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Pediatric mandibular chronic nonbacterial osteomyelitis: A case report with 12 years of radiologic follow-up

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ABSTRACT

Chronic nonbacterial osteomyelitis (CNO) is histologically characterized by nonspecific osteitis. This inflammatory disorder, which lacks an infectious origin, typically presents with chronic pain and swelling at the affected site that can persist for months or even years. However, it is rare for CNO to affect the mandible. A 10-year-old girl presented with a primary complaint of pain in her left mandible. She had no significant medical or dental history. On examination, swelling was visible on the left buccal side, and imaging revealed radiolucent bone deterioration within the left mandible. This case report presents the radiological changes observed over a 12-year follow-up period. Variations in radiopacity, radiolucency, and periosteal reactions were noted periodically. This case highlights the radiological characteristics and findings that are crucial for the diagnosis of CNO, a condition for which no clear diagnostic criteria are currently available. ***(Imaging Sci Dent 2024; 54: 93-104)***

KEY WORDS: Osteomyelitis; Mandible; Pediatrics; Radiography, Panoramic

Chronic nonbacterial osteomyelitis (CNO) is a sterile inflammatory bone disorder that predominantly affects pediatric patients, with the average age of onset being around 10 years.[1] The annual incidence of CNO, as documented in Germany in 2011, was reported to be 0.4 cases per 100,000 children.[2]

For an extended period, the prevailing belief was that CNO resulted from infection. However, a comprehensive cohort study focusing on CNO demonstrated contradictory findings regarding the presence of specific bacteria upon analysis of bone tissue samples.[3] CNO is now considered an autoimmune or autoinflammatory disorder.[1] It is characterized by nonspecific bone inflammation without histological evidence of infection.[3]

CNO can present as either multilocular or unilocular lesions and is associated with a wide range of clinical symptoms. When symptoms are mild, the diagnosis of CNO may be delayed. Therefore, it is crucial to differentiate CNO from bone or joint inflammation, malignant bone tumors, and infectious osteomyelitis. A histological examination is necessary to definitively exclude the possibility of infectious osteomyelitis or malignant bone tumors.[4]

CNO primarily affects the ilium but can also involve other areas, including the metaphyseal plate, vertebrae, clavicle, and mandible.[1] The primary symptoms of CNO are persistent pain and swelling at the affected site, which typically develop gradually over months or even years. While CNO is uncommon, it is sometimes seen in the mandible, with a reported incidence of 1.5-3%. Moreover, when CNO occurs in the mandible, it usually presents as a solitary lesion.[5]

The radiographic characteristics of CNO include evidence of osteolysis, sclerosis, and hyperostosis. Mandibular expansion and bone-on-bone patterns are observable on computed tomography (CT) scans.[4] Furthermore, a key distinguishing feature of CNO, as opposed to fibrous dysplasia, is the presence of a ground-glass periosteal reaction, which is unique to CNO.[4,5]

The current treatment standard for CNO is not well-

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defined; however, nonsteroidal anti-inflammatory drugs (NSAIDs) are the primary treatment option.[6] Although NSAIDs can significantly alleviate symptoms on their own, more potent anti-inflammatory treatments, such as steroids, may be recommended for cases with multilocular involvement or frequent recurrences.[7]

This case report presents the 12-year follow-up of CNO in a 10-year-old girl. After the diagnosis of CNO, she began pharmacotherapy with NSAIDs and steroids, which provided symptom relief. However, the recurrence of clinical symptoms was accompanied by repeated radiological findings that showed patterns of radiolucency and radiopacity. This case underscores the important radiological features of CNO observed over a 12-year period of radiological follow-up.

Case Report

First visit

A 10-year-old girl presented with the primary complaint of pain in the left lower mandible, which began 1 month prior to her visit. The patient had no significant medical or dental history. Clinical assessment revealed swelling of the left buccal mucosa and mandible, resulting in facial asymmetry due to the enlargement of the left mandible. Additionally, the patient experienced tenderness in the mandible upon palpation.

A panoramic radiograph revealed radiopaque images with indistinct boundaries in the apical area of the left mandibular second premolar and first molar (Fig. 1). No odontogenic lesions were detected in the left mandibular first molar; however, an enlarged periodontal ligament space was present. To further assess the mandibular lesions, a mandibular CT scan was conducted (Fig. 2). This scan showed osteosclerotic changes across a broad area of the left posterior mandible, along with hyperostosis characterized by clear periosteal new bone formation in the buccal region. Additionally, the left posterior bone marrow cavity exhibited a reduction in radiolucency when compared to the opposite side. Soft tissue edema was also noted on the buccal side of the left mandibular ramus in the CT soft tissue-setting image.

Considering the suspected infection stemming from a periodontal issue in the molar region, an incisional biopsy within the oral cavity was performed under local anesthesia. The biopsy revealed no evidence of pus drainage or significant soft tissue inflammation. Following histological examination, the patient was diagnosed with acute osteomyelitis. The histological analysis also confirmed the absence of malignancy or tumors in the lesions. Furthermore, since the swelling and pain in the mandibular bone decreased after a course of antibiotics and NSAIDs, a follow-up appointment was scheduled.

Follow-up 3 months later and surgery

During a follow-up visit 3 months later, the patient reported increased pain and further enlargement of the left mandibular area. A subsequent oral examination revealed more pronounced swelling in the left buccal region compared to that observed during the initial examination. As a result, it was decided to surgically remove the lesion from the left mandibular area under general anesthesia. After admission, the patient underwent curettage of the left mandibular lesion, also under general anesthesia. At the time of the patient's visit for mandibular angle and body cortico-

Fig. 1. Panoramic radiograph taken at the initial examination. A radiopaque image with unclear boundaries is observed in the apical area of the left mandibular second premolar and first molar. Although no odontogenic lesion is identified in the mandibular left first molar, an enlarged periodontal ligament space is observed.

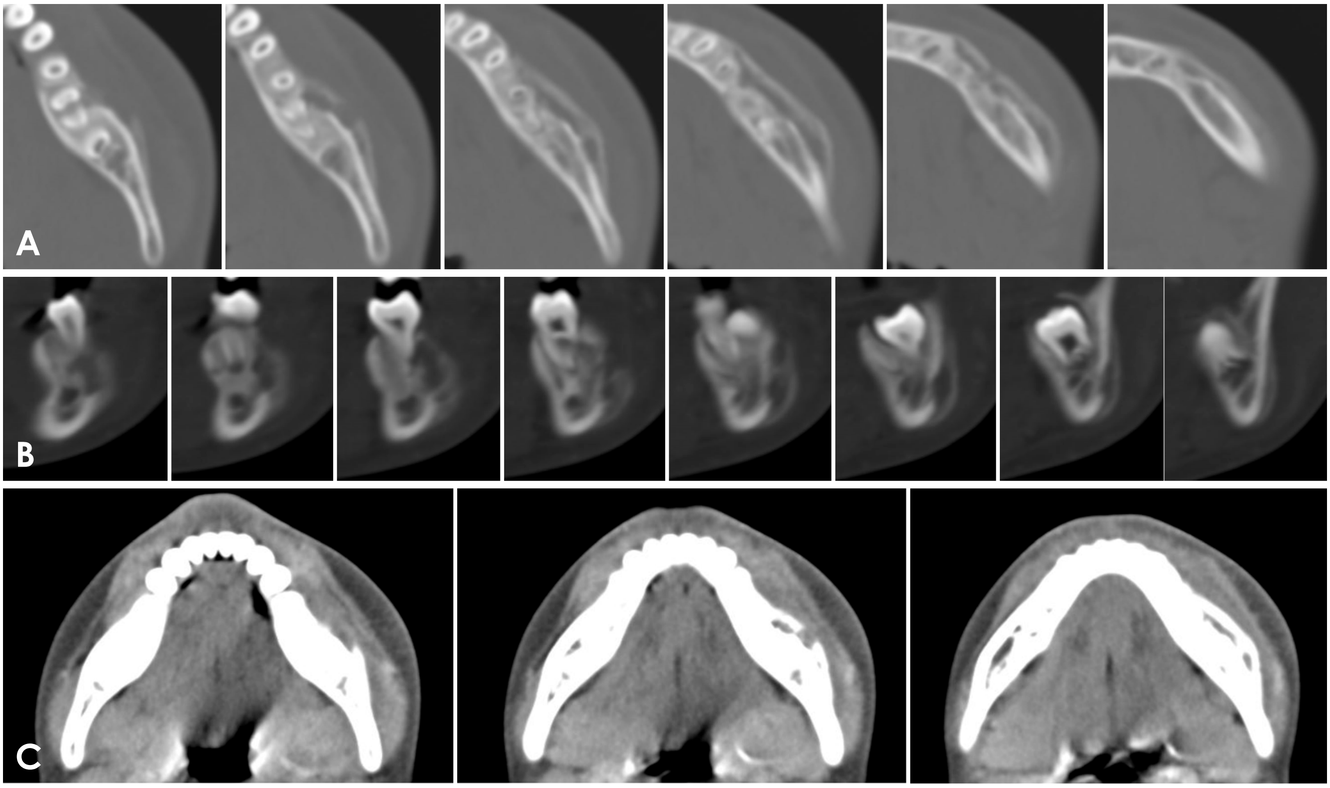

Fig. 2. Computed tomography (CT) before the initial surgical procedure. A. Bone tissue setting axial images. B. Bone tissue setting sagittal images. Osteosclerotic changes are observed in the left mandibular posterior region, along with hyperostosis in the buccal area. C. Soft tissue edema is evident on the buccal side of the left mandibular ramus in a CT soft tissue setting image.

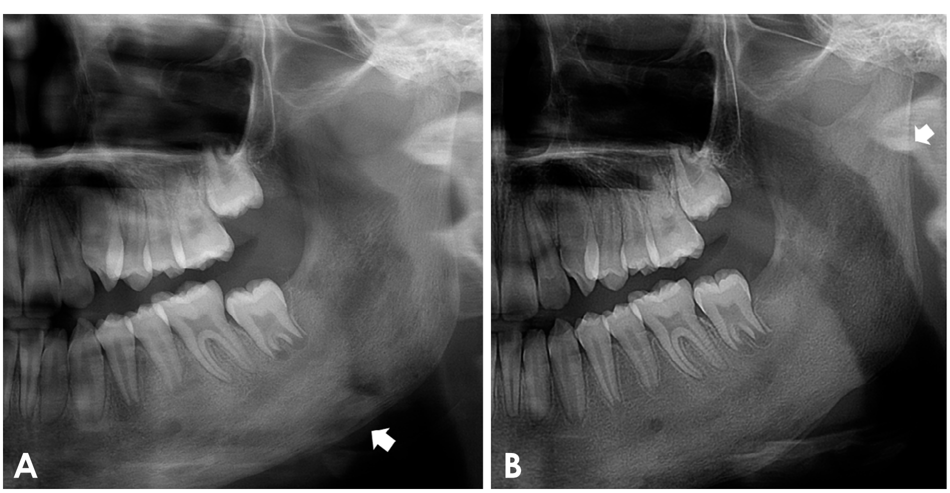

Fig. 3. A. Panoramic radiograph performed 3 months post-surgery. B. Panoramic radiograph performed 7 months post-surgery. Radiopacity extended to the bone area below the mandibular canal. A. A periosteal reaction (white arrow) is observed below the inferior border of the left mandible. B. The radiopaque image on the left side of the mandible increased, and a periosteal reaction (white arrow) is observed at the posterior border of the left mandibular ramus.

ostectomy, laboratory tests indicated elevated levels of C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). During the surgical procedure, bone tissue resembling normal mandibular anatomy was found beneath the periosteum. However, any abnormal bone-like tissue that had formed was excised. Subsequent histopathological analysis confirmed the same findings as the initial biopsy.

One week after surgery, the patient reported numbness in the left chin and lips. However, normal sensation in these areas returned 1 month after the procedure. While swelling in the left mandibular region decreased, persistent facial asymmetry remained due to residual swelling. A panoramic radiograph taken 3 months postoperatively showed that radiopaque images had extended to the area beneath the mandibular canal. Additionally, a periosteal reaction was noted below the inferior border of the left mandible (Fig. 3).

Postoperative 7 months/Follow-up 10 months later

Seven months postoperatively, the patient reported recurrent pain in the mandibular ramus. An oral examination revealed tenderness upon palpation at the left mandibular angle and body, which was also accompanied by redness and warmth. A comparison with the radiograph taken immediately before surgery showed increased radiopacity on the left side of the mandible, and a periosteal reaction was noted along the posterior border of the left mandibular ramus (Fig. 3). Additionally, a CT scan performed on the same day disclosed a lesion that extended from the premolar region to the ramus, coronoid process, and condyle of the mandible (Fig. 4). When compared with the preoperative axial CT scan, extensive osteosclerotic changes were evident in the left mandibular molar region, making it challenging to distinguish the boundary between the periosteal reaction area and the pre-existing cortical bone. A partial bone defect was present at the site of the previous curettage, and a new periosteal reaction had developed on the buccal side of the surgical site.

To evaluate the possibility of lesion recurrence and to determine a definitive diagnosis, an oral incisional biopsy was conducted under local anesthesia, accompanied by curettage. Subsequent histopathological examination led to a diagnosis of chronic osteomyelitis with multifocal reactive bone formation. Even though no abscesses or infected tissues were present, the patient was prescribed antibiotics and NSAIDs, which successfully alleviated the symptoms. While the asymmetry of the mandibular bone did not completely resolve, there was no further deterioration. Consequently, the decision was made to continue monitoring the patient for further progression.

Follow-up visit 1 year and 1 month later/ Postoperative 10 months

Ten months after surgery, the patient reported experiencing pain that had started a week before the visit. The pain radiated to the patient's head and was accompanied by facial swelling. The patient also had difficulty opening their mouth widely and eating hard foods. A CT scan performed on the day of the visit showed no signs of worsening at the site of concern. This was in contrast to a CT scan taken 7 months post-surgery, where the border of the area with additional periosteal reaction now appeared smooth, and there was evidence of bone growth at the surgical site. Furthermore, the border of the cortical bone had become well-defined, and continuity was restored (Fig. 4). As a result, the patient was prescribed NSAIDs for pain management and a follow-up plan was put in place to monitor her condition. Since there

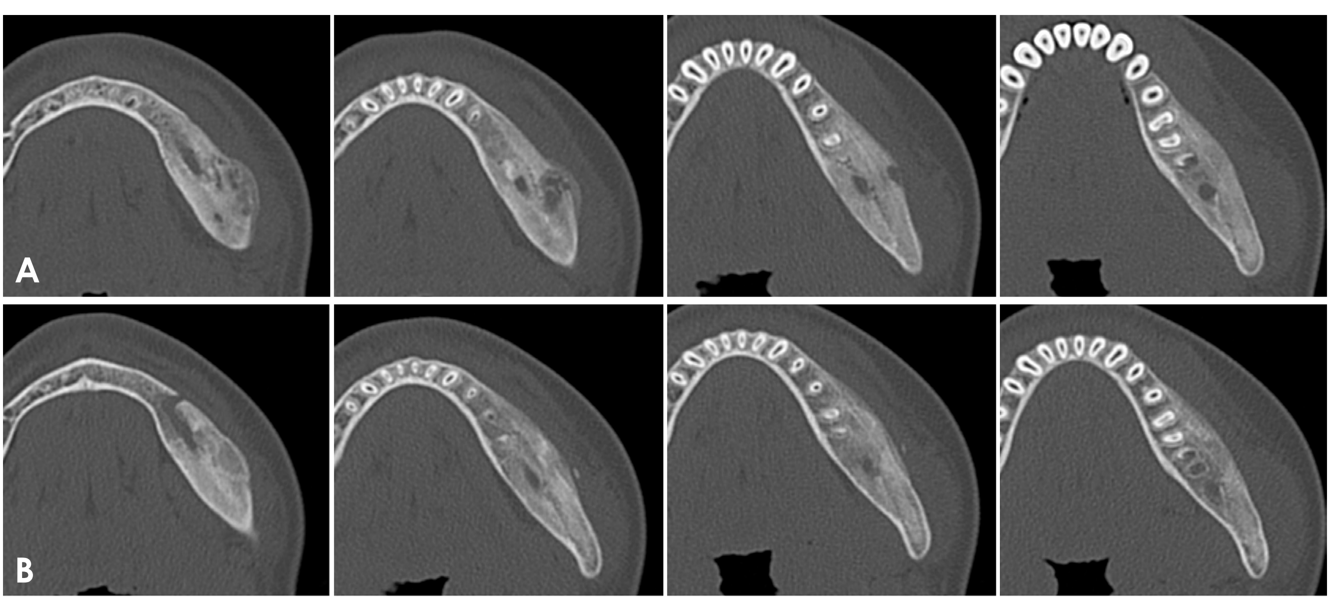

Fig. 4. A. Computed tomography (CT) performed 7 months post-surgery. B. CT performed 10 months post-surgery. A bone defect is partially observed at the surgical site after curettage, in addition to the periosteal reaction on the buccal side of the surgical site. When compared to the CT scan obtained 7 months after surgery, the border of the area where the additional periosteal reaction occurred appears smooth, and bone deposition has progressed at the surgical site. Additionally, the border of cortical bone is clear, and continuity has been achieved at 10 months post-surgery.

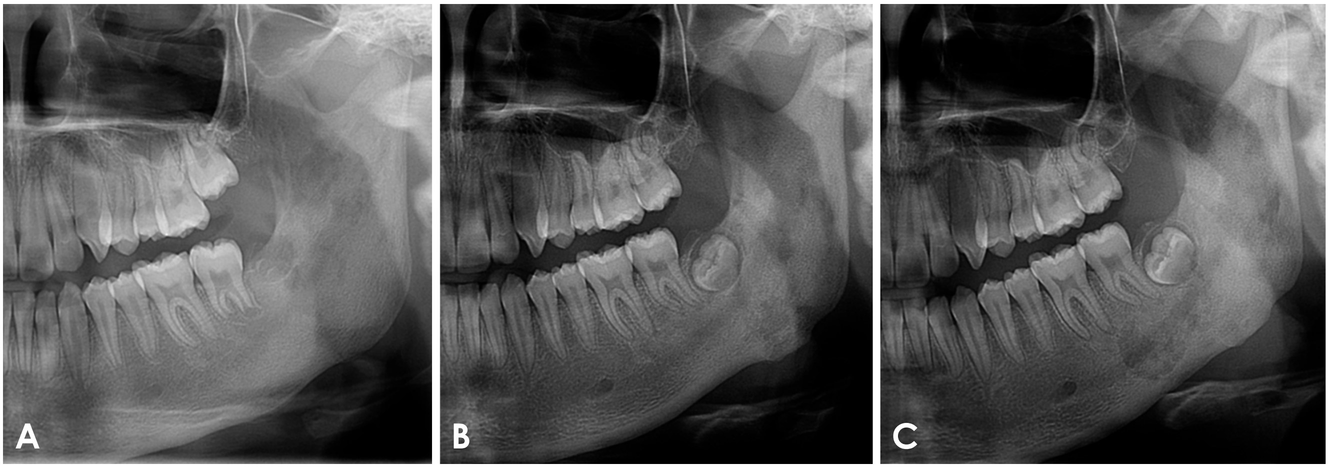

Fig. 5. Panoramic radiographs conducted 1 year (A) and 1 year and 5 months (B) post-surgery and 2 years and 3 months (C) following the second surgery. The periosteal reaction that occurred near the posterior border of the left mandibular ramus and the lower border of the mandibular body has merged with cortical bone 1 year after the initial surgery. In the panoramic radiograph performed 1 year and 5 months post-surgery, irregular radiolucent images are observed near the mandibular body. The size of the irregular radiolucency in the lower body has increased, and an additional radiolucency is observed below the left coronoid process 2 years and 3 months post-surgery.

were no signs of infection, antibiotics were deemed unnecessary. Over time, the patient's symptoms gradually improved.

A panoramic image acquired 1 year after surgery demonstrated that the periosteal reaction that occurred near the posterior border of the left mandibular ramus and the lower border of the mandibular body had merged with the cortical bone, unlike in the panoramic radiograph obtained 7 months after surgery (Fig. 5).

Follow-up 1 year and 8 months later

At 1 year and 5 months postoperatively, the patient returned to the hospital with concerns about swelling that had developed over the previous 3 days. The patient also reported pain and difficulty when opening her mouth. Upon clinical examination, swelling was noted in the left buccal region. The patient experienced pain and a tingling sensation upon palpation of the affected area. A restricted mouth opening was observed, with a maximum range of approximately 10 mm. The patient described pain in the left facial region when attempting to open her mouth fully. A panoramic radiograph showed irregular radiolucent areas near the mandibular body (Fig. 5). Since there were no signs of infection, NSAIDs and steroids were prescribed. At a follow-up visit 2 days later, the patient's symptoms had improved, and the maximum mandibular opening had increased to 30 mm.

Follow-up at 3 years and 11 months

At 2 years and 3 months after the second surgery (i.e., 3 years and 8 months after the initial procedure), the patient returned to the hospital with swelling on the left side of the face and difficulty opening the mouth. Despite the lack of improvement in clinical symptoms, the irregular radiolucency in the lower jaw had increased, and an additional radiolucency was observed below the left coronoid process (Fig. 5). The patient experienced symptom relief following the prescription of NSAIDs and steroids.

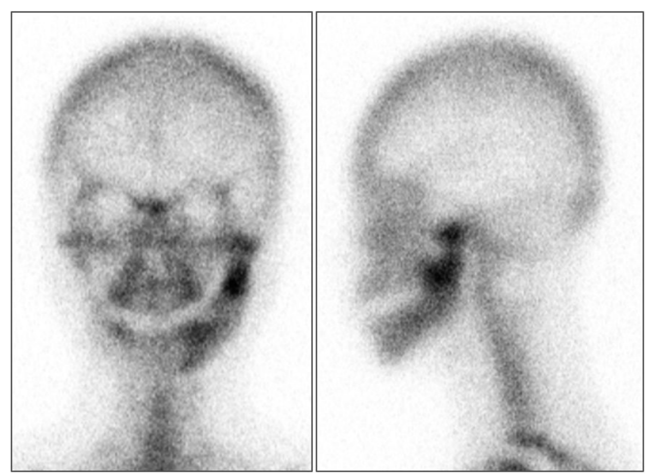

Fig. 6. Bone scintigraphy. The bone scan reveals heterogeneously increased ^{99m}Tc-methylene diphosphonate uptake at the left hemimandible with further localized uptake in the upper ramus and condylar process.

Considering the extent of the lesion's involvement with the skull, further evaluation of its growth was warranted, leading to a bone scan. The bone scan demonstrated heterogeneously increased ^{99m}Tc-methyl diphosphonate (^{99m}Tc-MDP) uptake in the left mandible, with further localized uptake in the upper ramus and condylar process (Fig. 6).

Compared to the panoramic radiograph obtained a year ago, the radiolucency observed below the left coronoid process and in the left molar area region of the body of the mandible had decreased (Fig. 7). However, due to the absence of significant clinical indications, it was decided to continue monitoring the patient's condition.

Follow-up at 5 years and 6 months

Approximately, 3 years and 10 months after the second surgery (i.e., 5 years and 3 months after the initial surgery), multiple radiolucent images were observed in the radiological findings (Fig. 7). There was minor swelling in the left mandibular body, and the patient reported tenderness upon palpation. Consequently, a steroid regimen was initiated. In the months that followed, the patient continued to experience persistent pain and slight swelling, with signs of pericoronitis noted around the mandibular third molar. A course of antibiotics and NSAIDs was prescribed. When the patient returned 1 week later, there was an improvement in symptoms.

Four years and 3 months after the second surgery (i.e., 5 years 8 months after the first surgery), multiple radiolucent images were observed on clinical examination and a panoramic radiograph, and a periosteal reaction was observed at the posterior border of the mandibular ramus (Fig. 7).

Five years and 4 months after the second surgery, the patient presented to the hospital complaining of intermittent pain that had persisted for the past 2 months. A comparison of the panoramic image taken 5 years and 4 months post-surgery (Fig. 8B) with the one captured 4 years and 10 months post-surgery (Fig. 8A) revealed increased radiolucency near the left mandibular ramus (Fig. 8). Although the lesion was not markedly severe, the third molar was scheduled for extraction to differentiate the lesion from pericoronitis and to remove any potential sources of infection.

Follow-up at 8 years

Six years and 4 months after the second surgery (i.e., 7 years and 9 months after the initial surgery), the patient presented to the hospital with complaints of pain around the second molar in the left mandible. A panoramic radiograph taken at this time revealed a decreased radiolucency in the left mandibular ramus. However, there was an observed increase in radiolucency near the apex of the left mandibular second molar and the antegonial notch (Fig. 8C).

The radiolucency observed deviated from the typical circular shape commonly associated with periapical radiolucency, presenting instead as atypical and irregular (Fig. 9). A prior cone beam computed tomography scan revealed a moth-eaten pattern in the lingual cortical bone adjacent to the distal root of the left mandibular second molar, indicative of irregular bone destruction rather than a conventional periapical radiolucent lesion (Fig. 9).

Collaborative efforts were made to provide conservative dental treatments. Upon diagnosing partial pulp necrosis

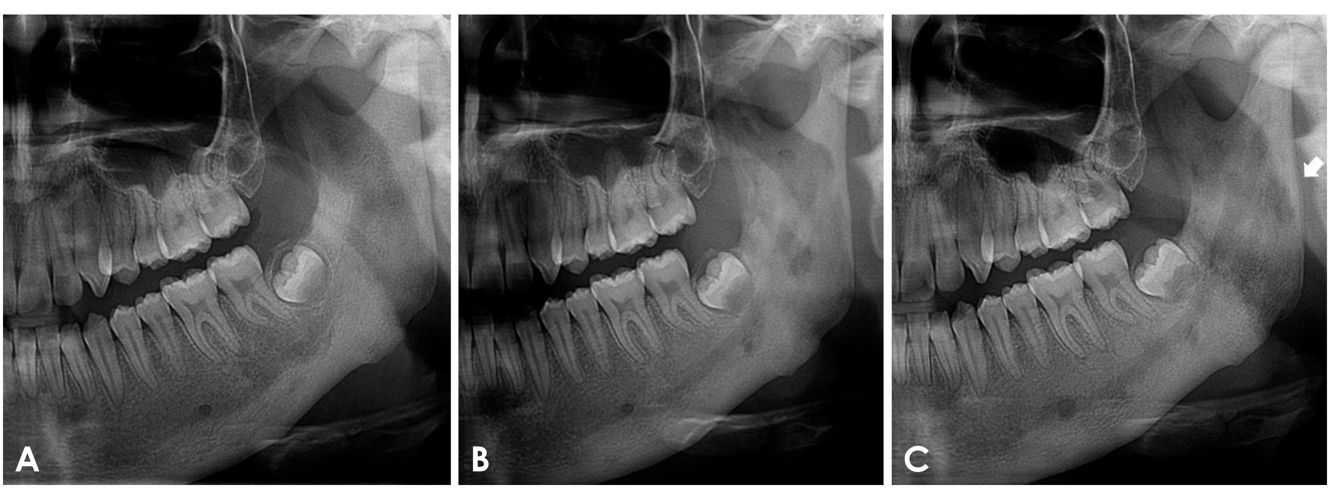

Fig. 7. Panoramic radiographs performed 3 years and 3 months (A), 3 years and 10 months (B), and 4 years and 3 months (C) following the second surgery. A. Compared to the panoramic radiograph from a year ago, the radiolucency observed below the left coronoid process and in the mandibular body of the left molar area has decreased. B. Multiple radiolucent images are observed in radiological findings 3 years and 10 months post-surgery. C. Four years and 3 months after the second surgery, multiple radiolucent images are still observed in clinical examination and panoramic radiograph, and a periosteal reaction (white arrow) is observed at the posterior border of the mandibular ramus.

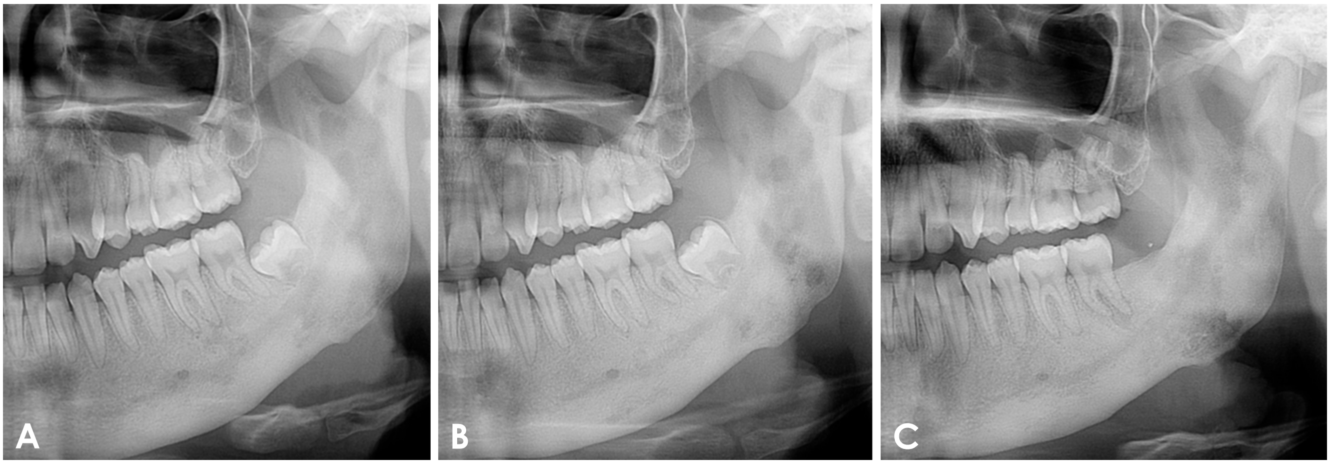

Fig. 8. Panoramic radiographs performed 4 years and 8 months (A), 5 years and 4 months (B), and 6 years and 4 months (C) following the second surgery. When comparing the panoramic image obtained 5 years and 4 months after the second surgery (B) with that obtained 4 years and 10 months after the second surgery (A), radiolucency near the left mandibular ramus appears to have increased. C. In the panoramic radiograph carried out 6 years and 4 months after the second surgery, the left mandibular ramus displays a decrease in radiolucency, but the radiolucency has increased in the area near the left mandibular second molar apex and the antegonial notch.

Fig. 9. Periapical radiographs performed 6 years and 4 months (A) and 9 years and 4 months (B) following the second surgery. Unlike the conventional circular form associated with periapical radiolucency, this radiolucency exhibits an atypical and irregular shape in the periapical radiograph conducted 6 years and 4 months post-surgery (A). C. On cone-beam computed tomography, a moth-eaten appearance, which is a finding of irregular bone destruction is observed in the lingual cortical bone. After root canal treatment, the clinical symptoms of the left mandibular second molar are alleviated, and a decrease in radiolucency near the apex is observed (B).

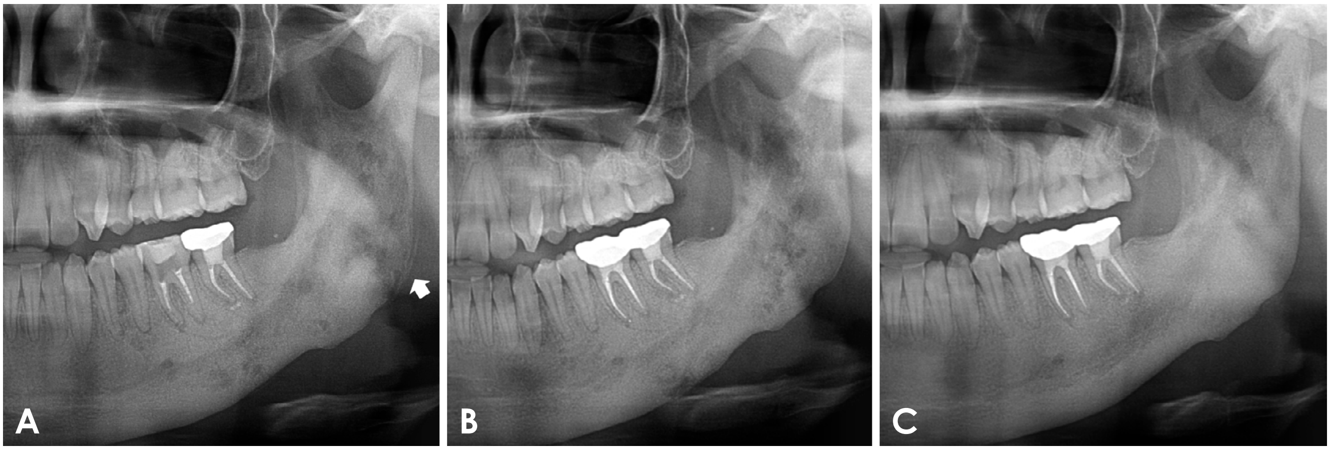

Fig. 10. Panoramic radiograph performed 7 years and 6 months (A), 7 years and 10 months (B), and 9 years (C) following the second surgery. In the panoramic radiograph carried out 7 years and 6 months post-surgery, the irregular radiolucency has increased in the mandibular ramus and body, and a periosteal reaction (white arrow) is observed near the mandibular angle area. In the panoramic radiograph obtained 7 years and 10 months after surgery, bone resorption around the mandibular ramus has progressed and the size of the radiolucent lesion has increased. In the panoramic radiograph obtained 9 years after the second surgery, the radiolucent lesions previously observed in the mandibular ramus and inferior border of the mandible are reduced.

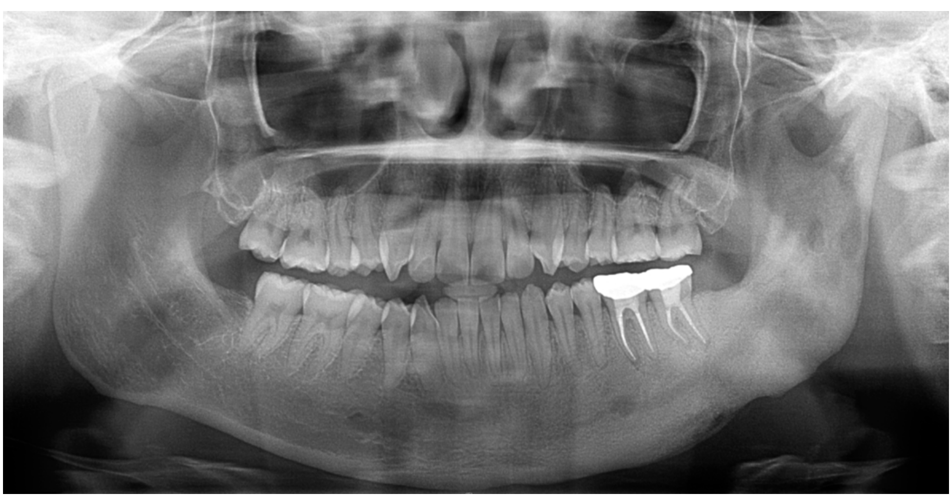

Fig. 11. Panoramic radiograph performed 10 years following the second surgery (equivalent to 12 years after the initial visit). A radiolucency is observed again at the inferior border of the left mandible, and a radiolucent image is observed around the left mental foramen.

in the second molar, a root canal procedure was initiated. Following the root canal treatment, the clinical symptoms associated with the left mandibular second molar subsided, and a reduction in radiolucency near the apex was noted (Fig. 9).

Furthermore, 7 years and 6 months after the second surgery, the patient presented to the hospital with complaints of pain in the lower mandible. A panoramic radiograph revealed an increased irregular radiolucency in the mandibular ramus and body, and a periosteal reaction was noted near the mandibular angle (Fig. 10). The patient was prescribed a steroid (prednisolone) and an NSAID (dexibuprofen), resulting in symptom relief.

Follow-up at 9 years and 6 months and beyond

At 7 years and 10 months after the second surgery (i.e., 9 years and 3 months after the initial surgery) and subsequently at 9 years after the second surgery (i.e., 10 years and 5 months after the initial surgery), no notable changes in clinical symptoms were observed during a follow-up examination. The patient reported occasional pain and swelling. A panoramic radiograph taken 7 years and 10 months after the surgery showed progressive bone resorption around the mandibular ramus, along with an increase in the size of the radiolucent lesion. Additionally, a radiolucent lesion was observed at the inferior border of the mandible beneath the left mandibular first molar (Fig. 10). In a panoramic radiograph taken 9 years after the second surgery, the previously noted radiolucent lesions in the mandibular ramus and at the inferior border of the mandible appeared to have diminished (Fig. 10).

At 10 years and 1 month following the second surgery (i.e., 11 years and 6 months after the initial surgery), the patient did not exhibit any abnormal symptoms. However, she reported occasional discomfort in her left mandibular area. The panoramic radiograph taken during that visit revealed radiolucency at the inferior border of the left mandible, as well as a radiolucent image around the left mental foramen (Fig. 11).

Discussion

This report presents a case of a 10-year-old female patient with mandibular CNO and examines the clinical and radiographic characteristics documented over the past 12 years. The findings of this study could provide valuable guidance for diagnosing CNO in pediatric patients and for adjusting clinical assessments accordingly. Diagnosis of CNO is based on clinical symptoms, radiographic evidence, and histopathological examination, due to the lack of specific laboratory tests or biomarkers for the condition.[2,6] This diagnostic complexity has led to instances of delayed CNO diagnosis, with an average delay of 9 months being reported.[8] In the case presented here, there was also a delay of approximately 1 year in diagnosing CNO following the initial examination.

To diagnose CNO, researchers recommend using radiographically established criteria. These criteria include the observation of osteolytic and sclerotic bone lesions, as well as multifocal bone lesions.[9] Another diagnostic criterion for CNO, as identified in a previous study, is the absence of signs of local or systemic inflammation when swelling is present. Radiographic features that suggest a periosteal reaction, a significant increase in CRP levels - even in the absence of bacterial growth in a bone biopsy and without the administration of antibiotics - and the presence of inflammatory changes should also be taken into account.[10]

Radiologic examinations are essential for diagnosing CNO. A US cohort study by Borzutzky et al. showed that radiographic findings revealed characteristic sclerotic, osteolytic, and/or hyperostotic bone lesions in 77% of plain film images.[1] Furthermore, when analyzing all imaging results, every patient exhibited at least 1 abnormal sclerotic bone lesion (68%), osteolysis (71%), or hyperostosis (23%).[1] In a study conducted by Padwa et al., 22 patients exhibited osteosclerosis alongside mandibular expansion in the initial CT scans, along with lytic destruction that had indistinct borders.[4] Within the medullary canal of the mandibular cortical bone, lytic foci were identified, and bone destruction extended toward the buccal or lingual region.[4] The posterior mandible was the most frequent site of bone destruction, with 20 cases (90%) involving the ramus.[4] Follow-up CT scans showed increased mandibular expansion and osteosclerosis in the majority of patients.[4]

The clinical and radiographic characteristics of CNO must be differentiated from those of acute bacterial osteomyelitis or malignancy. The smooth, lamellated appearance of newly formed bone on CT facilitates the differentiation of CNO from neoplasms, such as Ewing sarcoma and osteosarcoma. Furthermore, the absence of a periosteal reaction in fibrous dysplasia aids in distinguishing CNO from fibrous dysplasia.[4]

In the present case, the initial CT scan revealed a periosteal reaction characterized by the separation of the periosteum from the surface of the buccal cortical bone in the left mandible. A follow-up CT scan, conducted 1 year after the first visit due to worsening symptoms, showed an enlarged lesion with increased mandibular dimensions and osteosclerosis in the cancellous bone beneath the periosteum. In addition to the periosteal expansion, osteosclerosis beneath the periosteum was noted, along with multiple signs of bone resorption and the presence of a lytic lesion with an indistinct border. Lytic foci were also observed within the medullary cavity of the cancellous bone in the mandible, leading to the destruction of bone in both the buccal and lingual regions.

The radiographic findings in this case are distinguished by a 10-year follow-up period, during which radiographic assessments were conducted as the clinical manifestations of CNO fluctuated between improvement and exacerbation. The radiological features alternated between radiopaque and radiolucent phases, and the patient had not fully recovered at the time of the last follow-up. Clinically, the patient experienced a persistent cycle of pain onset and relief. However, there was a noted decrease in both the intensity and frequency of the pain over time, and the clinical symptoms showed a gradual improvement. Additionally, the radiological findings evolved, indicating a chronic increase in radiopacity when compared to the initial presentation.

Bone scans, a type of nuclear medicine imaging, can contribute to the early diagnosis of CNO. In these scans, early uptake indicates inflammation, while late uptake indicates osteosclerosis.[11] Although ^{99m}Tc-MDP bone scintigraphy is highly sensitive in detecting bone lesions, it lacks specificity and is not precise in assessing the lesion's size.[1]

Magnetic resonance imaging (MRI) is particularly useful for detecting CNO in the mandible. T2-weighted MRI sequences are highly effective for both early and late diagnosis of CNO, as they allow for the visualization of early bone inflammation and swelling of the adjacent soft tissues.[6,12,13] Mandibular CNO typically presents with changes in bone contour, which are detectable on MRI, along with increased signal intensity and periosteal reactions.[4] In the present case, MRI was not performed. Numerous studies have underscored the value of MRI in providing a more comprehensive morphological evaluation and assessment of disease activity, which can enhance the accuracy of CNO diagnosis and is essential for disease monitoring.[14,15]

Aside from radiographic and clinical observations, the inclusion of a bone biopsy can enhance the precision of diagnosing CNO. In this case, 2 bone biopsies revealed evidence of chronic inflammation, which led to the suspicion of fibrous dysplasia after infection was ruled out. Given the histological similarities between the hypocellular fibroblastic stroma found in CNO and that seen in fibrous dysplasia, an accurate diagnosis can be challenging and requires careful consideration.[4] Furthermore, bone and bone marrow biopsies have been recommended to differentiate CNO from infections and malignancies.[8] Bone biopsies for CNO often show an absence of organisms, a feature that helps distinguish CNO from bacterial osteomyelitis.[16] Histologically, CNO is characterized by the presence of parallel and interconnecting thin trabeculae of woven bone, atypical osteoid, hypocellular fibroblastic stroma, and patchy and nodular fibrosis within the medullary space. It is important to note that hypocellular fibroblastic stroma is also a characteristic of fibrous dysplasia, which underscores the need for careful diagnosis.

Laboratory tests, alongside clinical, radiological, and histological evaluations, can provide valuable insights. During the patient's visit for a mandibular angle and body corticoostectomy, laboratory tests revealed elevated levels of CRP and ESR. A large-scale cohort study reported elevated inflammatory markers in CNO, with CRP and ESR levels showing marginal increases.[17] However, CNO can be differentiated from bacterial osteomyelitis by the absence of an infectious source, such as residual roots, periodontitis, or other oral pathologies. Furthermore, the lack of a history of bisphosphonate use or radiotherapy in patients with CNO suggests that osteonecrosis of the mandible may also be a contributing factor.[16]

CNO is often misdiagnosed as early bacterial osteomyelitis, which results in the prescription of initial antibiotic treatments. A multicenter study emphasizes that antibiotics are commonly prescribed as the primary treatment for pediatric CNO patients; however, this approach is generally ineffective when administered before a rheumatologic evaluation. Supporting these findings, another cohort study showed that most CNO patients were initially misdiagnosed with an infection, resulting in antibiotic therapy that ultimately delayed appropriate intervention.[18]

Once it is established that CNO is unrelated to infection, NSAIDs become the primary treatment choice. Notably, naproxen at a dosage of 10-15 mg/kg/day has gained recognition for its effectiveness in approximately 70% of patients.[19] NSAID treatment for CNO typically lasts for approximately 13 months.[20] The efficacy of NSAIDs in alleviating CNO symptoms is thought to be due to their ability to reduce prostaglandin levels, which subsequently decreases osteoclast activation, since prostaglandins are essential for osteoclast activation and differentiation.[7] In a study by Beck et al.,[6] 51% of the 37 children experienced symptom resolution after 12 months of naproxen treatment alone.[6] A high treatment success rate was reported among the 18 cases of mandibular CNO, out of a total of 22 cases where NSAIDs were prescribed.[18] NSAIDs have been established as the first-line treatment and have demonstrated effectiveness in approximately two-thirds of patients who use them.[21]

Corticosteroids are thought to reduce prostaglandins and alleviate CNO symptoms by inhibiting the phospholipase A2 pathway.[22] Although short-term use of corticosteroids can be effective, the potential for various side effects makes prolonged use problematic, especially in CNO, where long-term management is required.[3]

When NSAIDs are ineffective for CNO, bisphosphonates (BPs) may be considered as an alternative treatment option. Both BPs and anti-tumor necrosis factor (TNF) agents are osteoclast inhibitors that exert their effects over an extended period and have been reported to be effective in cases of recurrent CNO.[23] BPs provide symptom relief for patients with CNO by inhibiting osteoclast-mediated bone resorption and reducing inflammatory cytokines.[21]

Although there is no established standard therapy for CNO, surgery is not the initial approach; instead, medications are typically prioritized as the first line of treatment.[24] NSAIDs are commonly used, but corticosteroids, disease-modifying antirheumatic drugs, and anti-TNF agents may also be considered as additional treatment options.[19] An early and accurate diagnosis of CNO is crucial to avoid unnecessary long-term antibiotic use and surgical interventions.

CNO typically manifests before the age of 20 years, with the primary symptoms being pain, swelling, and restricted mouth opening. It may also cause altered sensation in the lower lip due to the involvement of the inferior alveolar nerve.[25] Additionally, it may contribute to temporomandibular disorder.[25] In the current case, the patient experienced recurrent swelling and pain in the lower jaw, with imaging tests revealing evidence of bone destruction. The patterns of bone destruction and healing varied, extending from the left mandibular body to the ramus and condyle. The patient reported episodes of pain and swelling roughly every 2 months, although the recent episodes were of milder intensity. CNO can also affect the teeth adjacent to the involved area.[26] In this case, the patient experienced symptoms around the left mandibular first and second molars, with symptom relief following root canal treatment. When teeth are situated within a region affected by CNO, a thorough dental evaluation and continuous monitoring are advisable.

CNO is an autoimmune disorder characterized by a complex pathogenesis. The lack of well-defined diagnostic criteria makes the early identification of CNO challenging, yet it is crucial for effective management. Prompt diagnosis of CNO depends on a combination of clinical symptoms, physical observations, and radiological assessments. Radiographic evidence obtained from plain radiographs, CT scans, bone scans, and MRI is essential in facilitating the diagnosis of CNO.

Randomized controlled trials and established treatment guidelines for CNO are currently lacking. However, several retrospective studies suggest that NSAIDs are the primary treatment option, with the goal of alleviating symptoms and pain. Corticosteroids may also be considered. Surgical intervention is not typically the first-line approach, although contour reduction could be considered for aesthetic reasons; however, the decision to pursue surgical treatment should be made with caution. The primary objective of CNO treatment is to manage pain and inflammation, prevent bone destruction, and limit the progression of the disease. Differentiating CNO from other causes of osteomyelitis is important.[27]

The characteristic radiological findings of CNO have been documented in various studies. In this case, they included abnormal sclerotic bone lesions, osteolytic lesions, and hyperostosis. Over time, the clinical symptoms did not resolve completely and instead progressed to a state of partial relief; the radiological findings fluctuated between radiolucent and radiopaque phases. Consequently, even when clinical symptoms subside, there remains a risk of recurrence for radiological lesions. Given that there is no definitive cure for CNO, ongoing radiological monitoring during follow-up is essential.

Conflicts of Interest: None

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