Prevalence of idiopathic osteosclerosis in an Iranian population

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ABSTRACT

Aim: Idiopathic osteosclerosis (IO) is a localized radiopacity with no associated pain, bony expansion, symptom, or known etiology. The aim of this study was to assess its frequency and distribution according to its location and patient's age and gender and internal structure using panoramic radiography.

Subjects and Methods: In this retrospective study, 3975 panoramic radiographs (PRs) were used. Radiopaque regions which had no certain relationship to any known sources of hard tissue production were accepted as IO and characteristics such as shape, location, internal structure, and personal information were investigated.

Statistical Analysis Used: The obtained data were evaluated using SPSS software and Chi-square test.

Results: IO was found in 113 (2.84%) out of 3975 patients. The most frequent site was the posterior region of mandible. There was no significant difference in the incidence of IO between genders (P = 0.766).

Conclusion: IO is an asymptomatic radiopaque mass commonly seen in PR, which was found mostly in the first molar region of mandible. Furthermore, its maximum frequency was in the second decade.

Key words: Idiopathic osteosclerosis, jaw, panoramic radiography

Subjects and Methods

In this retrospective, descriptive, analytical study, 3975 panoramic radiographs (PRs) were selected from patients (1987 men and 1988 women) aged between 10 and 45 years old who were referred to Isfahan Dental School for routine dental examination. All radiographs were observed by a radiologist on a standard light box under normal room lighting to detect the presence of IO. All the PRs were obtained with a panoramic X-ray machine (Planmeca, EC, Finland) and Kodak film (Kodak, USA) and processed in an automatic film processor (Optimax, Germany).

Patients who had questionable situation about the existence of IO and had the following criteria were excluded from this study:

- Idiopathic osteosclerosis (IO) is an area seen as an irregular radiopacity. Although sometimes described as a dense bone island or enostosis, IO is often preferred. These lesions are expected as developmental intraosseous anatomic variations. IO is variable in size, even sometimes including the whole body of mandible.

Lesions may occur at root apices or between roots or may be separate from teeth. Histopathologically, IO is composed of dense calcified tissues without marrow spaces and noninflammatory cell infiltrates. There is a possible predilection for African, Japanese, Chinese, or indo-Chinese people; therefore, it was necessary to do proper research in Iranian society.

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• Radiopacities which were directly related to teeth with deep caries or large restorations;
• Characteristics associated with complex lesions such as periapical cemental dysplasia, odontoma, and fibro-osseous lesions;
• Remaining roots of primary or permanent teeth in the jaw which are clearly distinguishable;
• Radiopacities related to salivary gland stones, exostoses, lymph node calcifications, and tonsillitis (according to radiographic and clinical characteristics of the lesions);
• Radiopacities around malpositioned teeth or long-term abutments for fixed bridges or partial dentures, which may have thickened lamina dura;
• Patients with Gardner’s syndrome, familial polyposis, and other diseases associated with metabolic bone disorders;
• Solitary radiopacities in edentulous regions.

Statistical analysis
The observed results were analyzed with SPSS 15 (IBM Com., Chicago, USA), and data were obtained using the Chi-square test to investigate the possible relationship between the findings and gender, age, and location, and the amount of \( P < 0.05 \) was considered statistically significant level.

RESULTS
Osteosclerosis was identified in 113 of 3975 patients (1987 men and 1988 women), for an overall incidence of 2.84% of patients. There is a statistically significant difference between the rates of occurrence in the jaws \( (P < 0.001) \); only 4 IOs were detected in maxilla and the rest of them occurred in the mandible (96.5%). There were 113 cases of osteosclerosis that consisted of 57 cases (50.4%) among females and 56 (49.5%) among males. There was no statistically significant difference in the prevalence of IO between men and women \( (P = 0.766) \).

The ages of the study group ranged from 10 to 45 years, and most lesions were found in the second decade [Chart 1].

Furthermore, most lesions were formed in the posterior area of maxilla and mandible, and the most common location of IO was in the mandibular molar and then mandibular premolar region.

DISCUSSION
In this study, the prevalence of IO was 2.84%. This result was consistent with the findings of Miloglu et al. in Turkey (2.4%) and also with Avramidou et al. in Greece (1.96%).\(^{[6,12]}\) Although comparing to the results of most researches, shows lower incidence in the studied population.\(^{[1,13-15]}\)

One of the reasons for the variation in the studies is the different definitions of osteosclerosis. Some researchers included radiopacities that are related to traumatic occlusion or pulp inflammation, whereas others excluded these kinds of lesions from their study.\(^{[13,14]}\) In our study, asymptomatic radiopaque masses within the jaws which had no certain relationship to any known sources of hard tissue production were accepted as IO. Another reason may be the choice of radiography. In some studies, periapical radiographs were examined\(^{[1,13]}\) whereas in some others, PRs were used as the tool of investigation.\(^{[2,5,14]}\) Yonetsu et al. after studying 11 cases with the panoramic radiography also evaluated the cases with computed tomography and reported that the accuracy of panoramic radiography is suitable.\(^{[14]}\) However, at least we have to accept that theoretically structures outside the image layer of panoramic imaging will not have proper features in the final film. In our study, to maintain ethical issues, no radiographs were taken from the patients; instead, radiographs prescribed by other sections were used and because intraoral periapical radiographs usually do not include full mouth, we used panoramic views to have a full view and wide range for research.

In our study, the prevalence of lesion among men and women is almost equal and had no significant difference. Although some studies have described a higher incidence in women,\(^{[3,6,13,16]}\) most studies have observed no significant difference between men and women.\(^{[10,14,17-19]}\)
In our study, a higher incidence of IO is seen in the mandible which is consistent with the findings of all previous studies, and also the dental location of IO in our study is mostly in the first molar area, which is different with the results of some studies. In the studies of Geist and Katz in America and Zhang in China as well as Miloglu et al., IO was found to be most prevalent in the premolar region of the mandible. The majority of the articles suggest that the main area involved in the IO lesions is mandibular molars. This might partly be explained by the fact that when PRs are examined and assessed, there are fewer problems with the superimposition of anatomic structures in the mandible than in the maxilla. In addition, it may be attributed to differences in bone anatomy and blood supply.

In our study, IO is almost absent in the first decade, whereas in the second decade, we observed the greatest amount of IO probably due to the pubic stage of head and face bones and then declined in the third and fourth decade. In this respect, our findings are consistent with the results of Kawai in Japan and MacDonald-Jankowski in Hong Kong and the Western race living in that region.

In these studies, the maximum incidence is related to the second decade and decreases with aging. However, in MacDonald-Jankowski’s study, Eastern race living in Hong Kong had the highest incidence of IO in the fourth decade. Furthermore, Miloglu et al. in Turkey found during their study that the highest incidence of IO is in the third and fourth decades. These differences probably show the role of genetic as one of the main elements in the different prevalence of IO in different populations. Furthermore, all of these studies have noted decrease of IO incidence with increasing age. At the end, no incidence of IO in the first decade and then beginning of it in the second decade at the time of final mineralization of bone reinforces the hypothesis that IO is a normal variation in bone growth.

CONCLUSION

The review of different articles and the results of this study showed IO is a developmental variation of normal bone structure unrelated to any regional stimuli. The lesion occurs at any age, any location, without a sex predilection, and often does not require treatment. In this study, most lesions were homogeneous, irregular, and distinct from the apex of the tooth. To ensure the accuracy of diagnosis, periodic follow-up of the lesion is necessary.

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Conflicts of interest
There are no conflicts of interest.

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