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The prevalence of overhanging margins in posterior amalgam restoration

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Abstract: *Periodontal structures are vital tissues that could be affected by the surrounding environment. Dental materials and/or restorations may trigger negative response such as gingival inflammation and bone loss from periodontal tissues. The objective of this study was to report the prevalence of overhang interproximal amalgam restorations. Twenty (20) patients aged between 18 - 40 years were randomly selected for the study. Posterior bitewing radiographs were taken, and 640 proximal surfaces were examined.*
Statistical Package for Social Sciences (SPSS) was used for data analysis. Chi square test was utilized to assess the relationship between the location and the surface of the overhang. It was found that out of 106 surfaces restored with amalgam, 33% were over-hanged. Among the overhanging amalgam restorations, 71% were in maxillary posterior teeth and 29% in mandibular posterior teeth. Out of the overhanging amalgam surfaces, 60% were mesial and 40% distal surfaces. There was no significant (P>0.05) difference in the prevalence of overhanging amalgam restorations between molars (43%) and premolars (57%). This study has clearly identified a high prevalence of overhanging interproximal margins in amalgam restorations.
Keywords: *Amalgam overhang, periodontal destruction, dental amalgam.*

I. Introduction

Overhanging inter-proximal restorations have long been viewed as a contributing factor towards gingivitis and possible periodontal attachment loss.1 Overhanging restorations pose a significant concern, as their prevalence has been estimated at 25-76% for all restored surfaces.1 It is generally accepted that overhanging restorations contribute to gingival inflammation due to their retentive capacity for bacterial plaque. Gilmore *et al* (1971)2 demonstrated inter-proximal radiographic bone loss in posterior teeth associated with overhanging restorations. Jeffcoat *et al* (1980)3 evaluated 100 teeth with overhangs and 100 without overhangs; they reported greater bone loss around teeth with large overhangs. However; small overhangs were not associated with bone loss.

In addition, Lang *et al* (1983)4 investigated the specific aspects of the local bacterial accumulation associated with overhanging restorations. The placement of subgingival overhangs resulted in changes in the associated microflora similar to those observed in adult chronic periodontitis. Increased proportions of gram-negative anaerobic rods, in particular black pigmented bacteriodes were observed. Therefore, overhang restorations not only increase plaque mass, but also increase the specific periodontal pathogens in the plaque.

They also can cause damage by impingement of the biological width and embrasure spaces. The objective of this study was to report the prevalence of overhanging inter-proximal amalgam restorations performed by undergraduate students at the School of Dentistry; University of Sulaimani.

II. Methodology

Twenty patients were randomly selected aged between 18-40 years. Posterior bitewing radiographs were taken with Kodak Ektaspeed films utilizing paralleling technique at 70 kilovolts (peak) [kV (p)] and 7 mA using a 70 x-ray unit (SIEMENS® model Heliodent, Germany). The exposure time was 0.20 seconds. six hundred and forty (640) proximal surfaces were examined of which 106 surfaces were restored with amalgam. Third molars, overlapped proximal surfaces and teeth adjacent to spaces were excluded from the study.

Examination was performed by four clinician. Radiographs were viewed under standardized conditions using a constant light source on an x-ray viewer in a dark room. The data were analyzed using SPSS Version #15. *Chi square* test was utilized to assess the relationship between the location and the prevalence of overhanging surfaces.

III. Results

Sixty nine posterior bitewing radiographs were examined representing 320 teeth with 640 proximal surfaces of which 106 were restored with amalgam. Of all the 106 proximal surfaces restored with amalgam, 35 (33.0%) had overhanging margins. While comparing the overhanging restorations between upper and lower teeth, it was found that 25 (71%) of the maxillary posterior teeth had overhanging amalgam margins as compared to only 10 (29%) in mandibular posterior teeth [Table 1].

Out of the overhanging amalgam surfaces, 60% were mesial and 40% distal surfaces. The difference was not statistically significant ($P > 0.5$) [Table 1]. Similarly, there was no significant ($P > 0.05$) difference in the prevalence of overhanging amalgam restorations between molars (43%) and premolars (57%) [Table 1].

The highest prevalence of overhanging margins was on the mesial surfaces of the upper molars (30%);

while the least prevalence was on the distal surfaces of the lower molars (4.3%). Prevalence of overhanging amalgam margins at the mesial surfaces of the premolars was higher in the upper teeth (14.3%) than the lower teeth (7.1%). On the other hand, prevalence of amalgam over hangs at the distal surfaces of the premolars was higher in the upper teeth (15.7%) than in the lower teeth (10%).

Among molars; prevalence of overhangs at the mesial surfaces of molars was higher in upper teeth (30%) than in lower teeth (5.7%), and prevalence of overhangs at the distal surfaces of molars was higher in upper teeth (12.9%) as compared to lower teeth (4.3%) [Fig1].

IV. Discussion

There is no doubt regarding the destructive effects of overhanging restorative margins on the supporting periodontal structures.2-13 Recently, Roman-Torres *et al* (2006)14 and Mokeem (2007)15 reported the effect of overhang removal on periodontal parameters. Mokeem (2007)15 reported significant reduction on probing depth, gingival index, and gingival crevicular fluid after removal of overhang amalgam restorations.

The prevalence of overhanging amalgam margins found by this study (33%) was lower as compared to several other studies; Hakkaranein and Ainamo6 (50%), Sikri and Sikri7 (64.12%), Lervik *et al*8 (87%), Gorzo *et al*9 (74%), Wright10 (57%), Coxhead11 (76%) and Coxhead *et al*12 (52%). The difference could be attributed to the fact that the present sample was obtained from a dental college where all procedures are expected to be closely supervised by dental faculty; while previous samples were gathered from general dentists' clinics. The amalgam overhangs were more prevalent on the upper teeth than the lower teeth, which could be attributed to the easier accessibility of the lower teeth during restoration as compared to the upper teeth. No statistical difference between the amalgam overhang prevalence between mesial and distal surfaces; and between molars and premolars, may be attributed to a relatively smaller sample size.

V. Conclusions

• This study has identified a high prevalence of overhanging interproximal margins in amalgam restorations.
• A greater emphasis on the prevention, recognition and prompt removal of overhanging margins of amalgam restoration is required in order to minimize the risk to periodontal health.

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Table 1: Distributions Of The Amalgamoverhangs

	Percentage	Number	*P-value*
Upper	71%	25	0.026
Lower	29%	10	
Mesial	60%	21	0.425
Distal	40%	14	
Premolar	53%	16	0.753
Molar	47%	19	

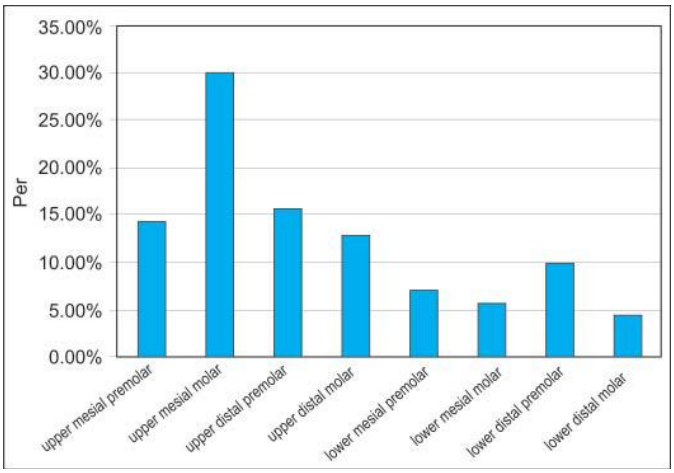

Fig 1: Distribution of the amalgam overhangs according to the surfaces