



Association of age and gender of patients who underwent amalgam restoration in mandibular premolars with class 1 dental caries

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ABSTRACT

The presence of dental caries is the main reason for the placement and replacement of restorations. Maintaining restorations to a satisfactory clinical condition is a big challenge for the practitioners. The aim of the study is to associate the age and gender of the patients who underwent amalgam restorations in mandibular premolars with class 1 dental caries. This was a descriptive study, where all the patients data were collected by reviewing patients records and analysing the data of 86000 patients reported from June 2019 to March 2020 to the Department of conservative dentistry and endodontics, Private Dental college and hospitals, Chennai. Data was collected and tabulated, statistical analysis was done by SPSS – IBM. In this study, we observed that there is a significant difference between the age, gender and tooth number of patients who underwent amalgam restoration in mandibular premolar with class 1 dental caries. Amalgam restoration has served the profession well, and it is very useful in restorative dentistry. Thus the use of amalgam can be continued as a material of choice if esthetics is not a concern.



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INTRODUCTION

Dental restorations restore the missing teeth/tooth and the parts of the tooth structure (Awan *et al.*, 2008). G.V black developed a standard for cavity preparation and experimented with various mixtures of amalgam (Black and Black, 1940). Den-

tal amalgam is one of the most common versatile restorative materials which is used in dentistry (Ramamoorthi *et al.*, 2015). It is commonly known as “silver fillings” (FDI, 2014). It has a greyish appearance (Haque *et al.*, 2019). The composition of dental amalgams as silver, tin and copper (Manohar and Sharma, 2018; Nasim and Nandakumar, 2018; Hollenback, 1969; Haque *et al.*, 2019). Dental amalgam constitutes nearly 75% of all restorative materials used by dentists (Bharti *et al.*, 2010). Amalgam has served as a dental restoration for more than 165 years (Ramanathan and Solete, 2015). It is found that there is no adequate economic alternative for dental amalgam in dentistry because of the combination of reliable long term performance in load-bearing situations and low cost is unmatched by other restorative material (Bernardo *et al.*, 2007; Bharti *et al.*, 2010; Mjör, 1997). Dental amalgam has a triad of uses: relatively low technique sensitivity, self-sealing prop-

erty and its longevity. It is used and satisfactory even today (ADA Council on Scientific Affairs, 2001; Teja and Ramesh, 2019).

Though dental amalgam has many uses still, there is evidence of a decrease in its use (Ramanathan and Solete, 2015; Siddique *et al.*, 2019). But due to its low cost, durability and easy manipulation have made many dentists continue to use it as their most preferred choice for restoring posterior teeth (Ramanathan and Solete, 2015; Rajakeerthi and Nivedhitha, 2019; Siddique *et al.*, 2019). In a two year study compared composite restoration and amalgam equally for posterior teeth (Hanson *et al.*, 1982). However, care should be taken for the type of restoration to be placed (Rajendran *et al.*, 2019). In case of extensive dental caries affecting tooth structure (when the cavity width does not exceed one-third of the intercuspal distance), a gold inlay may be indicated, and for very extensive restorations amalgam may be the choice (Nasim *et al.*, 2018). Composite resin and amalgam are considered to be the suitable direct filling materials for restoring class 1 and 2 dental caries (Kumar and Antony, 2018). The importance of the restorative material selection varies with dental caries risk level (Park *et al.*, 1999; Ravinthar and Jayalakshmi, 2018).

In a study conducted by Köhler *et al.* reveals that majority of patients with failed restorations are by secondary caries or marginal defects which carry high counts of potential cariogenic microorganisms (Köhler *et al.*, 2000; Noor and Pradeep, 2016). It has been found that amalgam restorations contain 8times fewer microorganisms than composite as the dental composite accumulates more biofilms and plaques. Oral bacteria, especially acidogenic bacteria, can produce acids that dissolve tooth minerals and degrade composite restorations (Ramesh *et al.*, 2018; Jose *et al.*, 2020) since prevention has a priority over treatment, so a proper knowledge about the etiologic factors involved in failures, will lead to successful amalgam restorations (Janani *et al.*, 2020). So the aim of our study is to find and associate the age and gender of the patients who underwent amalgam restoration in Mandibular premolars with class 1 dental caries.

MATERIALS AND METHODS

The current study is a comparative and descriptive study which is performed in a university setting where all the patient data from June 2019 to March 2020 was collected, reviewed and analysed. The ethical approval was obtained from the Institutional Ethical Committee (ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). The

data of patients who underwent amalgam restorations in Mandibular premolars with class 1 dental caries was collected, cross verified with photographs and were compiled for statistical analysis on SPSS Software. The sampling bias is minimised by incorporating random sampling methods. There were high internal validity and low external validity in our study.

Inclusion criteria

1. Patients who had class 1 dental caries
2. Patients who underwent class 1 amalgam restoration for the same
3. Patients of all age groups.

Exclusion criteria

1. Amalgam restorations other than class 1 cavity
2. Improper & incomplete data

SPSS (statistical package for social studies) version 22.0 (IBM corporation) was used for data entry and descriptive statistics. The Chi-squared test used to compare groups ($P < 0.05$) was considered significant.

RESULTS AND DISCUSSION

Out of 972 amalgam restoration done in our hospital, only $n = 90$ patients were found with an incidence of mandibular premolars class 1 amalgam restorations. Figure 1 denotes the prevalence of class 1 amalgam restoration in mandibular premolars among different age groups. The result of our study among age groups shows mandibular amalgam restoration in premolars are more prevalent among 21 years of age (13.2%). Figure 2 denotes prevalence of class 1 amalgam restoration in mandibular premolars among different tooth numbers.

The result shows that left mandibular first premolar (5.5%), left mandibular second premolar (52.2%), right mandibular first premolar (6.6%), right mandibular second premolar (35.5%), so findings show left mandibular second premolar is more prevalent. Figure 3 denotes gender, out of 90 patients, 57 were males (63.33%), and 33 were females (36.67%). Figure 4 denotes the correlation of age, gender and tooth number of patients who underwent amalgam restoration. The findings from the result show females have undergone more amalgam restoration at a mean age of above 30 years when compared to males undergone amalgam restoration. The chi-square test of age and tooth number ($p = 0.001$) was found to be statistically significant.

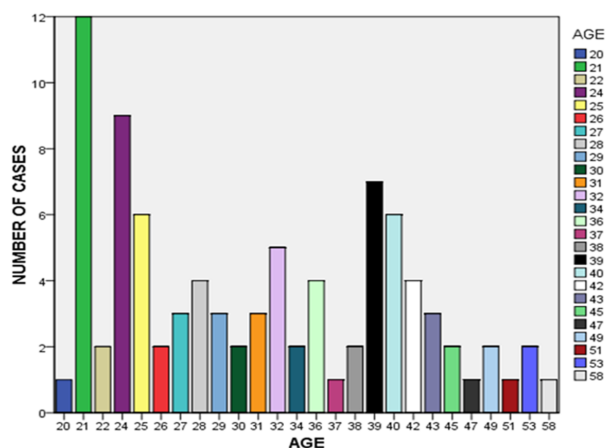


Figure 1: Prevalence of class 1 amalgam restoration in Mandibular premolars among different age groups

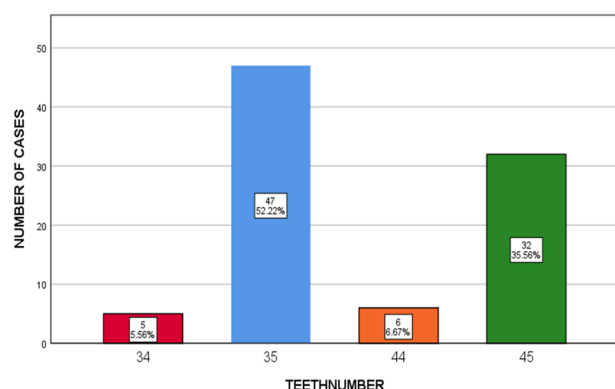


Figure 2: Prevalence of class 1 amalgam restoration in Mandibular premolars teeth

In Figure 1, the graph shows that the frequency of class 1 amalgam restoration in Mandibular premolars. The X-axis represents the age of patients, and Y-axis represents the number of class I amalgam restorations. The mandibular amalgam restoration in premolars is more prevalent among 21 years of age (13.2%). Chi square test; $p=0.01$; statistically significant ($p<0.05$).

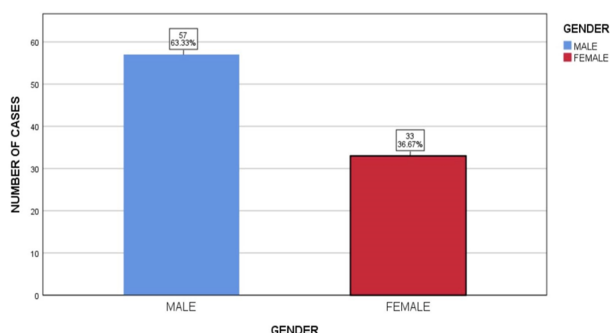


Figure 3: Prevalence of class 1 amalgam restoration in Mandibular premolars among different gender

Figure 2 shows the prevalence of class 1 amalgam restoration in Mandibular premolars teeth. The X-axis denotes the teeth number, and the y-axis represents the number of class I amalgam restorations. Red color denotes the lower left 1st premolar. Blue color denotes the lower left 2nd premolar. Orange color denotes the lower right 1st premolar. Green color denotes the lower right 2nd premolar. The class 1 amalgam restoration was more prevalent in mandibular left second premolar. Chi square test; $p=0.00$; statistically significant ($p<0.05$).

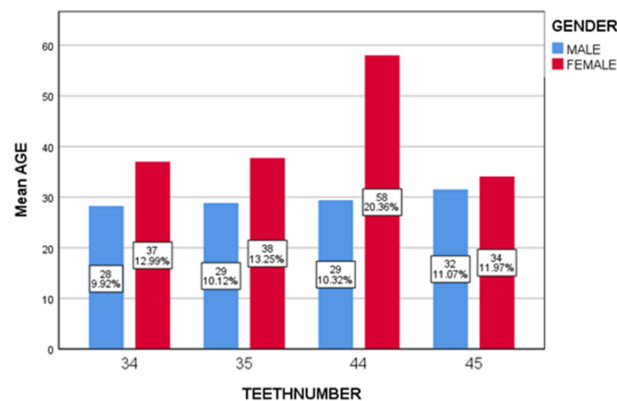


Figure 4: Association between age, gender and tooth number in patients who underwent amalgam restoration

Figure 3 shows the Prevalence of class 1 amalgam restoration in Mandibular premolars among different genders. The X-axis represents the gender, and the y-axis represents the number of class 1 amalgam restoration. Blue color denotes males. Red color denotes females. The class 1 amalgam restoration in Mandibular premolars was more prevalent in males. Chi square test; $p=0.011$; statistically significant ($p<0.05$).

Figure 4, shows the X-axis represents the tooth on which the patient underwent amalgam restoration, and the y-axis represents age. Blue color denotes - males. Red color denotes - females. The chi square test was found to be statistically significant ($p=0.001$).

In the current study Figure 1 showed that class 1 amalgam restoration in mandibular premolars among different age groups is more prevalent in 21 years of age (13.2%) and it is less prevalent among the age groups above 50 years (Maserejian *et al.*, 2012). The study conducted by Lubisich *et al.* (2011) revealed that older patients are more prevalent than young patients. Lubisich EB reported that patients of 65 years of age were found to have more amalgam restoration when compared to individuals among 21 years of age which showed contradictory results in relation to our study (Köhler *et al.*, 2000;

Lubisich *et al.*, 2011).

From Figure 2, it is evident that amalgam restoration in the left lower second premolar (52.22%) found to be more prevalent than other premolars in the mandibular arch. According to Lubisich EB, the amalgam restorations in molars was found to be 2.5 times higher than amalgam restoration in bicuspids (Lubisich *et al.*, 2011).

According to Figure 3, this study showed that there is a male predilection (63.33%). By correlating the age, gender, and tooth number of patients who underwent amalgam restoration, it was found that more amalgam restoration was done in females when compared to males. By correlating the left mandibular first premolar with gender showed that females who are above 30 years of age underwent more amalgam restoration when compared to males (less than 30 years). Similarly, the same results were obtained in relation to left mandibular second premolar and right Mandibular first premolar. But in relation to the right mandibular second premolar showed both males and females who are above 30 years of age had undergone amalgam restoration Figure 4. Similarly, the study done by Moncada showed amalgam restoration was more common in females (58%) than males (42%). The result shown in this study was similar to the current study (Estay *et al.*, 2017; Fernández *et al.*, 2015).

The limitations of our study include a very small sample size and cannot be generalised to a larger population.

CONCLUSION

Amalgam restoration has served the profession well and continues to do so in the years to come. In terms of longevity, they are superior to composite resin. Technical and operator variables do not have any influence on the survival time of restoration. Amalgam restoration does not have any margin fracture, bulk fracture and tooth fracture, so it has excellent compressive strength. Thus the association of compressive strength and longevity helps with the decision making process by the professionals. Thus the use of amalgam to be continued by considering these nature as a material of choice, if esthetics is not a concern.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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