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PREVALENCE AND DISTRIBUTION OF IDIOPATHIC OSTEOSCLEROSIS ON PATIENTS ATTENDING A DENTAL SCHOOL

İdiyopatik Osteosklerozun Bir Diş Hekimliği Fakültesine Başvuran Hastalardaki Görülme Sıklığı ve Dağılımı

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ABSTRACT

Purpose: The purpose of this study was to assess the prevalence and distribution of idiopathic osteosclerosis (IO) according to its location, patients' age and gender in the patients attending a dental school.

Material and Methods: This study included digital panoramic images of 1065 (623 females, 58.5 %; 442 males, 41.5 %) consecutive patients. The images were assessed by 2 authors.

Results: A total of 55 lesions in 50 patients whose mean age was 36.1 (36.1±15.1) were detected. The prevalence of IO was found to be 4.7 %. The most frequent number of lesion (36 %) was observed in 20-29 age groups. The number of lesions was higher in females (2.9 %) than males (1.8 %). There was no statistically significant difference between genders for the prevalence of IO (p=0.607). The most frequent number of lesion was observed in mandibular premolar region (47.3 %). Statistically significant difference was found between maxilla and mandible (p<0.001).

Conclusion: According to the results of this study, the prevalence of IO was found to be 4.7 %. Obtained findings were in accordance with the results of previous reports.

Keywords: *Osteosclerosis, panoramic radiography, prevalence*

ÖZ

Amaç: Bu çalışmanın amacı, bir diş hekimliği fakültesine başvuran hastalardaki idiopatik osteosklerozun (İO) görülme sıklığı ile bölge, yaş ve cinsiyete göre dağılımını değerlendirmektir.

Gereç ve Yöntem: Çalışmaya 1065 (623 kadın, % 58.5; 442 erkek, % 41.5) hastanın dijital panoramik görüntüleri dahil edildi. Görüntüler, iki araştırmacı tarafından değerlendirildi.

Bulgular: Yaş ortalaması 36.1 (36.1±15.1) olan 50 hastada, toplam 55 lezyon tespit edildi. İO'un görülme sıklığı % 4.7 olarak bulundu. En fazla lezyon (% 36) 20-29 yaş grubunda izlendi. Lezyonların sayısı kadınlarda (% 2.9) erkeklerden (% 1.8) daha fazlaydı. İO görülme sıklığı açısından cinsiyetler arasında istatistiksel olarak anlamlı fark yoktu (p=0.607). En fazla sayıda lezyon alt çene küçük azı dişler bölgesinde izlendi. İO görülme sıklığı açısından alt ve üst çene arasında istatistiksel olarak anlamlı fark bulundu (p<0.001).

Sonuç: Bu çalışmanın sonuçlarına göre, İO'un görülme sıklığı % 4.7 olarak tespit edildi. Elde edilen bulgular önceki araştırmaların sonuçları ile uyumludur.

Anahtar kelimeler: *Osteoskleroz, panoramik radyografi, görülme sıklığı*

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Introduction

Idiopathic osteosclerosis (IO) of the jaws is described as a localized no expansible radiopacity of unknown origin (1, 2). These lesions are generally asymptomatic and are discovered on radiographs taken for other reasons. This condition has been reported with several names including; dense bone island, idiopathic osteosclerosis, enostosis and focal periapical osteopetrosis in dental literature (1, 3-6). Currently, the term "idiopathic osteosclerosis" is preferred by various authors based on the unknown etiology (2, 4, 7-9). This benign lesions can be found anywhere in the skeleton, they appear in the pelvis, femur and other long bones as well as the jaws (10).

The purpose of this study was to assess the prevalence and distribution of IO according to its location and to patients' age and gender, in a sample of Turkish dental patients.

Material and Methods

Digital panoramic radiographs obtained for several dental reasons of 1065 consecutive patients aged between 10 and 79 who attended to the Dentomaxillofacial Radiology Department of Gazi University Faculty of Dentistry, were examined for the presence of IO in the jaw bones. The radiographs were taken with an Orthoralix 9200 DDE (Gendex Co, Milan, Italy) panoramic unit which is a CCD based system used at 70 kV, 4mA and 12 seconds exposure settings by the same radiology technician.

All radiographs were evaluated on the basis of the modified criteria used in several studies (1, 3, 8):

A well-defined radiopacity in the jaw bones that is located in the vicinity of sound teeth, in the vicinity of teeth with small restorations, or separated from the teeth.

Round or elliptical in shape and more than 3 mm in size.

No surrounding radiolucent rim.

The following criteria were used for exclusion from the survey:

Radiopacities around teeth with deep caries or large restorations.

Radiopacities in patients with Gardner's syndrome, familial adenomatosis of the colon, and other metabolic diseases of bone.

The images were assessed on the monitor with a 16-bit resolution in a dark room by two of the authors. A case was diagnosed as IO when both observers agreed on the radiographic diagnosis. If there was any disagreement, the case was excluded from the survey. Obtained data statistically analyzed with descriptive statistics, chi-square and Fisher' Exact tests.

Results

Panoramic radiographs of 1065 patients (623 females, 442 males) with mean age of 38.2 were examined. A total of 55 lesions of 50 patients whose mean age was 36.1 (36.1±15.1) were detected. The prevalence of IO was found to be 4.7 %.

The number of lesions was higher in females (2.9 %) than males (1.8 %). There was no statistically significant difference (p=0.607) between genders for the prevalence of IO. The most frequent number of lesion was observed in 20-29 age group (36 %) and followed by 40-49 (22 %), 30-39 (14 %), 50-59 (12 %), 10-19 (8 %), 60-69 (6 %), 70-79 (2 %) age groups, respectively. The distribution of the lesions according to patients' age and gender is shown in Table 1.

Table 1. The distribution of the lesions with respect to patients' age and gender.

Age	Gender		Total (%)
	Female (%)	Male (%)	
10-19	2 (50)	2 (50)	4 (100)
20-29	10 (55.5)	8 (44.5)	18 (100)
30-39	5 (71.4)	2 (28.6)	7 (100)
40-49	8 (72.7)	3 (27.3)	11 (100)
50-59	3 (50)	3 (50)	6 (100)
60-69	2 (66.7)	1 (33.3)	3 (100)
70-79	1 (100)	-	1 (100)
Total	31 (62)	19 (38)	50 (100)

Of the 55 lesions, 53 (96.4 %) were present in the mandible with only 2 (3.6 %) in the maxilla. Statistically significant difference ($p<0.001$) was found between maxilla and mandible (Table 2). The most frequent number of lesion was observed in mandibular premolar region (47.3 %). There was statistically significant difference ($p<0.001$) between the regions of mandible and no statistically significant difference ($p=1.000$) was found between the regions of maxilla for the prevalence of IO (Table 3). The dimensions of the lesions ranged from 3.7- 12 mm in diameter with an average diameter of 8.1 (8.1±2.6) mm. None of the lesions caused any real pathological relevance except for one case with two lesions caused pain which thought to be the result of nerve compression.

Table 2. The distribution of IO with respect to jaws.

Jaws	Patients with IO (%)	Patients without IO (%)	Total (%)	p value
Maxilla	2 (0.2)	1063 (99.8)	1065 (100)	$p<0.001^*$
Mandible	53 (5)	1012 (95)	1065 (100)	

**Statistically significant difference*

Table 3. The distribution of IO with respect to location.

Jaws	Regions of the jaws	Patients with IO (%)	Patients without IO (%)	Total (%)	p value
Maxilla	**Anterior region**	1 (0.1)	1064 (99.9)	2 (100)	$p<0.001^*$
	Canine region	1 (0.1)	1064 (99.9)		
	Premolar region	-	-		
	Molar region	-	-		
Mandible	**Anterior region**	-		53 (100)	1.000^*
	Canine region	2 (0.2)	1063 (99.8)		
	Premolar region	26 (2.4)	1039 (97.6)		
	Molar region	25 (2.3)	1040 (97.7)		

**Statistically significant difference*

Discussion

A number of theories including trauma, reactive response of the bone against mild inflammation and developmental etiology have been contended for formation of IO (4, 7, 11). The reported prevalence of IO varies from 3.3% to 31% in different ethnic groups (3, 12-14). MacDonald-Jankowski reported that the prevalence of IO was greater in Chinese and Japanese than in Western surveys (9). The prevalence of IO in Canada, London, Edinburgh, USA, Hong Kong, Norway, Italy and Japan was 2.3, 2.7, 4.1, 5.7, 6.7, 7.6, 8.3, 9.5 and 9.7 % respectively (3, 7, 9, 15-18). According to our knowledge, two studies were carried out in Turkish population about prevalence of IO (11, 19). Miloglu et al. (11) investigated the frequency of IO and condensing osteitis in Erzurum and reported as the rates of these lesions were 2.44 and 0.81%, respectively. The frequency of IO in the Turkish population of Cappadocia region was found to be 6.1% by Sisman et al. (19). The discrepancies between the surveys may be explained by different diagnostic criteria and differences of ethnicity. In this survey, the prevalence of IO was found to be 4.7 % and it was relatively parallel as reported the articles in Turkish populations and many other countries, though remaining significantly lower than the values reported in Eastern populations.

It was reported that there was no sex predilection for the prevalence of IO, (3, 8) but some studies reported that it is higher in females than males (1, 4). In the present study the prevalence in women was higher than in men. This finding was in accordance with the results of McDonnell (1), Geist and Katz (4), Miloglu et al. (11) and Moshfeghi et al. (17).

IO in the jaws is commonly found in the mandible, especially posterior region (3, 4, 8). Some authors reported that the most common location of IO is in the first molar region (1, 3, 5, 8), although some authors reported as the highest occurrence in premolar region (4, 20). In this study, the most common location of IO was found to be posterior region of the mandible and the percentages of the lesions were very similar in premolar (47.3 %) and molar regions (45.5 %) in accordance with previous reports.

Petrikowski and Peters (15) had studied with at least two panoramic radiographs taken 1 to 10 years apart from a population of 2991 patients age range 5 to 35 years. The results of the study indicated that IOs are labile lesions, develop during early adolescence, and retain a potential for enlargement, or to a lesser extent shrinkage, into adulthood (15). In this study, the most frequent number of IO was observed in 20-29 age groups. This result was in concordance with several reports (11, 17, 19).

The IO could appear as round, elliptical or irregular in shape and generally well defined radiopacity of more than 3 mm in size with no surrounding radiolucent rim (6, 8). Kawai et al. (21) reviewed the clinical and radiographic features of gigantic dense bone islands of the jaws in 21 subjects and reported most of the islands were asymptomatic with greatest dimension ranged from 2.5 to 7.0 cm. They concluded that gigantic dense bone island is not a benign bone neoplasm and is perhaps merely a large counterpart of smaller dense bone islands or idiopathic osteosclerosis (21). In this study, IO lesions were commonly observed as well defined radiopacities round and elliptical in shape and the dimensions of the lesions ranged from 3.7- 12 mm in diameter with an average diameter of 8.11 mm.

The study conducted by Halse and Molven (7) showed that IO lesions observed over a

period of more than two decades were stable and supported the theory that IO should be considered a normal anatomical variant of bone. Therefore, no treatment is needed, periodic follow up should be advisable in clinical practice. In some cases, a local etiological agent may cause development of structures with an identical appearance, as an example; residual roots, whose periodontal structures disappeared and later presented themselves as IO, had been observed in three patients (7). The local complications of IO in jaws were reported as changes in tooth position and complication of any future orthodontic treatment. Marques-Silva et al. (2)'s report described a rare case of ectopic eruption rote caused by IO that induced root resorption. In the present study none of the lesions caused any real pathological relevance except for one case with two lesions caused pain which thought to be the result of nervous compression.

The study of Yonetsu et al. (8) included some CT examinations. Eleven patients, all with lesions in the mandible, out of the 64 patients with IO had a CT examination performed for some other reason. Five lesions appeared as thickening of cortical bone and were classified as enostoses. Six lesions were located within medullary bone and were classified as central sclerosis (8). Because of the characteristics and the locations, the authors concluded that IO represented normal variants of bone, being developmental rather than reactive.

Conclusion

According to the results of this study, the prevalence of IO was found to be 4.7 %. This condition was relatively close with the studies in Turkish populations and significantly lower than the studies in Eastern populations. Our findings agree with previous reports that the common location of IO is largely in the posterior region of the mandible and the cases spanned a wide age range, from early teens to the seventh decade of life. Knowledge of the prevalence and characteristics of IO provided by this study can be considered as limited on the basis of being a cross-sectional study. Obviously, longitudinal studies may provide valuable information concerning origin and development of the lesions.

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