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Novel radiographic pattern of maxillary periostitis induced by endodontic inflammation: A case report

Periostitis, an inflammation of the periosteum, often causes pain and swelling, yielding diverse bone lesion patterns.[1] We presented a novel radiographic finding of the anterior maxillary periostitis, exhibiting a "blister-like" periosteal reaction, attributable to the maxillary canine endodontic disease. This unique pattern differs from previously documented periostitis.[1–3] Clinicians may utilize this pattern for enhancing their differential diagnosis ability, discerning periosteal reactions from other etiologies such as osteomyelitis or tumors.

A 48-year-old female was referred to our dental clinic on July 25, 2022, with a tender, oval mass (approximately 1.5 × 2 cm in area) at the periapical region of the right maxillary canine (tooth 13) (Fig. 1A). She had no systemic disease, trauma, or relevant history. Her dental history included orthodontic treatment 25 years ago. The tooth 13 was non-vital and exhibited localized tenderness without deep probing depth or percussion pain. Periapical radiographs revealed a periapical radiolucency with loss of the lamina dura, suggesting the possible endodontic pathology (Fig. 1B). Root canal therapy with calcium hydroxide dressing was initiated on August 9, 2022. Due to the persistent exudate, multiple re-dressings were required. By August 31, symptoms subsided, and the endodontic obturation was completed (Fig. 1B). However, the follow-up showed no significant reduction in the periapical lesion size. The preoperative cone-beam computed tomography (CBCT) was conducted and revealed a blister-like bone lesion at the facial side of the maxillary bone and the root of the tooth 13 was beyond the cortical boundary of the maxillary bone (Fig. 1C). Surgical intervention on November 8 included cyst enucleation, apicoectomy, and mineral trioxide aggregate retrograde filling (Fig. 1B). The cyst and blister-like bony tissue samples were preserved for pathological examination. The pathology report confirmed a periapical cyst with chronic inflammation in the fibrous cystic wall and periosteal new bone formation, consistent with the proliferative periostitis (Fig. 1F). At 1-week post-operation, the patient was asymptomatic, and CBCT showed a hermetic retrograde filling with residual periostitis bone lesion (Fig. 1D). At one year, radiographs confirmed complete resolution of the reactive bone lesion (blister-like periostitis) with no recurrence of the endodontic infection (Fig. 1B and E).

We described a novel "blister-like" periostitis pattern in the anterior maxilla, which was linked to canine periapical inflammation, aiding the diagnosticians, radiologists, endodontists, and surgeons in evaluating endodontic-related maxillary swellings via CBCT. This distinct CBCT finding is particularly useful when periapical films are inconclusive, suggesting endodontic or periapical inflammation and facilitating the differential diagnosis. Unlike typical non-aggressive and parallel periosteal reactions,[3] this unique radiographic pattern appears specific to the anterior maxilla.

Periapical osteoperiostitis in the posterior maxilla is associated with endodontic infections, presenting as a radiopaque "halo" affecting the maxillary sinus on CBCT.[4] Our case showed a distinct blister-like periostitis on the facial aspect of the premaxilla, extending beyond the maxillary bone boundary, a previously unreported radiographic pattern of periostitis of endodontic origin.

The finding of this case indicates that excessive orthodontic tipping performed 25 years before may result in localized ischemia and subsequent pulp necrosis of tooth 13, ultimately contributing to the development of periapical pathology and the maxillary proliferative periostitis. It also underscores the need for precise control of orthodontic force to prevent the pulpal necrosis.[5] Clinicians should recognize this novel proliferative periostitis pattern and use CBCT for monitoring the orthodontic complications.

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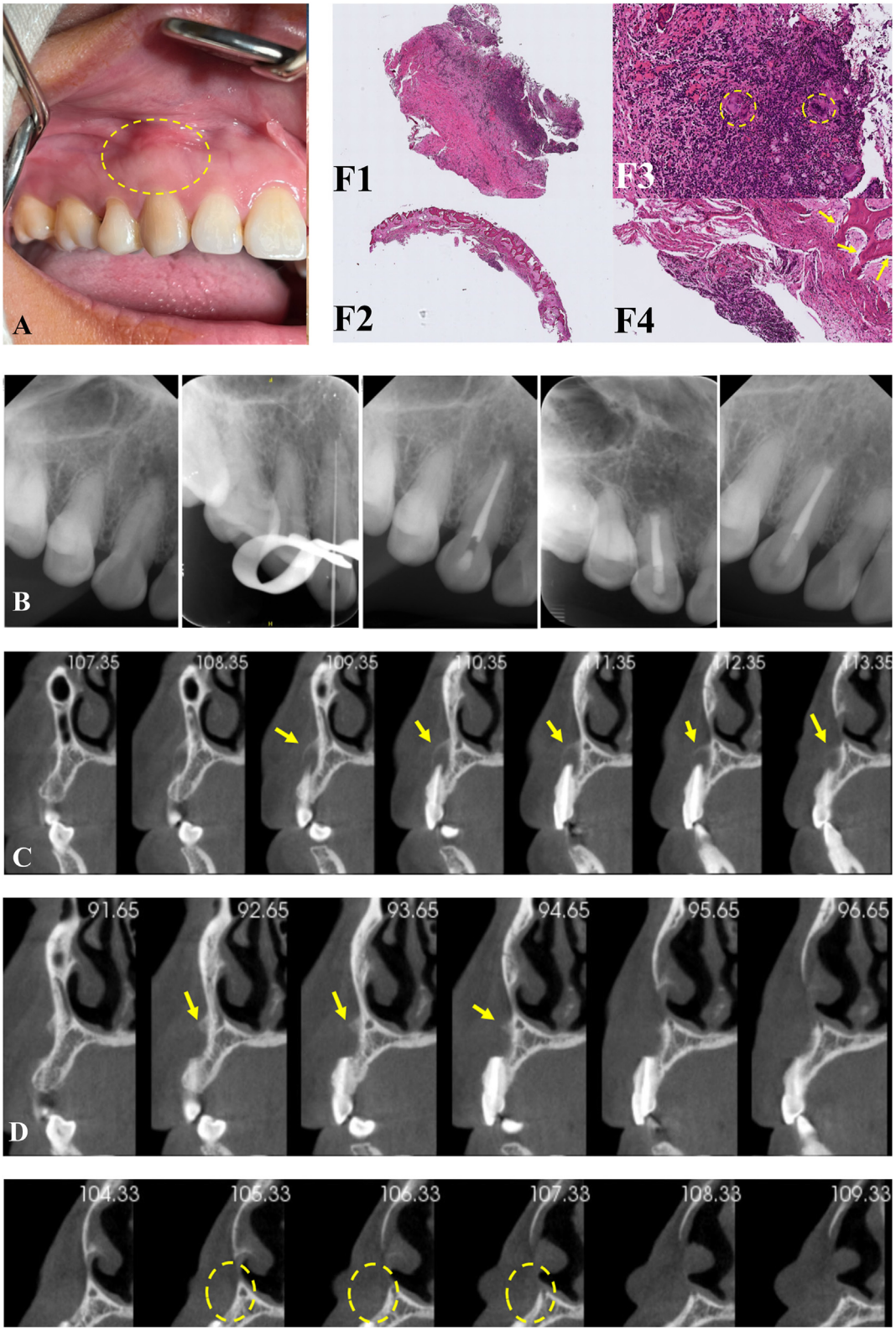

Figure 1 The clinical, histopathological, and radiographical photographs of our case. (A) Clinical photograph displaying an oval mass over the tooth 13 apex with absence of a sinus tract. (B) The periapical radiographs of the tooth 13 at different time points (original, working length measurement, root canal filling, immediate post-surgery, 1-year follow-up). (C) Pre-operative cone-beam computed tomography (CBCT) images exhibiting a blister-like buccal cortical bone lesion at the root apex area of tooth 13 (arrows). (D) Post-operative 1-week follow-up CBCT images revealing the bony remnant at the top of the original cyst. (arrows). (E) Post-operative one-year follow-up CBCT images showed complete resolution of bony remnants at the periapical area (circle) of tooth 13, confirming that the blister-like periostitis was a reactive periosteal response to pulp infection. Once the source of infection was

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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eliminated, the reactive bone lesion resolved. (F1 and F2) Microscopic examination revealed chronic inflammation in the fibrous cystic wall without a true cystic epithelial lining, but with inflammation-induced thin layer of cancellous bone formation at the peripheral area of the cystic wall, confirming the histopathological diagnosis of a periapical cyst with the proliferative periostitis (H&E stain, 40×). (F3) The high-power view showed an infiltrate of lymphocytes and plasma cells with few multinucleated foreign body giant cells (circles) (H&E stain, 100×). (F4) The thin bone specimen showed cancellous bone trabeculae surrounded by osteoblasts (arrows) (H&E stain, 100×).