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A comparative radiographical evaluation of alveolar bone resorption in upper and lower anterior teeth

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Abstract

Alveolar bone loss is the atrophy of maxillary and mandibular bone that underlines and support the teeth lead to reduction in bone height and volume. The sample of this study was collected from patients who attended Al-Mammon center for specialist dentists. The patients usually complaing from bleeding gum, discomfort on eating and relative mobility of teeth. In this study 60 male patients with age between 20-49 years were selected and divided into three groups to assess bone loss by the aid of digital panoramic radiographs in the upper and lower anterior teeth. The results revealed that bone loss is more in lower anterior teeth than in upper anterior teeth in most of the age groups.

Key: Bone loss, Digital panoramic radiograph.

Introduction

Alveolar bone loss is the atrophy of maxillary and mandibular bone that underlines and supports the teeth with reduction in bone height and volume. The primary cause of alveolar bone loss is periodontitis although tooth loss and osteoporosis may also contribute [1]. Periodontal diseases refer to a group of diseases which affect the tissue that invest and support teeth [2]. Periodontal disease leads to bony changes, and interpretation of periodontal disease on dental radiographs should include an evaluation of the alveolar bone [3].In elderly patients who retain some of their teeth, alveolar bone loss contributes to progression of periodontitis, so in elderly patients with periodontal disease, alveolar bone resorption accelerate further [4].Clinical and radiographic examination are necessary to detect, evaluate and diagnose periodontal disease. The clinical examination alone may not provide enough information about supporting bone, so the radiographic examination is mandatory [5].The term digital radiography refers to a method of capturing a radiographic image using sensor breaking it into electronic pieces, presenting and storing, giving a computerized image [6].Panoramic radiography was used to assess bone loss at baseline, and progression of periodontal bone loss over time with elderly age [7,8].

The aim of this study is to estimate bone level in a healthy males and to compare bone loss between upper and lower teeth anterior area in different age groups.

Materials and Method

The sample of this study was collected from patients who attended Al-Mammon center for specialist dentists complaining from bleeding gum, discomfort on eating and relative mobility of teeth.

Sixty patients with the age between 20-49 years were selected and divided into 3 groups with equal numbers according to the following criteria:

1. No systemic disease to exclude any predisposing factor for bone loss like diabetes
2. No drug intake
3. The upper and lower anterior teeth are present and free from caries.
4. The patients are male to exclude hormonal changes.

The patients were sending to the radiology department for taking digital panoramic radiographs with Dimax 3 digital planmeca x-ray machine, with focal spot size 0.50, the total filtration is 2.5mm.AL, the magnification is 1.2. The patients were divided according to the age as follow:

1. 1st group   20-29 years old. (20 patients)
2. 2nd group   30-39 years old (20 patients)
3. 3rd group 40-49 years old   (20 patients)

The sites that include in this study are between canine and lateral incisor on both sides and jaws and between central incisors of each jaws, so the total sites were 360.

The division of bone loss was done according to the following:

a- No bone loss (according to the normal distance between alveolar bone crest and the cervical area of the tooth which is 1.5-2mm.).

b- Bone loss less or equal to 4mm (2-4mm.).

c- Bone loss more than 4mm.

Result

The result of this study revealed that bone resorption is directly related to age. In the (1st group), 60% have bone loss in lower anterior teeth (48% less or equal to 4mm. and 12% more than 4mm.) , and 47% have bone loss in upper anterior teeth(40% less or equal to 4mm. and 7% more than 4mm.). In the (2nd group),72% have bone loss in the lower anterior teeth(52% less or equal to 4mm. and 20% more than 4mm.), and 62% have bone loss in the upper anterior teeth(52% less or equal to 4mm. and 10% more than 4mm.). In the (3rd group),90% have bone loss in lower anterior teeth(38% less or equal to 4mm. and 52% more than 4mm.), and 83% have bone loss in the upper anterior teeth(58% less or equal to 4mm. and 25% more than 4mm.).

Bone lose is more in lower anterior teeth than upper anterior teeth in all age groups except (3rd group) in which 58% have bone loss less or equal to 4mm in upper anterior teeth while 38% in the lower anterior teeth with the same type of bone loss (Table 1).

Table (2) show that there is no significant differences in both upper and lower anterior teeth regarding no bone loss in the (1st group) while there is highly significant differences in both 2nd and 3rd groups in the upper and lower anterior teeth except the upper teeth in the 2nd group.

Table (3) show that there is highly significant differences in both upper and lower anterior teeth regarding bone loss less or equal to 4mm in the 1st group in addition to the lower anterior teeth of the 3rd group and significant difference in the upper anterior teeth of the 2nd group, but no significant difference in upper teeth of the 3rd group and lower teeth of the 2nd group.

Table (4) show that there is highly significant differences in all upper and

lower anterior teeth regarding bone loss more than 4mm and in all age groups except lower anterior teeth of the 3rd group which is non significant.

Discussion

Bone resorption is one of the common problems that affect people. Periodontal disease increases in prevalence and severity with increasing age(8,9). It was found that bone resorption is more in the lower anterior teeth than upper and this may be due the fact that the lower anterior bone (interseptal bone) is thinner than the upper and also the opening of the submandibular salivary gland orifice is located lingual to the lower incisors which increase the incidence of plaque and calculus formation from saliva in addition to the difficulty in cleaning the lower anterior region because of the curvature of the teeth.Some studies show that the bone resorption increase with age with high prevelance of male that may due to the presence of retentive factors in male due to smoking for example or carelessness for brushing that found in male as usual(10,11,12).While other studies show no difference in bone loss between genders(13),but the bone loss in young patients with no underlying causes is more risky because this will lead for further bone loss.

In this study, it was found that it is directly proportional to the age which may be due to the effect of long standing local factors that play a role in the resorption of bone such as calculus and caries which play as a retentive factor for food debris, and this is reported by some authors(14-15-16) who stated that the increase in prevalence and severity with increasing age may be caused by the cumulative effect of the number of bursts of periodontal destruction, a deterioration in plaque removal efficiency, or to the

increase number of teeth retained into old age and therefore affected by plaque-induced disease, while other authors stated that there is a decline in the immunofunction with age(17,18,19).The purported association of increased age with altered salivary function might be significant(20).Dry mouth is a common complaint in the aged may be related. I suggest for further study to evaluate the effect of age on bone resorption by comparing same quadrants in different age groups.

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Table (1): Bone loss in upper and lower anterior teeth in all age group

	Age Group	Number of cases	T	df	p-value	Sig.
Lower teeth	age20-29	7	-9.166	59	.000	HS
Upper teeth		4	-17.123		.000	H.S
Lower teeth	age30-39	12	-6.814	59	.000	HS
Upper teeth		6	-16.748		.000	H.S
Lower teeth	age40-49	31	1.776	59	.081	NS
Upper teeth		15	-11.636		.000	H.S

Table (2): Comparison between lower and upper anterior teeth in no bone loss cases

	Age Group	Number of cases	T	df	p-value	Sig.
Upper teeth	age20-29	32	-.033	59	.974	NS
Lower teeth		24	1.732		.089	NS
Upper teeth	age30-39	23	3.508	59	.001	S
Lower teeth		17	5.145		.000	HS
Upper teeth	age40-49	10	7.570	59	.000	H.S
Lower teeth		6	12.630		.000	HS

NS: Non significant, S: Significant, H.S: highly significant

Table (3): Comparison between lower and upper anterior teeth in bone loss less or equal to 4mm cases

	Age Group	Number of cases	T	df	p-value	Sig.
Lower teeth	age20-29	29	-3.717	59	.000	HS
Upper teeth		24	-5.730		.000	HS
Lower teeth	age30-39	31	-.834	59	.408	NS
Upper teeth		31	-3.244		.002	S
Lower teeth	age40-49	23	7.203	59	.000	HS
Upper teeth		35	1.168		.247	NS

NS: Non significant, S: Significant, H.S: highly significant

Table (4): Comparison between lower and upper teeth in bone loss more than 4mm.cases

\	Age group	No bone loss		Bone loss less or equal 4mm		Bone loss more than 4mm		Total
		No.	%	No.	%	No.	%	
Upper teeth	20-29	32	53	24	40	4	7	60
	30-39	23	38	31	52	6	10	60
	40-49	10	17	35	58	15	25	60
Lower teeth	20-29	24	40	29	48	7	12	60
	30-39	17	28	31	52	12	20	60
	40-49	6	10	23	38	31	52	60