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Evaluation of the Prevalence of Lesions Resembling Cemento-Osseous Dysplasia on Panoramic Radiographs: A Retrospective Study

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ABSTRACT

Aim: Cemento-osseous dysplasia (COD) is a benign fibro-osseous lesion where normal bone tissue is replaced by fibrous connective tissue. This study aims to evaluate the prevalence of COD, and its periapical, focal, and florid types based on age and gender using panoramic radiographs.
Material and Methods: This retrospective study was conducted at the Department of Oral, Dental, and Maxillofacial Radiology, Necmettin Erbakan University Faculty of Dentistry. Panoramic radiographs of 500 patients who visited between January 2023 and January 2024 were included in the study. These radiographs were screened for the presence of subtypes of cemento-osseous dysplasia. The findings were classified according to age, gender, and types of COD.
Results: Cemento-osseous dysplasia was detected in 25 out of 500 patients (5%). Among the radiographs, 19 cases were identified as focal COD (76%), and 6 cases as periapical COD (24%). No cases of florid COD were found. There was no significant difference in the prevalence of COD based on gender and age ($p<0.05$).
Conclusion: The study highlights the utility of panoramic radiographs in detecting COD. The findings illuminate the distribution of different types of COD according to age and gender. The data obtained may provide a better understanding of the recognition and management of COD for dental practitioners and other healthcare professionals.

Panoramik Radyografilerde Semento-Osseöz Displaziye Benzeyen Lezyonların Prevalansının Değerlendirilmesi: Retrospektif Bir Çalışma

Makale Bilgisi

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ÖZET

Amaç: Semento-osseöz displazi (SOD), normal kemik dokusunun fibröz bağ dokusu ile yer değiştirdiği iyi huylu bir fibro-osseöz lezyondur. Bu çalışma, panoramik radyografilerde SOD'un prevalansını ve periapikal, fokal ve florid SOD tiplerini yaş ve cinsiyete göre değerlendirmeyi amaçlamaktadır.
Gereç ve Yöntemler: Bu retrospektif çalışma, Necmettin Erbakan Üniversitesi Diş Hekimliği Fakültesi Ağız, Diş ve Çene Radyolojisi Bölümü'nde gerçekleştirilmiştir. Ocak 2023-Ocak 2024 tarihleri arasında başvuran 500 hastanın panoramik radyografileri çalışmaya dahil edilmiştir. Bu grafilerde semento-osseöz displazinin alt türlerinin varlığı taranmıştır. Elde edilen bulgular yaş, cinsiyet ve SOD çeşitlerine göre sınıflandırılmıştır.
Bulgular: Semento-osseöz displazi 500 hastanın 25'inde (%5) tespit edilmiştir. Radyografilerde 19 fokal SOD (%76), 6 periapikal SOD (%24) bulunmuştur. Florid SOD'a ise rastlanmamıştır. Semento-osseöz displazinin görülmesinde cinsiyet ve yaş ile ilişkili anlamlı bir fark kaydedilmemiştir ($p<0,05$).
Sonuç: Çalışma, SOD'un tespiti için panoramik radyografilerin kullanılabilirliğini vurgulamaktadır. Elde edilen bulgular, SOD'un farklı tiplerinin yaş ve cinsiyete göre dağılımını aydınlatmaktadır. Elde edilen veriler, diş hekimlerine ve diğer sağlık profesyonelleri için SOD'un tanınması ve yönetimi konusunda daha iyi bir anlayış sağlayabilir.

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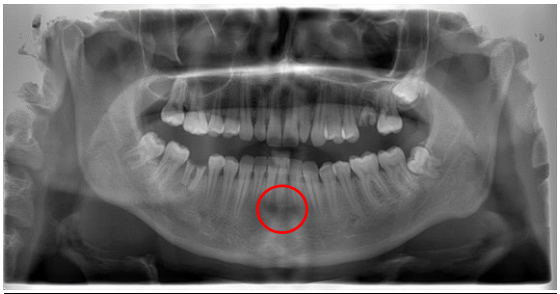
INTRODUCTION

Cemento-osseous dysplasia (COD) is a benign fibro-osseous bone lesion characterized by the replacement of normal bone with fibrous connective tissue, followed by calcification of the fibrous tissue resulting in the formation of osseous and cementum-like tissue. Abnormal bone or cementum takes the place of normal bone formation.[1] COD is most commonly seen in fibro-osseous lesions and is predominantly observed in middle-aged African-origin women. Among African-origin women, the prevalence is reported to be 5.5%.[2]

COD occurs in the periapical regions of vital teeth or in areas where teeth have been extracted.[3] However, contact between the lesions and oral flora can lead to infection, and sclerotic lesions may be more susceptible to infection (Figure 4).[4]

Based on their location in the jaws, COD lesions are categorized into three types: periapical COD, focal COD, and florid COD. Periapical COD is observed in the apical region of anterior mandibular teeth, while focal COD is associated with a single tooth. Florid COD, on the other hand, is seen in multiple quadrants of the jaws (Figure 1,2,3).[5-7]

Figure 1: Periapical cemento-osseous dysplasia in the anterior mandible



Although COD lesions can be diagnosed without the need for biopsy based on clinical and radiological evaluation, their radiographic features play a crucial role in diagnosis.[7-9] COD lesions can appear radiolucent, radiopaque, or mixed on radiographs, with increased density and calcification indicating lesion maturation. In the initial stage, COD appears radiolucent, followed by a mixed appearance in the second stage, and finally radiopaque in the third stage (Figure 3).[6-9] Some lesions may show no interruption of the periodontal ligament on radiographs between the tooth and the lesion.[2,10]

Figure 2: Focal cemento-osseous dysplasia seen in the posterior right mandible

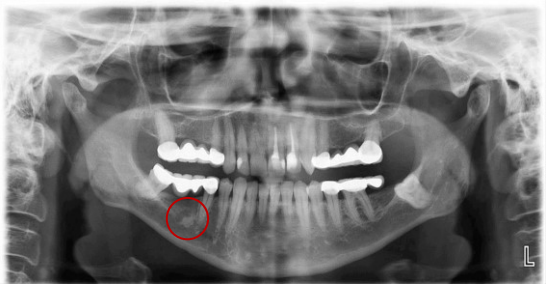


Figure 3: Fluoride cemento-osseous dysplasia of the mandible in an asymptomatic 48-year-old African-American woman.[14]

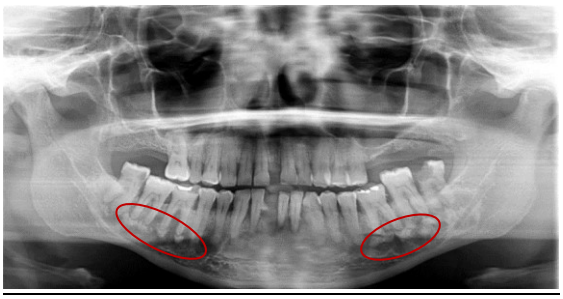
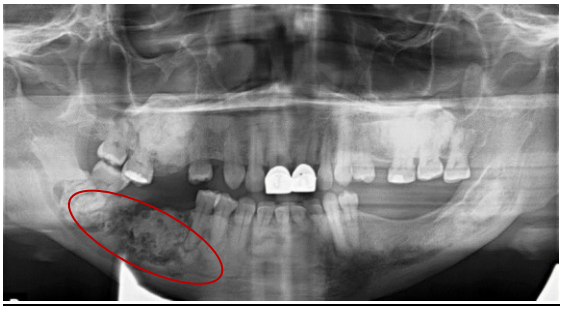


Figure 4: Fluorid cemento-osseous dysplasia involving four quadrants in a symptomatic 54-year-old African-American woman.[14]



Caries, infection, trauma, periodontal disease and systemic diseases have been reported to trigger focal cemento-osseous

dysplasia. However, the focal pathogenesis and etiology of cemento-osseous dysplasia are not known exactly.[11] It is thought that these lesions are formed as a result of a dysplastic or reactive process in periapical tissues. It is less common in the maxilla than in the mandible.[12]

Understanding the incidence of COD and its distribution across age and gender is crucial for improving clinical decision-making and patient outcomes. COD lesions, despite being benign, often mimic other pathologies such as periapical lesions or inflammatory conditions on radiographs, which can lead to misdiagnosis and unnecessary invasive procedures, including endodontic or surgical interventions. By analyzing the demographic patterns and prevalence of COD, this study aims to provide valuable insights that will aid clinicians in recognizing and differentiating COD more effectively. This, in turn, can help prevent overtreatment, optimize patient management, and contribute to better overall oral healthcare practices.

MATERIAL AND METHODS

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of Necmettin Erbakan University (approval number:2024/426). As this was a retrospective study, patient consent was waived, and all data were anonymized to protect patient confidentiality.

Study Design and Sample Selection

A retrospective cross-sectional study was conducted using panoramic radiographs and demographic data of patients who presented to the X clinic between January 2023 and January 2024 for routine dental care or specific complaints. Radiographs were systematically reviewed to identify cases of COD and assess their distribution in the study population.

Inclusion criteria:

Patients with panoramic radiographs displaying diagnostic features of COD.

Complete demographic data, including age and gender.

Radiographs with sufficient image quality for evaluation.

Exclusion criteria:

Radiographs with poor image quality or significant artifacts.

Cases lacking demographic information or presenting with other fibro-osseous lesions.

Radiographs of conditions mimicking COD (e.g., periapical cysts, chronic osteomyelitis).

From the initial pool of 552 panoramic radiographs, 500 met the inclusion criteria and were included in the study.

Radiographic Evaluation

Panoramic radiographs were acquired using a standardized imaging protocol with the Planmeca ProMax® panoramic unit (Planmeca, Helsinki, Finland), operated at 60-70 kVp, 5-7 mA, and a 6-8 second exposure time, as recommended by the manufacturer. Proper positioning of patients was ensured to achieve diagnostic-quality images.

Two maxillofacial radiologists with extensive experience reviewed the radiographs independently on high-resolution, calibrated LCD monitors under standardized lighting conditions. Diagnoses were confirmed by identifying characteristic radiographic features of COD, such as radiolucent, mixed, or radiopaque patterns, depending on the lesion's maturation stage. Cases of interobserver disagreement were

resolved through consensus.

Data Collection and Analysis

For each patient, demographic data (age and gender) were retrieved from clinical records and paired with radiographic findings. The incidence of COD was calculated as a proportion of the total study population. The age distribution of cases was categorized into decade intervals (e.g., 20-29, 30-39), and the gender ratio was analyzed to identify potential differences.

Statistical Analysis

Descriptive statistics, including mean and standard deviation for continuous variables (e.g., age) and frequencies and percentages for categorical variables (e.g., gender), were computed. Chi-square tests were employed to analyze differences in COD prevalence between genders, and independent t-tests or Mann-Whitney U tests were used to assess age-related variations, based on normality testing. A p-value < 0.05 was considered statistically significant.

RESULTS

COD-like lesions were detected in 25 (5%) of 500 patients. Of the 25 patients with COD, 20 (80%) were female and 5 (20%) were male. The mean age of males was 25.4 years with a standard deviation of 6.88, while the mean age of females was 37.45 years with a standard deviation of 12.13.

Radiographs revealed 19 focal COD (76%) and 6 periapical COD (24%). Of the 19 patients with focal COD, 16 (84.21%) were female and 3 (15.79%) were male. Of the 6 patients with periapical COD, 4 (66.67%) were female and 2 (33.33%) were male. Fluoride COD was not detected.

DISCUSSION

COD are non-neoplastic fibro-osseous lesions in which normal bone is replaced by a fibrous tissue matrix and are most commonly seen in Africans, followed by Asians.[5,9,13-16] Although COD lesions are more common in females, the majority of cases are observed in the fourth and fifth decade.[6,16-18] In our study, the ratio of females to males in COD lesions was 4:1, with a mean age of 35.04 years in a total of 25 patients.

Periapical COD is a relatively common type of COD affecting single or multiple teeth, predominantly involving the anterior mandible.[19] Periapical COD is more common in black women over 40 years of age. The lesions may be single or multiple. It is asymptomatic and does not involve changes in periodontal tissue. The common lesion site is the anterior region of the mandible close to the apices of the mandibular anterior teeth and canines, and the relevant teeth retain their vitality.[10, 20] The patient usually has no history of pain or tenderness. The lesions may become quite large and cause a marked enlargement of the alveolar process and may continue to grow slowly.[21] In our study, periapical COD lesions were detected in the anterior mandible in accordance with the literature. The mean age of 4 female patients with periapical COD was 32 years and the mean age of 2 male patients was 24.5 years.

Focal CODs are usually seen in the posterior mandibular region, more frequently in females and in the mid-thirties.[3,5,22,23] Histopathologically, focal CODs are heterogeneous lesions consisting of benign fibrous stroma and cement-like material including irregular trabeculation of mature or immature bone.[3,24] Focal COD does not require interventional treatment unless it reaches very large dimensions. Surgical excision and curettage is the recommended treatment method if they cause functional and aesthetic losses.[25] In this study, the female to male ratio in focal COD lesions was found to be 5.3:1 and the mean age of females was 38.8 years. The mean age of male was found to be 26 years.

Fluorid COD is a rare benign fibro-osseous lesion in the jaws.[26] It is most common in middle-aged black women who are usually Caucasian or Asian.[27] The lesions are located bilaterally and symmetrically. Although its etiology is unknown, it is thought that it may be caused by reactive or dysplastic change of the periodontal ligament.[28]

COD lesions should not be intervened if they are asymptomatic and there is no secondary infection. Patients should be followed up with routine radiographs. Biopsy should be avoided in asymptomatic sclerotic COD with poor blood supply as it may cause secondary infection. Cases with secondary infection are cured with antibiotics.[6]

CONCLUSIONS

This study identified a 5% prevalence of COD-like lesions, with no significant differences observed based on age or gender. Focal COD was the most common subtype (76%), while no cases of florid COD were detected. The findings emphasize the importance of panoramic radiography as a vital diagnostic tool for detecting and assessing COD-like lesions, aiding in accurate diagnosis and avoiding unnecessary treatments. Future research should focus on refining diagnostic criteria and understanding the clinical implications of COD.

Ethical Approval

The necessary ethical approval for this study has been obtained from the Necmettin Erbakan University Non-Drug and Medical Device Ethics Committee (2024/426).

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The authors have no relevant financial or non-financial interests to disclose.

Conflict of Interest

The authors deny any conflicts of interest related to this study.

Author Contributions

Design: SB, IBY, Data collection or data entry: SB, IBY, AA, TZ Analysis and interpretation: SB, IBY, AA, TZ Literature review: SB, IBY, AA, TZ Writing: SB, IBY

REFERENCES

1. MacDonald D. Classification and nomenclature of fibro-osseous lesions. Oral Surg Oral Med Oral Pathol Oral Radiol. 2021;131:385-9.
2. El-Naggar A, Chan J, Rubin Grandis J, Takata T, Slootweg P. WHO classification of head and neck tumours. 4th ed. Lyon: IARC; 2017. p. 254-55.
3. Bhandari R, Sandhu S, Bansal H, Behl R, Bhullar R. Focal cemento-osseous dysplasia masquerading as a residual cyst. Contemp Clin Dent. 2012;3:S60-2.
4. Mainville G, Turgeon D, Kauzman A. Diagnosis and management of benign fibro-osseous lesions of the jaws: a current review for the dental clinician. Oral Dis. 2017;23:440-50.
5. Dagistan S, Tozoglu Ü, Göregen M, Çakur B. Florid cemento-osseous dysplasia: A case report Med Oral Patol Oral Cir Bucal. 2007;12:E348-50.
6. Mufeed A, Mangalath U, George A, Hafiz A. Infected florid osseous dysplasia: clinical and imaging follow-up. BMJ Case Rep. 2015;2015:bcr2014209099.
7. Önder B, Kurşun Ş, Öztaş B, Barış E, Erdem E. Florid osseous dysplasia in a middle-aged Turkish woman: A case report. Imaging Sci Dent. 2013;43:197-200.
8. Galgano C, Samson J, Küffer R, Lombardi T. Focal cemento-osseous dysplasia involving a mandibular lateral incisor. Int Endod J. 2003;36:907-11.
9. Min C, Koh K, Kim K. Recurrent symptomatic cemento-osseous dysplasia: A case report. Imaging Sci Dent. 2018;48:131-7.
10. 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.

11. Mortazavi H, Baharvand M, Rahmani S, Jafari S, Parvaei P. Radiolucent rim as a possible diagnostic aid for differentiating jaw lesions. Imaging Sci Dent. 2015;45:253-61.
12. Tozoğlu Ü, Alkış H, Özbilim G, Tozoğlu S. Fokal Semento-Osseöz Displazi: Bir Olgu Sunumu. Ata Dis Hek Fak Derg. 2017;2017.
13. White S, Pharoah M. Oral radiology: principles and interpretation. 7th ed. St. Louis: Elsevier Mosby; 2013. p. 402-26.
14. Decolibus K, Shahrabi-Farahani S, Brar A, Rasner S, Aguirre S, Owosho A. Cemento-Osseous Dysplasia of the Jaw: Demographic and Clinical Analysis of 191 New Cases. Dent J (Basel). 2023;11:138.
15. Grün P, Bandura P, Grün A, Sutter W, Meller O, Turhani D. Sensory disturbance along the inferior alveolar nerve as a first clinical sign of multiple florid cemento-osseous dysplasia of the mandible—a case report. Int J Surg Case Rep. 2018;53:452-7.
16. Daviet-Noual V, Ejeil A, Gossiome C, Moreau N, Salmon B. Differentiating early stage florid osseous dysplasia from periapical endodontic lesions: a radiological-based diagnostic algorithm. BMC Oral Health. 2017;17:161.
17. Toledano-Serrabona J, Núñez-Urrutia S, Vegas-Bustamante E, Sánchez-Torres A, Gay-Escoda C. Florid cemento-osseous dysplasia: Report of 2 cases. J Clin Exp Dent. 2018;10:1145-8.
18. Kawai T, Hiranuma H, Kishino M, Jikko A, Sakuda MS. 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.
19. Summerlin D, Tomich C. Focal cemento-osseous dysplasia: a clinicopathologic study of 221 cases. Oral Surg Oral Med Oral Pathol. 1994;78:611-20.
20. Komabayashi T, Zhu Q. Cemento-osseous dysplasia in an elderly Asian male: a case report. J Oral Sci. 2011;53:117-20.
21. White S, Pharoah M. Oral radiology: principles and interpretation. 7th ed. St. Louis: Elsevier Mosby; 2013. p. 402-26.
22. Macdonald-Jankowski D. Focal cemento-osseous dysplasia: a systematic review. Dentomaxillofac Radiol. 2008;37:350-60.
23. Eversole R, Su L, ElMofty S. Benign fibro-osseous lesions of the craniofacial complex a review. Head Neck Pathol. 2008;2:177-202.
24. Cankaya A, Erdem M, Olgac V, Firat D. Focal cemento-osseous dysplasia of mandible. BMJ Case Rep. 2012;2012:bcr2012006432.
25. Brannon R, Fowler C. Benign fibro-osseous lesions: a review of current concepts. Adv Anat Pathol. 2001;8:126-43.
26. Cannon J, Keller E, Dahlin D. Gigantiform cementoma: report of two cases (mother and son). J Oral Surg. 1980;38:65-70.
27. Miyake M, Nagahata S. Florid cemento-osseous dysplasia: Report of a case. Int J Oral Maxillofac Surg. 1999;28:56-7.
28. Blaschke D. Diseases of bone manifested in the jaws. In: White S, Pharoah M, editors. Oral radiology: principles and interpretation. 4th ed. St. Louis: Elsevier Mosby; 1994. p. 325-40.