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Incidence of Pocket Depth More than 3 MM in Maxillary Premolars and Molars with a Class II Restoration

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Abstract

Aim: To study the incidence of periodontal pocket depth more than 3mm in maxillary premolars and molars with class 2 restorations. Introduction: A class II restoration of a tooth and its status of periodontal health are closely related. A healthy periodontium is required for the proper functioning of all restorations while the functional stimulation due to dental restorations is essential for periodontal protection. Materials and Method**s**: It is a retrospective study in which we reviewed patient records and analysed the data of 86000 patients between June 2019 and March 2020, out of these patients we collected the data of 885 patients who had class II restoration done.The data was compiled into class II restorations with pocket depth more than 3 mmm and less than 3 mm, reviewed, tabulated and exported to SPSS software for statistical analysis. Result**:** Incidence of pocket depth more than 3mm in Class II amalgam restorations was 3.42% out of 614 samples and in Class II LCR restorations was 3.69% out of 271 samples. In comparison of incidence of pocket depth more than 3 mm in both amalgam and composite class II restorations amalgam is 2.37% and composite is 1.13%. Conclusion: Within the limits of study, it can be concluded that incidence of pocket depth more than 3mm in maxillary premolars and molars with class II amalgam restoration was less (3.42%) compared with composite (3.69%). However on comparison between amalgam and composite the mean pocket depth was more in amalgam.

Keywords*: Periodontal pocket;class II restoration ; amalgam; composite; pocket depth*

Introduction

Dental restoration and periodontal health are closely related, a healthy periodontium is needed for the proper functioning of all the restorations while the functional stimulation due to dental restoration is essential for periodontal protection.[1,2] An adequate treatment must take into account to carry out the correct dental anatomy as follows[3]-Occlusal surfaces should be made in such a manner that forces are directed along the longitudinal axis of tooth.[4,5] Cuspal slopes of improper restoration in retention with the antagonist tooth can trigger enlargement of the contact point during functional movements.[6] This allows interdental impact of foodstuff with devastating conquest effects on interproximal periodontal tissues.[4,7] Marginal occlusal ridges must be placed above the proximal contact surface and must be rounded and smooth so as to allow access the dental floss. Proximal surface must be divergent,beginning from contact area towards vestibular direction orally and apically.[3,8] They must be smooth and polished and the interdental area must be correctly made,in order to prevent the settling of food in interdental spaces.[8,9]

Alteration of interproximal contact surface entails food retention, gingival inflammation, pocket formation, bone loss and finally dental mobility.[10,11] Food settling is a common cause of chronic marginal gingiva and periodontal pathologies. The reason why the contact

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surface in a lateral tooth must be situated at 1-2mm in length in occluso-gingival direction and it will measure approximately 25% of the oro-vestibular width of neighbouring tooth, in the upper arch the contact surface is situated slightly towards vestibular area, from the median mesio-distal line. These surfaces, if well proportioned, play an important role in maintaining gingival health.[10,12] Undercontoured vestibular and oral surfaces may alter the normal route of food and cause its stuffing and accumulation in the gingival groove.[10,13] Over countering will deviate food beyond the marginal mechanical action of food which can stagnate in overprotected gingival groove. Cervical extension of restorations should be placed possibly supragingival and it should present an optimal marginal closing.[14,15] The microscopical spaces at the tooth restoration interface constitute niches for plaque accumulation.[16,17]

From the periodontal point of view, the most important element is the gingival niche(embrasure).[16,17] Periodontal disease triggers tissue destruction,diminishing the level of the alveolar bone and creating greatly enlarged interdental spaces.[17,18] Restorations can be made to respect the coronal and radicular morphology,maintaining the embrasure enlarged and the interdental space open.[17,19] Teeth can be remodelled through restorations so as the gingival embrasure is replaced near the new level of gingiva.[17] This is made by modifying the contour of the proximal surfaces and by placing the contact areas more apically.[17 20,21]The interdental gingiva takes again the normal shape, filling the new embrasure, which must have adequate dimensions.[22–24]As dental restorations and periodontal health are closely related this study was aimed at finding out the incidence of periodontal pocket more than 3 mm in maxillary premolars and molars with class II restorations.

Materials and Methods

This is a retrospective study regarding the incidence of periodontal pocket more than 3 mm in maxillary premolars and molars with class II restorations in patients who visited Saveetha Dental college and Hospitals in between June 2019 March 2020. The approval for this university setting study was obtained from the Institution Ethics Board. The study was reviewed by 2 reviewers and was cross verified.

Inclusion criteria - Patients with class II restoration,Vital tooth

Exclusion criteria - Patients without class II restoration,Patients who have undergone periodontal surgeries, Patients with orthodontic appliances

Data was obtained by reviewing the patient records and analysing 86000 patients between June 2019 and March 2020, out of these the data of 885 patients who had undergone class II restorations was collected. This data was compiled into class II restorations with pocket depth more than 3 mmm and less than 3 mm. After retrieval it is tabulated in excel and then imported to SPSS(Statistical Product and Service Solutions) software by IBM. Variables were defined and selected .

The following parameter was evaluated:

Probing Pocket depth: The probing Pocket depth were carried out at six sites for every tooth (mesiobuccal, mid buccal, distobuccal, mesiolingual, midlingual and distolingual using WHO periodontal probe) The periodontal probing score on the side (mesial or distal) of the restoration was considered.

Statistical Analysis

After further verification by an external reviewer, it was imported to the SPSS Version 20 by IBM for statistical analysis.Descriptive statistics and chi square test were performed and graphs were plotted to arrive at final results. A p-value less than was of less than 0.05 was considered as statistically significant.

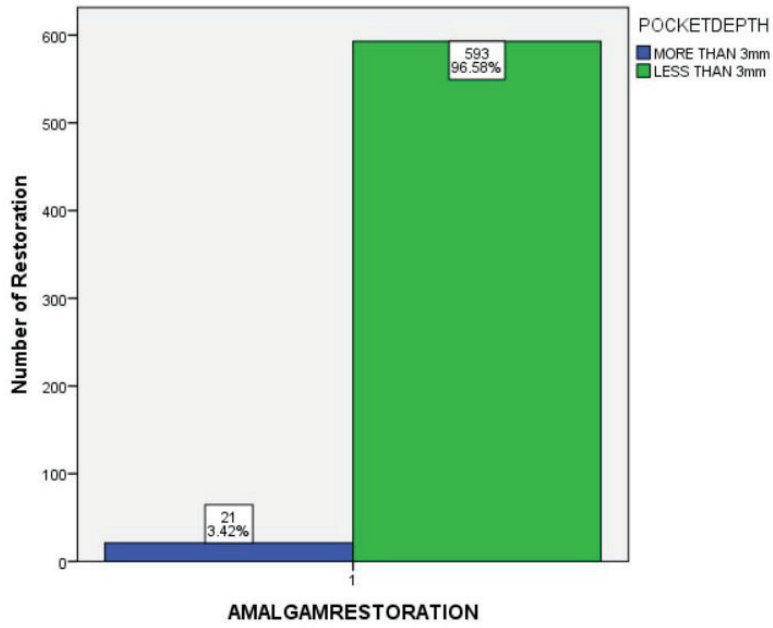
Results & Discussion

In this retrospective study we compared the incidence of periodontal pocket depth more than 3mm in maxillary premolars and molars with class II restorations. The incidence between two commonly used direct restorations amalgam and composite are compared in this study. The survival of dental amalgam is twice as high compared with composite filling, this is because of various factors like polymerisation shrinkage, deficient marginal adaptation, higher wear rates, defective contact points leading to food impactions, insufficiently converted composite at the bottom of the cavity are problems that cannot be underestimated when using resin-composite.[25,26,27] This does not imply that there is no weakness for amalgam: the need for retentive cavities at the cost of healthy tooth surface, weakening of tooth's strength by cutting through tooth's crown's ridges, the

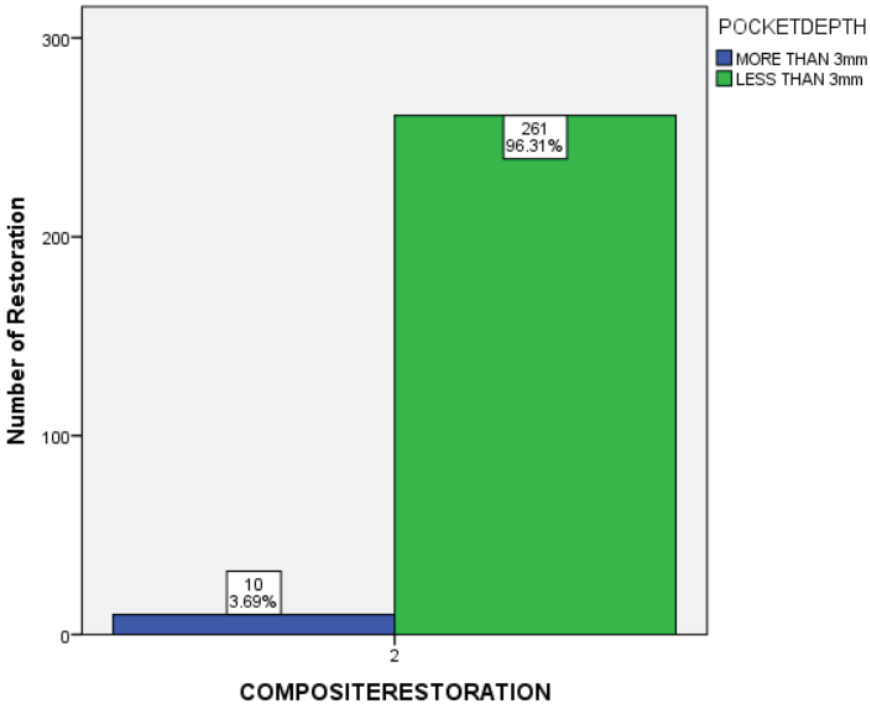
risk of fracture of remaining tooth substance as the result of cavity design and the lack of adhesion between amalgam and tooth substances.[28,29] The incidence of pocket depth more than 3mm in amalgam restorations. 614 amalgam restorations were done in a time period from June 2019 to March 2020.The incidence of pocket depth more than 3mm was found to be 3.42% in amalgam restorations(Graph 1). The incidence of pocket depth more than 3mm in composite restorations.271 composite restorations were done in a time period from June 2019 to March 2020. The incidence of pocket depth more than 3mm was found to be 3.69% in composite restorations(Graph 2). The comparison of pocket depth in both amalgam and composite restoration shows that in amalgam it is 2.37% whereas in composite it was found to be 1.13%(Graph 3). Levin L et al., and Kim K et al., stated that class II amalgam restoration has more incidence of pocket depth compared to composite.[30,31] However there are studies in which results indicated that class II composite restorations have more incidence of periodontal pocket compared to class II amalgam.[26,32-36] The other studies may have used a different diagnostic criteria..[26,32–36] As the control in other studies were normal teeth without any restorations whereas the control in the present study were the teeth with class II restoration less than 3mm pocket depth. The comparison of pocket depth of pocket depth of more than 3 mm in between maxillary premolars and molars with a class II restoration, it was found that molars had more incidence of pocket depth more than 3 mm with 21 teeth than premolars with 10 teeth(Graph 4).

The main objective of matrix systems is to reproduce the natural proximal contour of a contact that is tight enough to prevent food impaction, which is crucial for the healthy maintenance of underlying periodontal tissues.[37] Increased gingival inflammation and attachment loss, apart from the presence of overhanging restorations, have also been attributed to plaque accumulation due to loose proximal contacts.[38,39] However, alveolar bone loss is not directly attributed to open interproximal contacts but is strongly related to the overall periodontal status of the patient.[40] Annoyance and discomfort have been reported by patients who experience food impaction4 at sites of open contact.[40] On the other hand, the contact point must not be too strong, in order to avoid the shredding and impaction of dental floss fibers interproximally or periodontal trauma induced by excessive force applied during flossing.[40]

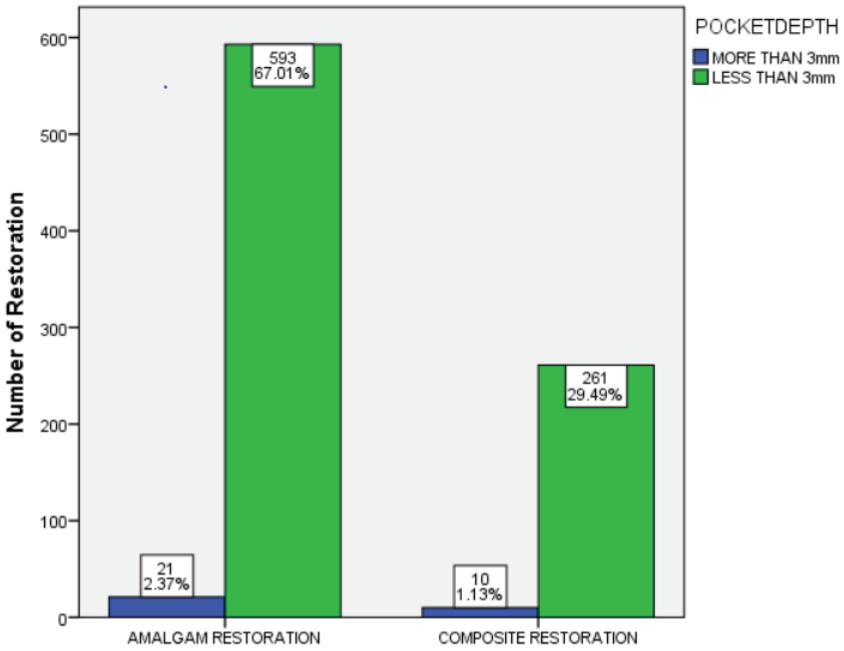
Hence, various researches were done to overcome these problems by improving material characteristics and application techniques. The choice of the matrix system, separation technique and restorative material is an important factor.[41]Conventionally Tofflemire matrix systems were used but failed to create tight proximal contacts.[41] This might also be a reason for periodontal pocket formation in class II restorations. In several in vitro and in vivo studies, sectional matrix systems in combination with separation rings showed tight proximal contacts in two surface Class II cavities.[41] There are two reasons for a successful restoration: to reproduce the natural contour with tight proximal contact and proper oral hygiene maintenance by the patient after the restoration. Further studies can be done on prognosis of class II restorations with advanced sectional matrix systems.



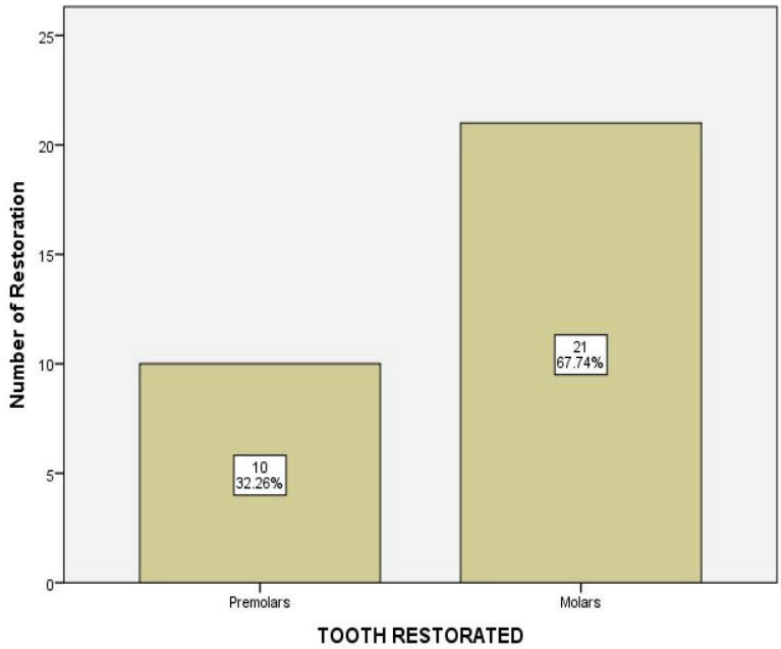
Graph 1 represents the Incidence of pocket depth more and less than 3mm in amalgam restorations. X axis represents pocket depth more and less than 3mm and Y axis shows the number of restorations where blue bar denotes the number of amalgam restoration with pocket depth more than 3mm and green bar denotes the number of amalgam restoration with pocket depth less than 3mm. Out of total 614 amalgam restorations, 21 restorations(3.42%) had pocket depth more than 3mm which is less when compared to 593 restorations(96.58%)which had pocket depth less than 3mm.



Graph 2 represents the Incidence of pocket depth more than 3mm in composite restorations. X axis represents pocket depth more and less than 3mm and Y axis shows the number of restorations where blue bar denotes the number of composite restoration with pocket depth more than 3mm and green bar denotes the number of composite restoration with pocket depth less than 3mm. Out of total 271, 261 restorations(96.31%)had pocket depth less than 3mm which is more when compared to 10 restorations(3.69%)which had pocket depth more than 3mm.



Graph 3 It represents the comparisons between the pocket depth more than 3mm in both amalgam and composite restoration. X axis shows the types of restorations-amalgam and composite restorations and Y axis shows the restorations with pocket depth more and less than 3mm where blue bars denote the number of restoration with pocket depth more than 3mm and green bar denote the number of restoration with pocket depth less than 3mm. It shows that pocket depth more than 3mm in amalgam restoration is (2.37%) which is more when compared to composite restoration (1.13%). (Chi square test was done with p value 0.841, where P value > 0.05, statistically not significant association).



Graph 4: This graph represents the incidence of pocket depth more than 3mm in maxillary premolars and molars with class II restoration. X axis shows the maxillary premolars and molars with class II restoration and Y axis shows the number of restorations with pocket depth more than 3mm. It shows that the maximum number of class II restorations with pocket depth more than 3mm was found in maxillary molars(67.74%) followed by maxillary premolars(32.26%).

Conclusion

Within the limitation of this study it concluded that class II amalgam restoration have more incidence of pocket depth more than 3mm with 2.37% than class II restoration which was 2.37% in maxillary premolars and molars.

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Ethical Clearance: It is taken from "Saveetha Institute Human Ethical Committee" (Ethical Approval Number- SDC/SIHEC/2020/DIASDATA/0619-0320)

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