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Evaluation of Periodontal Health Adjacent to Class V Restoration

NURUL SYAMIMI BINTI MOHD AZLAN SUNIL[1], ARVINA RAJASEKAR[2]*, REVATHI DURAISAMY[3]

[1]Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600 077.
[2]Senior Lecturer, Department of Periodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600 077.
[3]Senior Lecturer, Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600 077.
*Corresponding Author
Email ID: 151501089.sdc@saveetha.com[1], arvivar.sdc@saveetha.com[2], revathid.sdc@saveetha.com[3]

Abstract: Periodontal health and dental restoration are inseparably interrelated. The margin adaptation, the proximal relationship, the contours of restoration and the smoothness of restoration surface have a major biological impact on the gingiva and supporting periodontal structures. Cervical placed restorative margins usually have a detrimental effect of periodontal health. The aim of the present study was to evaluate the periodontal health adjacent to class V restoration. The retrospective study was conducted using the case records of patients in a private dental institution between June 2019 to March 2020. A total of 942 patients (159 females and 783 males) with class V restorations were recruited. Data regarding the periodontal status of the patients were collected from their records. Descriptive and inferential statistics were done using SPSS software. The present study showed 95.1% of teeth demonstrated pocket depth of 1-3 mm and 4.9% had pocket depth of 4mm or more. 65.7% of teeth presented with clinical attachment loss and prevalence was more males (67%) compared to females (59.1%). 84.5% of teeth were observed to have bleeding on probing and prevalence was more in males (85.8%) compared to females (78%). Statistically significant association was found between clinical attachment loss and class V restoration and also between bleeding on probing and class V restoration. Within the limitation of this study, it can be concluded that most teeth with class V restoration presented with clinical attachment loss (65.7%) and bleeding on probing (84.5%). Also, males showed higher prevalence of clinical attachment loss and bleeding on probing when compared to females.

Keywords: Bleeding on probing, clinical attachment loss, class V restoration, periodontal health, pocket depth, innovative

INTRODUCTION

Class V restoration is the restoration of the cervical third of any tooth. Class V restoration is done in both class V caries and non-carious cervical lesions such as cervical abrasion. Periodontal health and dental restoration are inseparably interrelated. The margin adaptation, the proximal relationship, the contours of restoration and the smoothness of restoration surface have a major biological impact on the gingiva and supporting periodontal structures (Vacaru *et al.*, 2003). Dental restorations, especially tooth coloured restorations are used in class V caries and non carious cervical lesions to cover the dentin and reduce sensitivity. It also improves the appearance of a single tooth or dentition as a whole (Christensen, 1985; Peumans *et al.*, 1998; Vacaru *et al.*, 2003).

Class V restoration margins are usually in direct contact with the gingival and sometimes periodontal tissues, which may cause inflammation to the gingival and periodontal tissues if restoration is not properly placed. Many authors have reported that gingival inflammation due to restoration can be avoided with good oral hygiene and perfect marginal adaptation of restoration (Blank, Caffesse and Charbeneau, 1979, 1981; Barham *et al.*, 1983; Dunkin and Chambers, 1983; van Dijken, Sjöström and Wing, 1987). Some studies reported an increase in plaque accumulation and gingival inflammation after more than 3 years of composite restoration (Van Dijken, Sjöström and Wing, 1987; Smales and Gerke, 1992). A detrimental relationship between cervical placed restorative margins and periodontal health have been investigated in a number of studies (Alexander, 1968; Leon, 1976). Gingival inflammation is more commonly observed in restoration with subgingival finish

while there is no statistically significant difference in gingival and periodontal condition associated with supragingival finished restorations from contralateral non-restored surfaces (Silness, 1974; Leon, 1976).
Tavanger et al. have found that class V overhanging restoration was observed in 38.1% of patients (Tavangar *et al.*, 2016). Overhanging restoration is known to have an important role in decay, plaque accumulation and periodontal disease (Paolantonio *et al.*, 2004). A study by Ababneh et al. reported that class V restoration demonstrated the highest attachment loss compared to other classes of restoration (Ababneh, Al-Omari and Alawneh, 2011; Tavangar *et al.*, 2016). Class V resin restorations also have negative effects on the quantity and quality of subgingival plaque (Paolantonio *et al.*, 2004; Gurgel *et al.*, 2016). Over the past 5 years, our team had conducted innumerable clinical trials (Panda *et al.*, 2014; Thamaraiselvan *et al.*, 2015; Khalid *et al.*, 2017; Priyanka *et al.*, 2017; Ramesh, Ravi and Kaarthikeyan, 2017; Ravi *et al.*, 2017; Kavarthapu and Thamaraiselvan, 2018; Ramamurthy and Mg, 2018; Ramesh *et al.*, 2019), article reviews (Khalid *et al.*, 2016; Mootha *et al.*, 2016; Ramesh, Sheeja Saji Varghese, *et al.*, 2016; Ramesh, Sheeja S. Varghese, *et al.*, 2016; Avinash, Malaippan and Dooraiswamy, 2017) and in-vitro study (Varghese *et al.*, 2015). Our department is passionate about research we have published numerous high quality articles in this domain over the past years ((Kavitha *et al.*, 2014) , (Praveen *et al.*, 2001),(Devi and Gnanavel, 2014), (Putchala *et al.*, 2013), (Vijayakumar *et al.*, 2010), (Lekha *et al.*, 2014a, 2014b) (Danda, 2010) (Danda, 2010) (Parthasarathy *et al.*, 2016) (Gopalakannan, Senthilvelan and Ranganathan, 2012), (Rajendran *et al.*, 2019), (Govindaraju, Neelakantan and Gutmann, 2017), (P. Neelakantan *et al.*, 2015), (PradeepKumar *et al.*, 2016), (Sajan *et al.*, 2011), (Lekha *et al.*, 2014a), (Neelakantan, Grotra and Sharma, 2013), (Patil *et al.*, 2017), (Jeevanandan and Govindaraju, 2018), (Abdul Wahab *et al.*, 2017), (Eapen, Baig and Avinash, 2017), (Menon *et al.*, 2018), (Wahab *et al.*, 2018), (Vishnu Prasad *et al.*, 2018), (Uthrakumar *et al.*, 2010), (Ashok, Ajith and Sivanesan, 2017), (Prasanna Neelakantan *et al.*, 2015).
In this context, the study was undertaken to evaluate the periodontal health adjacent to class V restoration.

MATERIALS AND METHODS

A retrospective study was conducted to evaluate the periodontal health adjacent to class V restoration. The study was done using the case records of patients in a private institution between June 2019 to March 2020. Prior permission to utilize the data for study and analysis was obtained from the Institutional Research Committee of the University under ethical approval number SDC/SIHEC/2020/DIASDATA/0619-0320.
A total of 942 patients with class V composite restorations which included 159 females and 783 males were recruited. Data regarding periodontal status of patients were collected from their records. and was assessed. Descriptive (frequency distribution and percentage) and inferential statistics (chi-square test) were done using SPSS software.

RESULTS AND DISCUSSION

A total of 942 patients including 159 females and 783 males were included in the study. Each patient presented with a class V composite restoration, and hence a total of 942 teeth with class V composite restoration was assessed for the periodontal health status in the present study. Based on pocket depth, majority of class V restorations (95.1%) showed pocket depth of 1-3mm for both males and females and 4.9% of teeth had pocket depth more than 4mm. However, there was no statistically significant association between class V restorations and pocket depth (p=0.263)(Figure 1).
According to clinical attachment loss, it was found that 34.3% of teeth had no clinical attachment loss whereas 65.7% of teeth had clinical attachment loss and clinical attachment loss was higher in males (67%) compared to females (59.1%). Statistically significant association was found between class V restoration and clinical attachment loss. (p=0.05)(Figure 2).
When bleeding on probing was assessed, 84.5% of teeth demonstrated bleeding on probing and 15.5% of teeth showed no bleeding on probing. Bleeding on probing was more in males (85.8%) when compared to females (78%). Statistically significant association was found between bleeding on probing and class V restoration (p=0.013)(Figure 3).
The present study assessed the periodontal health adjacent to class V restoration. In our study, we found that most of class V restoration has a pocket depth of 1-3mm. Ababneh et al. studied the effects of dental restoration type and material on periodontal health (Ababneh, Al-Omari and Alawneh, 2011). His study reported pocket depth adjacent to class V restoration to be between 1.75mm to 2.29mm (Ababneh, Al-Omari and Alawneh, 2011). This finding was in agreement with our study and adds consensus to our current finding.
In the present study, bleeding on probing was reported in 84.5% of teeth with class V restoration. In agreement to our current finding was an article by Willershausen et al. who found that bleeding on probing was observed in 74.3% in class V restoration (Willershausen, Köttgen and Ernst, 2001). Gurgel et al., also reported significant bleeding on probing around teeth with class V restoration (Gurgel *et al.*, 2016).
The present study showed most teeth with class V restoration presented with clinical attachment loss and bleeding on probing and these were more prevalent in males than females.

CONCLUSION

Within the limitation of this study, it can be concluded that most teeth with class V restoration presented with clinical attachment loss (65.7%) and bleeding on probing (84.5%). Also, males showed higher prevalence of clinical attachment loss and bleeding on probing when compared to females.

Authors Contribution

Nurul Syamimi binti Mohd Azlan Sunil performed the analysis, interpretation and drafted the manuscript. Arvina Rajasekar contributed to conception, data design, analysis, interpretation and critically revised the manuscript. Revathi Duraisamy participated in the study and revised the manuscript. All the three authors equally contributed to the manuscript.

Conflict of Interest

None declared.

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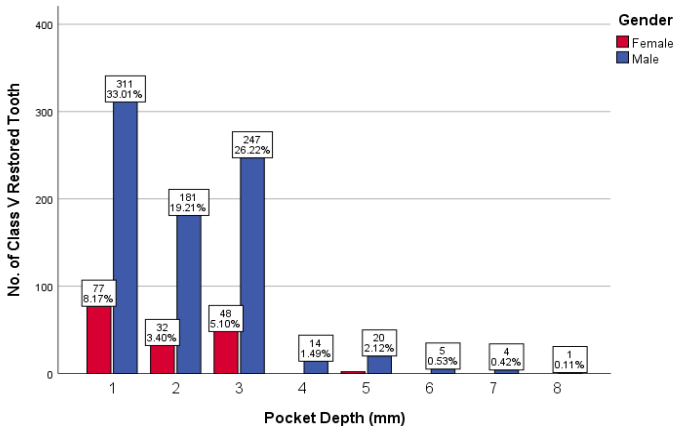

Fig.1: Bar graph depicting the association between class V restoration in males and females and

pocket depth. X-axis represents the pocket depth and Y-axis represents the number of class V restoration. Majority of class V restorations showed pocket depth of 1-3mm for both males and females. Pocket depth of 1-3mm was more prevalent among males (blue) when compared to females. Association between class V restoration and pocket depth was statistically not significant (Chi-square analysis, p value= 0.263).

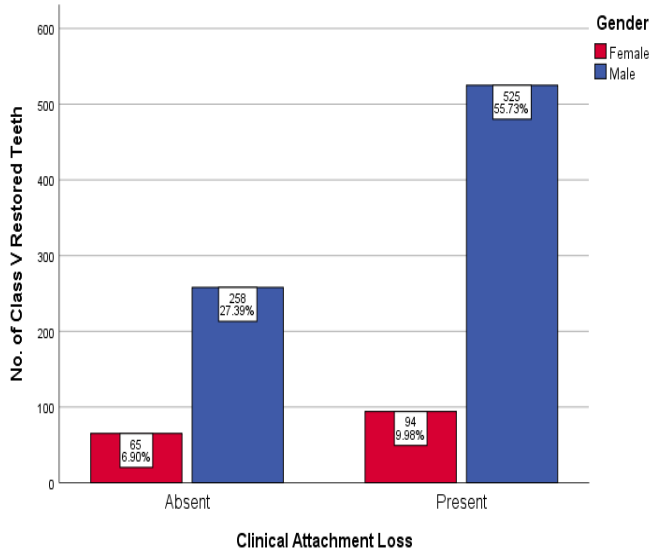

Fig.2: Bar graph depicting the association between class V restoration in males and females and the clinical attachment loss. X-axis represents the clinical attachment loss and Y-axis represents the number of class V restoration. Clinical attachment loss was observed among both males and females. However, it was more prevalent among males (blue) when compared to females. Association between class V restoration and clinical attachment loss was statistically significant (Chi-square analysis, p value= 0.05)

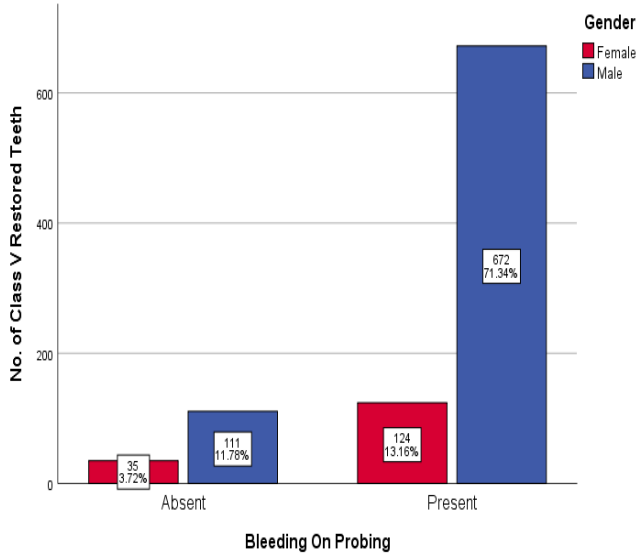

Fig.3: Bar graph depicting the association between class V restoration in males and females and bleeding on probing. X-axis represents the bleeding on probing and Y-axis represents the number of class V restoration. Bleeding on probing was observed among both males and females. However, it was more prevalent among males (blue) when compared to females. Association between class V restoration and bleeding on probing was statistically significant (Chi-square analysis, p value= 0.013).