

ASSOCIATION OF GENDER AND TOOTH POSITION WITH SECONDARY CARIES IN CLASS V RESTORATIONS - A RETROSPECTIVE ANALYSIS

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ABSTRACT

Dental caries is one of the most prevalent chronic diseases of people worldwide. Secondary caries is a disease that occurs on the tooth surface after the restoration has been used for a period of time. It is also known as recurrent caries and is predominantly seen cervically or gingivally on restorations. The aim of the study was to evaluate the association of gender and tooth position with secondary caries in class V restoration. Data was collected from June 2019 to March 2020 from the patient records of an institution, Chennai. The inclusion criteria included individuals with an existing restoration, adults above the age of 18 years. d=Data was entered and excel tabulation was done in a methodical manner: [serial number-age-name-gender-tooth number-presence of secondary caries-site] and statistical analysis using SPSS was done to obtain results. Out of the 28 cases in the study, 23 (82.15%) were males and 5 (17.85%) were females. 11 patients (39.28%) had secondary caries in relation to class V restoration in anterior region and 17 patients (47.22%) in posterior region. Within the limitations of this study, it was concluded that male population

had more often secondary caries in association with class V composite restoration than the females. Posterior teeth had more association with secondary caries in class V composite restoration than the anterior teeth. However gender did not affect the presence of secondary caries on teeth sites.

Key words: Class V; Gender; Recurrent caries; Secondary caries

1. INTRODUCTION

Dental caries is also known as tooth decay and it is one of the most prevalent chronic diseases of people worldwide. Human beings are susceptible to this disease throughout their lifetime (Selwitz, Ismail and Pitts, 2007). Therefore, finding ways to prevent or minimize this condition is very important and is an area of the present research (Mahalakshmi Nandakumar, 2018). The process of formation of dental caries is through a complex interaction over time between acid-producing bacteria and fermentable carbohydrate, and many host factors including teeth and saliva. Various risks and factors for caries include physical, biological, environmental, behavioural, and lifestyle-related factors (Selwitz, Ismail and Pitts, 2007). Hence antibacterial agents such as chlorhexidine can be used regularly to help prevent caries (Noor and Others, 2016; Siddique *et al.*, 2019). Secondary caries is a disease that occurs on the tooth after the filling has been used for a period of time. Secondary caries is also the main reason for the replacement of dental restorations (Xiping, 2014). It is thus also known as recurrent caries. It appears to be a localized lesion similar or identical to primary caries. It is most often localized gingivally on restorations. The main locations are areas of biofilm stagnation, such as the cervical margins of restorations (Mjör and Toffenti, 2000). Secondary caries, hence it is considered as primary lesions around restorations. Caries at the margins of restorations is difficult to diagnose, and the relevance of staining and ditching around tooth-colored fillings is unclear.

It has been reported that dentists spend 60% to 75% of their working time replacing restorations (Kidd, Joyston-Bechal and Beighton, 1994). This causes high personal and social cost (Gilmour and Edmunds, 1998). The replacement of restorations is mainly related to the occurrence of secondary caries (Ozer and Thylstrup, 1995; Mjör, 2005). They can be also known as "dental caries near to restorations" (Thomas *et al.*, 2007). Secondary caries may also appear as a wall lesion or a superficial lesion adjacent or next to a restoration. Class V restorations are done when carious lesions are located gingivally, cervical third of the labial or buccal aspect of the anterior and posterior teeth. These restorations represent as one of the less durable types of restorations and have a high index of loss of retention, marginal excess, and secondary caries (Perez, 2010). Problems with class V restoration include difficulty in obtaining moisture control and gaining access to subgingival margins, which further leads to higher prevalence of secondary caries (Fahl, 2015).

Various research has been done to evaluate the durability of class V restorations and its association with secondary caries. However there are many challenges faced during the study. In a study by Alcaraz MG *et al.*, in comparison between amalgam and tooth-coloured resin

restorations, amalgam fillings had lower failure rates and lesser chances of secondary caries in the posterior region of permanent teeth. Secondary caries also occurred less frequently next to or under amalgam fillings compared with composite resin fillings(Alcaraz *et al.*, 2014). According to Mjör I., Overall, 80% to 90% of the clinically diagnosed secondary caries was reported to be located gingivally, irrespective of the type of restoration or restorative material employed (Mjör, 1998). In a study by Ferracane JL., the main reason for the replacement of dental composite restorations in class V was the recurrence of caries. And its formation around dental composites was highly prevalent (Ferracane, 2017). The chemical composition, type, and amount of filler can alter the wear on restorations(Nasim *et al.*, 2018; Rajendran *et al.*, 2019). The most common challenges faced during treatment is the inherent polymerization shrinkage of composites that produce gap formation between tooth/restoration and microleakage has been strongly associated with marginal gap(Ravinthar and Others, 2018). The efficiency of diagnostic aids plays an important role in the treatment plan(Teja, Ramesh and Priya, 2018; Janani, Palanivelu and Sandhya, 2020). There is a need for continuing dental education programs with active participation of general practitioners and specialists to update themselves(Manohar and Sharma, 2018). Many dental practitioners follow a conventional option rather than exploring the newer treatment possibly as they are unaware of the other treatment modalities or the lack of exploration of other methods of treatment(Jose and Subbaiyan, 2020).The purpose of this study was to understand secondary caries and the success/failure of class V composite restorations based on its site and gender distribution.

The aim of the study was to evaluate the association of gender and tooth position with secondary caries in class V restoration.

2. MATERIALS AND METHODS

Study setting:

University based study was conducted retrospectively by retrieving patient records from June 2019 to March 2020. The study was conducted with the approval of the Institutional Ethics Committee [SDC/SIHEC/2020/DIASDATA/0619-0320].

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 from June 2019 to March 2020. Data was entered and excel tabulation was done in a methodical manner: [serial number-age-name-gender-tooth number-presence of secondary caries-site] and statistical analysis using SPSS was done. Incomplete data was managed by excluding from data. The data was exported to SPSS windows version 20 (IBM) for data checking. Data was sorted and represented in frequencies.

Statistical analysis:

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

3. RESULTS AND DISCUSSIONS

Based on this study, the 28 participants assessed had presence of secondary caries in relation to class V restoration. Out of the 28 participants , 23 (82.15%) were males and 5 (17.85%) were females as shown in Figure 1. It was observed that 11 patients (39.28%) had secondary caries in relation to class V restoration in anterior region while 17 patients (47.22%) had secondary caries in relation to class V restorations in the posterior region as shown and Figure 2. Figure 3 shows association between the gender of the patient and the region of secondary caries due to class V restoration in patients, there is higher predilection of secondary caries due to class V restoration in the posterior region among males with 53.57%

Mjör IA et al, stated that the clinical diagnosis of secondary caries was the main reason for replacement of composite class V restorations, however the reasons for replacement of restorations were not associated with the gender of the patients (Mjör, Moorhead and Dahl, 2000). In another study , Demirci M et al, showed that Females (59.1%) showed a higher incidence of secondary caries than males (40.9%). However approximal surfaces showed the highest caries rates in both sexes. Hence gender and age do not affect the prevalence of secondary caries on teeth sites (Demirci, Tuncer and Yuceokur, 2010). These results can be due to the limited sample size and population which alters the findings based on gender distribution.

In our study, secondary caries in relation to class V restoration was predominantly seen in the posterior region with (47.22%). Similarly, in a report by Demirci M et al, caries distribution was higher in the maxillary jaw (62.4%) than in the mandibular jaw (37.6%). The cervical regions of molars demonstrated the highest secondary caries rate, ranging from 58.5% to 77.5%. The cervical regions of canines, premolars and molars showed the highest caries rates in both sexes (15). In a study by Bernardo M, subjects received a total of 1,748 restorations done at the posterior region with composite and Amalgam which the authors followed for up to seven years. The survival rate of the amalgam restorations was 94.4 %; that of composite restorations was 85.5 % . . Secondary caries was the main reason for failure of restorations in both materials. However risk of secondary caries was 3.5 times greater in the composite group. Amalgam restorations performed better than did composite restorations. Use of amalgam appears to be preferable to use of composites in multi surface restorations of

posterior teeth if longevity is the primary criterion in material selection (Bernardo *et al.*, 2007). Similarly, in a study by Kuper NK, Records of 84 patients with 1912 restoration sites were examined. 257 restorations failed due to secondary caries at posterior sites of dentition (Kuper *et al.*, 2012). Resin composite restorations showed increased risk for secondary caries compared to amalgam restorations. Endodontic Therapy is one of the preferred treatment options among the general practitioners in cases where the secondary caries extend into the pulp. The institution had previously conducted a number of studies in various fields of conservative dentistry and endodontics based on the need for endodontic therapy (Ramamoorthi, Nivedhitha and Divyanand, 2015; Ramanathan and Solete, 2015; Kumar and Delphine Priscilla Antony, 2018; Rajakeerthi and Ms, 2019; Teja and Ramesh, 2019). A smooth surface is essential for better esthetics and longevity of restorations and this could be obtained with proper finishing and polishing procedures. Local chemical environment, the durability of the bonded interface, the extent of bacterial penetration, and the presence of mechanical loading influences success of a class V restoration (Kidd, 1990).

The limitations of the study was the limited population and limited sample which greatly influences the results of the findings. Subjective error and bias could occur as well. Future scope of the study is to cover other parts of the population and conduct the study for a larger group over a greater period of time for Better results and understanding.

4. CONCLUSION

Within the limits of this study, male population had more often secondary caries in association with class V composite restoration than with females. Posterior teeth had more association with secondary caries in class V composite restoration than the anterior teeth. However gender did not affect the presence of secondary caries on teeth sites.

5. AUTHOR CONTRIBUTORS

All authors have contributed equally in the conception of the study, study design, data collection, analysis and writing the manuscript of this study.

6. CONFLICT OF INTEREST

There were no conflicts of interest as declared by the authors.

7. ACKNOWLEDGEMENT

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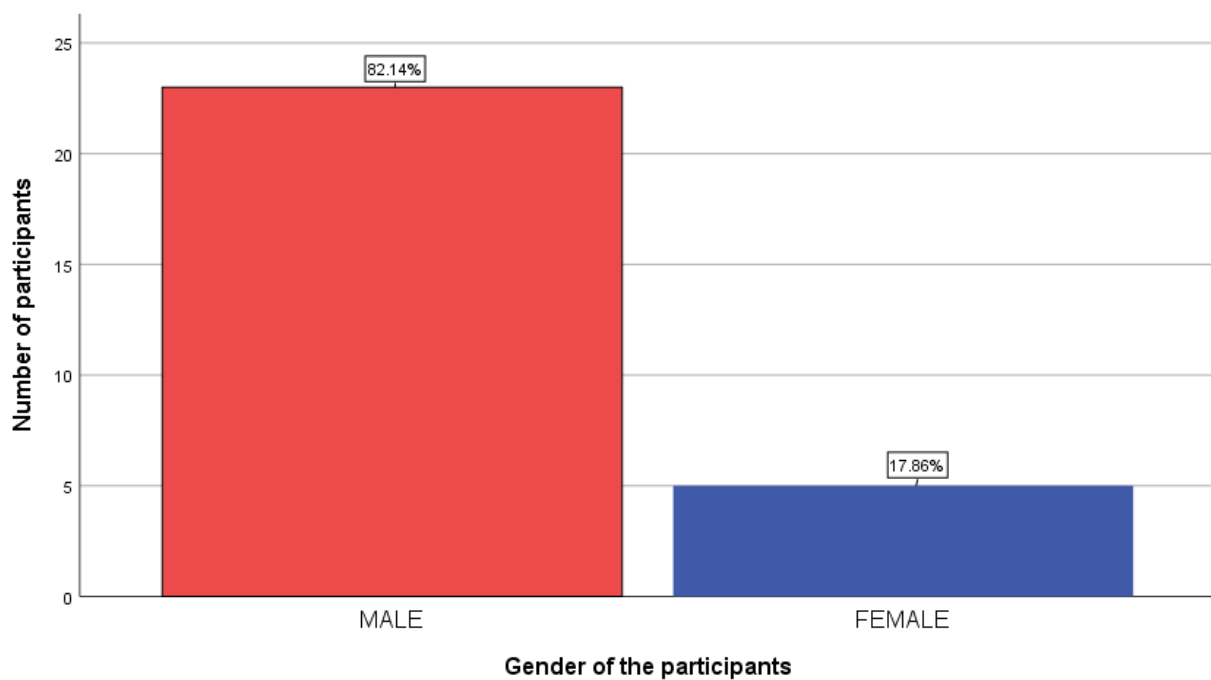


Figure 1: Bar graph showing gender wise distribution of patients with secondary caries in class V restorations. X axis represents the gender of the patient; Y axis represents the number of patients. Among the patients with secondary caries in class V restoration 82.14% were male (red) and 17.86% were female (blue)

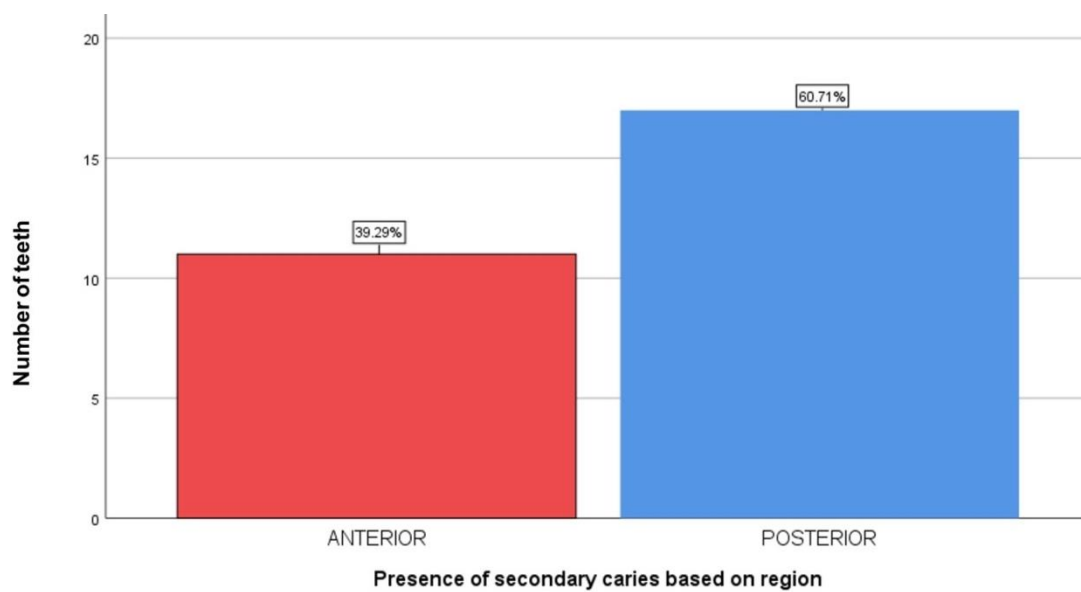


Figure 2: Bar graph showing distribution of teeth with secondary caries in Class V restorations based on position of tooth on the arch. X axis represents the position of the tooth in the arch; Y axis represents the total number of teeth. 39.29% of the teeth having secondary caries in class V restorations were among the anteriors (red), and 60.71% were among the posteriors (blue).

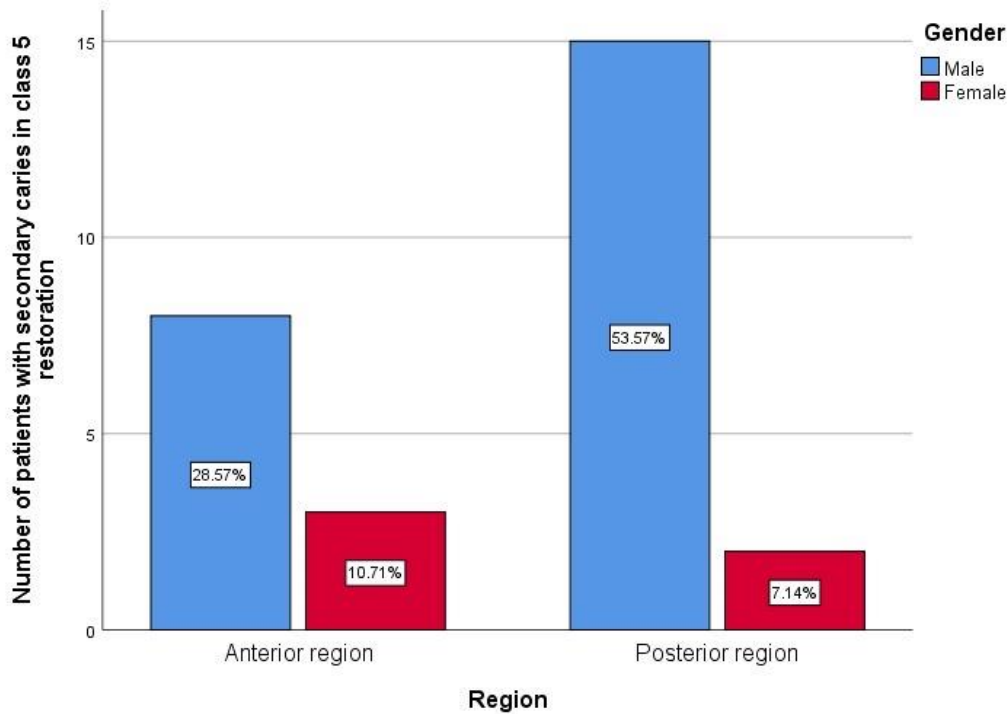


Figure 3: The bar graph represents the association between the gender and the presence of secondary caries in class V restoration in anterior or posterior tooth. X axis represents the position of the tooth in the arch; Y axis represents the number of patients. Among the patients observed 28.57 % were male with disease in anterior teeth, 53.57% were male with disease in posterior teeth, 10.71 % were female with disease in anterior teeth, 7.14% were female with disease in posterior teeth. (Pearson's Chi square test, p value-0.295, p value >0.05, statistically not significant. Association between the gender and the position of tooth in the arch was not established. The analysis shows that the gender did not influence the presence of secondary caries in class V restoration in anterior or posterior tooth.