CASE REPORT

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Cone beam computed tomography findings in monostotic fibrous dysplasia of the mandible: a case report

Rr.Dinar Restiti[1*], Aries Sugih Budhiana[1], Farina Pramanik[2]

ABSTRACT

Objectives: This case report aims to describe the 3-dimensional radiographic features of Fibrous Dysplasia of the mandible.

Case Report: A 38-year-old woman came to Padjadjaran University Dental Hospital with complaints of an enlarged right lower jaw, feeling hot, and a limited mouth opening of ±2cm. The patient was then referred for a CBCT (Cone-Beam Computed Tomography) examination.

Conclusion: Based on the examination results, it was concluded that on CBCT (Cone Beam Computed Tomography) radiography, radiolucent lesions, ill-defined, bone-expanding lesions occurred in the facial bones. This case leads to a radiological diagnosis of suspected fibrous dysplasia

Keywords: *CBCT, diagnosis, fibrous dysplasia*
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INTRODUCTION

First described by Von Recklinghausen in 1891, Fibrous Dysplasia (FD) is a developmental defect in bone tissue that results in the replacement of normal bone by fibrous tissue.[1] Fibrous Dysplasia (FD) is a bone development that can affect one bone (monostotic type) or several bones (polyostotic type). The most common locations affected by monostotic FD are the ribs, skull, and femur.[2] The most commonly affected sites in the polyostotic form are the skull, mandible, pelvis, and femur. In McCune-Albright syndrome (MAS), this may be associated with hyperpigmentation and endocrinological disorders.[3,4]

FD is generally found in adolescents in the second decade of life. It often involves the long bones, craniofacial bones, ribs, and pelvis.[5] Bone lesions in the bone can be unilateral, asymptomatic, and incidentally detected on routine radiological examinations. Still, they can also occur in multiple bone locations and be responsible for various clinical symptoms, especially bone pain, bone deformities, and pathological fractures.[2] For many radiologists, FD is often associated with the term smooth, homogeneous “ground glass bone matrix”; FD is usually part of a complex disease, and knowledge of its unique pathogenesis and course is essential to understanding the radiological features and potential complications.[3]

This article aims to report a rare case of Monostotic Fibrous Dysplasia (MFD) occurring at any number and location in the mandible. This case report explains the radiographic features of a Monostotic Fibrous Dysplasia (MFD) found on panoramic radiography and CBCT.

CASE REPORT

A 16-year-old female patient came to the Padjadjaran University Dental and Oral Hospital Radiology Installation to take a CBCT photo. The patient complained of swelling for ± 3 years. Initially, the patient only felt pain in the teeth in the lower right jaw area, where every time the pain arose, the patient would feel the area of the painful tooth was swollen. When the pain disappeared, the patient felt the swelling would shrink again. The patient has a history of taking a panoramic photo in April 2024 and undergoing 36 extraction treatments; tissue samples were taken for further examination. The patient complained that the

[1]Resident of DMF Radiology, Faculty of Dentistry, Padjadajaran University, Bandung, Indonesia, Bandung, Indonesia, 40132

[2]Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Padjadjaran University, Bandung, Indonesia, 40132

*Correspondence to:
Rr.Dinar Restiti
dinar23005@unpad.ac.id

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swelling in the lower right jaw area was getting bigger, felt hot, and was accompanied by fever. The patient also felt limited in opening her mouth by ± 2 cm. The patient took antibiotics and painkillers.

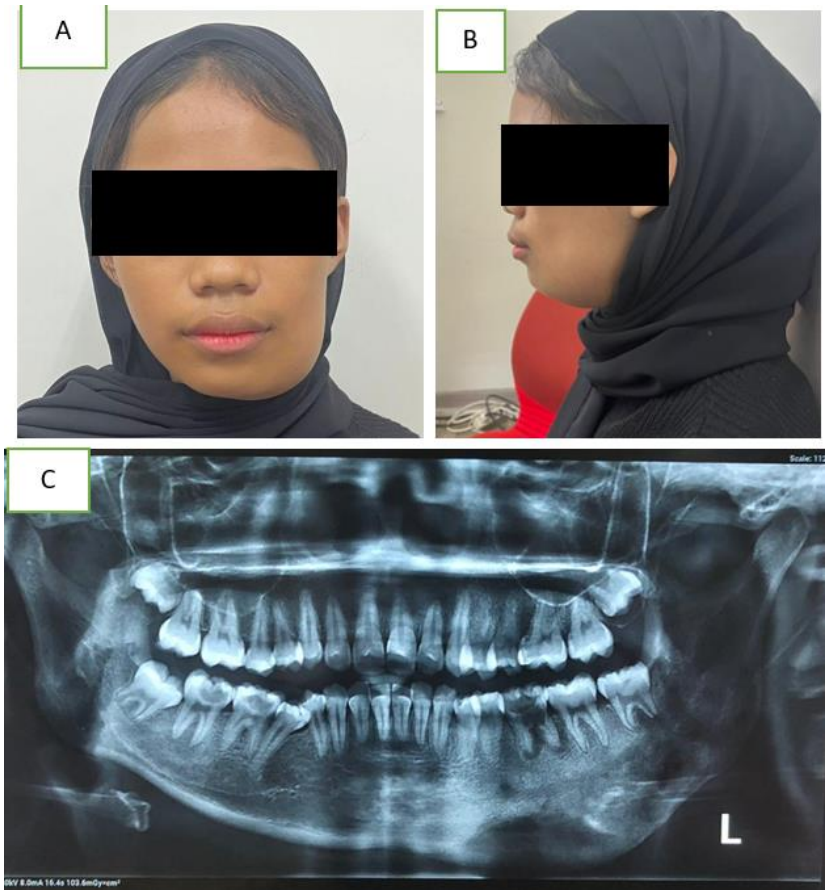

Figure 1. (A) Extraoral clinical photos: front view; (B) Lateral view; (C) Panoramic photo before tooth extraction treatment 36

From the results of the CBCT examination, a suspected lesion was found in the form of a fibrous lesion in the left mandibular region that extended inferiorly and pressed the cortical bone. It was unilocular, ill-defined, and there was a discontinuity in the buccal cortical bone. The average density of the lesion core was lower than the average density of the lingual cortical bone area. The entire lesion area appeared to be in contact with the mandibular canal. The suspected radiodiagnosis in this case is Monostotic Fibrous Dysplasia, with a differential diagnosis of ossifying fibroma.[6] The patient's treatment was a segmental resection, which removes tumors or lesions that grow on the mandible. Further surgery, namely mandibular reconstruction, was performed to restore the shape and function of the patient's mandible.

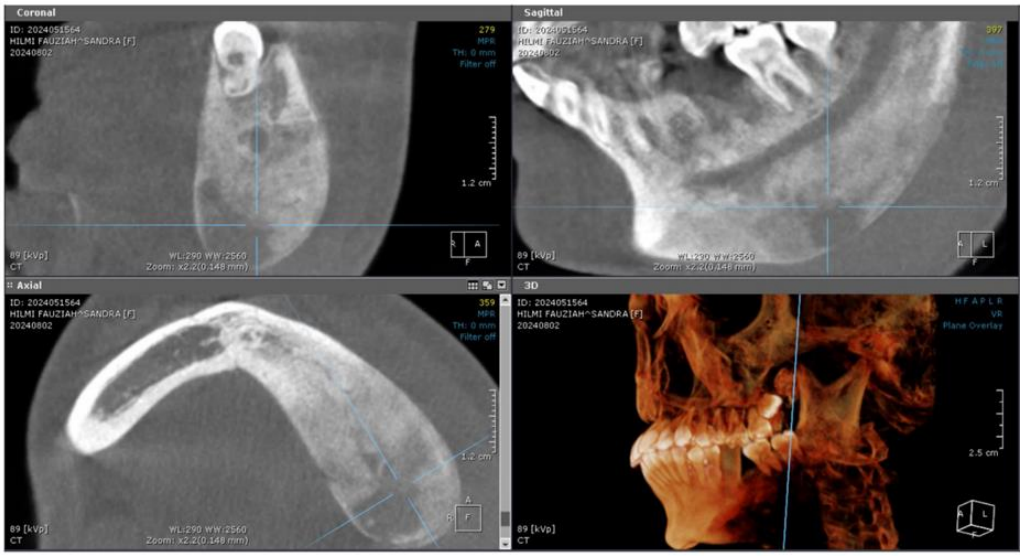

Figure 2. CBCT multiplanar radiograph shows lesions in coronal, sagittal, axial, and 3D views

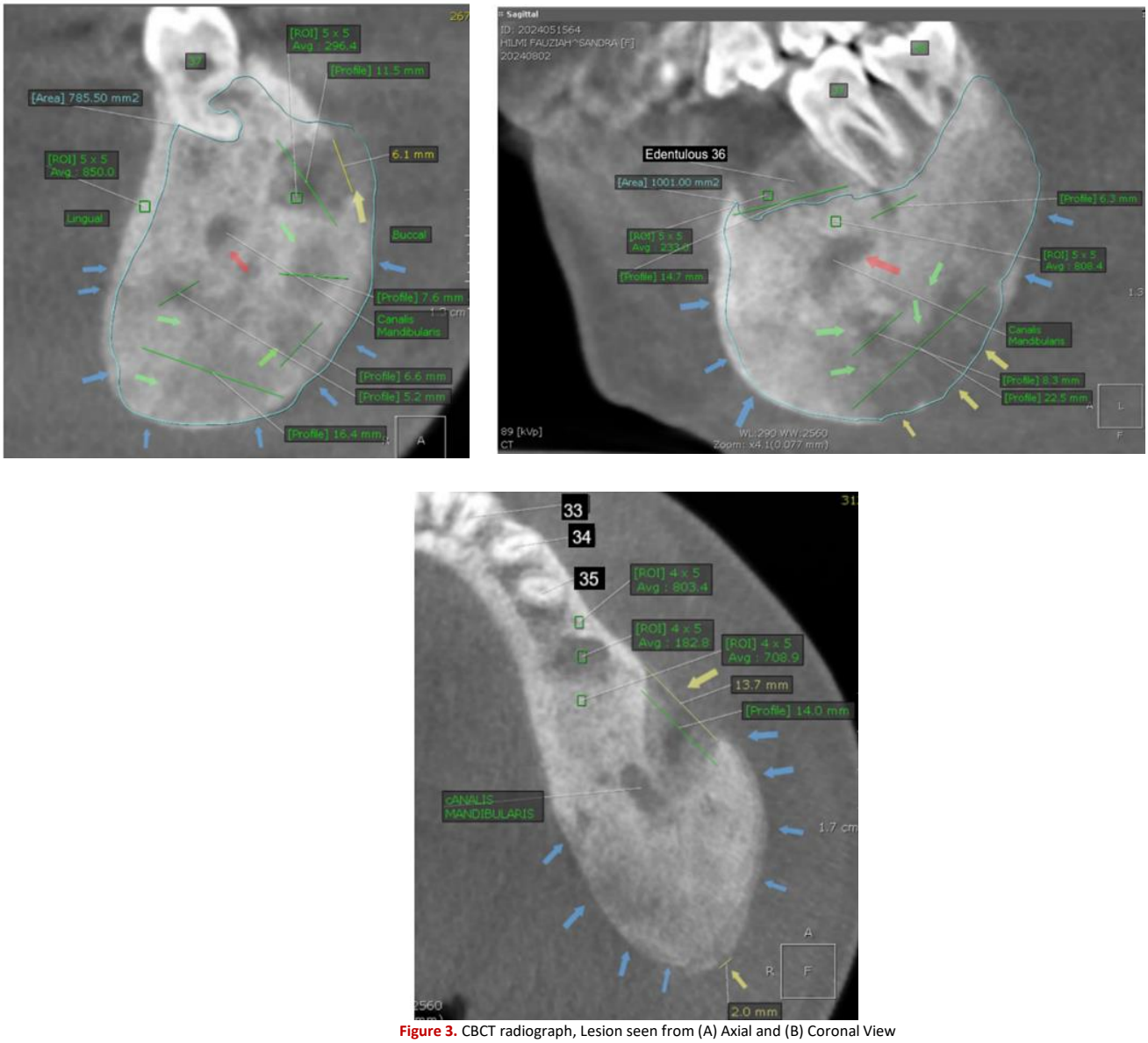

Figure 3. CBCT radiograph, Lesion seen from (A) Axial and (B) Coronal View

DISCUSSION

Fibrous lesions are a pathological condition in which abnormal fibrous tissue replaces normal bone tissue. This fibrous tissue is a type of connective tissue consisting of collagen fibers, which function to provide structural support. This replacement process can affect the structural integrity and strength of the bone, which in turn can cause various clinical symptoms and complications.[7]

Fibrous lesions, especially fibrous dysplasia, are complex conditions with an incompletely understood etiology. However, there is evidence to suggest that genetic factors, especially mutations in the GNAS1 gene, play a role in the development of this condition. Fibrous dysplasia is characterized by the replacement of normal bone tissue by irregular fibrous tissue, which can lead to complications such as pain, deformity, and fractures.[8-10]

The exact cause of fibrous dysplasia is still a research subject, but mutations in the GNAS1 gene have been identified as a key factor. These mutations cause constitutive activation of the Gαs protein, which plays a role in signaling pathways that regulate the growth and differentiation of osteogenic cells.[11,12,13] GNAS1 mutations result in changes in the production and function of fibroblasts and osteoblasts, which contribute to the formation of abnormal fibrous tissue. This leads to excessive proliferation of fibroblasts and reduced normal bone formation, resulting in the characteristic fibrous lesions.[11] In addition to genetic factors, some theories also suggest that environmental and hormonal factors may contribute to the development of fibrous dysplasia. For example, some researchers note that the condition may be triggered by factors such as trauma or mechanical stress to the bone, although evidence to support this theory is limited.[9,14]

Establishing the diagnosis of fibrous lesions, such as fibrous dysplasia, requires a comprehensive approach, including physical examination and various supporting tests to assess the condition of the bone and surrounding tissue. In X-ray examination, we can see changes in bone structure. Fibrous lesions often show typical patterns on X-ray images, namely: Radiolucent (dark) areas that

indicate the replacement of normal bone tissue with fibrous tissue, see the extent of the lesion and its potential impact on the surrounding bone structure, detect deformities that occur due to lesions that can cause enlargement or changes in bone shape, detect pathological fractures that may occur due to this lesion because fibrous lesions can weaken the bone structure, increasing the risk of fractures.[11,15,16]

Cone Beam Computed Tomography (CBCT) is a medical imaging technology that uses X-rays to produce three-dimensional (3D) images of anatomical structures, primarily in the head and neck area. This technology has become invaluable in various medical fields, including dentistry and maxillofacial surgery. CBCT offers the advantage of visualizing complex anatomical structures in greater detail than traditional imaging methods, such as conventional X-rays.[17]

The advantage of CBCT is its ability to produce three-dimensional (3D) images of anatomical structures. This is especially important in detecting fibrous lesions, which often have complex characteristics and can be hidden within bone tissue. With CBCT, doctors can view the lesion from multiple angles, providing a more complete picture of the lesion's size, shape, and location.[16] A study comparing CBCT with conventional radiography found that CBCT could identify smaller and more subtle lesions, which may not be visible on two-dimensional images. This is especially important in detecting fibrous lesions.[19]

CBCT can provide in-depth morphological information about the surrounding tissues. This includes analysis of the relationship of the lesion to other anatomical structures, such as tooth roots and soft tissues. This information is particularly useful in surgical planning, where a clear understanding of the local anatomy can minimize risks and improve the procedure's outcome. In maxillofacial surgery, CBCT allows the clinician to plan the procedure better. With detailed 3D visualization, the clinician can plan the most effective and safe surgical approach to address the fibrous lesion. This is particularly important in cases where the lesion may be adjacent to vital structures, such as nerves or blood vessels.[20,21]

Once the diagnosis is established, regular monitoring is necessary to evaluate the progression of the fibrous lesion using the same imaging methods to monitor changes in the size or characteristics of the lesion over time. The patient's symptoms should be monitored to determine if there are changes that require further intervention.[22]

CONCLUSION

The final diagnosis of this case was monostotic fibrous dysplasia based on a combination of radiographic findings, clinical findings, and histopathological examination. CBCT can provide further information for the diagnosis of fibrous dysplasia through the analysis of X-ray images. It can also identify changes in bone structure and deformities associated with fibrous lesions, which can help in establishing the diagnosis and determining the appropriate treatment steps. Understanding the typical X-ray findings is essential for accurate diagnosis and effective management of this condition.

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FOOTNOTES

All authors have no conflict of interest to declare for this article. Informed consent was obtained from the patient for being included in this case report.

REFERENCES

1. Adetayo OA, Salcedo SE, Borad V, Richards SS, Workman AD, Ray AO. Fibrous dysplasia: an overview of disease process, indications for surgical management, and a case report. Eplasty. 2015;15:16.
2. Majoor BCJ, Traunmueller E, Maurer-Ertl W, Appelman-Dijkstra NM, Fink A, Liegl B, et al. Pain in fibrous dysplasia: relationship with anatomical and clinical features. Acta Orthopaedica. 2019;90(4):401–405.
3. Kushchayeva YS, Kushchayev S V., Glushko TY, Tella SH, Teytelboym OM, Collins MT, et al. Fibrous dysplasia for radiologists: beyond ground glass bone matrix. Insights into Imaging. 2018;9(6):1035–1056.
4. Kaynak BA. Conservative treatment of Fibrous Dysplasia. Pakistan Journal of Medical Sciences. 2019;35(3):873–876.
5. Anitha N, Sankari SL, Malathi L, Karthick R. Fibrous dysplasia-recent concepts. Journal of Pharmacy and Bioallied Sciences. 2015;7(April):S171–172.
6. Obirija SE, Rasheed MW, Okonkwo JE. A rare case of fibrous dysplasia in the mandible: a case report. Nigerian Journal of Dental Research. 2024;9(1):5–19
7. Feller L, Wood NH, Khammissa RA, Lemmer J, Raubenheimer EJ. The nature of fibrous dysplasia. Head and Face Medicine. 2009;5(1):1–5.
8. Muthusamy et al. Locally Aggressive Fibrous Dysplasia Mimicking Malignancy: A Report of Four Cases and Review of the Literature. Clinical Orthopaedics and Related Research. 2015; 473(2):742-750.
9. Gupta S, Jain S. Orthopantomographic Analysis for Assessment of Mandibular Asymmetry. Journal of Indian Orthodontic Society. 2012;46(1):33–37.
10. Zhao X, Deng P, Iglesias-Bartolome R, Amornphimoltham P, Steffen DJ, Jin Y, et al. Expression of an active Gαs mutant in skeletal stem cells is sufficient and necessary for fibrous dysplasia initiation and maintenance. Proc Natl Acad Sci U S A. 2018 Jan 16;115(3):E428–437.
11. Bhattacharya, S. and Mishra, R. Fibrous dysplasia and cherubism. Indian Journal of Plastic Surgery, 2015;48(03):236-248.
12. Guruprasad Y, Chauhan D. Craniofacial fibrous dysplasia - A review of current management techniques. Chronicles of Young Scientists. 2012;3(2):106.
13. Robinson C, Collins MT, Boyce AM. Fibrous Dysplasia/McCune-Albright Syndrome: Clinical and Translational Perspectives. Vol. 14, Current Osteoporosis Reports. Current Medicine Group LLC 1; 2016. p. 178–86.
14. Zanetti D, Gamba P. Cholesteatoma and fibrous dysplasia of the temporal bone: Case report and review of the literature. Journal of Otolaryngology. 2007;36(1):59–63.
15. Weinstein LS, Chen M, Liu J. Gsα mutations and imprinting defects in human disease. Annals of the New York Academy of Sciences. 2002;968:173–197.
16. Nagar J, Joshi S, Verma RK, Patel AK, Deora KN, Sharma G. A rare case report of fibrous dysplasia of maxillary bone causing progressive vision loss: Case report. IP Journal of Otorhinolaryngology and Allied Science. 2022;5(2):35–41.
17. Scarfe WC, Farman AG. What is Cone-Beam CT and How Does it Work? Dental Clinics of North America. 2008;52(4):707–730.

18. Suphanantachat S, Tantikul K, Tamsailom S, Kosalagood P, Nisapakultorn K, Tavedhikul K. Comparison of clinical values between cone beam computed tomography and conventional intraoral radiography in periodontal and infrabony defect assessment. Dentomaxillofacial Radiology. 2017;46(6):20160461
19. Kurniati N. Evaluasi Diagnostik Lesi Endo-Perio Yang Menetap Setelah Perawatan Endodontik Menggunakan Radiografi Periapikal Dan CBCT. 2019;15(1):6–11
20. Deana NF, Alves N. Cone Beam CT in Diagnosis and Surgical Planning of Dentigerous Cyst. Case Reports in Dentistry. 2017; 2017(Feb):1-6.
21. Bayat S, Talaeipour AR, Sarlati F. Detection of simulated periodontal defects using cone-beam CT and digital intraoral radiography. Dentomaxillofacial Radiology. 2016;45(6).20160030
22. Zhang L, He Q, Li W, Zhang R. The value of 99mTc-methylene diphosphonate single photon emission computed tomography/computed tomography in diagnosis of fibrous dysplasia. BMC Medical Imaging. 2017;17(1):46.