

Assessment of alveolar bone loss in orthodontic cases in Mosul City in 20–23 year old males

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ABSTRACT

This study was undertaken to design the relationship between different orthodontic cases and amount of bone level loss. The study sample consisted of 72 male students (20–23 years old) classified into 3 groups: Control group with normal overjet and overbite, overjet group with at least 8 mm, and overbite group with at least 6 mm. The results showed a significant reduction of bone height in upper and lower incisors in malocclusion group at significant level 0.01 if it is compared with normal group bone level.

Key Words: Bone loss, cemento–enamel junction, alveolar crest of bone.

الخلاصة

أعدت هذه الدراسة لتبين العلاقة بين كمية فقدان العظم مع اختلاف حالات تقويم الأسنان. تألف نموذج الدراسة من ٧٢ طالب ذكر تتراوح أعمارهم بين ٢٠–٢٣ سنة، قُسموا إلى ثلاث مجاميع: مجموعة السيطرة مع إطباق طبيعي، المجموعة الثانية فيها زيادة في المسافة الأفقية بين الفكين الأعلى والأسفل بما لا يقل عن ٨ ملم. أما المجموعة الثالثة ففيها زيادة في المسافة العمودية بين الفكين بما لا يقل عن ٦ ملم. بينت النتائج نقصان واضح في ارتفاع العظم السنخي في حالات مجاميع الإطباق غير الطبيعي بمستوى معنوية ٠.٠١ إذا ما قورنت بكمية مستوى العظم السنخي في مجموعة السيطرة.

INTRODUCTION

Malocclusion may be in marked premature contact in centric closure leads to excessive mobility of teeth especially when gingival inflammation is present,⁽¹⁾ while some inter–relation between the trauma and the inflammation may exist, such teeth are usually crowded or have an abnormal position in the arch form. This environment is conducive to initiate the inflammatory process.⁽¹⁾

Few studies have reported an association between the amount of plaque, calculus and Angle's classification of various indices of malocclusion,⁽²⁾ while several studies reported no relationship.^(3–6) There is an evidence of increasing gingivitis, pocketing in patients with irregularities and lack of spacing.^(7, 8)

There is an evidence between the periodontal problems with increasing maxillary overjet (greater than 6 mm), and ma-

xillary overbite (greater than 6 mm).⁽⁹⁾ On the other hand, others said that there is no relationship between overjet, overbite and periodontal health.⁽¹⁰⁾

Radiography is usually considered essential in the diagnosis and treatment planning of periodontal diseases.^(11, 12)

The general opinion seems to be that intraoral radiographs should be the technique of choice for dental radiographic examinations.^(13, 14)

The marginal bone level has often been measured using periapical and bite-wing radiographs.^(15, 16)

The purpose of the present study was to assess the differences between overbite and overjet cases taking in consideration the severity and the reduction of alveolar bony support as expressed by the distance from the cemento–enamel junction (CEJ) to the alveolar bone crest (ABC) and to compare these two groups with the group

of normal occlusion untreated orthodontically.

MATERIALS AND METHODS

From 1300 male students selected randomly from Mosul University, only 72 students (20–23 years old) fulfilled the criteria of the sample and were classified into 3 groups:

A. Control Group (35):

Normal occlusion with overjet, overbite 2–4 mm,⁽¹⁷⁾ Class I molar and canine relationship,⁽¹⁸⁾ without spacing, crowding or congenital missing teeth, no transversal problem, untreated orthodontically and no history of orthodontic treatment.

B. Overjet Group (20):

Revealed an overjet with at least 8.0 mm, no deep bite (< 4.0 mm), no any other malocclusions.

C. Overbite Group (17):

Revealed an overbite with at least 6.0 mm,

overjet ≤ 0.4 mm, no any trauma to the palatal tissue or any other mal-occlusion.

Six periapical films of the anterior segments in the upper and lower arches were taken by x-ray machine [Trophy (94) Vincennes–Minorex] using 60–65 kvp, a focus to object distance of 20–28 cm and paralleling technique. The criteria for acceptable image quality were that the radiographs covered all the anterior teeth and their surrounding bone without obvious projection errors.

The x-ray beam directs the central ray between the central incisor and modifying the long axis, vertical film plane, and the bisector of the tooth–film angle and the central ray is directed to the center of the film perpendicular to the bisector (for taking mandibular anterior teeth). While for maxillary anterior teeth, we start increasing the vertical angulation until the shadows of the incisal edges of the teeth are cast on the film 1/8 inch above the lower border.^(19, 20) Examples for intraoral periapical films regarding the three groups were shown in Figures (1), (2) and (3).



Figure (1): Intraoral periapical film of lower anterior bone loss (normal)

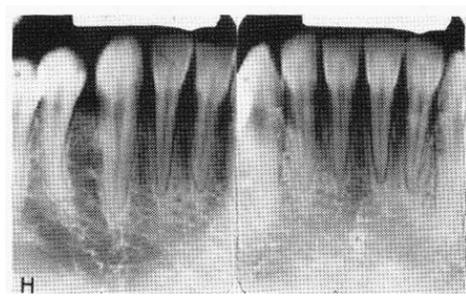


Figure (2): Intraoral periapical film of lower anterior bone loss (overjet)



Figure (3): Intraoral periapical film of upper anterior bone loss (overbite)

The alveolar bone height was measured at all proximal surfaces to the nearest millimeter with the CEJ and the ABC as measuring points. The measuring point of the crestal bone was the most coronal edge of the unbroken lamina dura.⁽²¹⁾

It has previously been shown that the expression of the alveolar crest level as a distance between the CEJ and ABC is as accurate as the ratio of bone height to root length.⁽²²⁾

Descriptive statistics include mean and standard deviation, analysis of variance (ANOVA) and Duncan's Multiple Ra-

nge Test for all groups to show the degree of significance.

RESULTS

The Table below shows that the distance from CEJ to ABC increases from 0.49 mm in the control group, to 1.32 mm in overjet group, and 1.41 mm in overbite group. ANOVA showed a significant F-value and Duncan's Multiple Range Test showed a significant difference between the groups.

Table: Analysis of variance and Duncan's Multiple Range Test of upper and lower anterior segments

Group	CEJ-ABC (mm)				
	No.	Mean	± SE	F-value	Significance
Upper	C	35	0.49 ^a	1.805 E-02	284.121 0.000
	J	20	1.320 ^b	4.800 E-02	
	B	17	1.41 ^b	3.841 E-02	
Lower	C	35	0.49 ^a	1.822 E-02	27.695 0.000
	J	20	0.72 ^b	5.138 E-02	
	B	17	0.94 ^c	7.451 E-02	

CEJ: Cemento-enamel junction; ABC: Alveolar bone crest.

C: Control group; J: Overjet group; B: Overbite group.

SE: Standard error.

Means with different letters were statistically significant at $p < 0.01$.

In the lower arch this distance (CEJ-ABC) increased from 0.49 mm in control group to 0.72 mm in overjet group and 0.94 mm in overbite group; ANOVA test showed a significant F-value, and Duncan's Multiple Range Test showed a significant differences between these groups.

DISCUSSION

This study showed that the alveolar bone level in the upper arch was significantly lower in overbite, and overjet groups, than in control group ($p < 0.01$).

This observation expressed the finding that the lower incisors had a significant periodontal loss in deep overbite in comparison with overjet groups. This observation support the finding that there is a difference between reactions in the upper and lower jaws in general.⁽²³⁾

This study is supported by another study that shown the CEJ-ABC distance greater than 2 mm indicating a periodontitis on the basis of a study of the normal appearance of the alveolar crest in young and healthy dentition although the risk of error estimation is considerable with a large distance.⁽²⁴⁾

This study is supported by another study,⁽²³⁾ which found that in a group of children selected for their high likelihood of developing periodontal diseases, subjects who had 16 years had developed loss of attachment at 1 mm level and few at 2 mm level revealed a loss of attachment that had increased significantly more at 19 years of age than in group where there was no loss of attachment by 16 years.

The differences between the mean bone level in the groups were considerably smaller due to severe discrepancies between upper and lower jaws.⁽²²⁾

CONCLUSION

This study showed a good relationship between gingivitis, periodontal problems and a large amount of interproximal bone loss in patients with large overjet and overbite, and this relationship became significant problem with neglected oral hygiene especially in the anterior segment of the jaws.

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