ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES

Published by JK Welfare & Pharmascope Foundation Journal Home Page: https://ijrps.com

Association of age and gender distribution of patients undergoing class 2 amalgam restorations in maxillary premolars

Vaishnavi Sivakali Subramanian[1], Pradeep S[*2], Aravind Kumar S[3]

[1]Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai-77, Tamil Nadu, India
[2]Department of Conservative Dentistry and Endodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai-77, Tamil Nadu, India
[3]Department of Orthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai-77, Tamil Nadu, India

Article History:

Received on: 26 Jul 2020
Revised on: 08 Aug 2020
Accepted on: 15 Sep 2020

Keywords:

Amalgam restoration, Class 2 restoration, Disto-Occlusal caries, Mesio-Occluso- distal, Mesio-Occlusal

ABSTRACT

Amalgam is the most versatile restorative material in dentistry. It constitutes 70% of all restorative material. Dental amalgam accounts for various advantages and disadvantages. Among the disadvantages replacement of the amalgam restoration has been a major concern due to various reasons like recurrent caries, esthetics and fracture of non-functional cusp among class II, fracture of non-functional cost is mostly documented. The aim of the study is to evaluate the association between age and gender distribution undergoing class 2 amalgam restoration in maxillary premolars. In this retrospective study, the details of the 86,000 patient records were reviewed and analyzed, out of which 303 patients who had undergone class 2 amalgam restoration in maxillary premolars between June 2019 to March 2020 were included in this study. The details like age, gender, tooth number and the surface of restorations were evaluated and entered in SPSS, version 23. The data were analyzed through a chi-square test. More number of restorations were done in the age group of 31-40 years. It was observed that there is no significant association between age, and surface distribution in mandibular premolars ($p>0.05$) and analyzing the association between gender and tooth surface, no significant difference seen ($p>0.05$). Disto occlusal restoration was predominantly done in both the genders and both the maxillary premolars. In general female patients underwent more restorations compared to male patients.

*Corresponding Author

Name: Pradeep S
Phone: +91 9710404482
Email: pradeeps@saveetha.com

ISSN: 0975-7538

DOI: https://doi.org/10.26452/ijrps.v11iSPL3.3042

Production and Hosted by

IJRPS | https://ijrps.com

INTRODUCTION

Despite much controversy, dental amalgam has been the most versatile material for many years more than 165 years. It has a gazillion of uses. The wide range properties of amalgam shows long-term performances in load-bearing situations and its low price will make it unique from other restorative materials. It has various other uses like self-sealing property, longevity and low technique sensitivity (Berry *et al.*, 1998). Even if there is a decline in the use of amalgam around the globe, amalgam's cost, your ability and ease of manipulation have

made many dentists continue to use it for restoration. Apart from all these advantages, there was always a concern about amalgam causing mercury toxicity (Dunne *et al.*, 1997). More than half of dental amalgam filling is liquid mercury and the other half comprises silver, tin, and copper. Mercury vapour is released during the functional life of restoration. Considering the toxicity, there are restrictions on the use of amalgam at certain clinical situations. The use of amalgam is contraindicated in large class I and class II cavities, involving more than a middle third of an occlusal surface of posterior teeth. Class II cavities where the cervical margin is deep subgingivally, extensive coronal tooth structure loss and anterior teeth where aesthetic is a major concern are also contraindicated for amalgam restoration (Klausner *et al.*, 1987; Widstrom and Forss, 1998; Clarkson *et al.*, 2003; Brownawell *et al.*, 2005; Olaleye, 2014).

The longevity of a class 2 amalgam restoration depends on the cavity design and the extent of caries on the proximal aspect. In the clinical trials, composite restorations show success rate slightly lower than amalgam restorations (Smales *et al.*, 1990; Mjör and Jokstad, 1993; Mjör *et al.*, 2000). However, in cross-sectional retrospective studies, based on restorations placed in general practise, the success of amalgam restoration is twice as much as composite restoration (Jokstad *et al.*, 1994). Placement of the base; its adequate thickness depends on the depth of the cavity also influences the longevity of amalgam restoration. The type of base used, liner or varnish is determined by remaining Dentin Thickness [RDT]. This helps to prevent damage to dental pulpal tissue (Dawson *et al.*, 2015).

Therefore, the aim of this retrospective study is to evaluate if there is any association is seen between the age, gender of patients undergoing class II amalgam restoration in maxillary premolars.

MATERIALS AND METHODS

Study Selection

This retrospective study is done under the university setup, conducted in Saveetha Dental College. Class 2 amalgam restored patients were included for this study. Approval was obtained from the institutional committee [IEC], 2 examiners were involved in the study.

Sample Collection

The details of the 86,000 patient records were reviewed and analyzed, out of which 303 patients who had undergone class 2 amalgam restoration in maxillary premolars between June 2019 to March 2020 were included in this study. Cross verification of data for error was done by the presence of additional reviewers and by photographic evaluation. Simple random sampling was done to minimize sampling bias. It was generalized to the South Indian population.

Data Collection /Tabulation

The records of all the patients who underwent Class 2 amalgam restoration in mandibular premolars were collected from the initial to last in the chronological order. The data verification was done based on age and sex surfaces (MO, DO, MOD). The data was entered in the excel sheet in a methodical manner and was imported to SPSS. Incomplete or censored data were excluded from the study.

Analysis

IBM SPSS 23.0 software was used for data analysis. Independent variables include age, gender and dependent variable class 2 amalgam restoration. Descriptive and inferential statistics were used. Descriptive statistics include the frequency of distribution of a patient's age and gender. Inferential tests include the chi-square test.

RESULTS AND DISCUSSION

The study consisted of a total of 303 patients who underwent class II amalgam restoration in maxillary premolars, among which 112 are males (40.3%) and 181 were females (59.7%). On analysing the age groups 31 to 40 years, age group received the maximum number of class II restoration (35%), followed by 41 to 50 years old age group which constitutes 27.7% of the population (Figure 1). On analysing the teeth, both the maxillary premolar underwent more number of disto-occlusal restorations when compared to mesio occlusal restoration, however, no significant difference observed ($p>0.05$), (Figure 2). No significant difference observed amongst gender ($p>0.05$). Still, female patients had more class 2 amalgam restorations when compared to male patients, in which disto occlusal restorations were done more in both the genders (Figure 3). Out of 181 female population,74 patients were with mesio-occlusal restorations,105 with disto-occlusal and only 2 patients with mesio-occluso- distal restoration.

In this study, we can contemplate that there is no significant association between gender and surface distribution in patients undergoing class II amalgam restoration in maxillary premolar p (>0.05). However, more restorations were done in female patients. Disto occlusal restorations found to be done more amongst both the genders.

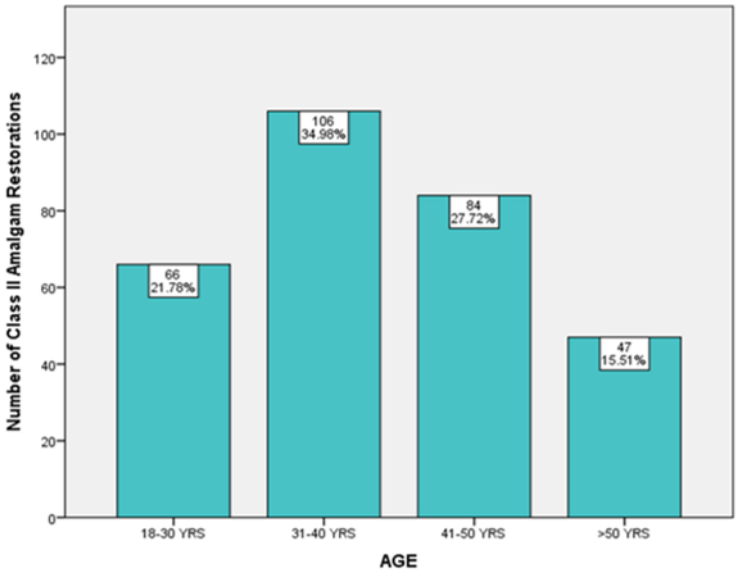

Figure 1: Bar chart shows the Distribution of Age of patients underwent Class II amalgam restoration

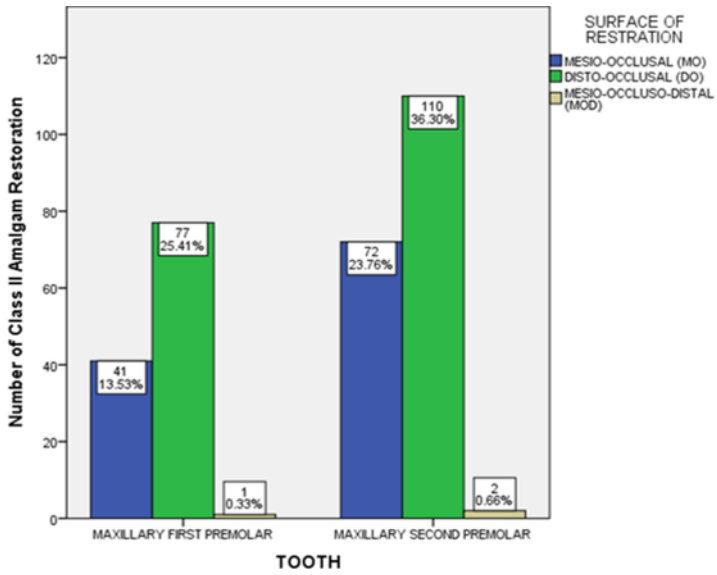

Figure 2: Bar chart shows the Association of surfaces of Class II amalgam restoration involved in maxillary first and second premolars

When the type of tooth was evaluated, the second premolar had more incidence of 61.7% than the first premolar. A study showed similar results with gender prevalence; out of 277 patients, females were more prevalent with 180 patients. Even during the recall and review period, only 263 patients showed, out of which 174 were females [66.6%] and males were 89 [33.84%]. This is almost the ratio of 2:1 also suggesting that female patients tend to stick to a treatment centre more than males in keeping regular appointments (Klausner *et al.*, 1987; Widstrom and Forss, 1998; Clarkson *et al.*, 2003; Brownawell *et al.*, 2005; Olaleye, 2014). Across the globe, the prevalence of amalgam restorations is about 53.3% in Taiwan, 21% in Sweden, 25 to 32% in Norway. Bernardo et al. (Bernardo *et al.*, 2007), reported that the failure of amalgam restoration due to secondary caries was 3.5 times higher in composite restorations than in amalgam restorations, but Collins et al (Collins *et al.*, 1998). Reported that composite restorations fail at a rate two to three times higher than that of amalgam restorations after 8 years of review.

The advantages of using dental amalgam restoration are that they are strong and long-lasting, so they are more likely to resist the masticatory forces than some other types of filling. It is the least expensive type of filling material (Pereira, 2016). In the long run, the result of dental amalgam restoration

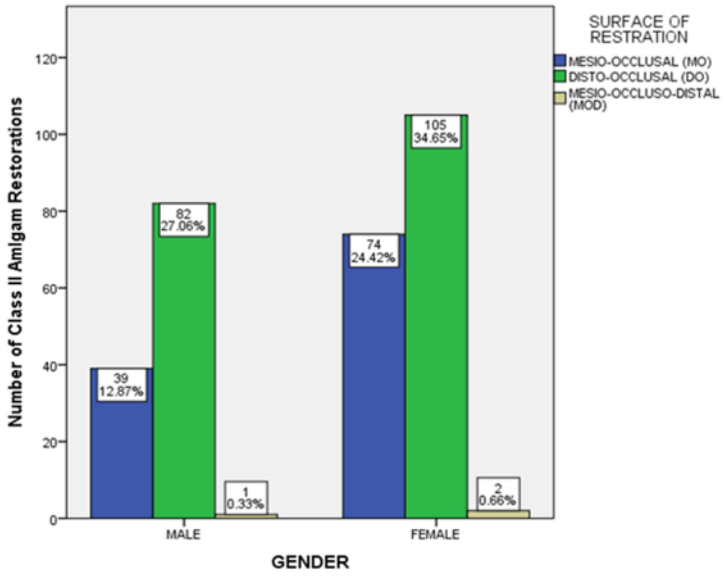

Figure 3: Bar charts depicts the Association of surface of Class II Amalgam restorations amongst Gender

will be satisfactory provided, if the cavity preparation and marginal seal are ideal and intact. The average survival time of 6.6-14 years and 3.3-4.7 years is reported for amalgam and composite restorations, respectively (Mjör *et al.*, 2000).

Previously in our university, various studies were conducted. The in-vitro studies conducted at our university were (Ramanathan and Solete, 2015; Rajendran *et al.*, 2019; Janani *et al.*, 2020) the invivo studies include (Nasim and Nandakumar, 2018; Nasim *et al.*, 2018; Siddique, 2019), the molecular study (Ramesh *et al.*, 2018), the reviews and systematic reviews published are (Noor and Pradeep, 2016; Kumar and Antony, 2018; Ravinthar and Jayalakshmi, 2018; Rajakeerthi and Nivedhitha, 2019), the surveys conducted (Manohar and Sharma, 2018; Jose *et al.*, 2020), and the clinical trial conducted on root canal irrigants were (Teja and Ramesh, 2019; Ramamoorthi *et al.*, 2015). Currently, we are analyzing the retrospective studies, in this study, we evaluated the prevalence of class II amalgam restoration.

The rate of secondary caries associated with resin-based composite restoration is substantially higher than that associated with amalgam restorations, which can be explained by the presence of a hybrid layer, which inevitably degrades with time; by the polymerization contraction and by the existence of a higher proportion of Streptococcus mutans in composite restoration margins which has been revealed by microbiological studies (Leinfelder, 2000; Ziskind *et al.*, 2007).

The limitations of this study include limited sample size and the time frame. The future scope of the study is to extend the data collection into a wider range of population and to analyze the frequency of amalgam restoration over other direct restorations and its survival rates.

CONCLUSION

Within the limitations of the study, we contemplate that there was no significant association between age and gender distribution in amalgam class II amalgam restoration in maxillary premolars. Female patients showed a higher number of restorations, of which disto occlusal restoration were maximum.

ACKNOWLEDGEMENT

I would like to acknowledge Mr Arun for the data collection.

Funding Support

The authors declare that they have no funding support for this study.

Conflict of Interest

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

REFERENCES

Bernardo, M., Luis, H., Martin, M. D., Leroux, B. G., Rue, T., Leitão, J., DeRouen, T. A. 2007. Survival and reasons for failure of amalgam versus composite posterior restorations placed in a randomized clinical trial. *The Journal of the American Dental Association*, 138(6):775–783.

Berry, T. G., Summitt, J. B., Chung, A. K., Osborne, J. W. 1998. Amalgam at The New Millennium. *The Journal of the American Dental Association*, 129(11):1547–1556.

Brownawell, A. M., Berent, S., Brent, R. L., Bruckner, J. V., Doull, J., Gershwin, E. M., Hood, R. D., Matanoski, G. M., Rubin, R., Weiss, B., Karol, M. H. 2005. The Potential Adverse Health Effects of Dental Amalgam. *Toxicological Reviews*, 24(1):1–10.

Clarkson, T. W., Magos, L., Myers, G. J. 2003. The Toxicology of Mercury — Current Exposures and Clinical Manifestations. *New England Journal of Medicine*, 349(18):1731–1737.

Collins, C. J., Bryant, R. W., Hodge, K. L. V. 1998. A clinical evaluation of posterior composite resin restorations: 8-year findings. *Journal of Dentistry*, 26(4):311–317.

Dawson, V. S., Amjad, S., Fransson, H. 2015. Endodontic complications in teeth with vital pulps restored with composite resins: a systematic review. *International Endodontic Journal*, 48(7):627–638.

Dunne, S. M., Gainsford, I. D., Wilson, N. H. F. 1997. Current materials and techniques for direct restorations in posterior teeth: Part 1: silver amalgam. *International Dental Journal*, 47(3):123–136.

Janani, K., Palanivelu, A., Sandhya, R. 2020. Diagnostic accuracy of dental pulse oximeter with customized sensor holder, thermal test and electric pulp test for the evaluation of pulp vitality: an in vivo study. *Brazilian Dental Science*, 23(1).

Jokstad, A., Mjör, I. A., Qvist, V. 1994. The age of restorations in situ. *Acta Odontologica Scandinavica*, 52(4):234–242.

Jose, J., P, A., Subbaiyan, H. P. 2020. Different Treatment Modalities followed by Dental Practitioners for Ellis Class 2 Fracture – A Questionnaire-based Survey. *The Open Dentistry Journal*, 14(1):59–65.

Klausner, L. H., Green, T. G., Charbeneau, G. T. 1987. Placement and replacement of amalgam restorations: a challenge for the profession. *Operative Dentistry*, 12(3):105–112.

Kumar, D., Antony, S. D. P. 2018. Calcified Canal and Negotiation-A Review. *Research Journal of Pharmacy and Technology*, 11(8):3727.

Leinfelder, K. F. 2000. Do Restorations Made of Amalgam Outlast Those Made of Resin-Based Composite? *The Journal of the American Dental Association*, 131(8):1186–1187.

Manohar, M. P., Sharma, S. 2018. A survey of the knowledge, attitude, and awareness about the principal choice of intracanal medicaments among the general dental practitioners and nonendodontic specialists. *Indian Journal of Dental Research*, 29(6):716.

Mjör, I. A., Dahl, J. E., Moorhead, J. E. 2000. Age of restorations at replacement in permanent teeth in general dental practice. *Acta Odontologica Scandinavica*, 58(3):97–101.

Mjör, I. A., Jokstad, A. 1993. Five-year study of Class II restorations in permanent teeth using amalgam, glass polyalkenoate (ionomer) cermet and resin-based composite materials. *Journal of Dentistry*, 21(6):338–343.

Nasim, I., Hussainy, S., Thomas, T., Ranjan, M. 2018. Clinical performance of resin-modified glass ionomer cement, flowable composite, and polyacid-modified resin composite in noncarious cervical lesions: One-year follow-up. *Journal of Conservative Dentistry*, 21(5):510–510.

Nasim, I., Nandakumar, M. 2018. Comparative evaluation of grape seed and cranberry extracts in preventing enamel erosion: An optical emission spectrometric analysis. *Journal of Conservative Dentistry*, 21(5):516.

Noor, S., Pradeep 2016. Chlorhexidine: Its properties and effects. *Research Journal of Pharmacy and Technology*, 9(10):1755–1760.

Olaleye, A. O. 2014. Gender Distribution of Amalgam Restoration and Treatment Pattern in Regular Attendees of a Teaching Hospital in Nigeria. *World Journal of Dentistry*, 5(2):109–112.

Pereira, T. 2016. Silver amalgam: A clinician's perspective. *Journal of Restorative Dentistry*, 4(2).

Rajakeerthi, R., Nivedhitha, M. S. 2019. Natural Product as the Storage medium for an avulsed tooth – A Systematic Review. *Cumhuriyet Dental Journal*, 22(2):249–256.

Rajendran, R., Kunjusankaran, R. N., Sandhya, R., Anilkumar, A., Santhosh, R., Patil, S. R. 2019. Comparative Evaluation of Remineralizing Potential of a Paste Containing Bioactive Glass and a Topical Cream Containing Casein Phosphopeptide-Amorphous Calcium Phosphate: An in Vitro Study. *Pesquisa Brasileira em Odontopediatria e Clínica Integrada*, 19:1–10.

Ramamoorthi, S., Nivedhitha, M. S., Divyanand, M. J. 2015. Comparative evaluation of postoperative pain after using endodontic needle and EndoActivator during root canal irrigation: A randomised controlled trial. *Australian Endodontic Journal*, 41(2):78–87.

Ramanathan, S., Solete, P. 2015. Cone-beam Computed Tomography Evaluation of Root Canal Preparation using Various Rotary Instruments: An

in vitro Study. *The Journal of Contemporary Dental Practice*, 16(11):869–872.

Ramesh, S., Teja, K., Priya, V. 2018. Regulation of matrix metalloproteinase-3 gene expression in inflammation: A molecular study. *Journal of Conservative Dentistry*, 21(6):592.

Ravinthar, K., Jayalakshmi 2018. Recent Advancements in Laminates and Veneers in Dentistry. *Research Journal of Pharmacy and Technology*, 11(2):785.

Siddique, R. 2019. Qualitative and quantitative analysis of precipitate formation following interaction of chlorhexidine with sodium hypochlorite, neem, and tulsi. *Journal of conservative dentistry: JCD*, 22(1):40–47.

Smales, R. J., Gerke, D. C., White, I. L. 1990. Clinical evaluation of occlusal glass ionomer, resin, and amalgam restorations. *Journal of Dentistry*, 18(5):243–249.

Teja, K. V., Ramesh, S. 2019. Shape optimal and clean more. *Saudi Endodontic Journal. Medknow Publications and Media Pvt. Ltd*, 9(3):235–236.

Widstrom, E., Forss, H. 1998. Dental practitioners' experiences on the usefulness of restorative materials in Finland 1992-1996. *British Dental Journal*, 185(10):540–542.

Ziskind, D., Mass, E., Watson, T. F. 2007. Effect of different restorative materials on caries: a retrospective in vivo study. *Quintessence International*, 38(5):429–434.