



Evaluation the Overhang Rate in Class II Amalgam Restorations among Bandar Abbas Patients in 2015

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ABSTRACT

Overhang in tooth restoration not only increases dental plaque size, but also is responsible for deterioration of periodontal tissues due to environmental changes and the imbalance in the equilibrium between beneficial bacteria and pro-pathogen plaque they cause. Aim of this study is to evaluate the prevalence of overhang in class II amalgam restoration in patients referred to Bandar Abbas dentistry faculty. This study was designed as a cross sectional study. Patients referred to Dentistry faculty of Hormozgan University of Medical Sciences with at least one class II amalgam restoration in 2014-2015 first and second semesters were clinically examined and there radiographs were evaluated. Since using radiographs and clinical examination is one of the most reliable methods to diagnose overhang, both methods were used. Number and site of restoration, presence of absence of overhang and weather they were mesial or distal were recorded. Radiograph evaluation was performed twice by two students who should 95 percent homology in a pilot study under supervision of a restorative dentist. Then clinical examinations were performed and in necessary cases bitewing radiography were executed. Results showed that 22.2 percent of restorations presented overhangs from which distal, mesial, and distomesial overhangs included 7.1, 12.4, and 2.7 percent of overhangs respectively. Chi-square test was performed to analyses the relation between site and level of overhangs, results of which suggested that there is no relationship between dental site and presence of overhangs. Due to the importance of damages of overhang to dental tissue, it is suggested that principles of properly preparing the restorations be emphasized in dentistry instruction courses.

Keywords: Overhang, dental restoration, amalgam

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INTRODUCTION

Loss of teeth due to decay and periodontal diseases has long been a problem in human societies. Lack of teeth replacement causes several issues in chewing, speaking, beauty, health, and hygiene of teeth. Thus, it is needed that proper function be returned to dental system of patient using periodontal, restoration, and prosthesis treatment [1,2]. Incomplete dental treatments responsible of periodontal tissue deterioration are

called iatrogenic factors. Wrong restoration methods including proximal overhang is often the reason of many pathologic conditions in dental tissues, including gingivitis or gum disease, bone destruction and finally losing teeth, whereas correct restoration may maintain or return health of soft tissue and periodontal fibers. Based on the definition, overhang is the extra amount of restoration which is out of cavity and causes plaque accumulation, dental decay, and periodontal diseases such as gingivitis. 25 percent prevalence of overhang aroused serious concern [2-6]. Overhang threaten the health of periodontium in two ways: they change the balance of the ecologic sulcus of gum to make it more proper for pathogenic organism rather than

beneficial organism (mostly optional gram positive species) and they make it more difficult for patient to remove the plaque [7-10].

MATERIALS AND METHODS

Among referral patients to diagnostic section of dentistry faculty of Hormozgan University of Medical Sciences in 2014-2015 first and second semesters, radiographs of those who had entrance characteristics were evaluated to see whether they show overhangs in class II amalgam restoration. This study was designed as a cross sectional study. Panoramic images with at least one class II amalgam restoration who referred to diagnostic section of dentistry faculty of Hormozgan University of Medical Sciences was analyzed up to 187 patients. Since using radiograph images and clinical examination are the most reliable methods to diagnose overhang, both methods were used [5]. Number and sites of restorations, presence or absence of overhang, and weather it is mesial or distal were evaluated. Radiographs were analyzed two times by two students who have shown 95 percent homology in a pilot study under the supervision of a restorative dentist. The data in this study showed 95 percent homology as well and in case of overhang presence, clinical examinations were performed. In overhang suspected cases, bitewing radiograph and clinical examinations were performed using dental floss, catheter, and mirror.

RESULTS

Data was recorded and analyzed in SPSS software ver. 23. Descriptive and analytic results were reported: variables description, central and dispersion indices. Moreover, correlation test and chi-square test were used for data analysis and $p < 0.05$ was considered meaningful. In this study, presence of overhang in 225 teeth of 187 referred patients to diagnostic section of Hormozgan University of Medical Sciences with at least one class II amalgam restoration were evaluated. As chart 1 shows, upper jaw restorations were 40.5% mesial, 44.8% distal, and 14.7% MOD; lower jaw restorations were 54.1% distal, 36.7% mesial, and 9.2% MOD.

According to Table 1, in current study, 77.8% of evaluated restorations were successful and 22.2% of them presented overhang from which 7.1%,

12.4% and 2.7% were mesial, distal, and both mesial and distal overhang respectively. In this table, data about lower and upper jaw is presented distinctively which shows that 80.7% of lower jaw restoration and 75% of upper jaw restoration have been successful (chart 2-4).

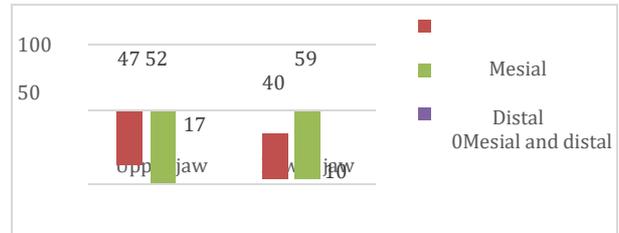


Chart 1: Mesial or Distal overhang prevalence

Table 1: Overhang prevalence

	Number	Percent	Cumulative Percent
No overhang	175	77.8	77.8
Mesial	16	7.1	84.9
Distal	28	12.4	97.3
MOD	6	2.7	100.0
Total	225	100.0	

Table 2: Overhang prevalence in jaws

		Jaw		Total
		Maxilla	Mandible	
Overhang Successful Restoration	Count	87	88	175
	% within overhang	49.7%	50.3%	100.0%
	% within dandan	75.0%	80.7%	77.8%
Mesial	Count	10	6	16
	% within overhang	62.5%	37.5%	100.0%
	% within dandan	8.6%	5.5%	7.1%
Distal	Count	15	13	28
	% within overhang	53.6%	46.4%	100.0%
	% within dandan	12.9%	11.9%	12.4%
Both	Count	4	2	6
	% within overhang	66.7%	33.3%	100.0%
	% within dandan	3.4%	1.8%	2.7%
Total	Count	116	109	225
	% within overhang	51.6%	48.4%	100.0%
	% within dandan	100.0%	100.0%	100.0%

5.5% of lower jaw restoration showed mesial overhang which is 8.6% in upper jaw restoration. Distal overhang was seen in 11.9% of restorations in lower jaw and 12.9% of restorations in upper

jaw. Mesial and distal overhang (MOD) included 1.8% of restorations in lower jaw and 3.4% of restorations in upper jaw (Table 2). According to the results, it can be inferred that restorations in lower jaw have been more successful compared to upper jaw overall. Note that dentist's vision is better for lower jaw (chart 5-10).

In addition, it is interesting that distal overhang was nearly two times as common as mesial overhang in both lower and upper jaws, although statistical analysis indicated that the differences were not meaningful. All of the molar and premolar teeth were included; the most studied tooth was First left maxillary molar according to table 3.

Table 3: Studied teeth prevalence

	Frequency	Percent	Valid Percent	Cumulative Percent
First right maxillary premolar	2	.9	.9	.9
Second right maxillary premolar	8	3.6	3.6	4.4
First right maxillary molar	24	10.7	10.7	15.1
Second right maxillary molar	22	9.8	9.8	24.9
Valid First right maxillary molar	8	3.6	3.6	28.4
First left maxillary premolar	4	1.8	1.8	30.2
Second left maxillary premolar	30	13.3	13.3	43.6
Valid First left maxillary premolar	18	8.0	8.0	51.6
Second left maxillary premolar	18	8.0	8.0	51.6
First left mandibular premolar	3	1.3	1.3	78.7
Second left mandibular premolar	28	12.4	12.4	91.1
Valid First right mandibular molar	20	8.9	8.9	100.0
Second right mandibular molar	225	100.0	100.0	
Total				

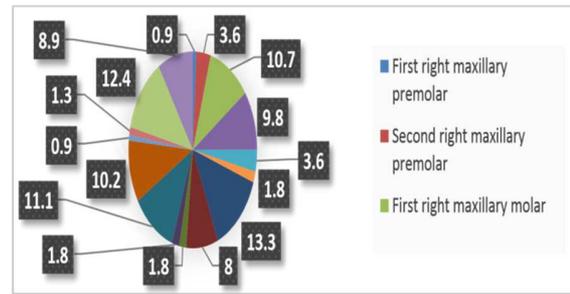


Chart 2: Overhang rate in tooth

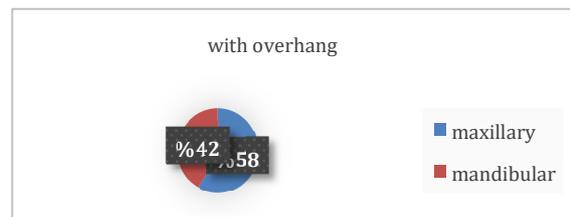


Chart 3: Overhang prevalence in jaws

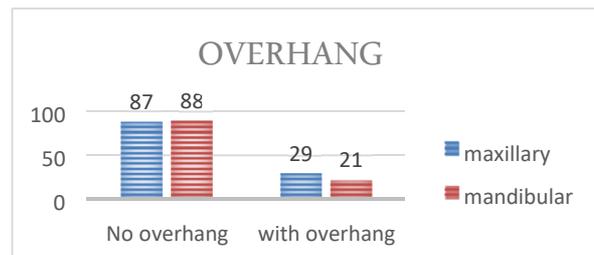


Chart 4: Comparison of mandible and maxilla in success rate

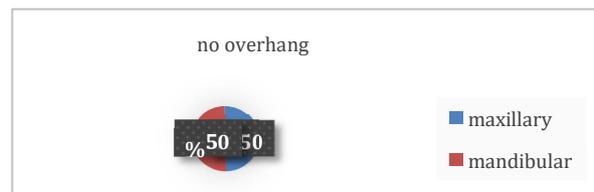


Chart 5: Comparison of mandible and maxilla

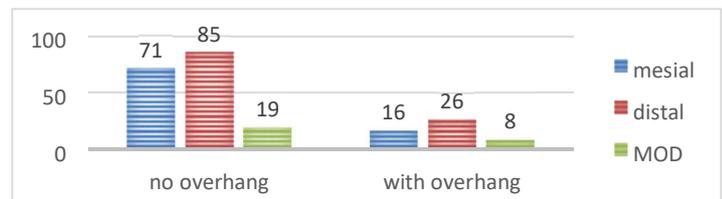


Chart 6: Type of overhang

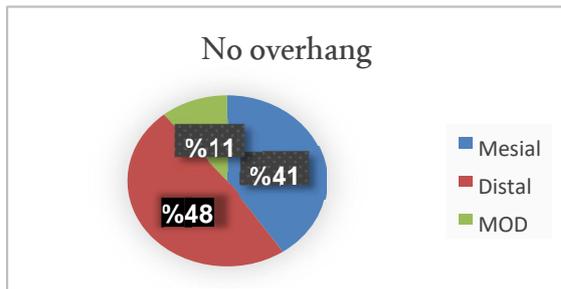


Chart 7: Type of restoration without overhang

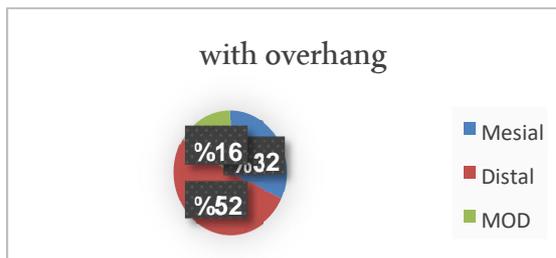


Chart 8: Type of over hanged restorations

According to the table below, 18.4% of mesial restorations present overhang which is 23.4% in distal restorations and 29.6% in MOD restorations, none of which showed meaningful difference, of course.

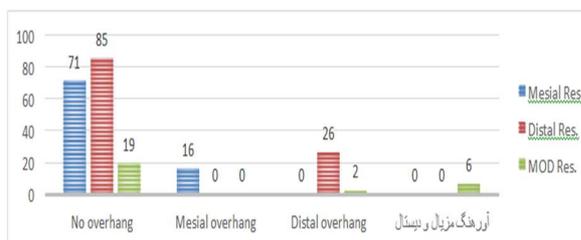


Chart 9: prevalence of overhang related to type of restoration

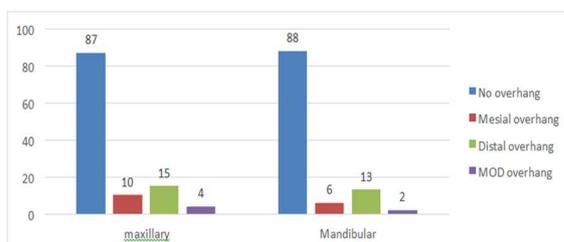


Chart 10: prevalence of overhang in jaw separated to type of restorations

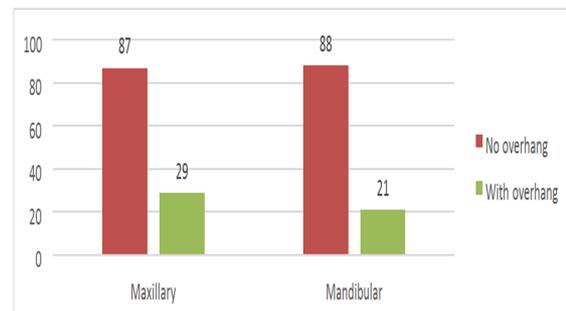


Chart 11: Prevalence of overhang separated to maxilla and mandible

DISCUSSION

Dental amalgam is yet the most common material for filling out decayed teeth [11]. Amalgam is still used since: it is resistant to breaking in posterior teeth restoration and blind construction; it does not have high technical sensitivity; it can be used in stressed sites; it prevents leakage after a period of time; and it is economic for teeth restoration [12]. According to vast usage of amalgam, it is necessary to be familiar with the correct method to use it since any error in practice may result it complications. Overhang, as a complication, may be an etiologic factor for periodontal diseases. The relation between periodontal health and dental restoration is very close and impartible. Periodontium should be kept healthy so that restoration last long. In order to keep periodontium healthy restorations should be in close coordination with periodontal tissue. To keep beauty of patient, the relation between periodontal tissue and teeth should look natural, i.e. gum tissue encompasses dental restoration finely. In this study, we found that prevalence of overhang is 22.2% in class II amalgam restoration in patients referred to Dentistry faculty of Hormozgan University of Medical Sciences in 2014-2015 first and second semesters. This index was measured to be 42.30% in a study in Shahid Sadoghi Medical University in Yazd in 2010 which is nearly two times as much as what is measured in this study. In this study, clinical examinations and radiographs were both used to diagnose overhang. Different studies showed different prevalence of overhang. According to the results of current study, it is inferred that generally mandibular dental restoration is more successful than maxillary dental restoration. Here, vision of dentist is an important factor (p value). In addition, note that distal overhang was nearly two

times as much as mesial overhang. Again, it can be attributed to better access, though number of distal restoration was a bit higher in this study. Statistically, the second relation was not meaningful as well (P value =0.660). Most overhang cases were observed in right maxillary quadrant and the least overhang cases belonged to left mandibular quadrant. For right handed dentists, it can be said that they can better access these areas. Of course, in this case there were no meaningful differences as well. Since amalgam restorations with overhang is a cause of periodontal diseases, when diagnosed, overhangs should be corrected if they may cause problems. According to the severity and place of overhang to gum margin, soft tissue problems such as plaque accumulation, inflammation, gum bleeding, breaking dental fold etc. right decision will be made. Treatment may include different methods for removing overhang using different instruments, including flame-shaped steel bur, diamond bur and sonic scaler and after working with rotary instrument, tools with plastic head and prophylaxis paste will be used to polish the surface to achieve a soft surface [13]. Using multidirectional hand pieces may help remove overhangs and cantering more accurately. Loss of adhesion in subgingival restorations takes place very slowly and these restorations may be detectable after 1 to 3 years. Thus, they should be checked in annual checkups so that they can be refined before periodontal problems occur. Removing overhang makes plaque control much more effective. Consequently it will help reduce gingivitis and slightly increase alveolar bone height. Overhang removing is most effective in 4th week. In some cases, the correct approach is to change restoration. To sum up, dentist may choose one of the following based on his skills and judgment: lack of correction, overhang correction, changing restoration. In order to prevent from overhangs in decayed teeth restoration, some studies suggest that small flaps be used to access and better see the area so that restoration better coordinate with gum [8, 14].

Wrong restorations which are contrary to gum health including amalgam restorations showed 22.2 percent prevalence. It shows the importance of putting more efforts to reduce these errors. It is suggested that obeying correct restoration methods be more emphasized on.

1. Proximal amalgam overhang prevalence was reported to be 22.2%.

2. Maxillary overhangs were reported to be more frequent than mandibular overhangs, although this difference was not meaningful.

3. Distal overhangs were reported to be more frequent than mesial overhangs, although this difference was not meaningful.

4. Most overhang cases were reported from right maxillary quadrant and least overhang cases were reported from left mandibular quadrant.

Since, amalgam is yet the most common material for dental restoration in Iran and in the Middle East, instructing the correct method of amalgam restoration should be considered in dentistry instruction plans and educational planning organizations and dentists should pay more attention to this issue. We hope that this simple problem eliminated and dentist design more proper matrixes.

Proposal

Studies like this be performed for restorations performed by dentistry students in Dentistry Faculty of Hormozgan University of Medical Sciences.

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