



Sclerotic ostitis in jaw bones in Iraqis (A radiographic study)

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Abstract

The objective of this study was to investigate the frequencies of sclerotic ostitis in jaw bones in Iraqi patient population with respect to age and gender, in addition to shape, localization, and the dental relationship of lesions.

A retrospective study was performed using a conventional panoramic radiographs of 867 patients ranging in age from 15 to 60 years subjected to dental treatment. Descriptive characteristics of radiopacities (Idiopathic osteosclerosis IO, and Condensing ostitis CO) including shape, location, and its dental relationship were recorded.

There were 40 radiopacities detected, 27 IO lesions in 24 subjects (3.1 %) (15 females, 9males), and 13 CO lesions in 11 subjects (1.2 %) (9 females, 4 males). Both IO and CO lesions were found to be higher in number among females when compared to males. The frequency of IO lesions was found to be significantly higher in the age group (31-45 years) than in other groups. On the other hand, the frequency of CO lesions was higher in both age groups (31-45) and (46-60), and its frequency in these periods was statistically higher than in the (15-30).

Our results point to the low IO and CO frequency among the Iraqi population. In addition, our findings support the theory that IO lesions are developmental variations of normal bone architecture unrelated to a local stimulant and CO lesions could be considered reactive formations related to teeth with severe caries,restoration, or pulpitis.

Key words: Frequency, idiopathic osteosclerosis, condensing ostitis, Dental panoramic

Introduction

Idiopathic osteosclerosis (IO) refers to a focal area of increased radiodensity that is of unknown cause and cannot be attributed to any inflammatory, dysplastic, neoplasia, or systemic disorder. IO is invariably asymptomatic, not associated with detectable cortical expansion, and is typically detected during a routine radiographic examination⁽¹⁾.

Idiopathic osteosclerosis (IO) is described as a localized no expansible

radiopacities with unknown etiology. The IO is generally asymptomatic and could appear as round, elliptical or irregular in shape (Fig 1). The internal aspect is usually uniformly radiopaque. IO should be distinguished from condensing ostitis of dental origin(Fig 2), or other alveolar bone related radiopacities such as periapical cemental dysplasia.This condition may cause changes in tooth position or problems during orthodontic

treatment. In differential diagnosis of IO and CO lesions, root segments, exostoses, foreign bodies, or even impacted teeth should be taken into consideration ⁽²⁾.

The aim of this study is to investigate regions with the largest sample size in the literature and to calculate the frequency of IO and CO lesions in jaw bones of Iraqi patient population with respect to age, gender, shape, location, and its dental relationship.

Material and Methods

I designed a descriptive study composed of 867 panoramic radiographs of patients that were collected from different dental centers and private clinics that were taken for them for different reasons such as impacted wisdom teeth, orthodontic treatment...etc, and those patients were not complaining from any symptoms in the jaws or other bones and these informations were taken from their files. To minimize variability in the present study, examinations were carried out jointly by the four examiners 2 academics from the department of oral diagnosis and radiology and 2 academics from oral and maxillofacial surgery department. Throughout the study, in case of disagreement between them as to the outcome of an examination, a fifth academic from the same department was consulted. Cases in which there was no consensus were excluded from the study. For each panoramic film examined, the patient's age and gender was recorded as based on his/her patient case sheet. Of the examined films, those diagnosed as showing IO or CO the shape, localization, and dental relationships of the lesions were recorded.

Lesions were considered to be CO if it was likely that they were

associated with chronic inflammation. Generally, these lesions surrounded the apex of teeth with deep caries or large restorations. Lesions that did not show any obvious connection to inflammation, that were well demarcated, and were not ruled out by the instances listed above were identified as IO. The following radiopacities were specifically excluded:

- 1- Characteristic mixed radiopaque-radiolucent areas.
- 2- Increased thickening of the lamina dura around teeth that showed marked mal-position or that served as abutment for fixed bridges or partial dentures.
- 3- Clearly identifiable remnants of deciduous or permanent teeth.
- 4- Radiopacities interpreted as tori or exostoses.
- 5- Solitary radiopacities seen in edentulous regions, since these might have been excessively ossified surgical sites.

The shape of the lesions was classified as either round or irregular.

The location of the lesion was classified first as mandibular or maxillary, then further by region of the jaw: incisive, canine, canine-premolar, premolar, premolar-molar, and molar.

The relationship to teeth was defined using the criteria from Geist and Katz ⁽⁵⁾:

- 1- apical if the masses were predominately located around the root apices
- 2- separate if the radiopacities were apical to and clearly separated from the teeth and lamina dura.
- 3- Interradicular if the sclerotic tissue was limited to the area between the roots.
- 4- Apical and interradicular if the radiopacities were located at the apices and exhibited

significant extension between the roots.

Results

This study was performed on panoramic radiographies of 867 patients (418 females, 449 males), with different dental complaints, aged 15-60 years. There were 35 subjects (4%) detected, 24 IO (2.7 %) and 11 CO (1.3 %). Of the subjects with multiple lesions, 3 had 2 IO, 2 had 2 CO so the total lesions that detected were 40 (27 IO, and 13 CO). No patient had IO and CO lesions concurrently. Both IO (15 females, 9males) and CO (7females, 4 males) lesions were found to be higher in number among females when compared to males. The number of IO and CO lesions were found to be significantly higher in the (31-45 years) old patients than in other ages (Table 1).

Lesions had an almost equal distribution in terms of shape. Both types of lesions were determined to be round (56%) as IO, (69%) as CO and irregular (44. %) as IO, (31%) as CO. Similarly, almost (92%) of both lesions were located in the mandible while only (8%) in the maxilla. The lesions largely involved the premolar and molar regions (Table 2).. While IO lesions exhibited higher rate of involvement in the premolar region than CO lesions, molar region involvement by CO lesions was higher than that of IO lesions . Such significant differences were also found with regard to a lesion's relationship to teeth, it was found that the CO lesions were greater in number than the IO lesions in the dental apical and apical+interradicular regions,. In contrast, IO lesions were more frequent than CO lesions as a separate dental relationship.

The percentage of the distribution of both IO and CO regarding gender

and age were shown in Fig 3, 4 and the comparison between them was shown in Fig 5.

Discussion

The prevalence of radiopaque lesions as presented in the literature ranges from 3.3% to 31.0% (4-6). Geistand Katz ⁽³⁾ observed 5.4% frequency of idiopathic osteosclerosis in 1,921 full-mouth intraoral radiographic surveys. On the other hand, Elliassonet al.(1984) ⁽⁷⁾ observed a 2% prevalence of condensing otitis in a study of periapical radiographs of 1,149roots and their files, whereas 6% of the periapical radiographs were recorded to have condensing otitis in smaller study ⁽⁸⁾ of 889 patients. The present study found IO prevalence to be 3.1% and a lower CO prevalence at 1.5%. The low frequency found in the present study might first be attributed to the exclusive use of panoramic radiographs to identify the lesions. This could be evidenced by higher prevalence rates due to the use of periapical radiographs ^(3, 8, 9). A second reason might be due to the differences among the descriptive criteria used in the studies. For instance, radiopacities occurring in edentulous regions, were excluded, as these could be excessively ossified regions that formed after surgery. Yet, these regions might also be areas of condensing otitis that remained after tooth extraction. Also ethnic reason may play a role.

In the present study, both IO and CO lesions had a higher prevalence among females than among males. This finding agrees with Geist and Katz ⁽³⁾ and McDonnell ⁽¹⁰⁾, who found a female to male ratio of 1.5:1 and 2:1, respectively. Similarly, Avramidou et al. (2008) ⁽²⁾ detected that female patients were more likely to have a radiopaque lesion than men. However, Kawai et al.(1992) ⁽¹¹⁾ and Yonetsuet

al.(1997)⁽¹²⁾ found no difference between the incidence in women and men. (idiopathic osteosclerosis related to teeth), In the present study, both IO and CO lesions were found more in the 31-45 years age group with a marked frequency. In addition, CO lesions were observed in the age ranges of 31-45 years and 46-60 years more than 15-30 years. A possible explanation might be increased tooth caries and pulpal infections with increased age. The high prevalence of IO lesions in the 31-45 years coincides with the maximum bone mass acquisition in this period.

A higher prevalence of radiopacities was found in the mandible than in the maxilla. This might partly be explained by the fact that when panoramic radiographs are examined and assessed, there are fewer problems with the superimposition of anatomic structures in the mandible than in the maxilla. In the evaluation of our study, IO lesions were more frequent in the premolar region than CO lesions, while CO lesions were observed to be more frequent in the molar region. It has been maintained that since IO lesions are most frequently found located in the premolar and molar areas, they might represent residual roots from deciduous molars, resorbed and replaced by sclerotic bone⁽¹³⁾. Histological examination in the study of Henrikson et al.⁽¹⁴⁾ clearly demonstrated sclerotic bone containing a retained root in one case. So, it is possible that microscopic root fragments may act as a nidus for bone proliferation in some cases. On the other hand, the frequency of CO lesions in the molar region could be attributed to caries, traumatic occlusal stress, and pulpal infections, which occur more frequently in molar teeth than in premolar teeth. In addition, nearly 44% of the IO lesions in our examination were separate lesions

unrelated to the region, upon which neither residual root fragments nor excessive occlusal forces can have a stimulator effect. CO lesions, on the other hand, were observed to exhibit only apical and apical+interradicular involvement.

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Table 1: Patients with IO and CO according to gender and age groups

		No.	Patients with IO Lesions	%
Gender	Female	418	15	3.6
	Male	449	9	2.0
Age Groups	15-30 years	297	9	3.0
	31-45 years	311	12	3.9
	46-60 years	259	3	1.1
		No.	Patients with CO Lesions	%
Gender	Female	418	7	1.7
	Male	449	4	0.09
Age Groups	15-30 years	297	2	0.7
	31-45 years	311	6	1.9
	46-60 years	259	3	1.2

Table 2: The distributions of IO and CO lesions with respect to shape, localization, and dental relationship

		27 IO lesions in 24 subjects	%	13 CO lesions in 11 subjects	%
Shape of lesions	Round	15	56	9	69
	Irregular	12	44	4	31
Localization of lesions	Mandible	25	92.5	12	92.3
	Maxilla	2	7.5	1	7.7
Regional localization of lesions	Incisive	0	0	0	0
	Canine	1	3.7	0	0
	Canine-Premolar	4	14.8	1	7.7
	Premolar	6	22.2	2	15.3
	Premolar-Molar	5	18.5	0	0
The relationship to teeth of lesions	Molar	11	40.8	10	77
	Apical	8	30	11	84.6
	Interradicular	6	22.3	0	0
	Apical and interradicular	1	3.7	2	15.4
	Separate	12	44	0	0

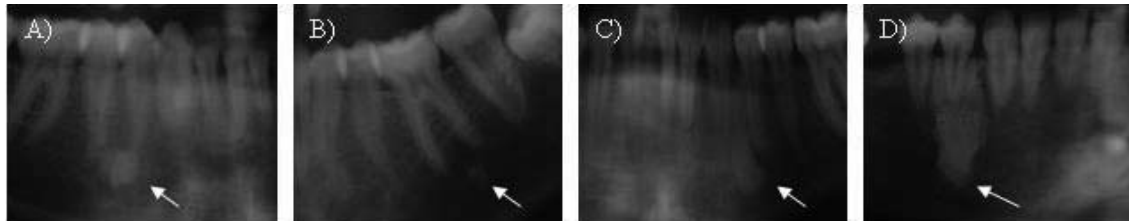


Fig. 1. IO lesions in terms of dental relationships Geist and Katz(3)

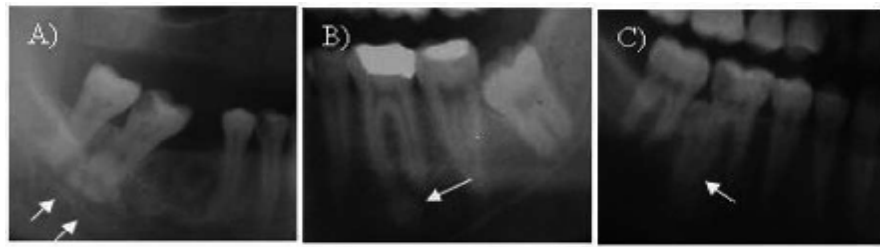


Fig. 2. CO lesions in terms of dental relationships. Geist and Katz(3)

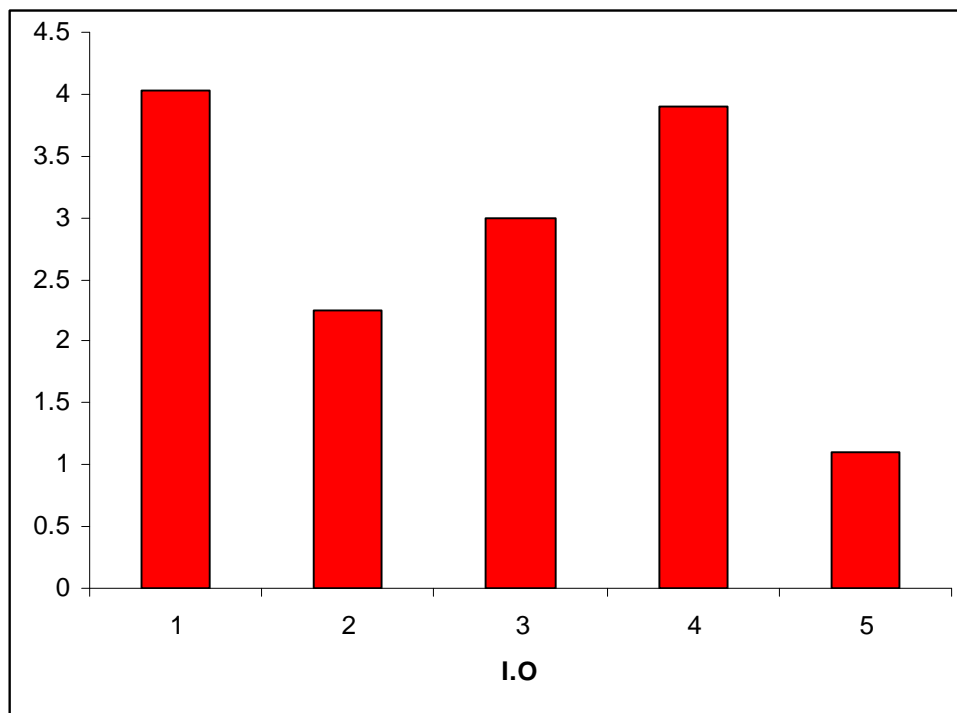


Figure 3: The percentages distribution for I.O patients where 1. represent females, 2 represent males, 3. Age 15-30 years old, 4. Age 31-45 years old. 5. age from 46-60 years old.

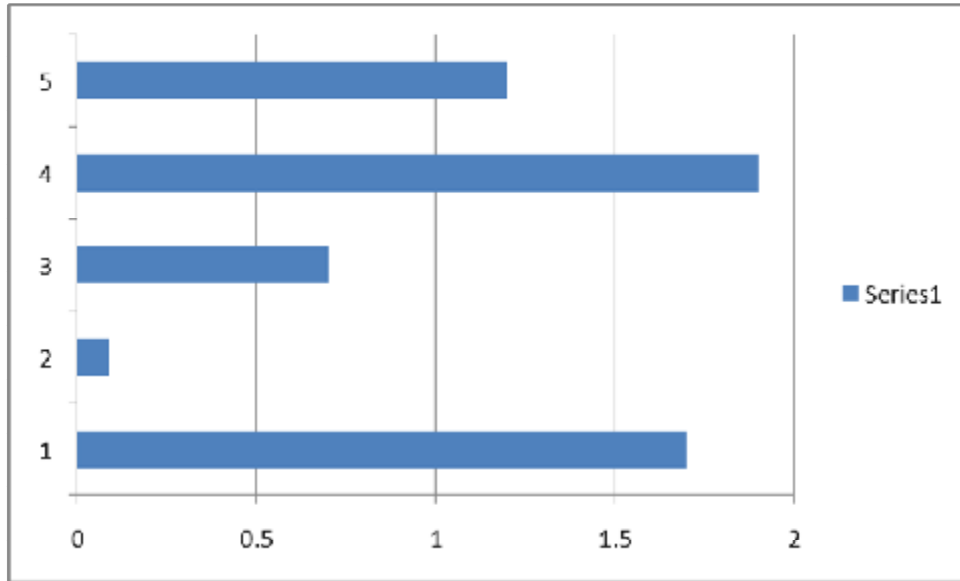


Figure 4: The percentages distribution for CO patients where 1. Represent females, 2 represent males, 3. Age 15-30 years old, 4. Age 31-45 years old. 5. age from 46-60 years old.

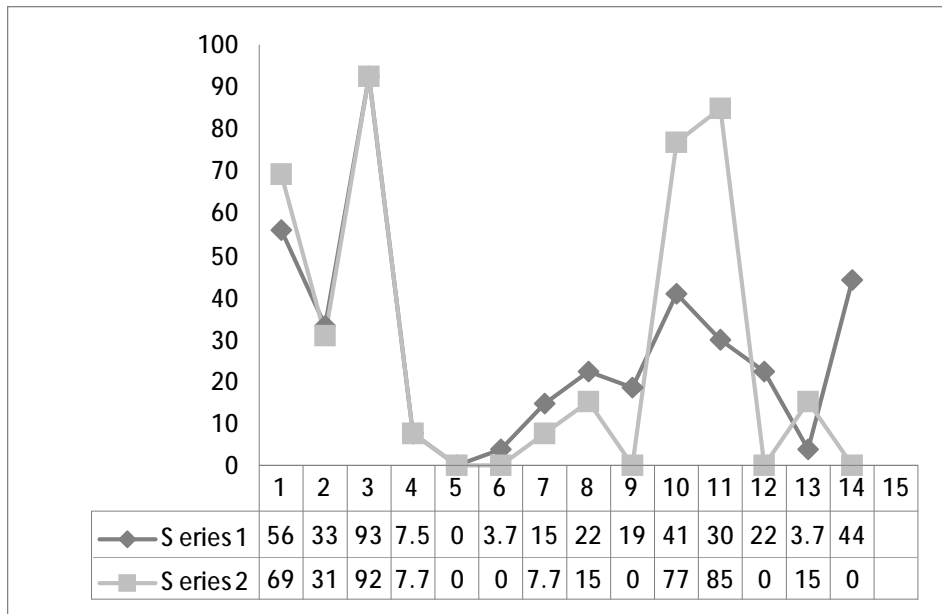


Fig 5: The comparison between the percentages of IO and CO lesions where series 1 represent the IO lesion and series 2 represent the CO lesion