Periostitis ossificans in a 10-year-old child

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ABSTRACT

Periostitis ossificans (PO) is a type of osteomyelitis stemming from an odontogenic infection, generally found in children and adolescents, and often leads to the loss of the involved tooth. This case presents a less invasive alternative for the treatment of PO. A 10-year-old patient presented with an asymmetrical increase in the left side of the mandible. Tooth 36 exhibited pulp necrosis and incomplete root formation. Radiographically, the bone in the region had the appearance of the layers of an onion. Computed tomography indicated periosteal bone proliferation in the region of the ramus and angle of the mandible adjacent to the vestibular cortical bone. Therapy involved root canal preparation and intracanal medication with calcium hydroxide in tooth 36. Complete remission of the condition occurred within 14 months. In conclusion, endodontic intervention is a less invasive alternative and should be considered to minimize the negative impact of tooth loss in children.

KEYWORDS: Endodontics, osteomyelitis, pediatric dentistry

Case Report

A 10-year-old male patient with no adverse systemic conditions presented with an asymptomatic increase in volume on the left side of the mandible. The patient’s principal complaint was the effect of his physical appearance on social relationships at school [Figure 1a].

In the extraoral examination, the left side of the face exhibited an increase in volume, with a hard consistency and without lymphadenopathy. No splotches were observed on the skin [Figure 1a].

The intraoral examination revealed an increase in volume of the vestibular bone plate. The permanent left first molar exhibited temporary restorative treatment

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material and did not respond positively to the vertical/horizontal percussion or thermal tests.

The panoramic and periapical radiographs revealed a radiolucent lesion in tooth 36 which presented incomplete root formation [Figures 1b and 2]. The lower left occlusal radiography revealed the presence of concentric lamellae with the appearance of the layers of an onion [Figure 3]. Cone-beam computed tomography was performed as the complementary examination, which indicated periosteal bone proliferation in the region of the ramus and angle of the mandible adjacent to the vestibular cortical bone [Figure 4].

The radiographic images demonstrated the preservation of the mandibular contour, classifying Type I, Subtype II PO based on the volumetric increase of the newly formed bone on the external portion of the original cortex, resembling the layers of an onion.\(^3\)

Treatment consisted of endodontic access and chemomechanical preparation of root canals using 2.5% sodium hypochlorite as the irrigating liquid. An irrigation test with ethylenediaminetetraacetic acid was then performed to complement the removal of the smear layer, followed by further irrigation with 10 ml of sodium hypochlorite per root canal. After chemomechanical preparation, calcium hydroxide was used as an intracanal medication to eliminate the remaining microorganisms. This medication was exchanged on a monthly basis for 14 months until apexification [Figure 5]. The clinical follow-up and radiographic examination at 14 months demonstrated a significant reduction in the previously observed volume, with the return of facial symmetry [Figure 6].

**Discussion**

Endodontic therapy proved to be an effective, less invasive treatment for the resolution of the present case of PO. This option enabled the maintenance of the permanent first molar which is an essential tooth to
adequate occlusal development. The elimination of the infectious process from the root canal system led to the regression of the periapical lesion and local bacteremia. The return of facial symmetry restored the patient’s self-confidence, with the consequent reestablishment of his social life and daily routines.

The greatest difficulty in performing endodontic therapy in these patients is related to their age, since they generally do not yet have complete root formation. In such cases, the use of calcium hydroxide is justified by its ability to induce the formation of mineralized tissue and its antimicrobial activity. Moreover, the formation of a mineralized apical barrier provides conditions for the hermetic filling of the root canals, which is fundamental to maintaining the decontamination obtained by chemomechanical preparation. Therefore, despite the various alternatives to treat immature permanent teeth with pulp disease, the use of calcium hydroxide is a valid therapy for treatment until the occurrence of apexification.

The treatment for PO often described in the literature is extraction of the affected tooth. However, this procedure constitutes a form of mutilation and should only be adopted if absolutely necessary. Endodontic therapy in such cases has been performed little but has demonstrated satisfactory results in the few reports (such as the present study) that have employed this technique.

The prevalence of PO is higher in children and adolescents than adults due to the considerable osteoblastic activity in the periosteum in young people. The patient in the present report falls within this age range. This is a phase in which the effects of osteomyelitis can exert an influence on the development of the face and quality of life, leading to changes in the normal routine and social interactions with other children. It is therefore important for dentists to know the clinical and radiographic characteristics of PO as well as the different intervention possibilities, since the most common causal factor is an infection of a dental origin, such as caries and periapical infection.

In the present case, the radiographic findings were characteristic of PO, with successive layers of bone deposition resembling the layers of an onion. Such a pattern can be seen on both occlusal radiographs and tomograms.

The mandibular location and facial asymmetry due to an increase in bone volume in the present case are frequently reported signs in the literature. PO commonly presents as swelling and hardening in the affected region, with trismus and the absence of suppuration. The condition is generally asymptomatic, but pain may be reported in some cases, with fever and lymphadenopathy in the region, which are likely related to the inflammatory process.

The molar region is the most commonly affected, which is in agreement with the present case, in which the left permanent mandibular first molar (tooth 36) was the precursor of PO. The higher prevalence in molars is due to cultural factors of hygiene, since the molars erupt early, which exerts an influence on their conservation.

The most important differential diagnosis is fibrous dysplasia, as the signs and symptoms of the two conditions may be clinically indistinguishable. Radiographically, both conditions can produce images characterized by regions of sclerosis with and without osteolytic areas and an increase in the volume of the jaw. The increase in volume in cases of PO is due to new bone formation in the periosteum, whereas the increase in fibrous dysplasia is the result of support bone formation on the outer side of the cortex secondary to remodeling stemming from endosteal erosion. As periosteal new bone formation was found in the radiographic findings in the present case, fibrous dysplasia was improbable.

The diagnosis and treatment of choice based on descriptions found in the literature proved to be correct in the case reported herein and led to satisfactory results. Therefore, root canal treatment is an indicated procedure for cases of PO.
Conclusion

Although tooth extraction is the most reported treatment in the literature, endodontic intervention is a less invasive alternative for PO and should be considered to minimize the negative impact of tooth loss in children and adolescents.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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