

RESEARCH ARTICLE

The Prevalence of Amalgam Overhang in Erbil City Population

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ABSTRACT

Overhanging tooth restorations are defined as an extension of amalgam restorative material beyond or after the cavity preparation lines, lead to environmental change of the balance between beneficial bacteria and periodontopathogens, lead to periodontal breakdown. This study aim was to obtain the prevalence of tooth amalgam overhang in Erbil city population. Amalgam overhang restoration prevalence study about 1200 patients examined in College of Dentistry, Hawler Medical University, and (Khanzad) Specialized Center for Dentistry for the presence of proximal amalgam restoration. The patients also have who proximal restorations were examined clinically using dental mirror and explorer and then radiographically by taking bitewing radiograph. The results showed statistical analysis for the prevalence of amalgam overhang among patients attitude in the study (25.4%). The distribution of amalgam overhang was 59.4% for upper teeth and 40.6% for lower teeth and 64.6% for distal surface, 36.4% for the mesial surface. In conclusion, there is a high percentage of amalgam overhang among population that need treatment to prevent subsequent periodontal diseases.

Keywords: Amalgam overhang; Prevalence; Bitewing X-ray; Plaque; Calculus

INTRODUCTION

Dental subgingival restorations are frequently associated with the development of gingival inflammation. This may apply to subgingivally positioned onlays, crowns, fillings, and orthodontic bands (Ercoli and Caton, 2018). Some prosthodontics restoration or filling may invade the biological width by being placed within the junctional epithelium. This may promote inflammation and attachment loss and bone resorption with gingival recession and reestablishment of the attachment apparatus at a more apical level (Newman et al., 2011).

The position of marginal gingiva of the restoration is correlated with the health status of the adjacent periodontal tissue (Waerhaug, 1965). Numerous studies (Chen et al., 1987; Karlsen, 1970; Trivedi and Talim, 1973; Jansson et al., 1997; Koka, 2001; Schatzle et al., 2001; and Reitemeier et al., 2002) have shown that subgingival margin restorations are accomplished with more plaque, more severe gingivitis, and more periodontal diseases than supragingival ones.

Dental restorations may produce periodontal disease and may alter tooth form, surface integrity, relationship with the periodontium and adjacent teeth. The marginal edge

located in the gingival sulcus is likely the cause of the inflammatory reaction (Ilday et al., 2016).

Bitewing radiographs found to be clinically more useful and effective, especially in the posterior segments. It is accepted that radiographic diagnosis should be a confirmation usually of all the other clinical evidence available. Radiographic diagnosis is accompanied with the conventional dental mirror and explorer inspection (Pitts, 1986).

The purpose of restorative dentistry is to reinstate good periodontal health and functional comfort of the natural dentition, apart from providing satisfactory esthetic appearance (Matthews et al., 2004).

Despite these differences among studies, the evidences showed that the prevalence of overhang dental restorations is very significant and alarmingly prevalence of overhang dental restorations among subgingival restorations. Overhang dental restorations were 2–3 times more often seen in the subgingival rather than in the supragingival restorations (Brunsvold and Lane, 1990).

Significantly higher prevalence and degree of severity of periodontal problems are adjunct with the presence of overhanging restorations. Most studies showed that an

increased level of gingival inflammation and significant alveolar bone resorption accompanied with the overhang dental restorations (Gilmore and Sheiham, 1971; Rodriguez-Ferrer et al., 1980).

The prevalence of overhang dental restorations has been studied and documented in different patient populations. The studied range on teeth restored is between 18 % (Jansson et al., 1994) and 87% (Lervik et al., 1984). Criteria used to determine the presence of overhang restorations differ from the study to study Lervik et al. (1984), including bitewing radiographs, a microscope, and magnifying glass. The previous studies showed 96% of overhangs not go deep than 0.5 mm from the tooth; this lead to that these studies using the criterion of 0.5 mm to underestimated overhang prevalence (Lervik et al., 1984).

Pack et al. (1990b) employed bitewing radiographs, and clinical probe examination and exploration detected only 35% of interproximal amalgam overhangs; of these, 74% were detected with radiographic examination alone, while 62% were found using only clinical exploration. Pack et al. (1990) showed that using both clinical and radiographic examinations of overhang dental restorations were the most reliable way of detecting overhanging margin restorations. Neither clinical nor radiographs examination alone is accurate.

Overhanging dental margins also significantly affected the periodontal health status of the adjacent neighboring teeth. Thus, amalgam overhangs increase the specific periodontal pathogens in the dental plaque, it is not only about increase plaque mass (Padbury et al., 2003).

Most overhanging restorations can be retreated without replacing or refilling the restoration, and this should be considered a standard component of no surgical treatment (Padbury et al., 2003).

Hence, this study was aimed to show the high percentage of overhang among proximal amalgam restorations and treatment of this condition.

MATERIALS AND METHODS

Patients included in this study were selected within 6 months from patients attending the department of diagnosis in the College of Dentistry, Hawler Medical University, and (Khanzad) Specialized Center for Dentistry.

Before starting the study, the study protocol had been reviewed and approved by the scientific committee at the College of Dentistry – Hawler Medical University.

To identify prevalence, about 1200 patients (age range 18–55 years old) examined in both College of Dentistry, Hawler Medical University, and (Khanzad) Specialized Center for Dentistry for the presence of proximal amalgam restoration. The patients who have proximal restorations were clinically and radiographically examined. Bitewing radiograph was taken to evaluate the amalgam restoration in relation to periodontal health.

Study Design

The prevalence of amalgam overhang was studied by evaluating (1200) for both male and female patients attending to both the Diagnosis Department of College of Dentistry (Hawler Medical University) and (Khanzad) Specialized Center for Dentistry by clinical examination and bitewing radiograph.

Patients were invited to attend for an clinical intra oral examination in which premolar and molar teeth. Subsequently, all surfaces of the same teeth (mesial, distal, buccal, and lingual) surfaces were assessed using a fine sharp sickle sterilized explorer and scored for the presence or absence of overhanging amalgam restoration margins when overhanging margin was present bitewing radiographs were taken. Overhanging margins were scored on mesial or distal surfaces if the radiographic image examination result of a proximal restoration 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, attributable to an overhanging margin that it may present in a shape of concavity on the surface of the tooth (Coxhead et al., 1978).

The oral examination was conducted to evaluate the periodontal status and restorative quality. Sites with overhang dental restorations were recorded.

Radiographic Examination and Evaluation

The bitewing radiograph represents the premolar and molar areas of both right and left sides were done. The digital bitewing radiograph (Planmeca Pro-One) was operated at 68 kVp, 7 mA, and 9.5 s exposure time according to the individual size [Figures 1-4].

The statistical analysis includes:

Descriptive statistics both

- Mean
- Standard deviation.

RESULTS

Prevalence of Amalgam Overhanging

The statistical analysis for the prevalence of amalgam overhang among patients attitude in the study (25.4%) is shown in Table 1 and Figures 5 and 6.



Figure 1: Digitalized panoramic radiograph machine taking bitewing radiograph

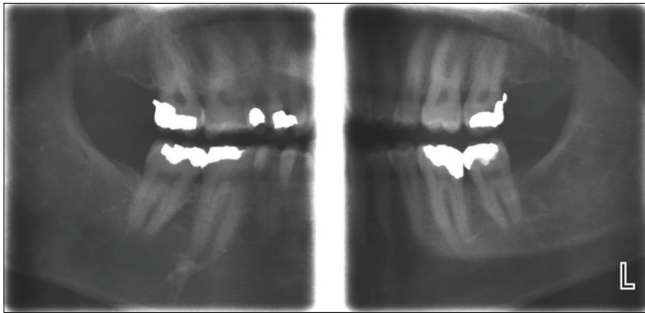


Figure 2: Bitewing radiograph of amalgam overhang for both teeth (No.2 and 17)

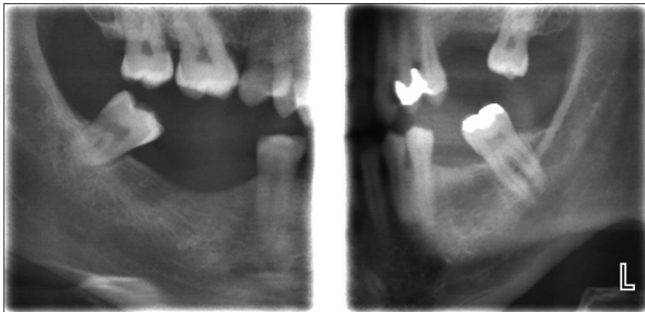


Figure 3: Bitewing radiograph of amalgam overhang for tooth (No.12)

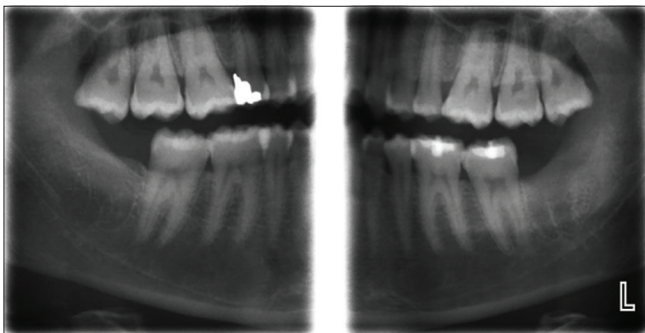


Figure 4: Bitewing radiograph of amalgam overhang for tooth (No.4)

The distribution of amalgam overhang was 59.4% for upper teeth and 40.6% for lower teeth and 64.6% for distal surface and 36.4% for the mesial surface, as shown in Table 2.

The results of the present study emphasized the effects of iatrogenic factors on periodontal health status. The study discovered that the 25.4% of posterior restorations in 1200 patients (among 18–55 years old) examined by a combination of both dental explorer and digitalized bitewing radiograph for those attending to both specialized (Khanzad) for dentistry and clinic of College of Dentistry in Hawler Medical University had overhanging margins. It

Table 1: Prevalence of amalgam overhang

Sex	Sample	Overhang positive	Percentage
Male	725	182	25.103
Female	475	124	26.105
Total	1200	305	25.416

Table 2: Distribution of amalgam overhang

Site of overhang	Without overhang	Percentage	Overhang	Percentage
Mesial	803	66.9	112	36.8
Distal	397	33.1	194	64.2
Total	1200	100	302	100
Upper	713	59.4	212	70.1
Lower	487	40.5	93	30.9
Total	1200	100	302	100

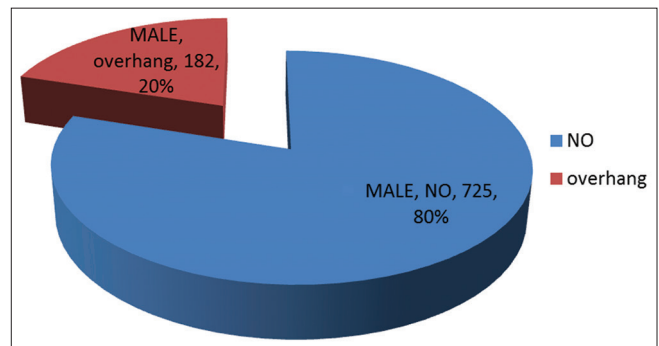


Figure 5: A prevalence of amalgam overhang among the male subjects

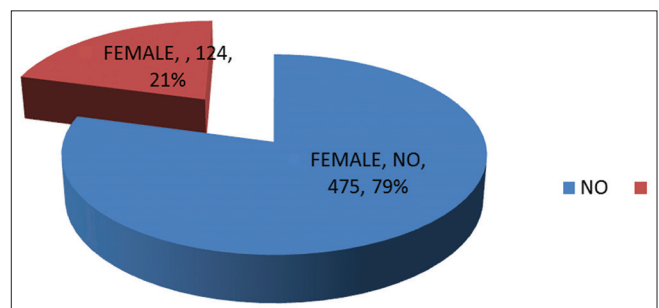


Figure 6: A prevalence of amalgam overhang among the female subjects

had been found that there were 302 of restored surfaces from (1200) subjects selected, which had overhanging amalgam restoration.

This result of the current study is slightly higher than that of other studies done by Claman et al., 1986 and Kells and Linden, 1992 and slightly lower than Gilmore and Sheiham, 1971. The prevalence of overhanging amalgam margins found in this study 25.4% and was lower as compared to several other studies; Hakkarainen and Ainamo (1980) found 50%, Sikri and Sikri (1993) found 64.12%, Lervik et al. (1984) found 87%, Gorzo et al. (1979) found 74%, Wright (1963) found 57%, Coxhead (1978) found 76%, and Coxhead et al. (1978) found 52%. The difference could be attributed to the fact that the present sample was obtained from a dental college and specialized dental center, where all procedure steps are expected to be closely supervised by dental faculty, in while previous samples obtained from general dentists' clinics.

DISCUSSION

Distribution of amalgam overhang restoration surfaces shown that about 64% of distal restored surfaces present with overhang amalgam restoration, while mesial surfaces present with 37% of overhang amalgam restorations; also, the result found that the amalgam overhang restorations found that were more prevalent on the upper teeth (70%) than on the lower teeth (30%), which could be related to the easier accessibility and visibility of the lower teeth during restoration as compared to the upper teeth; this result agreed with (Pack et al. 1990a and Al-Farhan and Al-Shammari, 2008), while the other studies revealed that there is no statistical difference between the amalgam overhang prevalence between mesial and distal teeth surfaces and between upper and lower teeth, which may be correlated to a relatively smaller sample size. Overhanging restorations when compared to sound teeth showed that more attachment loss associated with overhang surfaces. Pack et al. (1990a) evaluated the prevalence of restoration overhangs and the presence of periodontal disease of 100 patients who had recently finished the treatment. Sixty-two percent of all proximal restorations had overhanging marginal restoration, and periodontal disease was more evident when overhangs were present.

CONCLUSIONS

The prevalence of amalgam overhanging in Erbil was 25.4%. The distributions of amalgam overhangs were 59.4% for upper teeth and 40.6% for lower teeth; also, the prevalence among male was (25.1%) and in female was (26.1%).

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