Evaluation of finishing and polishing of class 1 amalgam restorations done by dental students - a retrospective study

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Abstract

Introduction: Finishing amalgam restorations includes the removing marginal irregularities, defining anatomical contours, and also smoothing the surface roUndergraduatehness of the restoration. Polishing is performed to obtain a smooth, shiny glow on the surface of the amalgam. Finishing, polishing of dental restorations are one of important aspects of clinical procedures that enhance both appearance and longevity. Residual surface roUndergraduatehness associated with improper finishing and polishing can mainly cause plaque accumulation, gingival irritation, and also increased surface staining poor or suboptimal aesthetics. The finishing and polishing process requires a stepwise approach they differ interns of intent and degree.This retrospective study was conducted for Evaluation of finishing and polishing of class 1 amalgam restorations done by dental students among patients visiting Saveetha Dental College. **Materials and methods:** Data collection was done in a university setting. One thousand cases were reviewed. Excel tabulation and SPSS version 23 was used for data analysis. Chi-square test was used for the analy- sis of the data. There was no statistical significance between the variables that included types of base and the tooth number. (P-value>0.05). **Results:** In this university-based study, 7.19% of the Amalgam restorations were done by Postgraduate whereas 92.81 % of the amalgam restoration were done by Undergraduate. Out of 1172 class 1 restoration only 127 restoration (11.2%) were finished and polished whereas the other restoration has not finished and polished .25% of postgraduate students did finishing and polishing of the amalgam restorations whereas 16.2% of undergraduates did finishing and polishing of the amalgam restoration. Pearson chi-square test shows p-value as 0.183, (p-value > 0.05) Hence, it is statistically not significant. **Conclusion**: Within the limits of the study, it can be concluded that Undergraduate students have done more finishing and polishing work compared to Postgraduate students.for class 1 amalgam restorations, and one amalgam among patients visiting Saveetha Dental College.

Keywords: Finishing - polishing - class 1 - amalgam restorations -innovative - dental students - a retrospective study

Introduction

During the last few years, several changes have occurred in the use of restorative materials, we can also refer to the increasing importance of esthetic in restorations on posterior teeth(1,2). Esthetics are important in restorative dentistry and the longevity of restorations should be the most important criterion in material selection(3). Failure of dental restorations is one of the major concerns during dental practice and it has been estimated that replacement of failed restorations constitutes about 60 % of overall operative work(3,4). Amalgam is a type of alloy where Mercury is one of the important components present. Mercury is a liquid at room temperature if it becomes solid or plastic for which can be convenient for packing and packing into a prepared tooth cavity plastic state that hardens by the formation of solid reaction products(4). Class, I lesions are associated with caries mainly in the pits and fissures. Dental amalgam may be recommended for most of the restoration of those lesions due to its strength or resistance to wear, or the ability to self-seal the margins of the restoration over time(1).

Amalgam is a restorative material that is especially suitable for classes I and II restorations in teeth that do all heavy chewing(5). The advantages of amalgam restorations include resistance to wear and excellent load-bearing functions. Anyway, it may also present degradation in the intraoral environment mainly due to secondary caries, fracture, or marginal breakdown, and wear(5,6). A solution for those all failures has been the complete replacement of the restorations, which may include minor mistakes in the restorations, and replacement of defective restorations represents a major problem in dental practice faced by many practitioners, reaching up to 60% of operative dentistry interventions(7). Likewise, the median survival time of amalgam varies from 2 to 11 years, but studies place it at mostly over 5 years(8). Previous studies have indicated that repaired and replaced restorations have shown similar survival outcomes regarding marginal defects and secondary caries in patients with a low and medium risk of caries, and most of the restorations were considered clinically acceptable after 5, 7, or 10 years of clinical service(9).

Complete replacement of restorations has always had few disadvantages of being time-consuming, unrequited removal of tissue from a healthy tooth, enlarging preparations and restoration sizes, converting a normal restoration to an indirect restoration, and the possibility of major injuries in pulp tissues(9,10). During the last few years, new strategies have been found such as repair and refinishing of localized defects, it has shown much more improvement in the quality of the defective restorations and increased longevity of restorations with minimal time required(11). Repair is more relevant than to replacement of failing restorations is a part of minimally invasive dentistry, To preserve natural tooth structure, and find about early detection of carious lesions, nonsurgical interventions, and a modified surgical approach which includes delayed restoration and smaller tooth preparations with modified cavity designs, etc.(12). Introduction

The finishing and polishing of Class I amalgam restorations are essential procedures that improve the longevity, aesthetics, and overall quality of restorations (13). Proper finishing helps in refining anatomical contours, reducing surface roughness, and minimizing plaque accumulation, which significantly lowers the risk of secondary caries and periodontal issues

(12). Polishing further contributes to surface smoothness, reducing tarnish and corrosion while enhancing the restoration's resistance to staining and bacterial adhesion (13). The selection of suitable polishing agents, such as polishing paste or pumice, influences the final surface quality, with studies indicating that polishing paste provides superior smoothness and gloss compared to pumice (14)(13). Additionally, the timing of polishing—whether immediate or delayed—has been debated, with research suggesting that delayed polishing may lead to better marginal adaptation and restoration longevity(15) . The expertise of the operator also plays a significant role in achieving optimal finishing and polishing, as experienced clinicians tend to produce more refined results than novice practitioners. Given these factors, this retrospective study aims to evaluate the finishing and polishing of Class I amalgam restorations performed by dental students at Saveetha Dental College.(16)

References

This retrospective study was conducted for Evaluation of finishing and polishing of class 1 amalgam restorations done by dental students among patients visiting Saveetha Dental College

Materials and methods

Study setting:

A university-based study was conducted retrospectively by retrieving patient records. The study was conducted with the approval of the Institutional Ethics Committee.

Study design:

The study was designed to include all dental patients above 18 years having restorations done previously. Population selection was done based on inclusion and exclusion criteria and the population type included outpatients preferably adults.

Sampling technique:

The study was based on consecutive sampling. Bias was avoided by including all available data. The confounding factors were eliminated and the results can be applied in practical situations.

Data collection and tabulation:

The data collected was cross verified with photographs. The data collection was done from the patient records. Data collection was done from July 2019 to March 2021. Case sheets of the patients were reviewed and cross-verified by another examiner to avoid missing data. The sample size of this was 1172 patients, where only 127 patients had class 1 amalgam restorations done with finishing and polishing and statistical analysis using SPSS was done. Incomplete data was managed by excluding from data. The data was exported to SPSS windows version 23 (IBM) for data checking. Data wereThe finishing sorted and represented in frequencies.

Statistical analysis:

Descriptive statistics and chi-square analysis were performed using SPSS by IBM on the tabulated values.

Results

In this university-based study, about 7.19% of the Amalgam restorations iwere done by Postgraduate whereas 92.81 % of the amalgam restoration were done by Undergraduate . Out of 1172 class 1 restoration only 127 (11.2%) restoration has done finishing and polishing. Among Postgraduate students 75 % of the population have not done finishing and polishing and 25% of the population has done finishing and polishing . Among Undergraduate students 83.8% of the population have not done finishing and polishing and 16.2% of the population has done finishing and polishing. Among Postgraduate students 28.6% of pumice used in amalgam restoration class 1 with finishing and polishing . 71.4% of polishing paste used in amalgam restoration class 1 with finishing and polishing.Among Undergraduate students 32.1% of pumice used in amalgam restoration class 1 with finishing and polishing . 67.9% of polishing paste used in amalgam restoration class 1 with finishing and polishing.

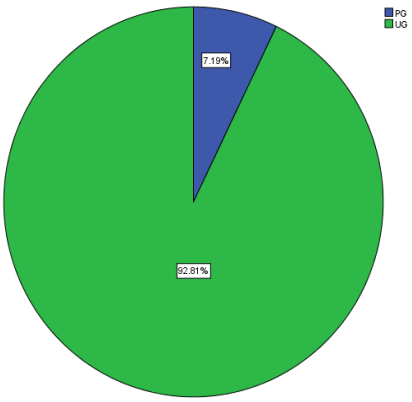

Figure 1: Pie chart showing amalgam restoration class 1 done among Undergraduate students and Postgraduate students. 7.19% of class 1 amalgam restoration were done by Postgraduate students.92.8% of class 1 amalgam restoration were done by Undergraduate students

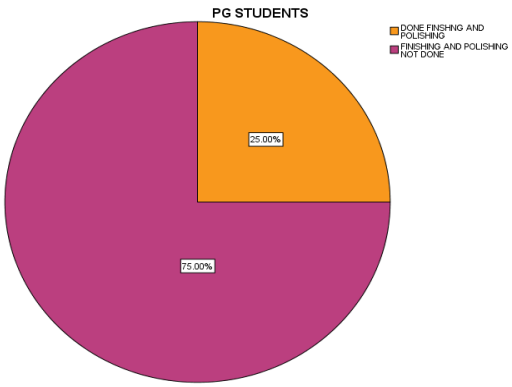

Figure 2 : Pie chart showing amalgam restoration class 1 done among Postgraduate students. 75% have not done finishing and polishing for class 1 amalgam restoration and 25 % have done finishing and polishing for class 1 amalgam restoration

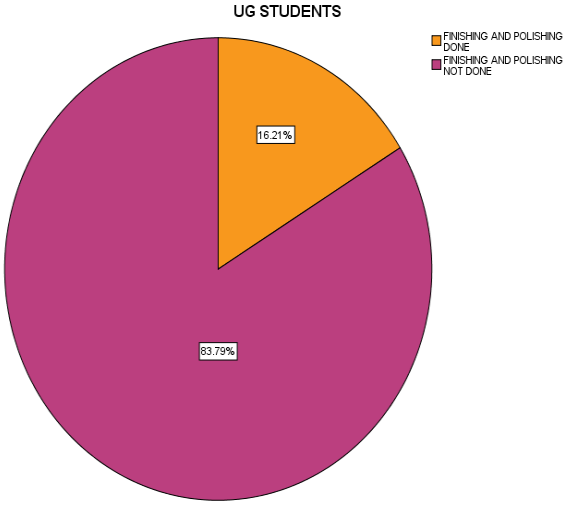

Figure 3 : Pie chart showing amalgam restoration class 1 done among Undergraduate students. 83.8% have not done finishing and polishing for class 1 amalgam restoration and 16.2 % have done finishing and polishing for class 1 amalgam restoration

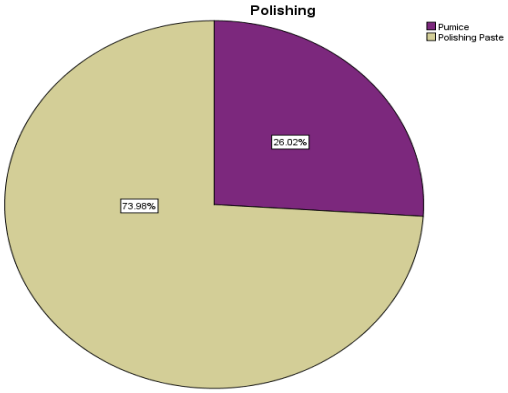

Figure 4: Pie chart showing the type of polishing used in amalgam restoration class 1 among Undergraduate and Postgraduate students. 26.02% of pumice have done class 1 amalgam restoration. 73.98% of polishing paste have done class 1 amalgam restoration with finishing and polishing.

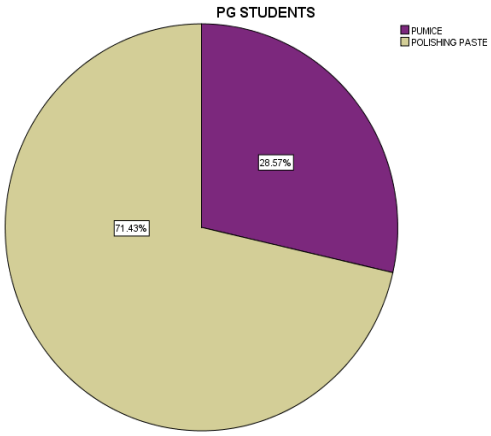

Figure 5: Pie chart showing the type of polishing used in amalgam restoration class 1 among Postgraduate students. 28.6% of pumice have done class 1 amalgam restoration. 71.4% of polishing paste have done class 1 amalgam restoration with finishing and polishing.

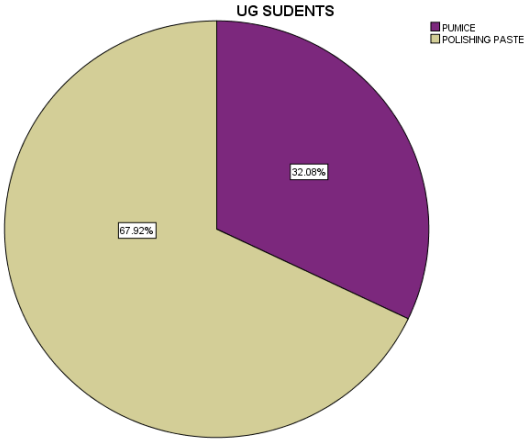

Figure 6: Pie chart showing the type of polishing used in amalgam restoration class 1 among Undergraduate students. 32.1% of pumice have done class 1 amalgam restoration. 67.9% of polishing paste have done class 1 amalgam restoration with finishing and polishing.

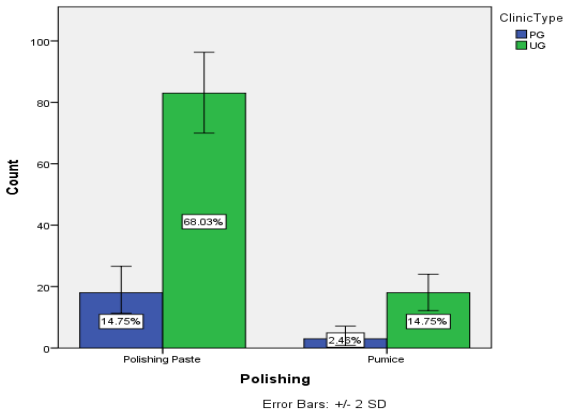

Figure 7: The bar graph represents the association between Undergraduate and Postgraduate students and no of count. The X-axis represents the Undergraduate and Postgraduate students of the study participant and the Y-axis represents the frequency of study concerning the type of polishing used in amalgam restoration class 1 among Undergraduate and Postgraduate students, Out of 82.78% using polishing paste , 14.75% were done by Postgraduate students whereas the rest 68.03% were done by Undergraduate students. Blue denotes Postgraduate students, green denotes Undergraduate students.Pearson chi-square test shows p-value as 0.542, (p-value > 0.05) Hence, it is statistically not significant.

Discussion

Finishing amalgam restorations includes removing marginal irregularities, defining anatomical contours, and also smoothing the surface roUndergraduatehness of the restoration. Polishing is performed to obtain a smooth, shiny glow on the surface of the amalgam. Finishing, polishing of dental restorations are one of important aspects of clinical procedures that enhance both appearance and longevity. Residual surface roUndergraduatehness associated with improper

finishing and polishing can mainly cause plaque accumulation, gingival irritation, and also increased surface staining poor or suboptimal aesthetics. The finishing and polishing process requires a stepwise approach they differ interns of intent and degree

In our study Out of 11.20 %, only 0.17% were done by(17) Postgraduate students whereas the rest 11.03% were done by Undergraduate students. In a previous study done by(18), they have said that Postgraduate students have done more polishing and finishing compared to Undergraduate students which is contrasting to our results which shows that Undergraduate students have done more finishing and polishing work compared to Postgraduate students. A study done by(19) shows similar results as our results that show that the Undergraduate students have done more finishing and polishing work compared to Postgraduate students

In our study by(19,20)they have used pumice and polishing paste for polishing in which 26.02 % of the population has used pumice whereas 73.96 % of the population have used polishing paste in which 13.01 % of the Postgraduate students have used polishing paste and 4.07 % of the Postgraduate students have used pumice and 60.98% of the Undergraduate students have used polishing paste and 21.95 % of the Undergraduate students have used pumice. A previous study by(21)also has shown similar results as our results in which polishing paste is more used compared to pumice in the finishing and polishing process. A similar previous study by(17,21)also has shown similar results compared to our results and in which more than 80% of the clinicians used polishing paste in the polishing process.

The limitations of this study were the small sample size and retrospective nature. This study cannot be generalized to a larger population due to specific data requirements. Future research should be conducted in a larger sample size and also in prospective study design to evaluate the clinical performance of amalgam restorations, particularly postoperative sensitivity and longevity of restorations.

Conclusion

Within the limits of the study, it can be concluded that Undergraduate students have done more finishing and polishing work compared to Postgraduate student for class 1 amalgam restorations among patients visiting Saveetha Dental College.

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Author Contribution

Data collection, collection of reviews , drafting manuscript was done by Lekha dhanasekaran. Structuring study design, revising manuscript, Drafting , revising manuscript and final approval of manuscript was done by Dr. Akshay Khandelwal

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Conflict of interest - The authors declare no potential conflict of interest

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