

Prevalence of overhang margins in posterior amalgam restorations and alveolar bone resorption

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ABSTRACT

Background: Overhanging dental restorations (ODR) are a major dental health problem, it is an etiologic factor in the progression of periodontal disease, and are alarmingly prevalent. The purpose of this study was to determine the prevalence of overhang margins and associated periodontal status in 100 patients, clinically detectable overhang margins were recorded on posterior teeth.

Materials and Methods: Overhanging margins on a proximal restoration were detected by using of bitewing radiographs. 2089 restored surfaces were evaluated, of these 1185 had overhanging margins.

Results: As far as related to their effect (ODR) on periodontal health, significantly more bone loss-attachment occurs adjacent to ODR compared to teeth without ODR.

Conclusion: This study show high prevalence of overhanging amalgam margins, further more, this study show that ODRs have a significant influence on periodontal status.

Keywords: Overhang, amalgam, bone resorption. (J Coll Dentistry 2005; 17(1): 11-13)

INTRODUCTION

Overhanging dental restorations (ODR) are a major dental health problem. An ODR is defined as an extension of restoration material beyond the confines of a cavity preparation^(1, 5). They have been strongly implicated as an etiologic factor in the progression of periodontal disease and alarmingly prevalent^(4, 15, 26). In addition to promoting plaque accumulation, they change a nondestructive subgingival flora to a destructive one^(3, 8, 10, 15). There is good documentation that bleeding, gingivitis, and bone loss increase in tissue adjacent to ODR as compared to homologous teeth^(11, 12, 14, 22). Many investigators^(1, 2, 19-26) have reported upon the adverse effect of poor restorations on the health of the adjacent periodontal tissue. The relationship of ODR to periodontal disease has been studied by three methods^(9-14, 18, 19). The most common method is to compare the periodontal status of teeth with ODR with homologous teeth without ODR^(12, 19).

Another approach utilized extracted teeth to directly measure attachment on tooth surface with and without ODR^(14, 18). By the third method, intentionally placed ODR were studied in humans for their effects on the subgingival microflora and periodontal tissue⁽¹⁵⁾.

The purpose of this study was to determine the prevalence of overhang margins and associated bone resorption in patients who had attended conservative and periodontal departments in the College of Dentistry, University of Baghdad.

MATERIALS AND METHODS

One hundred patients were recruited from those who attended conservative and periodontal departments seeking for operative or periodontal treatment. Suitable subjects had to have posterior teeth present in at least two quadrants; patients with complicated medical conditions were excluded. Intra oral examination in which premolar and molar (excluding third molars) were evaluated for loss of attachment at six sites around each tooth. Subsequently all mesial, distal, buccal and lingual surfaces of the same tooth assessed using fine sharp sickle probe⁽¹⁷⁾, and scored for the presence or absence of overhang margins;

Score 0 = unrestored surface

Score 1 = restoration within 1 mm. of the gingival margin or below, but without clinically detected overhang margin.

Score 2 = restoration within 1 mm. of gingival margin or below, but with clinically detected ledge indicative of overhanging margin.

At completion of the clinical examination, posterior bitewing radiographs (Kodak, Japan) were taken. Radiographs were then viewed under standardized conditions, using a constant

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light source and no magnification, to measure the level of alveolar bone.

Overhanging margins were recorded on mesial or distal surface, and if the radiograph image showed a step or ledge extending beyond the normal smooth profile of the tooth, or a “beveled” appearance at the base of a proximal restoration, it was attributed to overhang margin present in a concavity on the surface of the tooth⁽¹⁷⁾.

Proximal surfaces were scored from the radiographs as follows;

Score 0 = unrestored surface.

Score 1 =restoration without visible overhanging margins.

Score 2 =restoration with visible overhanging margin in a tooth adjacent to another tooth.

Statistical Analysis

Computation for the contingency table analysis (x) were performed, also probability and t-test, to verify the significance of alveolar bone loss.

RESULTS

In this study the range of the age of one hundred subjects were (20—56 years), (25) subjects had no missing teeth, the other (75) subjects had missing teeth. (2089) Restored surfaces were evaluated, from (5089) surfaces that were examined, and the other (3000) surfaces were with no restorations.

In applying the statistical method, table (1) show the number and percentage of overhanging margins detected clinically and / or radiographically on a proximal restoration. When comparing the restorative status of mesial, distal, buccal and lingual surfaces, there was a significant difference between lingual and buccal surfaces when compared with mesial and distal surfaces. This indicated that none proximal sites had a much lower prevalence of overhanging margins. There were no statistically significant differences between mesial and distal sites or between buccal and lingual sites.

Periodontal disease and overhangs:

In this study the relationship of ODR to the periodontal disease has been studied by measuring attachment loss on tooth surfaces with and without ODR, also the radiographic alveolar bone levels were measured. Table (2) shows high percentage of loss of attachment in mesial and distal restored surfaces with overhang margins comparing with lingual and buccal sites, this table also show high difference

in the loss of attachment between restored with overhang and restored without overhang.

Table (3) shows the level of alveolar bone loss. In this investigation the bone loss was measured on mesial and distal sites only when the cemento-enamel junction could be seen radiographically and could be measured easily. There was a significant difference in bone loss between surfaces. The percentage of alveolar bone loss in restored surface with overhang margins higher than other, in other word, significantly more bone loss- attachment occurred adjacent to ODR compared to teeth without ODR.

Table (1): The restored status of different posterior tooth surfaces. (x=1141.565,df=7,p<0.007)

Status	No. of Sites				
	Distal	Mesial	Lingua	Bucca	Total
Unrestored Surfaces	490	406	1100	1004	3000
Res. with no overhang	300	303	126	170	904
Res. with overhang	520	500	75	90	1185
No restorations	820	808	201	260	2089

Table (2): Comparison of loss of attachment and restored status of the tooth. (x=8.907,df=6,p<0.001)

Status	Percentage of loss of attachment							
	Mesial		Distal		Lingual		Buccal	
	<3mm	>3mm	<3mm	>3mm	<3mm	>3mm	<3mm	>3mm
Unrest	40.9	58.0	16.6	80.4	60.4	39.6	50.9	49.1
Res. With no overhang	30.5	59.5	20.3	79.7	70.1	29.9	75.2	24.8
Res. With overhang	22.8	77.2	20.8	79.2	40.3	59.7	35.8	64.2

Table (3): Comparison of alveolar bone resorption and restored status of teeth. (x=1.073,df=6,p<0.01)

Status	Percentage of bone loss			
	Mesial		Distal	
	No bone loss	Bone loss	No bone loss	Bone loss
Unrestored	70.5%	9.5%	89.6%	10.2%
Res. With no overhang	91.6%	8.4%	66.7	11.3%
Res. with overhang	88.8%	11.2%	86.3%	13.7%

DISCUSSION

The results of this study emphasize the effects of iatrogenic factors on periodontal inflammation. It is apparent that overhangs are one of accumulative factors, that promote an increase in plaque mass and increase the specific periodontal as well as caries pathogens in the plaque, and so overhangs are very common and destructive to the periodontium as well as to the tooth substance.

Many authors⁽¹⁹⁻²⁶⁾ have shown and reported these effects of overhang amalgam restorations. In this study, 51% of posterior amalgam restorations in (100) patients had overhanging margins, which indicates that the prevalence of ODR were very high. This results were in agreement with the results obtained from other studies^(16-19,21).

Also this study shows that, bone loss, attachment loss and inflammation occurred more significantly adjacent to ODR compared to control teeth without ODR. Deeper pockets were also found adjacent to ODR than control teeth, and this again was in agreement with other studies in this respect^(6,7,11-14).

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