The prevalence of overhanging margins in posterior filling restorations and periodontal consequences

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ABSTRACT
Background: The overhanging margins are responsible for much iatrogenic periodontal disease. Many investigators found that high proportions of restorations have reported overhanging margins.

Materials and methods: The prevalence of overhanging margins and associated periodontal status in patients who attended periodontal department, college were assessed.

Results: The chance of a site bleeding on probing depended not only on the probing depth but directly on the presence or absence of an over.

Conclusion: This study clearly identified a high prevalence of overhanging margins on amalgam’s restorations, especially at mesial distal sites, and prompt removal of overhanging margins of restoration of required in order to minimize the risk of periodontal health.

Keyword: amalgamposterior filling periodontal.

INTRODUCTION
Overhanging margins are said to be responsible for much iatrogenic periodontal disease; many investigators have reported upon the adverse effects of poor restorations on the health of the adjacent periodontal tissues (1-11).

Many investigators found that high proportions of restorations have been reported as having overhanging margins: 57% noted by Wright (5), 75% by Bjorn et. al. (7), 32% by Gilmore and Sheiham (8), 52% by Coxhead et al., (9), 74% by Gorzo, Newman and Strahan (12), 48% by Hakkaranein and Ainamo (14), 76% by Coxhead (11).

The study reported in this paper was designed to determine:
A. The prevalence of overhanging margins and associated periodontal status in patients who had attended Periodontal Department, College of Dentistry, University of Baghdad.
B. The status of periodontal tissues adjacent to tooth surfaces which were either unrestored, restored without overhanging margins, or restored with overhanging margin.

MATERIALS AND METHODS
One hundred subjects who had attended the periodontal department seeking periodontal treatment they have posterior teeth at least in two quadrants. Patients with complicated medical conditions were excluded.

Oral examination in which premolar and molar teeth (excluding third molars) were evaluated for probing depth and bleeding on probing at six sites around each tooth.

Overhanging were measured clinically using a fine sharp sickle probe and (Pack, 1990) the method for scoring:
0 = Unrestored surface.
1 = Restoration within 1mm. of the gingival margin or below, but without clinically detected overhanging.
2 = Restoration within 1 mm. of the gingival margin or below, but with a clinically I detected ledge indicative of a I overhanging margin.

Proximal surface were scored from the radiographs as I follows:
0 = Unrestored surface.
1= Restoration without I visible overhanging margin.
2= Restoration with visible overhanging margin in a tooth I adjacent to an other tooth.
3= Restoration with I visible overhanging margin in a I tooth adjacent to an edentulous I space.
8 = Unable to make a radiographic assessment owing to either overlapped approximal surfaces, or missing surface on the radiograph.

Statistical Analysis
Computations for the contingency label analysis ($X^2$) were performed using the statistical package SPSS, probability and T-test to see the significant or non-significant effecton periodontal tissues.

RESULTS
In this study of 100 subjects with a mean age of 42.1±20.833 (min. 30 years, Max. 56 years), 25 subjects having no missing teeth, 75 have missing teeth. 2405 teeth were assessed in which 2078 restored surfaces evaluated from 4831 surfaces were examined.

The mean number of restored tooth surfaces per subject was 20.78 + 11.891 (Min. 3 , Max 40 ) of all the 2078 restored surfaces were evaluated.
.1301 (62.6%) had overhanging margins, 1188 overhanging margins were found clinically and/or radiographically on proximal restorations. This was 70.25% of all proximal restored surfaces examined. Clinical data alone revealed that 20.9% of lingual and 18.46% of buccal restored surface had overhanging margins.

Table 1 shows the number of overhanging margins detected clinically and/or radiographically when comparing the restorative status of mesial, distal, buccal or lingual surfaces, very significant differences existed in the distribution of status across the sites. A much greater proportion of approximal restorations had overhanging margins compared with buccal or lingual restoration. (12.9%) of distal restoration, (11.65%) of mesial restoration, (4.61%) of buccal restoration and (1.24%) of lingual restoration had overhanging margins. Also, there is a significant difference between restorative with overhanging and restorative without overhanging margin especially in proximal sites and non proximal sites.

Table 2 shows comparison of pocket depths and restored status of teeth, high percentage of deep pocket more than 3 mmin proximal and non-proximal sites in restored with overhang and there is a significant difference between the sites. While high percentage of shallow pocket in non-approximal area in restored without overhanging margin and unrestored. (65.8%) of all pockets adjacent to overhanging margins were >3 mm compared with (29.1%) of pockets adjacent to unrestored surfaces and (50.6%) of pockets adjacent to restorations without overhanging margins, these findings indicated a highly significant difference between restoration with overhanging margins and non.

Table 3 shows a comparison of bleeding site and restored status of teeth. Also, high percentage of pockets bleeds easily in areas adjacent to restorative sites than restored with overhang and unrestored. (40.1%) of all pockets adjacent to overhanging margins bleed on probing margins bleed on probing compared with (20.5%) of pockets adjacent to unrestored surfaces and (33.1%) of pockets adjacent to restorations without overhanging margins, a similar highly significant association was found between restorative status and the prevalence of bleeding sites, thus both restorative and overhanging margins are significantly related to bleeding. The chance of a site bleeding on probing depends not only on the probing depth, but also directly on the presence or absence of an overhanging margin and the location of the site. That is, the effect of overhanging margins on the chance that bleeding will occur, can not be explained simply by probing depth, but also involves these other factors.

**DISCUSSION**

The results of this study emphasize the effects of iatrogenic factors on periodontal inflammation. The discovery that (62.6%) of posterior restorations (and 70.25% of approximal restoration) in 100 patients, had overhanging margins, indicates the prevalence of overhanging margins in patients attended periodontal department in University of Baghdad did not differ significantly from that found in other investigator in university clinic in New Zealand (9) In a radiographic study, reported 52% of restored posterior approximal surfaces in 184 patients taken from four New Zealand private practices. (11) used combined radiographic and clinical assessment of 50 patients reveal that 67.5% of posterior approximal restoration had overhanging margins. Many authors have shown that overhanging margins contribute to periodontal disease (5,7,8,10,12).

When the distribution of overhanging margins was examined, buccal and lingual surfaces had fewer restorations and fewer overhanging margins than did distal and mesial surfaces. Single surface buccal and lingual restorations do not require matrix bands. Surfaces of restorations with no adjacent tooth are more easily accessible for carving, trimming and polishing. This may explain why fewer overhanging margins were found on buccal and lingual surfaces than approximal, although lingual surfaces are more inaccessible than buccal surfaces. In addition, lingual restorations present more difficulties in control of moisture contamination because of the close proximity of the tongue.

Amalgam contaminated with moisture will expand when setting. The observation that more pockets, bleeding, restorations and overhanging margins were found at approximal sites, was not unexpected as interdental regions are known to be plaque retentive unless specific cleaning mechanisms are used. It has already been reported that amalgam restorations may encourage plaque to accumulate because of the relatively rough surfaces of amalgam, and the possibility of deficiencies existing between restoration and tooth (1, 3, 4). Hakkaranein and Ainamo (14) and Gilmors and Sheiham (8) showed that alveolar bone loss is associated with large subgingival overhanging margin.

In the present study, non-restored tooth surfaces were associated with fewer deep pockets and less tendency for bleeding than was the case adjacent to restored surfaces. When overhanging margins were present these features were more pronounced.
Periodontal status related to overhanging margins was worse lingually than buccally, and distally than mesially in this study, from which it is concluded that possibly greater plaque stagnation occurring had a stronger influence on periodontal status than did the restorative state of those tooth surfaces.

In conclusion, this study clearly identified a high prevalence of overhanging margins on amalgam restorations, especially at mesial and distal sites, and prompt removal of overhanging margins of restoration is required in order to minimize the risk of periodontal health.

REFERENCES


<table>
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| No. of restoration      | 826         | 17.9       | 665     | 17.8    | 223    | 4.61    | 164    | 3.39   | 2078   | 43.01  |

Table 1: Comparing the restored status of the different posterior tooth surfaces

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