addition to fracture, has been noted as a prevalent cause of restoration failure. Secondary caries were found in this investigation. This could be explained by the fact that the patients in the sample are all low-income and socioeconomically disadvantaged [22]. The prevalence of dental caries is expected to be greater in disadvantaged communities.

In previous studies, It has been noted that there is a difference in longevity between dental faculty and general practitioners. Another component that has been demonstrated to play a role in restoration survival is operator experience, according to these data [25]. However, in this study, the undergraduate student's experience (based on years of studying/practicing) had no bearing on restoration survivability, implying that the operator's aptitude may be more significant than their experience.

The limitations of the study are that data mostly relies on the case sheets available in the DIAS. Subject is not available for direct examination. In future the study can be performed in larger populations for longer duration, better management protocol with further scope of research. Thus the study serves as evidence and adds to the consensus that can be utilized for further studies at the larger population. Our institution is passionate about high quality evidence based research and has excelled in various fields.

CONCLUSION

Within the limitations of the study it can be concluded that, fracture is the main cause of restoration in patients with moderate and low risk of caries along with survival rate of restoration less than 5 years. The dental needs of the subjects in the present study is more concentrated on aesthetics, however it is known that high aesthetic preferences compromises the restoration which lead to the failures of the restoration.

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CONFLICTS OF INTEREST

None declared.

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