

The prevalence, clinical and radiographic characteristics of cemento-osseous dysplasia in Korea

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ABSTRACT

Purpose : This study was intended to estimate the prevalence of cemento-osseous dysplasia (COD) in the Korean population and to assess the clinical and radiographic characteristics of this condition.

Materials and Methods : Panoramic radiographs from 10,646 patients (4,982 males and 5,664 females, age range from 6 to 91 years) were reviewed for evidence of COD. Their demographics, clinical characteristics, and radiographic features were retrospectively assessed.

Results : Of 10,646 panoramic radiographs, 33 radiographs (0.31%) exhibited evidence of COD. The prevalence of COD increased to over 1% in women over 40-years old. Of these 33 patients, 16 had florid cemento-osseous dysplasia (FCOD) and 17 had focal COD. Due to the multiplicity of FCOD, a total of 63 COD lesions were assessed. These lesions were most common in the mandibular molar area. Most of the COD lesions examined (61.9%) were less than 10 mm and the majority (82.5%) showed radiopacity.

Conclusion : COD has a predilection for the mandibular molar area of middle-aged and older women. (*Korean J Oral Maxillofac Radiol* 2007; 37 : 185-9)

KEY WORDS : Prevalences; Radiography, Panoramic; Cementoma

Introduction

Cemento-osseous dysplasia (COD) is a cementum and/or bone-producing non-neoplastic condition of the jaw that may arise from the periodontal ligaments.^{1,2} This disorder is strictly localized to tooth bearing areas.^{3,5} Although the etiology and pathogenesis of COD are unknown, these lesions are thought to occur in response to reactive or dysplastic changes in the periodontal ligament.^{3,4}

The term cemento-osseous dysplasia was adopted for the World Health Organization (WHO) classification in 19926 and has three variants classified according to location and multiplicity. Periapical cemental dysplasias (PCDs) are confined to the anterior mandible and rarely exceed 1 cm in diameter.⁶ Florid cemento-osseous dysplasias (FCODs) are widely defined as multi-quadrant lesions which are bilateral and have a symmetrical appearance.^{3,4} The final category, other cemento-osseous dysplasias, includes CODs which share

some features of PCD and/or FCOD, but do not have their characteristic clinicopathological patterns of presentation.⁶ Focal COD characterized by its solitary development falls in this category.⁷ These three variants appear to have the same disease process⁵ and are histologically indistinguishable from each other.⁷

Although the term 'cemento-osseous dysplasia' is a histopathological term, diagnosis can be made based upon clinical and radiographic findings.¹⁴ Typically, this condition affects middle-aged women and has a predilection for people of African or Asian descent.^{8,9} These lesions are usually asymptomatic,⁵ therefore they are frequently diagnosed incidentally during routine radiographic examinations.^{4,10-13} Radiographs are generally considered adequate for diagnosis. The radiographic appearance of COD depends on the degree of maturation of the lesion and may show radiolucent, mixed or dense radiopaque masses with or without a radiolucent halo.¹³ Lesions are usually benign and do not require treatment, unless there is a cosmetic concern or the lesion becomes symptomatic.⁸

Although reports suggest that COD is relatively common among Asians,¹⁴ very few studies have been performed in Korean populations.¹⁵⁻¹⁷ Therefore, this study was intended to

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estimate the prevalence of COD and to describe the characteristic clinical and radiographic features of this condition.

Materials and Methods

Panoramic radiographs from 10,646 patients (4,982 males and 5,664 females, age range from 6 to 91 years) attending Pusan National University Hospital during the period from October 2004 to May 2007 were reviewed for the presence of COD. Digital panoramic radiographs were taken using 2002 CC Proline (Planmeca Co., Helsinki, Finland) and Kodak DirectView CR-975 digital radiography systems (Eastman-Kodak Co., Rochester NY, USA) with GP (general purpose) phosphor plates. Two oral and maxillofacial radiologists interpreted all radiographs and reviewed clinical records; a positive diagnosis was made when they both agreed. The diagnosis was based on clinical and radiographic features consistent with the 1992 WHO definition of COD.

After the COD positive radiographs were identified, the demographics, clinical characteristics, and radiographic features were assessed. The parameters of age, gender, symptom, subtype, location, size, and density were assessed for all COD positive radiographs. The classification of subtype was based according to the 1992 WHO definition. Size was determined by measuring the long diameter of the lesion and correcting by the radiographic magnification factor provided by the manufacturer.

Results

Of 10,646 panoramic radiographs, 33 radiographs were diagnosed as having COD. The positive radiographs consisted of 5 men and 28 women. The overall prevalence rate was 0.31% however, the prevalence of COD increased to over 1%

Table 1. The prevalence of cemento-osseous dysplasia in 10,646 subjects

Age group (years)	No. of patients/population(%)		
	Male	Female	Total
0-10	0/431 (0)	0/351 (0)	0/782 (0)
11-20	0/974 (0)	0/1074 (0)	0/2048 (0)
21-30	0/1210 (0)	0/1518 (0)	0/2728 (0)
31-40	1/551 (0.18)	2/578 (0.35)	3/1129 (0.27)
41-50	1/670 (0)	7/674 (1.10)	8/1344 (0.60)
51-60	0/624 (0)	10/702 (1.42)	10/1326 (0.75)
61-70	1/375 (0.27)	6/476 (1.26)	7/851 (0.82)
71-80	2/147 (1.36)	3/291 (1.03)	5/438 (1.11)
Total	5/4982 (0.10)	28/5664 (0.49)	33/10646 (0.31)

Table 2. Clinical features of cemento-osseous dysplasia in 33 patients

	Male (n=5)	Female (n=28)	Total (n=33)
Mean age	57.4	55.6	55.9
Symptomatic	0	5	5
Discomfort	(0)	(4)	(4)
	(0)	(1)	(1)
Expansion	(0)	(1)	(1)
	(0)	(1)	(1)
Subtype	1	15	16
Unilateral	(0)	(6)	(6)
	(0)	(6)	(6)
Bilateral	(0)	(6)	(6)
	(1)	(3)	(4)
Bimaxillary	(1)	(3)	(4)
	(1)	(3)	(4)
Focal COD	4	13	17

FCOD: Florid cemento-osseous dysplasia
Focal COD: Focal cemento-osseous dysplasia

Table 3. The number of involved lesion and tooth in 33 patients

	FCOD	Focal COD	Total
Patient	16	17	33
Involved lesion	46	17	63
Involved tooth	62	17	79

FCOD: Florid cemento-osseous dysplasia
Focal COD: Focal cemento-osseous dysplasia

Table 4. Distribution of involved tooth in 63 lesions

Tooth site	No. of tooth			
	Total (%)	Dentate	Edentulous	
Maxilla	Anterior	0 (0)	0	0
	Premolar	1 (1.3)	0	1
	Molar	8 (10.1)	2	6
Mandible	Anterior	4 (5.1)	4	0
	Premolar	14 (17.7)	11	3
	Molar	52 (65.8)	16	36
Total	79 (100)	33	46	

among women over 40-years old (Table 1). The mean age of the patients was 55.9 years and five patients showed clinical symptoms of either discomfort or expansion of the jaw. Of the 33 COD positive patients, 16 had FCOD and 17 had focal COD. None of the observed lesions were classified as PCD (Table 2 & Fig. 1).

A total of 63 COD lesions were examined due to the multiplicity of FCOD. Due to some FCODs involving multiple teeth, the affected teeth were totaled up to 79; 33 were dentate and 46 were edentulous. The mandibular molar area was most frequently affected (Table 3, 4). Even though most CODs (61.9%) were less than 10 mm, several lobulated lesions over 20 mm were also observed (Fig. 2). Radiopacity was a dominant radiographic feature in CODs (82.5%) (Fig. 3).

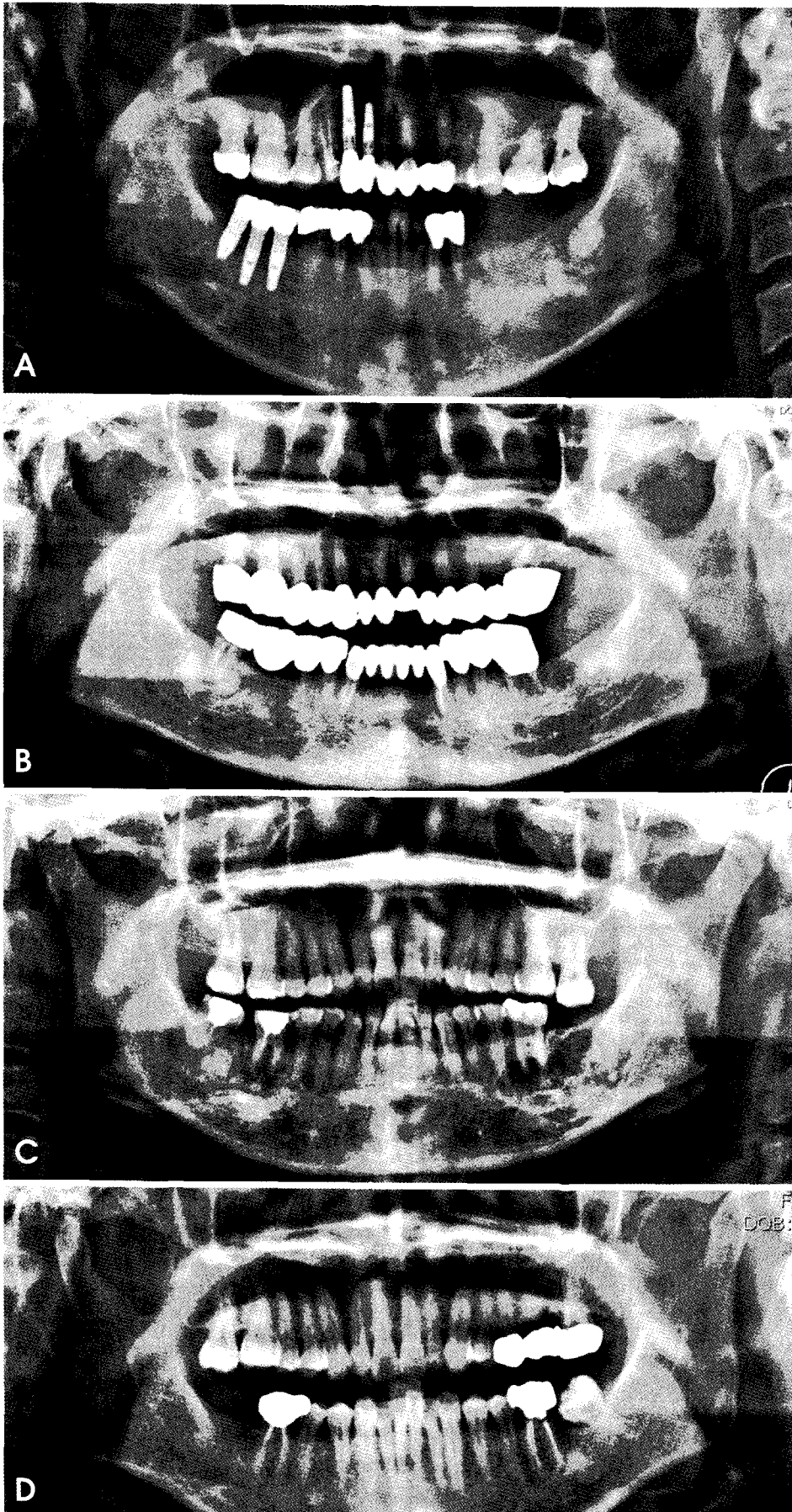


Fig. 1. A, Unilateral FCOD appearing as multiple radiopaque masses in the left mandibular edentulous molar area. B, Bilateral FCOD showing calcified masses with radiolucent rims in both posterior mandibular areas. C, Bi-maxillary lobulated FCOD presenting as mixed lesions in both maxillary and mandibular regions. D, Focal COD appearing as periapical radiopacity of the left first mandibular molar.

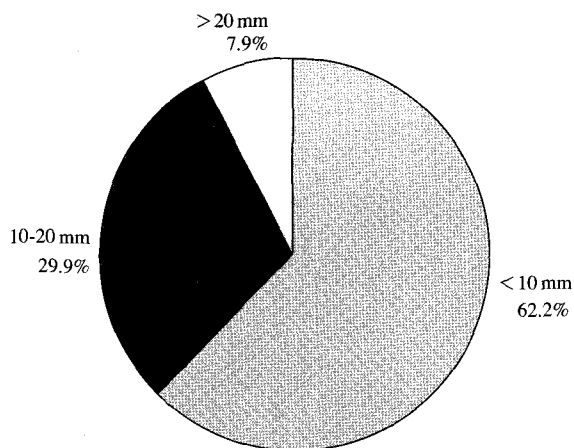


Fig. 2. Size distribution of 63 COD lesions.

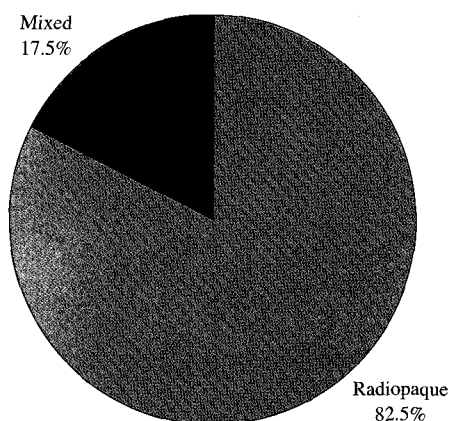


Fig. 3. Radiographic density of 63 COD lesions.

Table 5. Size and radiographic density of 63 lesions

		No. of cases (%)
Size	< 10 mm	39 (61.9)
	10-20 mm	19 (30.2)
	> 20 mm	5 (7.9)
Radiographic density	Radiopaque	52 (82.5)
	Mixed	11 (17.5)
	Radiolucent	0 (0)

Discussion

The diagnosis of CODs is usually based upon clinical and radiological features. In this study, we used panoramic radiographs along with clinical records, such as tooth vitality, in order to arrive at a diagnosis. Digital panoramic radiographs seemed to have adequate quality to screen CODs. In several radiopaque cases, it was difficult to differentiate COD from idiopathic osteosclerosis. In these cases, the presence of the

radiolucent rim around the lesion was helpful for the diagnosis of COD. Without biopsy, there was no way to verify the diagnosis however, considering that COD usually does not require treatment, we don't see any reason to use more aggressive approaches for diagnosing COD, such as computed tomography or histologic examination. One thing to be considered for this study is that our sample included only dental patients and the result might not represent the whole population.

The overall prevalence of COD in our study was 0.31%. However, the prevalence among women over 40 increased dramatically to over 1%. Furthermore, COD lesions were never observed in patients under the age of 30. The majority (84.8%) of the patients were females. Our results recapitulate previous findings and fit the general consensus that COD has a predilection for middle-aged women. Previous reports by Stafne¹⁸ and Chaudhry et al.¹⁹ reported prevalence rates among adult patients of 0.24% and 0.29%, respectively. Neville & Albenesius²⁰ reported that the overall prevalence was 5.5% among black women over 21 years of age. The variance among reported prevalence rates is mainly related to age, gender, and race of the sample used. FCOD seems to have a striking predilection for black women. MacDonald-Jankowski¹⁴ reported that fifty-nine percent of cases were found in Blacks, 37% in Asians and 3% in Caucasians. Our study demonstrates that COD is not uncommon among older Korean females.

Although a wide range of terminology has been used to describe presumed COD lesions,¹¹ we classified the cases into three main groups according to WHO classifications; periapical, florid, and focal cemental dysplasias.⁵ Interestingly, our study failed to identify any PCD cases. This is in contrast to the generally accepted view that PCD is a common condition affecting the jaws. This forced us to review our cases, but no results changed. We think this finding was either ascribed to differences in the definition of PCD or to the actual low incidence of this condition in our sample population. The high incidence of focal CODs which were previously classified as PCD might be relevant to this finding. Regardless of the underlying reason, our results clearly suggest that clinicians and researchers need to reassess the general view that PCD is quite common.

Bimaxillary involvement was shown in 4 out of 16 FCOD patients. In cases where only one jaw was affected, it was the mandible. Maxilla appeared to be subordinate to mandible. The most frequently involved tooth site was the mandibular molar, whether it was dentate or edentulous. COD is known to be derived from the cells of the periodontal ligaments there-

fore, the lesions in edentulous areas had been formed before the related teeth were removed. Kawai et al.²¹ mentioned that the fact that COD lesions were often seen in edentulous areas indicates that related teeth might be easily removed and at the same time suggests that the COD lesions might not be attached to related teeth.

In general, COD lesions showed limited growth however, large lesions greater than 20 mm in diameter were found in some FCOD cases. One patient with a large lesion complained jaw expansion and only patients with infections complained of any discomfort.

COD has been described as having three sequential stages, radiolucent, mixed and radiopaque. However, none of our cases showed radiolucency. We also conducted vitality tests in order to address the lack of radiolucent lesions and to differentiate between CODs and periapical lesions. Although we were unable to verify all the vitalities for various reasons, including the presence of crowned teeth, it was not likely that we may have overlooked some radiolucent lesions.

This study was performed to determine the prevalence of COD in the Korean population. The overall prevalence rate was 0.31%; however, the prevalence was significantly greater among women over 40 years old. Our results also demonstrate that the mandible was affected in all cases of COD. These findings are in accordance with the accepted idea that COD has a predilection for the mandibular molar area of middle-aged and older women.

References

1. Hamner JE 3rd, Scofield HH, Cornyn J. Benign fibro-osseous jaw lesions of periodontal membrane origin. an analysis of 249 cases. *Cancer* 1968; 22 : 861-78.
2. Waldron CA, Giansanti JS. Benign fibro-osseous lesions of the jaws: a clinical-radiologic-histologic review of sixty-five cases. II. Benign fibro-osseous lesions of periodontal ligament origin. *Oral Surg Oral Med Oral Pathol* 1973; 35 : 340-50.
3. Melrose RJ, Abrams AM, Mills BG. Florid osseous dysplasia. *Oral Surg Oral Med Oral Pathol* 1976; 41 : 62-82.
4. Waldron CA. Fibro-osseous lesions of the jaws. *J Oral Maxillofac Surg* 1985; 43 : 249-62.
5. Waldron CA. Fibro-osseous lesions of the jaws. *J Oral Maxillofac Surg* 1993; 51 : 828-35.
6. Kramer IRH, Pindborg JJ, Shear M. Neoplasms and other lesions related to bone. In: World Health Organization-Histologic typing of odontogenic tumours. WHO International classification of tumours. 2nd ed. London: Springer-Verlag; 1992. p.28-31.
7. Summerlin DJ, Tomich CE. Focal cemento-osseous dysplasia: a clinicopathologic study of 221 cases. *Oral Surg Oral Med Oral Pathol* 1994; 78 : 611-20.
8. White SC, Pharoah MJ. Oral radiology: principles and interpretation. 5th ed. St. Louis: Mosby; 2004. p.485-98.
9. Chapurlat RD, Meunier PJ. Fibrous dysplasia of bone. *Baillieres Best Pract Res Clin Rheumatol* 2000; 14 : 385-98.
10. Singer SR, Muralidhar M, Renaggio J. Florid cemento-osseous dysplasia and diffuse osteomyelitis. *J Am Dent Assoc* 2005; 136 : 927-31.
11. Waldron CA, Giansanti JS, Browand BC. Sclerotic cemental masses of the jaws (so-called chronic sclerosing osteomyelitis, sclerosing osteitis, multiple enostosis, and gigantiform cementoma). *Oral Surg Oral Med Oral Pathol* 1975; 39 : 590-604.
12. Miyauchi M, Ogawa I, Takata T, Ito H, Nikai H, Ijuhin N, et al. Florid cemento-osseous dysplasia with concomitant simple bone cysts: a case in a Japanese woman. *J Oral Pathol Med* 1995; 24 : 285-7.
13. Oikarinen K, Altonen M, Happonen RP. Gigantiform cementoma affecting a caucasian family. *Br J Oral Maxillofac Surg* 1991; 29 : 194-7.
14. MacDonald-Jankowski DS. Florid cemento-osseous dysplasia: a systematic review. *Dentomaxillofac Radiol* 2003; 32 : 141-9.
15. Park TW. The florid osseous dysplasia of the jaws. *Korean J Oral Maxillofac Radiol* 1989; 19 : 19-24.
16. Cho SB, Koh KJ. Florid osseous dysplasia of the jaws. *Korean J Oral Maxillofac Radiol* 1995; 25 : 159-70.
17. Han MR, Kim YH, Kang BC. The diagnostic importance of clinical and radiologic features of the multiple cemento-osseous dysplasia. *Korean J Oral Maxillofac Radiol* 1998; 28 : 299-311.
18. Shafer WG, Hine MK, Levy BM. A textbook of oral pathology. 4th ed. Philadelphia: W.B. Saunders Co; 1983. p.297-301.
19. Chaudhry AP, Spink JH, Gorlin RJ. Periapical fibrous dysplasia (cementoma). *J Oral Surg (Chic)* 1958; 16 : 483-8.
20. Neville BW, Albenesius RJ. The prevalence of benign fibro-osseous lesions of periodontal ligament origin in black women: a radiographic survey. *Oral Surg Oral Med Oral Pathol* 1986; 62 : 340-4.
21. Kawai T, Hiranuma H, Kishino M, Jikko A, Sakuda M. Cemento-osseous dysplasia of the jaws in 54 Japanese patients: a radiographic study. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1999; 87 : 107-14.