Conventional Versus Conservative Class Ii Amalgam Restorations In Mandibular Molars

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ABSTRACT

Introduction: Black's original preparation design called for extravagant extension with the intention of preventing secondary caries. Overtime, more conservative cavity preparations have been supported by scholars.

Aim: The aim of this study is to find the prevalence of conventional and conservative class 2 amalgam restorations in mandibular molars.

Materials and Methods: A retrospective cross-sectional study was conducted using data from the Dental Information Archiving Software. Data was collected, tabulated in Microsoft Excel and exported to the Statistical Package for Social Science for statistical analysis. Chi square test was employed with the level of significance set at $p<0.05$. Appropriate graphs, tables and charts were constructed using the same software for clear representation of the results obtained.

Results: The sample had a gender distribution of 60% males and 40% females. Most number of class 2 amalgam restorations were done in tooth 36 followed by 46, 47 and 37. Conventional type of cavity was done in 55% preparations and conservative was done in 45% preparations.

Conclusion: Within the limits of the study, the incidence of the conventional type of preparation is 55% and of the conservative type is 45%.

Keywords: Class II, amalgam, conventional, conservative, cavity preparation etc.

INTRODUCTION

Conventional cavity preparations have been based on Black's principles. (1) This involves preparation of one-third of the intercuspal distance buccolingually. (2) With time the principles of cavity design have evolved. (3) Conservative designs require only narrow preparations involving only one-fourth of the buccolingual width. (4) These preparations preserve the inherent strength and maintain the natural occlusion of teeth. (5) The concept of

"extension for prevention" should be followed in a conservatie way or not at all to preserve the sound tooth structure. (6) Usage of smaller burs has been advocated so that there is removal of only the diseased enamel and dentin. (7)

Many studies in the past have suggested that smaller cavities have a longer life span. (8) The fracture strength of amalgam cavities differs with preparation. MOD and other occlusal preparations have a higher tendency for vertical fracture whereas, slot preparations have a more limited fracture generally involving a single cusp. (9) There is higher tooth structure loss and low fracture strength in inlay cavities irrespective of the width of the occlusal box. (10)
Our team has extensive knowledge and research experience that has translated into high quality publications (11–20).

The aim of this study was to find the prevalence of conventional and conservative class 2 amalgam restorations in mandibular molars.

MATERIALS AND METHODS

STUDY DESIGN AND SETTING

This retrospective cross-sectional study was designed and conducted in a Dental University hospital in Chennai, India. Data for the study was assessed and obtained after reviewing patient records and analysing the data of 86000 patients. The data was collected from the patients reporting to the Department of Conservative Dentistry and Endodontics from June 2019- March 2021.

DATA COLLECTION

A total of 855 cases of class 2 amalgam restorations were identified. Other relevant demographic data such as age, gender, patient name, patient ID were recorded. Duplicate patient data and incomplete records were excluded from this study. Clinical photos and radiographs were used to verify the type of cavity preparation. Data was then verified by an external reviewer.

STATISTICAL ANALYSIS

Data was recorded in Microsoft Excel® and later exported to the Statistical Package for Social Sciences after proper coding of the variables involved. These variables included were gender (1. Male, 2. Female), age group (1. 18-35 years, 2. 36-55 years, 3. >56 years), type of cavity (1. Conservative, 2. Conventional) and site of preparation (1. 36, 2. 37, 3. 46, 4. 47). Thereafter, the data was subjected to statistical analysis using Statistical Package for Social Sciences (SPSS) for Mac OS (Version 28, 2021). Chi square test was employed with the level of significance set at $p<0.05$. Appropriate graphs, tables and charts were constructed using the same software for clear representation of the results obtained.

RESULTS AND DISCUSSION

The final data consisted of data sets from 244 patients with class 2 amalgam restorations done in the Department of Conservative Dentistry and Endodontics at Saveetha Dental College in Chennai, India. The gender distribution was found to be 50% males and 50% females. **(Graph 1)** Among all the patients 52.9% were 18-35 years old, 41% were 36-55 years old and 6.1% were above 56 years old. **(Graph 2)** Prevalence of each type of cavity preparation was 60.2% conservative preparations and 39.8% conventional preparations. **(Graph 3)** The most common

site of class 2 amalgam restoration among all mandibular molars was 36 (46.7%) followed by 46 (38.9%), 47 (9.8%) and 37 (4.5%). **(Graph 4)**

In the current study, conservative preparation is more prevalent (60.2%) than conventional preparation (39.8%). Studies suggest that conservative cavities are essential for the preservation of sound tooth structure. It has been noted that in all forms of cavity preparations, the narrower the isthmus, greater the load required to cause fracture of the tooth. In class 1 preparations stress is passed on to the remaining hard tissue whereas in class 2 preparations horizontal stresses tend to break the cavity wall. (21) Conservative designs exhibit least incidence of fracture whereas wider preparations have higher chances of fracture under stress. (22) Conservative preparations such as box only preparations show higher longevity provided the caries removal is sufficient. (23) In case of box only preparations, retention grooves play an important role in nullifying the opposing loads. A simple proximal box allows for greater stress on the central groove and than one with retention grooves. (24)

CONCLUSION

Within the limits of the study it can be concluded that, the incidence of the conventional type of preparation for class 2 amalgam restorations in mandibular molars is 55% and of the conservative type is 45%.

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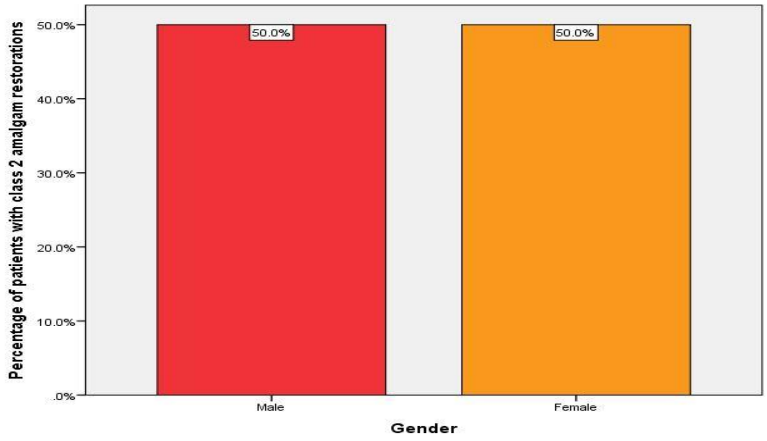
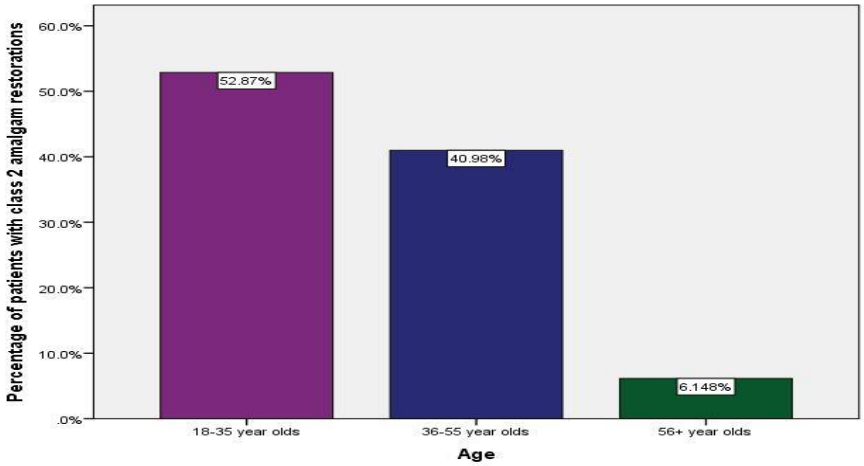
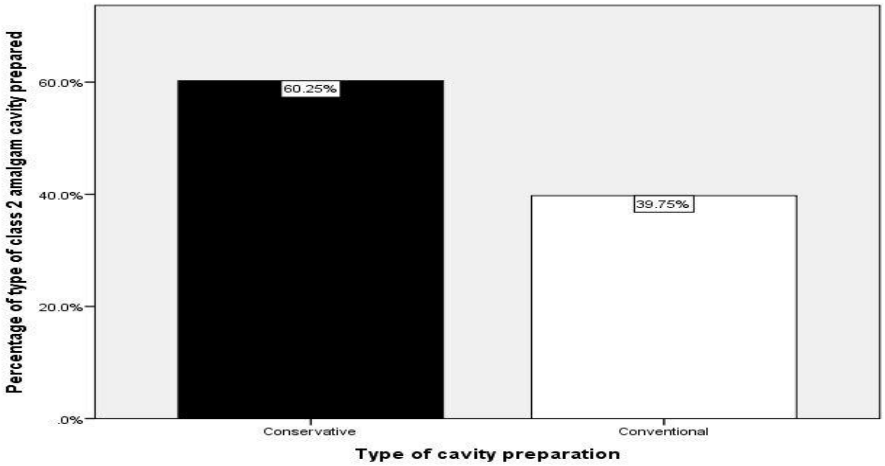
TABLES/ FIGURES



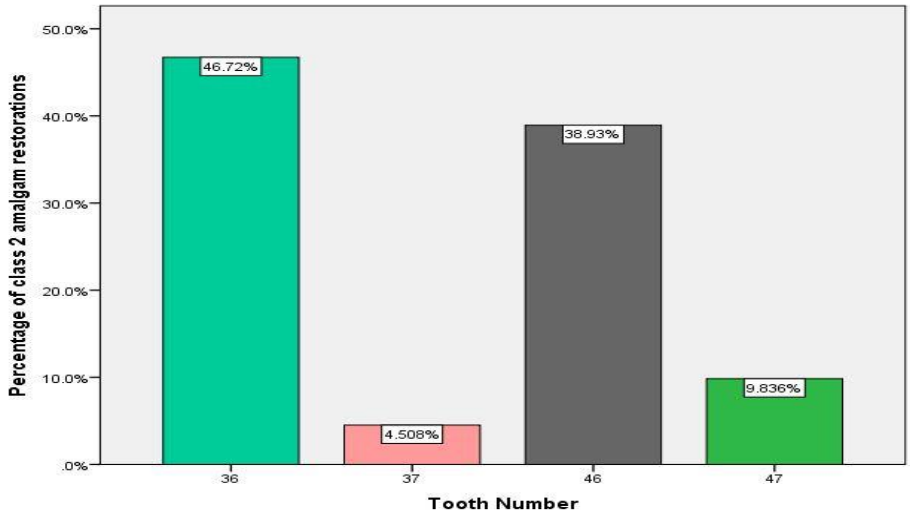
Graph 1: Gender distribution among the participants. Male 50% (red), Female 50% (orange)



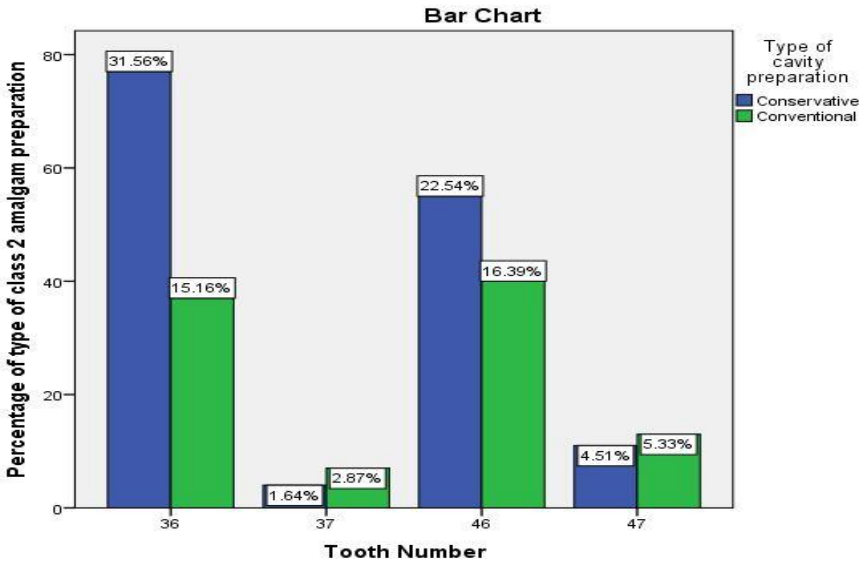
Graph 2: Age distribution among the participants. 18-35 year olds - 52.87% (purple), 36-55 year olds - 40.98% (blue), 56+ year olds - 6.148% (green)



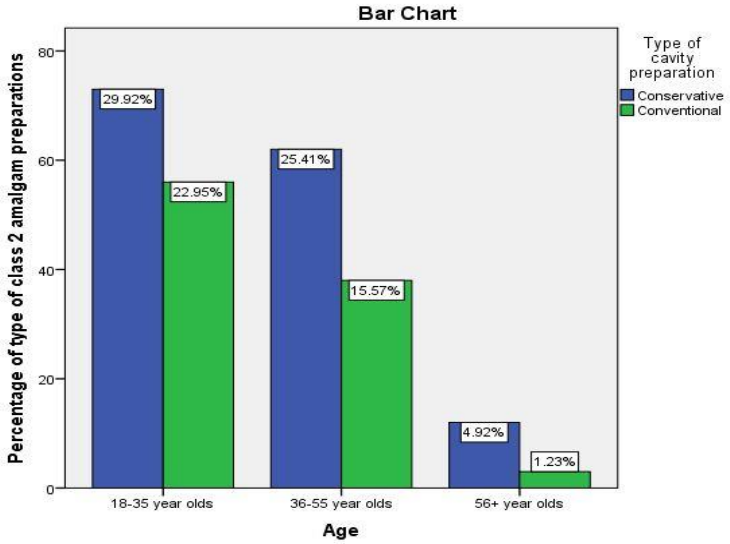
Graph 3: Graph showing distribution of type of class 2 amalgam cavity preparation. Conservative preparation 60.25% (black), conventional preparation 39.75% (white)



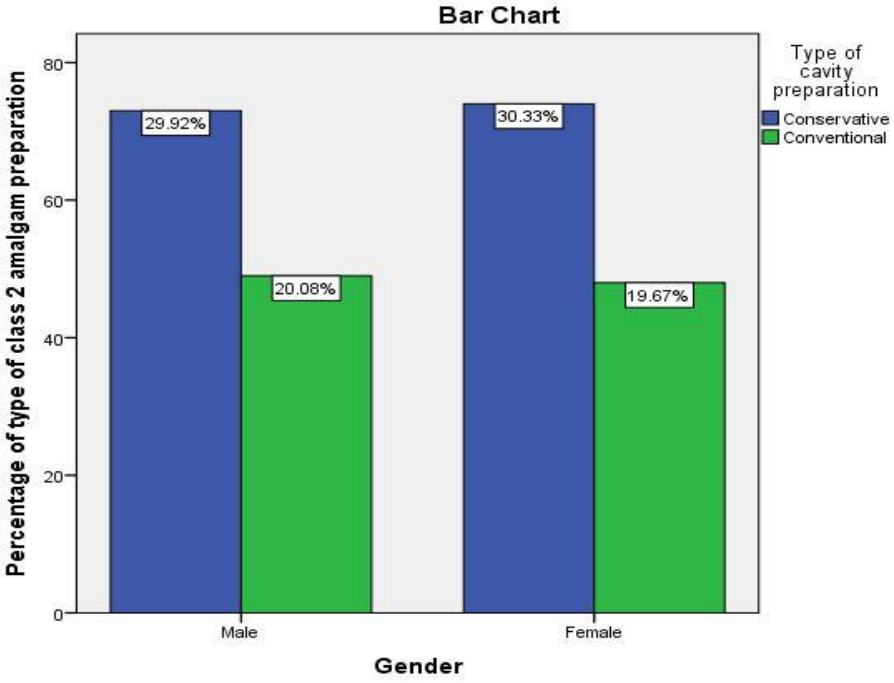
Graph 4: Graph showing distribution of tooth number on which class 2 amalgam cavity preparation was done. Tooth 36 - 46.72% (teal), Tooth 37 - 4.508% (baby pink), Tooth 46 - 38.93% (gray), Tooth 47 - 9.836% (light green)



Graph 5: Bar graph showing the association between tooth number and type of amalgam cavity preparations done in lower posterior teeth. The X axis represents tooth number and the Y axis represents the percentage of type of class 2 amalgam cavity preparation done. (Chi-square test; p-value=0.059; statistically not significant)



Graph 6: Bar graph showing the association between age and type of amalgam cavity preparations done in lower posterior teeth. The X axis represents age and the Y axis represents the percentage of type of class 2 amalgam cavity preparation done. (Chi-square test; p-value=0.193; statistically not significant)



Graph 7: Bar graph showing the association between gender and type of amalgam cavity preparations done in lower posterior teeth. The X axis represents gender and the Y axis represents the percentage of type of class 2 amalgam cavity preparation done. (Chi-square test; p-value=0.896; statistically not significant)