Most common tooth to be restored with amalgam restoration in maxillary and mandibular arch.

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Abstract

Background: To evaluate most common tooth to be restored with amalgam restoration.

Materials and method: This is a retrospective descriptive study in Chennai population. Our study is an institution based retrospective descriptive study was carried out in between the month of November 2020- February 2021. Data of patients who came with chief complaints of decayed tooth (dental caries) and who had undergone amalgam restoration were included in the study sample. SPSS software was used for statistical analysis. Based on statistical analysis results were tabulated.

Result: Most of the patient who had amalgam restoration was males (1131) compared to females (969). 278 patients underwent amalgam restoration in 47 (Mandibular right permanent second molar). Around 581 males and 463 female patients had class I amalgam restoration, 279 males and 265 female patients had class II distal amalgam restoration and 271 males and 241 female patients had class II mesial amalgam restoration. Where 153 Male patients and 125 female patients underwent amalgam restoration in 47 (Mandibular right permanent second molar).

Conclusion: Most common tooth to be restored with amalgam restoration is 47 (Mandibular right permanent second molar) Amalgam restorations have served the profession well and will continue to do so in the years to come. The use of amalgam can be continued as a material of choice if esthetics is not a concern.

Introduction

Dental amalgam is one among the foremost versatile restorative materials which is used in conservative dentistry [1]. It constitutes approximately 75% of all restorative materials employed by dentists all over the world [2,3]. Amalgam served as a dental restoration for quite 165 years. There is still no adequate economic alternative for amalgam [4]. Mixture of amalgam is a reliable long-term performance in load bearing situations and low cost is unmatched by other dental restorative material. Amalgam has multiple advantages like low technique sensitivity, self-sealing property and its longevity [5].

Dental amalgam apparently was first used by the Chinese. Su Kung (659 AD) mentioned the use of a mixture in the Material Medica. In Europe, Johannes stokers, a municipal physician in Ulm, Germany, recommended amalgam as a filling material in 1528. The popularity of amalgam might be attributed to its good mechanical properties, ease of application and the one-appointment treatment [6]. Amalgam has low technical sensitivity and it is believed that metallic ions released by amalgam have anti-cariogenic activity [7]. Despite advancements in resin-based composite technology, amalgam restoration remains a restorative treatment option in many dental practices [8-10]. The use of amalgam bonding agents has become popular in the restoration of posterior teeth and demonstrates many potential advantages, including tooth reinforcement, decreased postoperative sensitivity, better marginal adaptation, decreased microleakage, reduction of secondary caries and a more conservative preparation [11-17].

Amalgam cannot strengthen tooth structure, and is unaesthetic. In addition, cavity preparation for amalgam is difficult and proper insulation is necessary [15]. Present investigation evaluated most common tooth to be restored with amalgam restoration. Our team has extensive knowledge and research experience that has translate into high quality publications [16-35].

Materials and Methods

Study Setting

This university hospital-based retrospective study was carried out by reviewing the dental records of patients diagnosed with dental caries and underwent amalgam restoration who visited a university teaching hospital in Chennai. Since this

was a university hospital setting the large sample size and distribution of population contributed a major advantage for this study. Data collected was reliable and with evidence. The study was conducted after obtaining approval from the Institutional Ethical Review Board.

Data Collection

This retrospective descriptive study. For this study we got approval from the Institutional Ethical Review Board (SDC//SIHEC/2020/DIASDATA/0619-0320) and our study was carried in a university hospital setting in a major city of Tamil Nadu, South India. After getting approval Case sheets of 2500 dental OP patients who visited the University Hospital in between the month of November 2020 and February 2021 were considered. In that 25000 around 2100 case sheets of patients with chief complaints decayed tooth (dental caries) and who underwent amalgam restoration were taken into study. Inclusion criteria include patients who underwent for class I, Class II MO, DO, MOD amalgam restoration. Patients who underwent Gic restoration, in lay, onlay, composite restoration were excluded. 2100 case sheets were obtained by filtering those patients who visited the University Hospital with chief complaints of dental caries in oral cavity underwent amalgam restoration in maxillary and mandibular arch were analysed. The collected data were filtered and a case sheet of patients was considered.

Data Analytics

These 2100 data were analysed, even photographs, radiographs in the image gallery of the patient online case sheet records were verified. In order to reduce, minimize and avoid the occurrence errors, verified case sheets were once again cross verified by another examiner. Verified case sheet details were tabulated in excel under columns of age, gender, patient with class I and class II dental caries, maxillary arch and Mandibular arch tooth number in FDI notation, treatment done by dentist to patient. Excel tabulated data is transferred to SPSS software for statistical analysis. Descriptive statistics and chi square tests were conducted to evaluate differences between groups with significance level at 95% confidence interval ($P<0.05$).

Results

Based on analysis results were obtained and tabulated. The percentage distribution of gender of patient who underwent amalgam restoration was shown in Figure 1 where most of the patient who had amalgam restoration was males (1131) compared to females (969). Figure 2 represent frequency distribution of tooth number in fdi notation of patient who had caries and underwent amalgam restoration. Where 278 patients underwent amalgam restoration in 47 (Mandibular right permanent second molar), 254 patients underwent amalgam restoration in 37 (Mandibular left permanent second molar), 197 patients underwent amalgam restoration in 16 (Maxillary right permanent first molar), 188 patients underwent amalgam restoration in 26 (Maxillary left permanent first molar), 178 patients underwent amalgam restoration in 36 (Mandibular left permanent first molar), 172 patients underwent amalgam restoration in 46 (Mandibular right permanent first molar),139 patients underwent amalgam restoration in 36(Mandibular left second premolar), 113 patients underwent amalgam restoration in 45(Mandibular right second premolar), 108 patients underwent amalgam restoration in 25 (Maxillary left second premolar), 108 patients underwent amalgam restoration in 15 (Maxillary right second premolar), 103 patients underwent amalgam restoration in 24 (Maxillary left first premolar), 79 patients underwent amalgam restoration in 14(Maxillary right first premolar), 48 patients underwent amalgam restoration in 27 (Maxillary left permanent second molar), 42 patients underwent amalgam restoration in 17(Maxillary right permanent second molar), 29 patients underwent amalgam restoration in 48 (Mandibular right third molar), 24 patients underwent amalgam restoration in 38 (Mandibular left third molar), 23 patients underwent amalgam restoration in 44 (Mandibular right first premolar) and 17 patients underwent amalgam restoration in 34 (Mandibular left first premolar).

Figure 3 shows association between type of cervical lesion in the study population and gender. Where Around 581 males
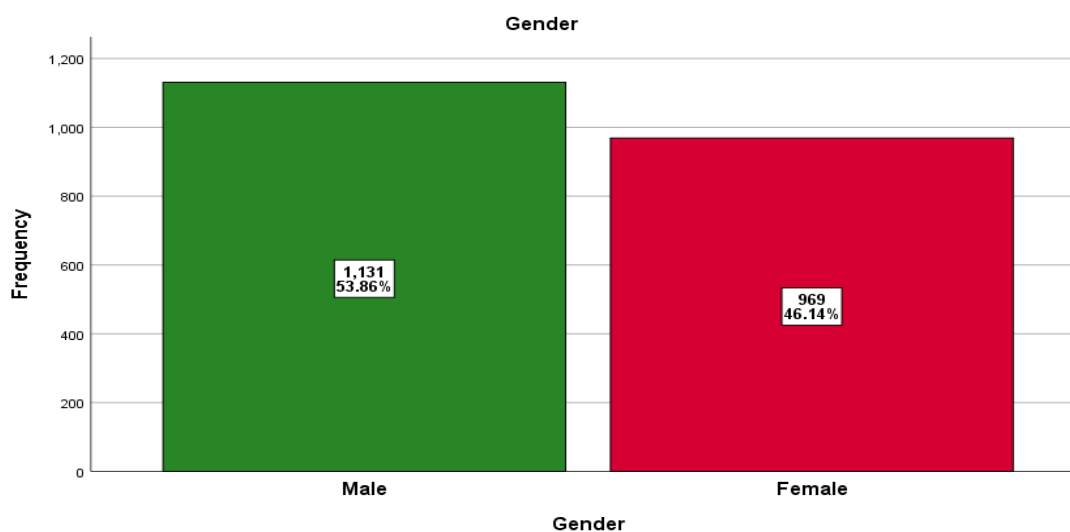

Figure 1. *Bar graph representing frequency distribution of gender of patient in the study population. X-axis represents gender and Y-axis represents the number of patients. Most of the patient who had amalgam restoration was males (1131) compared to females (969).*
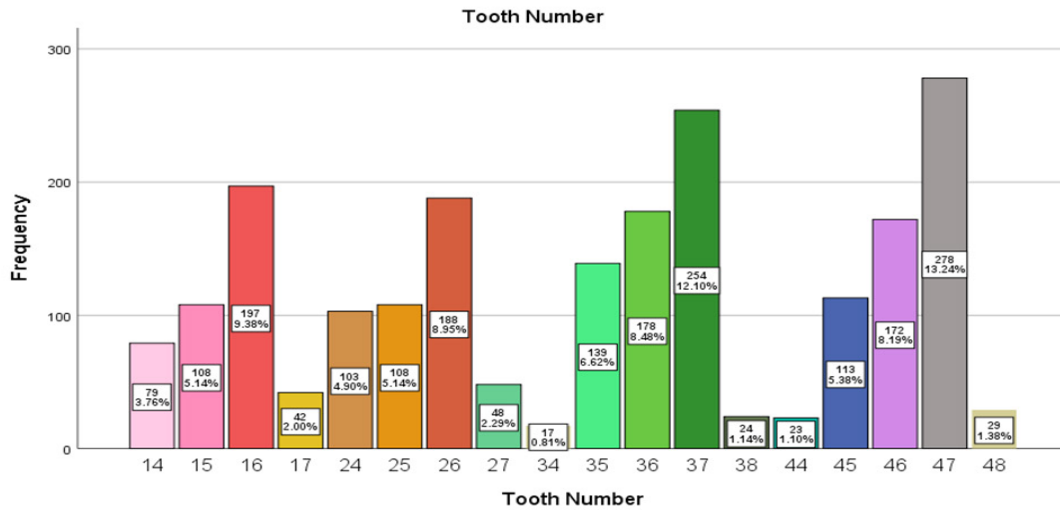
Tooth Number

Figure 2. Bar graph representing frequency distribution of tooth number in fdi notation of patient who had caries and underwent amalgam restoration. X-axis represents tooth number in fdi notation and Y-axis represents the number of patients. Where 278 patients underwent amalgam restoration in 47 (Mandibular right permanent second molar).
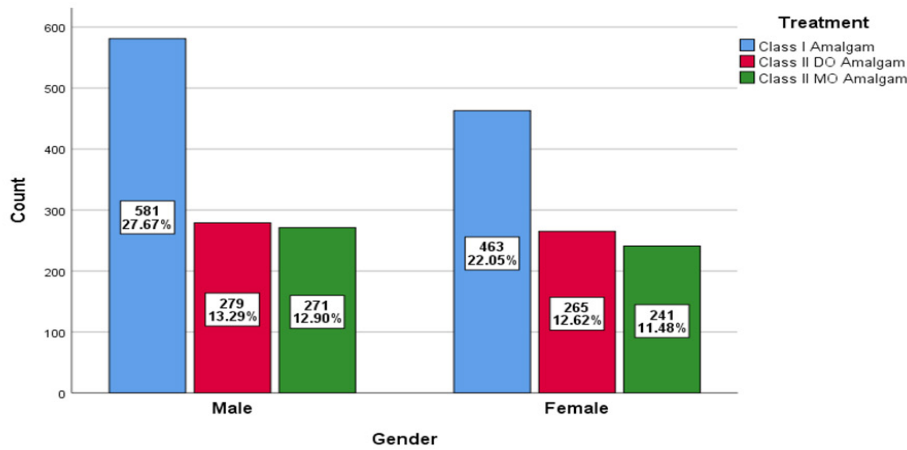

Figure 3. Bar graph representing association between type of cervical lesion in the study population and gender. X-axis represents the type of caries and amalgam restoration done in the study population in gender and Y-axis represents the number of patients. Around 581 males and 463 female patients had class I amalgam restoration, 279 males and 265 female patients had class II distal amalgam restoration and 271 males and 241 female patients had class II mesial amalgam restoration.
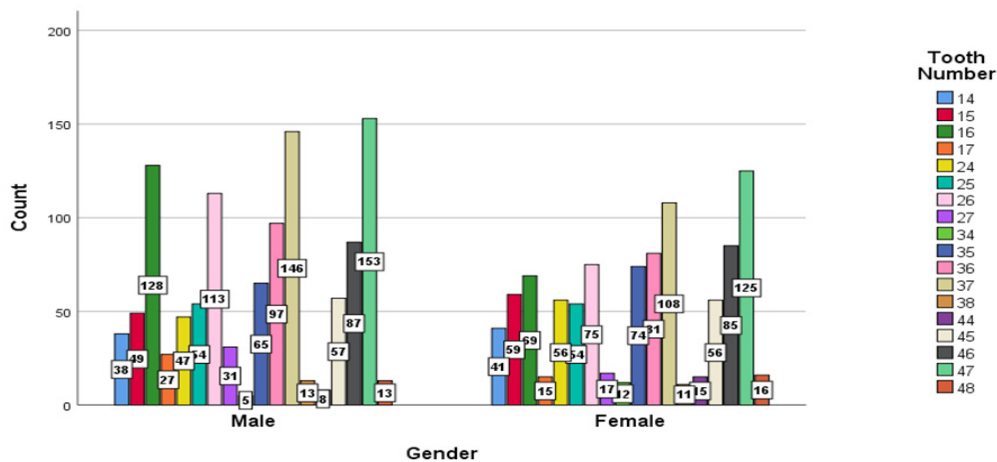

Figure 4. Bar graph representing frequency distribution of tooth number in fdi notation of patient who had caries and underwent amalgam restoration. X-axis represents gender wise categorisation of frequency distribution of patient's tooth number in fdi notation for amalgam restoration and Y-axis represents the number of patients. Where 153 Male patients and 125 female patients underwent amalgam restoration in 47 (Mandibular right permanent second molar).

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and 463 female patients had class I amalgam restoration, 279 males and 265 female patients had class II distal amalgam restoration and 271 males and 241 female patients had class II mesial amalgam restoration. Where 153 Male patients and 125 female patients underwent amalgam restoration in 47 (Mandibular right permanent second molar) (Figure 4).

Discussion

The performance of dental restorations is influenced by several factors, including the restorative materials used, the clinician's level of experience, the type of tooth, the tooth position in dental arch, the restoration design, the restoration size, the number of restored surfaces and the patient's age. Amalgam restorations have a simple technique and are very versatile. For those reasons, most likely amalgam restorations continue to be used very often. The use of amalgam as a restorative material is especially indicated in situations such as presence of extensive caries lesions; posterior teeth, especially those affected by high occlusion forces; difficulties isolating the operative field; sub gingival/dentin preparations, and finally high caries risk patients [36].

Most of the patient who had amalgam restoration was males (1131) compared to females (969). This goes in hand with Enabulele, et al. where there was a male preponderance with males accounting for 59.3% of the study population who underwent restoration. Most common tooth to be restored with amalgam restoration is 47 (Mandibular right permanent second molar). Amalgam restorations could be best restorative material of choice in case of posteriors, non-Esthetics zone, also low technique sensitivity, high longevity, high radiopacity, high compressive strength, excellent wear resistance, appearance easily distinguished from tooth structure and the ability to seal the marginal spaces over time. This study focused on most common tooth to be restored with amalgam restoration. Our study had few limitations such as it's a single centered study, subjects were not available for direct examination and we relied on photographs and case sheets of patients.

Conclusion

Most common tooth to be restored with amalgam restoration is 47 (Mandibular right permanent second molar). Amalgam restorations have served the profession well and will continue to do so in the years to come. In terms of longevity, they are probably superior to composite resins, especially when used for large restorations and cusp capping. The new high copper single composition alloys offer superior properties but may not offer as good seal as older amalgams. The use of amalgam can be continued as a material of choice if esthetics is not a concern.

Acknowledgement

Author Contributions

Santhanam P designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft manuscript. K Anjaneyulu managed the analyses of the study and the literature searches. All authors read and approved the final manuscript.

Conflict of Interest

No potential conflict of interest is declared in this study.

Source of Funding

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