Imaging Science in Dentistry 2022; 52: 309-17
https://doi.org/10.5624/isd.20220033

Scalloped border as a possible diagnostic aid for differentiating jaw lesions: A pictorial essay

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ABSTRACT

Purpose: The aim of this study was to introduce a category of jaw lesions comprising cysts and tumors associated with scalloped borders.

Materials and Methods: General search engines and specialized databases including Google Scholar, PubMed, PubMed Central, and Scopus, as well as an authoritative textbook, were used to find relevant studies by using keywords such as "jaw lesion," "jaw disease," "scalloping," "scalloped border," "scalloped margin," "irregular border," and "irregular margin." Out of 289 articles, 252 records were removed because they were duplicates, did not have a relevant title, or did not mention the frequency of findings described using the term "scalloped border." Finally, 37 closely related articles were chosen.

Results: According to the relevant literature, scalloped borders are found most frequently in ameloblastoma, followed by simple bone cyst, central giant cell granuloma, odontogenic keratocyst, and glandular odontogenic cyst.

Conclusion: The lesions most frequently reported to have scalloped borders are ameloblastoma, central giant cell granuloma, odontogenic keratocyst, simple bone cyst, and glandular odontogenic cyst. ***(Imaging Sci Dent 2022; 52: 309-17)***

KEY WORDS: Outline; Jaw Cysts; Odontogenic Cysts; Odontogenic Tumors

Introduction

Radiographic imaging plays a key role in the proper diagnosis of bony lesions in the oral and maxillofacial region.[1] Many types of jawbone lesions have several aspects of their radiographic appearance in common, which makes it difficult to differentiate them.[2] Therefore, radiographic features such as location, borders, internal structures, ability to expand, perforation, and impact on surrounding tissues can be used as diagnostic aids to reach a timely and correct diagnosis.[3] Among the above-mentioned items, the characteristics of the lesion's border can be helpful in limiting the differential diagnosis. Generally, lesion borders are divided into 2 major groups: well-defined and ill-defined. Well-defined borders also present with different shapes, such as punched out (a sharp demarcation between abnormal and normal bone with no other feature), corticated (a sharp, opaque, and usually curved line), and sclerotic (a sharp opaque border thicker and less uniform than a corticated border).[3] Furthermore, the borders of lesions may be smooth or scalloped. Scalloping describes a series of contiguous arcs or semicircles that may develop around the roots of teeth or within adjacent bone or bone cortices. Scalloping may reflect the mechanism of a lesion's growth. This shape may be seen in cysts, cyst-like lesions, and some benign neoplasms with a unilocular or multilocular internal structure.[4]

Therefore, the goal of this overview was to assist dental practitioners in making an accurate and timely differential diagnosis by focusing on the relevant radiographic findings. Based on a review of the literature, 5 types of jaw lesions are proposed as cysts and tumors associated with a higher tendency to have scalloped borders. When dentists encounter a lesion with scalloped borders, they should first consider these entities in the differential diagnosis.

Received February 14, 2022; Revised May 5, 2022; Accepted May 18, 2022
Published online July 5, 2022
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Materials and Methods

General search engines and specialized databases including Google Scholar, PubMed, PubMed Central, and Scopus, as well as an authoritative textbook, were used to find relevant studies by using keywords such as "jaw lesion," "jaw disease," "scalloping," "scalloped border," "scalloped margin," "irregular border," and "irregular margin."

Out of 289 identified articles, 252 were excluded because they were duplicates (122), had unrelated titles or abstracts (77), or did not mention the term "scalloped" or its synonyms to describe the periphery of lesions or their frequency in this context (53). Finally, 37 articles and 1 textbook closely related to the topic of interest were included. The details of the search strategy are also presented in a flowchart for better understanding (Fig. 1).

Results

Upon comparison of the lesions, ameloblastoma was found to be the most prevalent lesion with scalloped borders, and other lesions in this category were central giant cell granuloma, odontogenic keratocyst, traumatic bone cyst, and glandular odontogenic cyst. Table 1 presents the following 7 characteristics of jaw lesions with scalloped borders: origin, predominant age and sex, most common location and involved jaw, clinical features, and the proportion of lesions with scalloped borders.

Ameloblastoma

Ameloblastoma is the second most frequent benign odontogenic tumor after odontoma, accounting for 11% to 13% of all odontogenic tumors.[5] Most patients are between the ages of 30 and 50 years, and there is a slight sex predilection in men.[5,6] Clinically, it presents as a locally aggressive and slow-growing asymptomatic tumor.[6] The mandible is more affected than the maxilla, and most cases (70%) are seen in the molar-ramus area.[5] On the other hand, it is in association with an unerupted or impacted tooth, most commonly the mandibular third molar, in 15% to 40% of cases.[7] Radiographically, it is characterized by a unilocular or multilocular lesion with coarse and curved septation (Figs. 2 and 3).[5] In the mandible, the borders of the lesion are usually well-defined, occasionally scalloped, and frequently corticated; in contrast, maxillary lesions have ill-

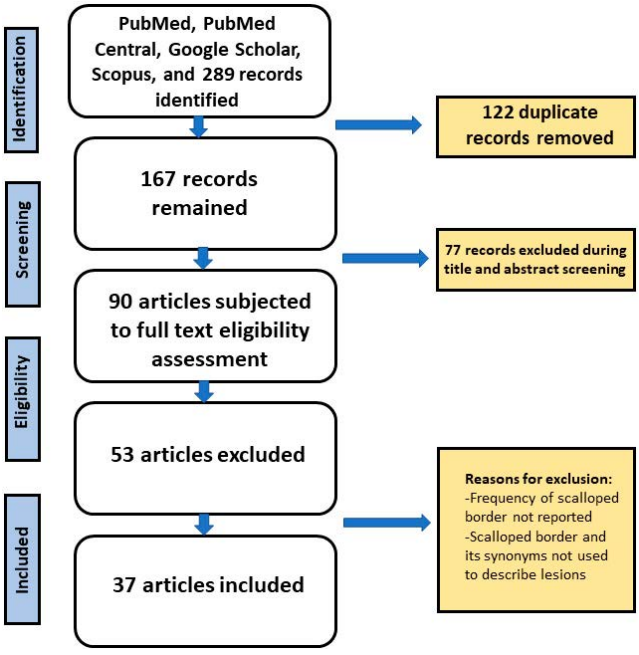

Fig. 1. Flowchart of the search strategy.

Table 1. General characteristics of jaw lesions with a relatively high likelihood of being associated with scalloped borders

Entity	Origin	Age (decade)	Sex	Predominant jaw	Common location	Clinical features	Proportion of lesions with a scalloped border
Ameloblastoma[5-9]	Odontogenic tumor	4th-6th	Male	Mandible	Posterior	Expansile	77.2%
Central giant cell granuloma[10-15]	Reactive lesion	2nd, 3rd	Female	Mandible	Anterior	Expansile	53%
Odontogenic keratocyst[17-20]	Odontogenic cyst	3rd	Male	Mandible	Posterior	No considerable expansion	40%
Simple bone cyst[21-25]	Pseudocyst	2nd, 3rd	Male	Mandible	Posterior	No considerable expansion	68%
Glandular odontogenic cyst[27-35]	Odontogenic cyst	5th, 7th	Male	Mandible	Anterior	Expansile	13%

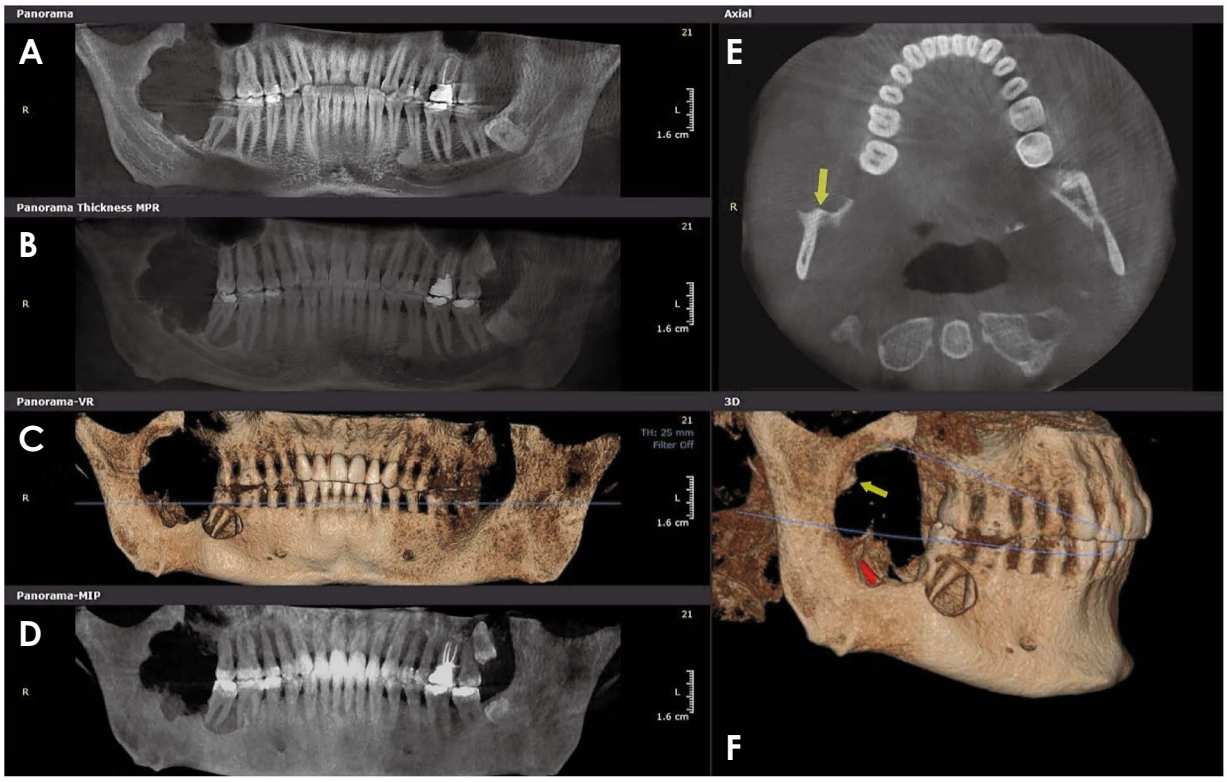

Fig. 2. Scalloped borders of ameloblastoma in the posterior mandible on cone-beam computed tomographic images. A. Low-thickness multiplanar reformatted (MPR) image. The superior border of the inferior alveolar nerve canal cannot be clearly detected adjacent to the lesion. B. High-thickness MPR image. C. Three-dimensional volumetric image. D. Maximum intensity projection (MIP) panorama image shows extensive destruction along the anterior border of right mandibular ramus E. A scalloped border of the lesion (arrow) is seen in an axial image. F. Three-dimensional surface rendering image shows septation (arrow) between adjacent locules and destruction of the superior border of the inferior alveolar canal is also observed.

defined borders because the lesions tend to spread into the bone rather than expanding it.[1,8] Scalloped borders have been mentioned as a characteristic feature of ameloblastoma. In this regard, Kitisubkanchana et al.[9] showed that 77.2% of all ameloblastomas had scalloped borders, of which 83% were desmoplastic ameloblastoma, 80% were conventional ameloblastoma, and 66% were unicystic ameloblastoma. In another study, Meng et al.[10] categorized the shape of maxillary ameloblastomas according to their radiographic outline as circular, oval, kidney, scalloped-circular, scalloped-oval, scalloped-kidney, and sinus-shaped lesions. In this study, the scalloped-oval type was the second most frequent shape after circular.

Central giant cell granuloma

Central giant cell granuloma is a locally aggressive, nonneoplastic intraosseous lesion, accounting for about 7% of benign lesions of the jawbones.[11] It usually occurs in the second and third decades of life and there is a sex predilection in women.[11,12] Clinically, it appears as an expansile lesion causing a swelling that can cross the midline in 50% of mandibular cases.[13] The mandible is more frequently affected than the maxilla, and most cases are seen in the anterior portion of the jaws.[11] Radiographically, it is characterized as a unilocular or multilocular radiolucency with well-defined, smooth, or scalloped margins and a honeycomb or soap bubble-like appearance (Fig. 4).[11-14] The same radiographic features have also been reported in other giant cell lesions such as giant cell tumors and brown tumors of hyperparathyroidism.[14] In a systematic review, Stavropoulos and Katz[11] showed that 53% of all central giant cell granulomas had scalloped margins. The presence of scalloped margins in this entity has also been reported by Kahlon et al.[14] In addition, they also pointed out that this radiographic feature can be seen in giant cell granulomas associated with genetic disorders such as Noonan syndrome, neurofibromatosis, cherubism, and arteriovenous malformations.[14] The same findings were also reported by Vaidya et al.[15] and Jeyaraj.[16]

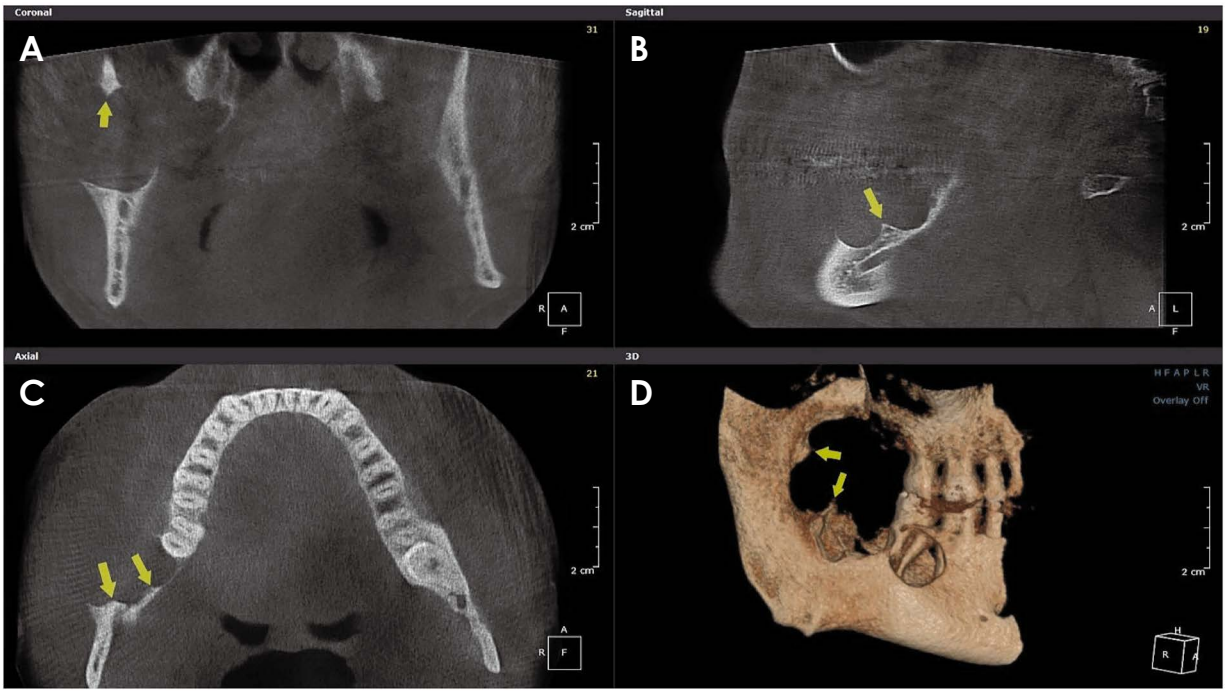

Fig. 3. Multilocular ameloblastoma on cone-beam computed tomographic images. A. Coronal section shows septation (arrow) in an expansile lesion. B. Sagittal view shows a typical scalloped border. C. Axial view shows an expansile multilocular radiolucent lesion, causing extensive destruction in the right ascending ramus. The lesion has well-defined, corticated, and sclerotic scalloping borders (arrows). D. Three-dimensional surface-rendering cone-beam computed tomographic image shows curved and coarse septa in ameloblastoma (arrows), which partially divide a unilocular cavity into multiple, smaller, variably sized cavities.

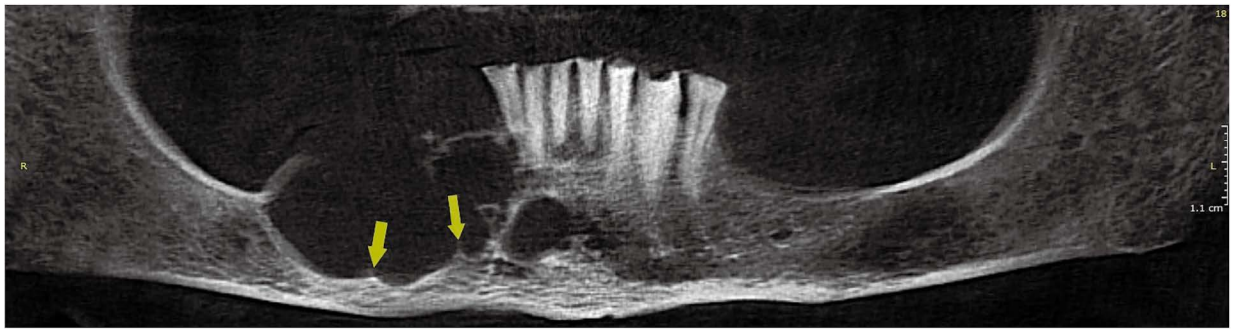

Fig. 4. Central giant cell granuloma extends from the right first molar to the midline of the mandible. Panoramic reconstructed cone-beam computed tomographic image with 2-mm thickness shows scalloped borders (arrows).

Odontogenic keratocyst

Odontogenic keratocyst is an odontogenic cyst representing the third most frequent cyst of the jaw bones, accounting for 10% to 14% of all odontogenic cysts.[5] There is a slight sex predilection in men, with the peak incidence occurring in the third decade of life.[17] More than 80% of cases have been detected in the mandible, mostly in the body (20%), angle (18%), and ascending ramus (10%).[5] This entity usually tends to grow in an anteroposterior direction within the bone without causing considerable clinical expansion, and this finding has also been reported for odontogenic myxoma.[5] It is usually asymptomatic, but pain and discharge have been reported by 40% of patients.[5] Radiographically, it appears as a unilocular or multilocular radiolucency with well-defined, smooth, or scalloped, and often corticated margins (Figs. 5 and 6).[5,9] In some cases, dystrophic calcification may be seen in long-standing lesions.[5] According to Veena et al.,[18] most cases of odontogenic keratocyst are unilocular with scalloped borders when present at the periapex. Lesions with scalloped borders have also been reported in 40% of

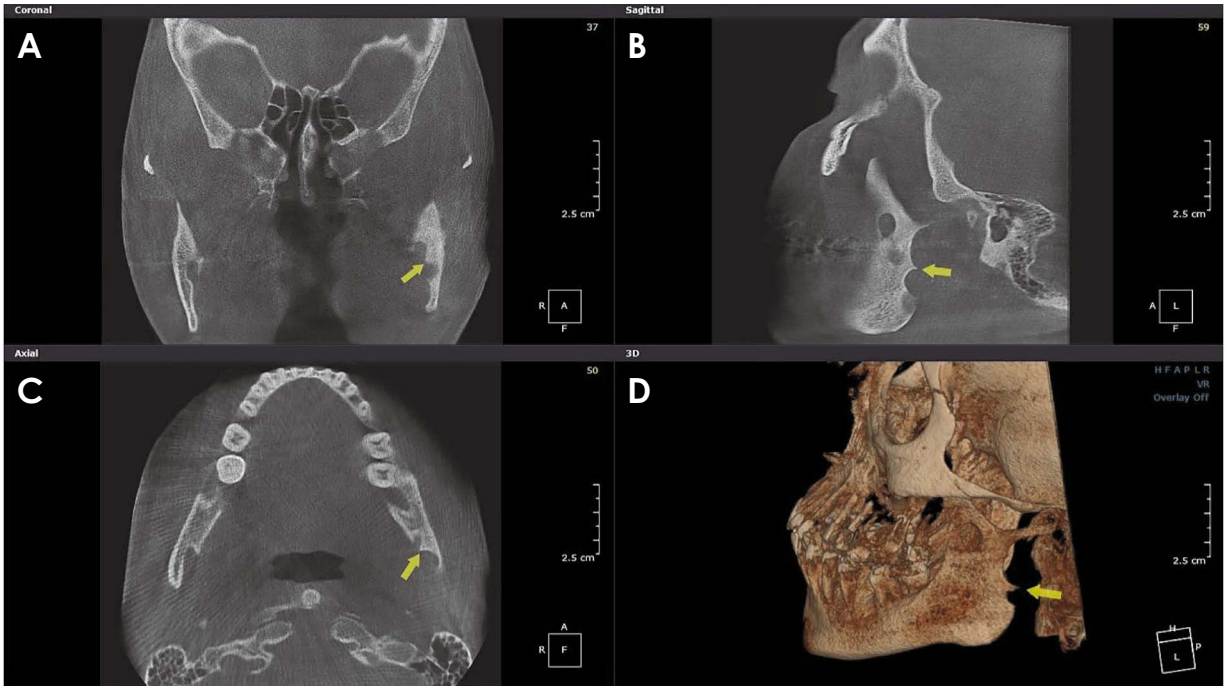

Fig. 5. Odontogenic keratocyst on cone-beam computed tomographic images. A. Coronal view shows a scalloped border in the lateral border of the left ramus (arrow). B. Sagittal view shows a scalloped border in the posterior border of the ramus (arrow). C. Axial view shows a scalloped border in the lateral border of the ramus (arrow). D. Three-dimensional surface-rendering image shows a scalloped border in the posterior border of the left ramus (arrow).

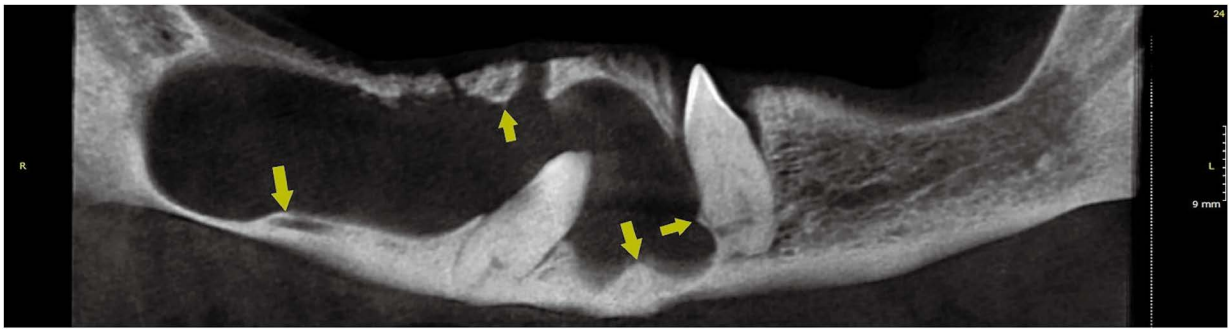

Fig. 6. Odontogenic keratocyst from the angle of the right mandible extending to the opposite side. Panoramic reconstructed cone-beam computed tomographic image with 2-mm thickness shows scalloped borders (arrows).

cases by Kitisubkanchana et al.[9] In another study by Ong and Siar,[19] the presence of scalloped borders in unilocular odontogenic keratocysts was reported to be 12.12%, and 12.12% of multilocular odontogenic keratocysts had scalloped borders as well. In this regard, Borghesi et al.[20] pointed out that multilocular lesions with scalloped borders were more frequent than unilocular lesions, and stated that this appearance seems to be characteristic of this entity.

Simple bone cysts

Simple bone cyst is a non-odontogenic pseudocyst with no epithelial lining that is also known as solitary bone cyst, extravasation cyst, traumatic bone cyst, progressive bone cavity, unicameral bone cyst, and hemorrhagic bone cyst.[21,22] It mostly occurs in the second and third decades of life, with a mean age of 20 years.[23] There is a slight male predominance or no sex predilection.[23] Most cases are in the mandible between the canine and third molar, followed by the mandibular symphysis, ramus, condyle, and anterior portion of the maxilla.[21] Trauma is the most commonly discussed etiologic factor in the formation of this lesion, and the presence of a traumatic experience in patients' history

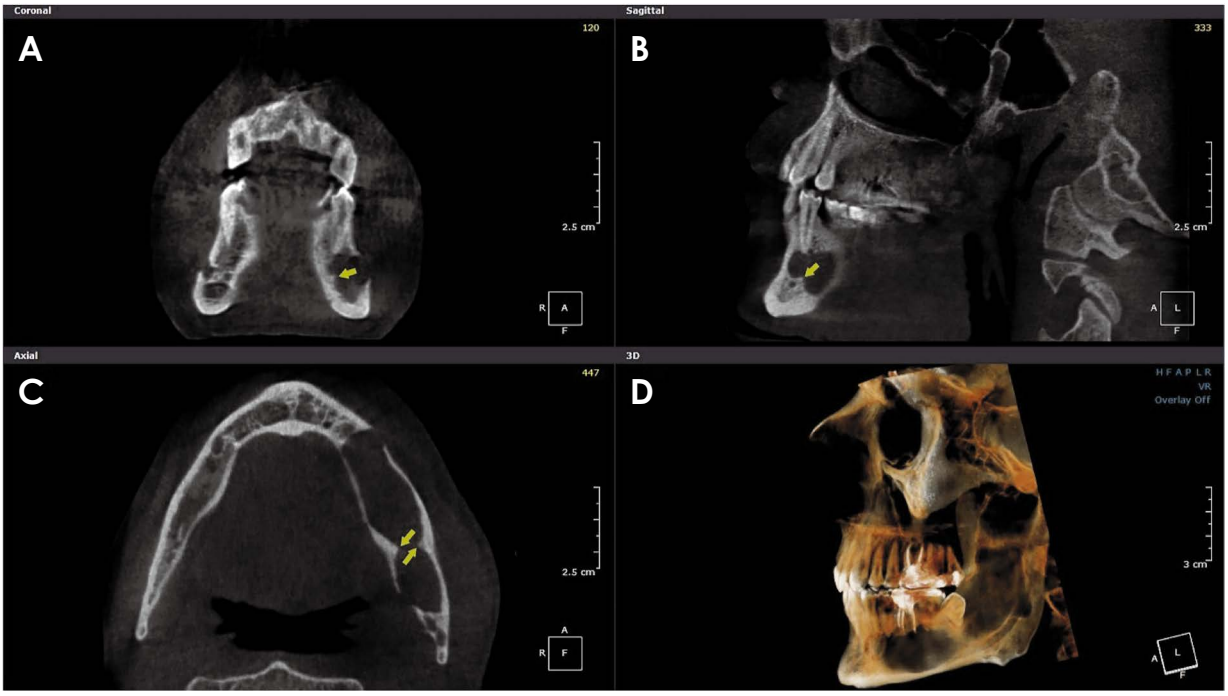

Fig. 7. Simple bone cyst on cone-beam computed tomographic images. A. Coronal view shows a scalloped border in the medial border of the mandibular body (arrow). B. Sagittal view shows a scalloped border in the anterior border of the lesion (arrow). C. Axial view shows scalloped borders in the buccal and lingual aspects of the lesion (arrows). D. Three-dimensional surface-rendering image shows a spatial view of the lesion on the left side of the mandible.

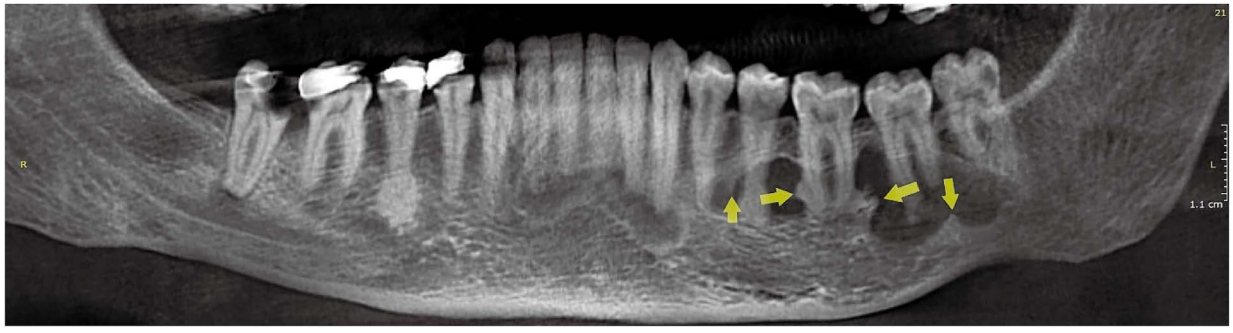

Fig. 8. Simple bone cyst in the posterior aspect of the left mandible. Panoramic reconstructed cone-beam computed tomographic image with 2-mm thickness shows scalloped borders and scalloping between roots (arrows).

has been reported to be up to 70% in the literature.[24] Clinically, it usually presents as an asymptomatic lesion with no considerable expansion; however, pain and buccal expansion have been reported in 10% to 30% and 18% to 50% of long-lasting lesions, respectively.[23,24] Radiographically, it appears as a unilocular or multilocular, well-defined lesion, with irregular or scalloped borders often suggesting the diagnosis (Figs. 7 and 8).[23] In this regard, a scalloping pattern has been reported in 68% of cases occurring between and away from the teeth.[24] In a review article, Xanthinaki et al.[21] described that the scalloping pattern is characteristic of traumatic bone cyst and can be seen either in dentate or edentulous areas.[21] The same descriptions were also reported by Suei et al.[25]

Glandular odontogenic cyst

Glandular odontogenic cyst is a rare, locally aggressive odontogenic cyst that is also known as sialo-odontogenic cyst, developmental odontogenic epithelial cyst, and polymorphous odontogenic cyst.[26,27] It tends to occur over a wide age range, with most cases diagnosed in the fifth to seventh decades of life.[26] There is either a slight male pre-

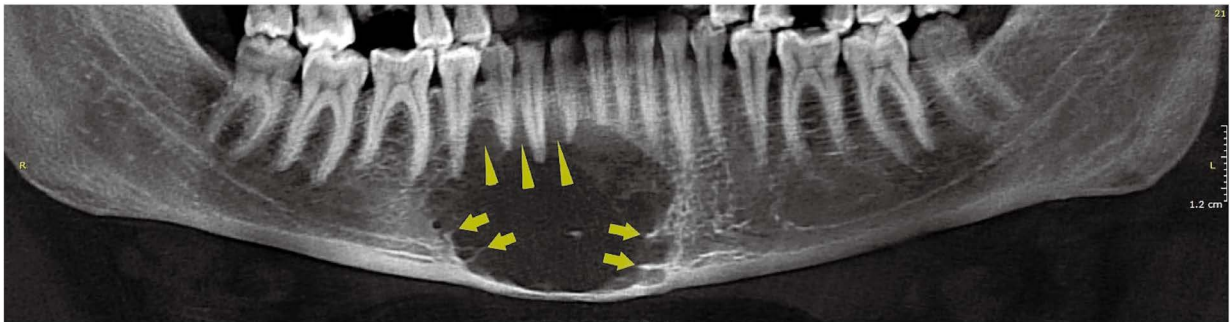

Fig. 9. Glandular odontogenic cyst in the anterior aspect of the mandible. Panoramic reconstructed cone-beam computed tomographic image with 2-mm thickness shows scalloped borders (arrows) and scalloping between roots (arrowheads).

dominance or no sex predilection.[26,28] The mandible is more affected than the maxilla, and most cases are seen in the anterior portion of the jaw.[28] Clinically, it usually presents as an asymptomatic, slow-growing, invasive lesion with considerable expansion; however, the presence of clinical symptoms has been reported in 24% of cases.[29,30] There may also be tooth displacement and cortical bone perforation, leading to extension of the lesion into the surrounding soft tissue.[27] Radiographically, it appears as a unilocular or multilocular, well-defined lesion, often with scalloped and sclerotic borders (Fig. 9).[27] In this regard, Manor et al.,[28] Opoundo et al.,[29] Chrcanovic and Gomez,[30] Shah et al.,[31] and Fowler et al.[32] reported scalloped borders in their case series and review articles as a common radiographical feature in patients with glandular odontogenic cyst. Kaplan et al.[33] reported that 54% of glandular odontogenic cysts are multilocular, 93% well-defined, and 13% associated with a scalloped border.

Discussion

Bony lesions have 2 types of borders: well-defined or ill-defined. The former usually is indicative of benign lesions with a slow-growing course, and the latter is present in fast-growing and destructive entities like infectious or malignant lesions.[3] Well-defined peripheries can be further divided into smooth or scalloped borders, as well as corticated or sclerotic.[4]

According to the findings of this review article, as summarized in Table 1, scalloped borders are found in 4 groups of lesions: 1) odontogenic cysts (odontogenic keratocyst, glandular odontogenic cyst), 2) pseudocysts (simple bone cyst), 3) odontogenic tumors (ameloblastoma), and 4) reactive lesions (central giant cell granuloma). Due to the structural differences between the maxilla and the mandible and the higher frequency of these lesions in the mandible, it is more likely that a clinician will encounter a lesion with scalloped borders in the mandible than in the maxilla.[3,4] Among those lesions having scalloped borders, ameloblastoma is the most frequent (72.2%), followed by simple bone cyst (68%), central giant cell granuloma (53%), and odontogenic keratocyst (41%).[5,7,10,17,18,21,22] Considering this feature along with other characteristics of lesions can help clinicians restrict the differential diagnoses; for example, a multilocular radiolucent lesion with well-defined scalloped borders in the posterior aspect of the mandible that extends to the ramus and causes expansion or tooth movement would prompt the clinician to think about ameloblastoma in the differential diagnosis.[5-9] In contrast, a unilocular or multilocular radiolucency with scalloped borders extending from the mesial aspect of the mandibular first molar to the midline with expansion or fullness of the vestibule might prompt consideration of central giant cell granuloma as the most probable diagnosis and glandular odontogenic cyst as a less likely diagnosis due to its lower prevalence.[10,12,26,33] When a clinician faces an extended multilocular radiolucent lesion with a scalloped border, but with minimal expansion, he or she should put forward the diagnosis of odontogenic keratocyst.[16] In another instance, simple bone cyst should be ranked first in the differential diagnosis when a solitary or multiple radiolucent lesions in the posterior aspect of the jaws is discovered on routine examination with scalloped borders with a possible history of trauma.[19,20] Generally, these 5 lesions should be considered first in the differential diagnosis. Otherwise, in case of incompatibility with lesion manifestations, rare entities with scalloped borders should be considered, such as odontogenic myxoma, vascular malformations, and multiple myeloma.[34-38] In conclusion, regarding the likelihood of a scalloped feature in the periphery of bony lesions, the clinician should consider ameloblastoma, central giant cell granuloma, odontogenic keratocyst, traumatic bone cyst, and glandular odontogenic

cyst in the differential diagnosis list and notice other characteristics of the lesions such as their process, location, and effect on the surrounding tissues to reach the most probable diagnosis. It is recommended to consider other entities with a lower likelihood of having a scalloped border after ruling out the above-mentioned lesions.

Conflicts of Interest: None

References

1. Arslan ZB, Demir H, Berker Yıldız D, Yaşar F. Diagnostic accuracy of panoramic radiography and ultrasonography in detecting periapical lesions using periapical radiography as a gold standard. Dentomaxillofac Radiol 2020; 49: 20190290.
2. Neyaz Z, Gadodia A, Gamanagatti S, Mukhopadhyay S. Radiographical approach to jaw lesions. Singapore Med J 2008; 49: 166-77.
3. Koong B. The basic principles of radiological interpretation. Aust Dent J 2012; 57: 33-9.
4. Baghdady M. Principles of radiographic interpretation. In: Mallya SM, Lam EW. White and Pharoah's oral radiology principles and interpretation. 8th ed. St. Louis: Elsevier; 2019. p. 298-300.
5. Mortazavi H, Baharvand M. Jaw lesions associated with impacted tooth: a radiographic diagnostic guide. Imaging Sci Dent 2016; 46: 147-57.
6. Fuchigami T, Ono Y, Kishida S, Nakamura N. Molecular biological findings of ameloblastoma. Jpn Dent Sci Rev 2021; 57: 27-32.
7. More C, Tailor M, Patel HJ, Asrani M, Thakkar K, Adalja C. Radiographic analysis of ameloblastoma: a retrospective study. Indian J Dent Res 2012; 23: 698.
8. Effiom OA, Ogundana OM, Akinshipo AO, Akintoye SO. Ameloblastoma: current etiopathological concepts and management. Oral Dis 2018; 24: 307-16.
9. Kitisubkanchana J, Reduwan NH, Poomsawat S, Pornprasertsuk-Damrongsri S, Wongchuensoontorn C. Odontogenic keratocyst and ameloblastoma: radiographic evaluation. Oral Radiol 2021; 37: 55-65.
10. Meng Y, Zhao YN, Zhang YQ, Liu DG, Gao Y. Three-dimensional radiographic features of ameloblastoma and cystic lesions in the maxilla. Dentomaxillofac Radiol 2019; 48: 20190066.
11. Stavropoulos F, Katz J. Central giant cell granulomas: a systematic review of the radiographic characteristics with the addition of 20 new cases. Dentomaxillofac Radiol 2002; 31: 213-7.
12. Shrestha S, Zhang J, Yan J, Zeng X, Peng X, He B. Radiological features of central giant cell granuloma: comparative study of 7 cases and literature review. Dentomaxillofac Radiol 2021; 50: 20200429.
13. Mortazavi H, Baharvand M, Safi Y, Behnaz M. Common conditions associated with displacement of the inferior alveolar nerve canal: a radiographic diagnostic aid. Imaging Sci Dent 2019; 49: 79-86.
14. Kahlon GK, Tilak K, Kondamudi N. Worsening lower jaw swelling and pain in a teenager: differential diagnosis and management. Cureus 2021; 13: e18296.
15. Vaidya K, Sarode GS, Sarode SC, Majumdar B, Patil S. Peripheral giant cell granuloma recurring as an exclusively intra-osseous lesion: an unusual clinical presentation. Clin Pract 2018; 8: 1023.
16. Jeyaraj P. Management of central giant cell granulomas of the jaws: an unusual case report with critical appraisal of existing literature. Ann Maxillofac Surg 2019; 9: 37-47.
17. Açikgöz A, Uzun-Bulut E, Özden B, Gündüz K. Prevalence and distribution of odontogenic and nonodontogenic cysts in a Turkish population. Med Oral Patol Oral Cir Bucal 2012; 17: e108-15.
18. Veena KM, Rao R, Jagadishchandra H, Rao PK. Odontogenic keratocyst looks can be deceptive, causing endodontic misdiagnosis. Case Rep Pathol 2011; 2011: 159501.
19. Ong ST, Siar CH. Odontogenic keratocysts in a Malaysian population: clinical, radiological and histological considerations. Ann Dent Univ Malaya 1995; 2: 9-14.
20. Borghesi A, Nardi C, Giannitto C, Tironi A, Maroldi R, Di Bartolomeo F, et al. Odontogenic keratocyst: imaging features of a benign lesion with an aggressive behaviour. Insights Imaging 2018; 9: 883-97.
21. Xanthinaki AA, Choupis KI, Tosios K, Pagkalos VA, Papanikolaou SI. Traumatic bone cyst of the mandible of possible iatrogenic origin: a case report and brief review of the literature. Head Face Med 2006; 2: 40.
22. Kumar J, Vanagundi R, Manchanda A, Mohanty S, Meher R. Radiolucent jaw lesions: imaging approach. Indian J Radiol Imaging 2021; 31: 224-36.
23. Razmara F, Ghoncheh Z, Shabankare G. Traumatic bone cyst of mandible: a case series. J Med Case Rep 2019; 13: 300.
24. Satish K, Padmashree S, Rema J. Traumatic bone cyst of idiopathic origin? A report of two cases. Ethiop J Health Sci 2014; 24: 183-7.
25. Suei Y, Taguchi A, Tanimoto K. A comparative study of simple bone cysts of the jaw and extracranial bones. Dentomaxillofac Radiol 2007; 36: 125-9.
26. Crane H, Karbhari B, Hughes D, Orr R, Brierley D. Glandular odontogenic cyst with metaplastic cartilage: report of an unusual case and literature review. Head Neck Pathol 2021; 15: 1041-6.
27. Tambawala SS, Karjodkar FR, Yadav A, Sansare K, Sontakke S. Glandular odontogenic cyst: a case report. Imaging Sci Dent 2014; 44: 75-9.
28. Manor R, Anavi Y, Kaplan I, Calderon S. Radiological features of glandular odontogenic cyst. Dentomaxillofac Radiol 2003; 23: 73-9.
29. Opondo F, Shaik S, Opperman J, Nortjé CJ. Glandular odontogenic cyst: case series and summary of the literature. S Afr Dent J 2019; 74: 502-7.
30. Chrcanovic BR, Gomez RS. Glandular odontogenic cyst: an updated analysis of 169 cases reported in the literature. Oral Dis 2017; 24: 717-24.
31. Shah AA, Sangle A, Bussari S, Koshy AV. Glandular odontogenic cyst: a diagnostic dilemma. Indian J Dent 2016; 7: 38-43.
32. Fowler CB, Brannon RB, Kessler HP, Castle JT, Kahn MA. Glandular odontogenic cyst: analysis of 46 cases with special emphasis on microscopic criteria for diagnosis. Head Neck Pathol 2011; 5: 364-75.

33. Kaplan I, Anavi Y, Hirshburg A. Glandular odontogenic cyst: a challenge in diagnosis and treatment. Oral Dis 2008; 14: 575-81.
34. Gupta S, Grover N, Kadam A, Gupta S, Sah K, Sunitha JD. Odontogenic myxoma. Natl J Maxillofac Surg 2013; 4: 81-3.
35. Limdiwala P, Shah J. Odontogenic myxoma of maxilla: a review discussion with two case reports. Contemp Clin Dent 2015; 6: 131-6.
36. Ramesh S, Govindraju P, Pachipalusu B. Odontogenic myxoma of posterior maxilla - a rare case report. J Family Med Prim Care 2020; 9: 1744-8.
37. Li X, Su L, Wang D, Gui Z, Jiang M, Yang X, et al. Clinical and imaging features of intraosseous arteriovenous malformations in jaws: a 15-year experience of single centre. Sci Rep 2020; 10: 12046.
38. Lu SY, Ma MC, Wang MC, Hsue SS. The status of jaw lesions and medication-related osteonecrosis of jaw in patients with multiple myeloma, J Formosan Med Assoc 2021; 120: 1967-76.