

# Differential diagnosis of apical periodontitis and nasopalatine duct cyst: case report

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## ABSTRACT

The presence of periapical bone alteration in the anterior maxilla, particularly between maxillary incisors, can be mistaken for apical periodontitis (AP) or nasopalatine duct cyst (NPDC) of which accurate differential diagnosis should be established to define the best treatment for endodontically untreated maxillary anterior teeth. The proper use of clinical sources of investigation, especially pulp sensibility tests, is of paramount importance, since it is tested negative in cases of apical periodontitis, differently from cases of nasopalatine duct cysts. The patient, a 48-year-old women with swelling in the palate and in the anterior gutter area, feeling acute pain surrounding maxillary central incisors, sought the Endodontic Clinic where she was meticulously examined

and submitted to radiographic examinations. Clinical examination revealed absence of pulp vitality, and radiographs showed a radiolucent area appearing symmetrically on both sides of the midline, which could have been an endodontic lesion or a NPDC. During endodontic treatment, a communication between the root canal and the periapical lesion was observed, suggesting it might be an endodontic problem. Root canal treatment was performed and after eight months of follow-up it was possible to observe the periapical lesion was under process of repair. This case evinces the importance of an accurate differential diagnosis of AP and NPDC to lead to a suitable treatment and favor periapical tissue repair.

**Keywords:** Oral diagnosis. Endodontics. Periapical periodontitis. Nonodontogenic cysts.

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## Introductions

Endodontic treatment is a necessary procedure when the root canal is infected, has lost its function and/or contains diffused inflammation throughout the osseous tissue that forms periapical lesions.<sup>1</sup> However, during diagnosis of apical periodontitis (AP) it must be established whether the lesion is of endodontic or nonendodontic origin to avoid iatrogenic canal treatment, retreatment or unnecessary extractions.<sup>2</sup> The sources available for diagnosis are patient's dental/medical history, clinical examination, pulp vitality analyses, radiographic examination, and histopathological assessment.<sup>3</sup>

There are many periapical lesions of nonodontogenic origin that can imitate the radiographic view of inflammatory odontogenic lesions.<sup>4-6</sup> Nasopalatine duct cyst (NPDC) is one of the most common developmental nonodontogenic cysts of oral cavity, which accounts for 1.3% to 4.2% of cases.<sup>7,8</sup> Those cysts are situated near or over incisive canals, just behind maxillary central incisors, and can be seen on radiographs in close relationship to the apices of maxillary anterior teeth, which can be misdiagnosed as inflammatory periapical lesions.<sup>9-11</sup> Clinically, NPDC presents slow and asymptomatic growth usually discovered during clinical/radiographic examination,<sup>12,13</sup> with teeth adjacent to these lesions presenting with pulp vitality.<sup>14</sup> In some cases, manifestations such as pain, swelling of the anterior palate, response to palpation of buccal and palatal structures, pus drainage, and tooth movement might occur.<sup>15,16</sup>

In radiographic examination, a well-defined oval radiolucency can usually be seen in the maxillary midline or between the apices of central incisor roots.<sup>8,11</sup> In some cases, root resorption may also occur.<sup>17</sup> Suitable treatment for nasopalatine duct cysts is surgical enucleation combined with histopathological evaluation.<sup>8,18</sup> In some cases, variations of clinical characteristic and symptoms previously described in the literature can mislead the diagnosis, and this is a situation that has been commonly reported in previous case reports.<sup>19,20</sup>

The present study aims to report a clinical case in which the periapical lesion had similar radiographic characteristics to those of NPDC, in addition to clinical tumefaction in the anterior region of the

maxillary arch. Prognosis suggested potential surgical intervention and absence of pulp vitality, thus revealing the necessity of endodontic treatment.

## Case report

The patient, a 48-year-old women, sought help at the Endodontic Clinic of Bauru School of Dentistry, complaining of pain and swelling in the palate and in the anterior gutter area surrounding maxillary central incisors (Fig 1). There was no history of trauma or pain in adjacent teeth and the patient sought help only because she was in pain at the time. Pain was not associated with teeth (#14, #21 and #22) that did not respond positively to heat, cold and pulp cavity vitality tests. Swelling was firm to palpation, sessile, and measured about 2x2cm both in the aforementioned gutter region and the palate. Radiographic examination indicated a heart-shaped radiolucent area, appearing symmetrically on both sides of the midline (Fig 2).

Due to absence of pulp vitality, endodontic treatment was performed in teeth #14, #21 and #22, and during the appointments, the lesion was regularly monitored for eight months. During treatment of tooth #21, a communication between the root canal and the radiolucent area was observed, and the lesion was traced by means of the triangular technique of Bramante and Berbet<sup>19</sup> (Fig 2).

The tracing technique indicated that the lesion was located centrally on the midline. Furthermore, tooth #21 required extensive pus drainage, with the use of formocresol medication between sessions to allow the purulent content to drain. Final radiographic examination of anterior teeth showed relative reduction of the lesion as may be observed in Figure 3A, image captured on the day the canal was filled.

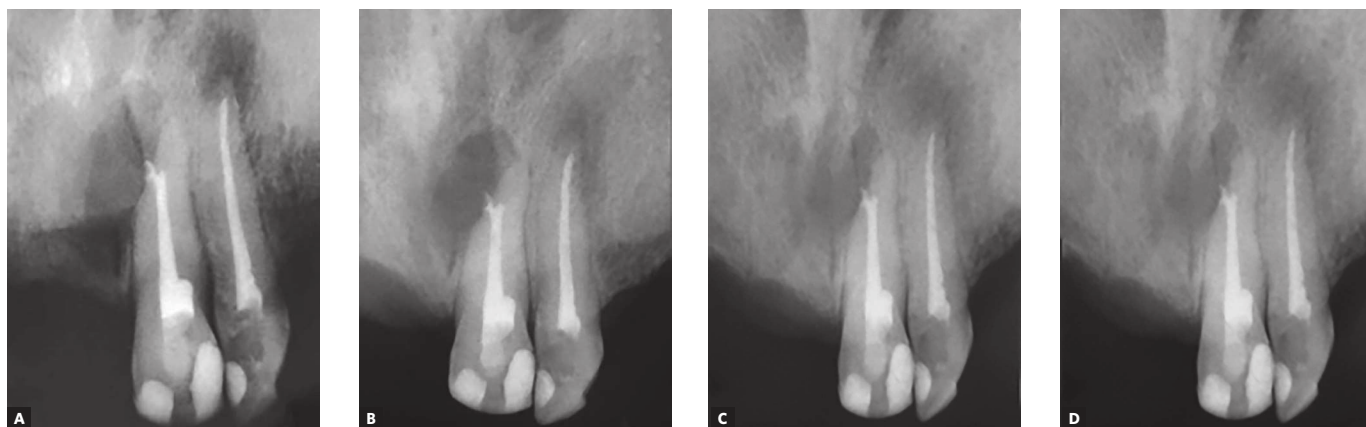
Although Figure 3 shows relative regression of the radiolucent area, the possibility of a NPDC superimposed over an endodontic lesion was monitored. Therefore, the patient was examined on a weekly basis until treatment of tooth #14 was concluded, and monthly control was performed by means of radiographic examination of the anterior maxilla. Both clinical and radiographic conditions after eight months of control may be observed in Figures 3B, 3C, 3D, and Figure 4.



**Figure 1.** Patient's clinical photograph. Intra-oral edema can be seen in the anterior region of the maxilla.



**Figure 2.** Bramante and Berbert's technique used to trace radiolucent image of the periapical lesion: **A)** mesioradial radiographic image; **B)** orthoradial radiographic image; and **C)** distoradial radiographic image.



**Figure 3.** Clinical control, periapical radiographs: **A)** radiographic image after root canal filling; **B)** mesioradial radiographic image after eight months of control; **C)** orthoradial radiographic image; **D)** distoradial radiographic image. The beginning of periapical healing is seen when compared with initial radiograph.



**Figure 4.** Clinical image after eight months of control: edema and symptoms disappeared completely from the anterior region of the maxilla.

## Discussion

Accurate diagnosis of periapical lesions is important to avoid unnecessary interventions, and depends on various sources of information, such as patient's dental/medical history; clinical examination; radiographic examination, and histopathological confirmation. Patient's history reported herein brings to light the history of pain, time of duration of lesion, and potential causal factors - essential for identifying the causes of lesion. Clinical and pulp vitality examinations are the most important for diagnosis, as both reveal the present condition of the tooth and pulp organ. Additionally, radiographic examination is a useful tool to investigate the anatomy of the area and extent of lesions, thus providing important information for planning endodontic treatment. The interpretation of x-rays requires special attention, since possible superimposition of structures may impose limitations on making an accurate diagnosis. Histopathological assessment is an additional investigation required when none of the aforementioned examinations are sufficient to enable a reliable conclusion. Microscopic techniques are used in histopathology to analyze root canal and/or periapical lesion contents and, therefore, determine the origin of lesions.

Although there are many sources available for investigation, misdiagnosis of nonendodontic periapical lesions commonly occurs, as found in the literature.<sup>3,20,22</sup> This highlights the importance of a thorough

investigation of the causes of periapical lesions. Despite finding a great deal of material describing lesions from their radiographic aspects,<sup>23</sup> variations of these characteristics are common and can mislead diagnosis.<sup>24</sup> In addition to radiographic examination, endodontic diagnosis also depends on patient's history, clinical examinations, and previous pulp tissue conditions, which may assist the dental clinician to reach a reliable diagnosis.

In the present case, a lesion was shown in the anterior maxilla, and consisted of swelling in the palate and anterior gutter area; no history of toothache; absence of pulp vitality, and presence of pain in swollen areas. During radiographic analysis of this case, it was important to consider the diagnosis of nasopalatine duct cyst (NPDC), the second most common nonendodontic periapical lesion reported in the literature.<sup>25</sup> NPDC is a nonendodontic lesion that originates from epithelial proliferation of remnants of the nasopalatine duct. Its causes are uncertain, but associated with infection, trauma or idiopathic factors.<sup>26</sup> Superimposition of images on the apex of central incisors is common<sup>10,11</sup> and can result in inaccurate diagnosis and improper treatment.<sup>18,20,27</sup> Furthermore, radiographic examination of the present case showed a well circumscribed, heart-shaped lesion, centrally located on the midline, thus suggesting a potential case of NPDC.<sup>3</sup> However, absence of pulp vitality was a strong trace of endodontic lesion, as well as of dentoalveolar abscess, periapical



granuloma, and other lesions related to the root canal.<sup>20,22</sup> Therefore, associating the clinical examination with patient's dental/medical history and pulp vitality assessment was sufficient to indicate the need for endodontic treatment and further investigation of lesion regression.

As a result of clinical assessment, endodontic treatment was performed for teeth with unresponsive pulp tissue, showing an extensive collection of purulent pus in the central incisor (tooth #21), which was connected to the periapical lesion revealed by radiographic examination. After instrumentation and drainage of pus from tooth #21, formocresol medication was used to combat infection in the area and allow future pus accumulation to be drained through the root canal. Tooth #21 was monitored weekly until pus was completely drained and symptoms had disappeared. The root canal and the periapical lesion were monitored clinically and radiographically until there was no sign of infection, then the canal was filled and the periapical lesion continued to be investigated. Although an endodontic lesion was detected, the suspicion that there was NPDC was not discarded, since both lesions could be present at the same area. The diagnosis that it was an AP of endodontic origin was reinforced during follow-up because of absence of purulent pus collection, communication between root canal and the apical lesion, and reduction in the size of apical radiolucency.

During endodontic treatment, the apex of the central incisor (tooth #21) was also observed to be about 5mm from the tooth apex. This anatomical variation is common and essential to determine the apical extent of instrumentation during the treatment.<sup>28,29</sup> Moreover, this characteristic of the central incisor apex may have contributed to forming an apical lesion that mimicked an NPDC, since the apex had directed all dead pulp

tissue to a central area, thus causing an AP that was centrally on the midline. Therefore, the aforementioned evidence found during endodontic treatment was relevant to minimize the concern about the potential presence of an NPDC.

All in all, the sources of information available to reach a reliable diagnosis of periapical lesions are: patient's history, pulp vitality tests, radiographic assessment, and histopathological examination. In the present case, the authors used all the aforementioned techniques except for histopathological confirmation, which was not recommended, since the other sources indicated the need for root canal treatment. Histopathological assessment is the only examination able to reach the diagnosis of NPDC, however, it was avoided in this case due to being considered an invasive procedure and because patient's progress indicated regression of the lesion, thus reducing the evidence pointing to an NPDC. However, if the patient had persistently presented swelling and a radiolucent spot in periapical radiographs, further investigation with surgical procedure to remove the lesion and to have histopathological assessment carried out would have been necessary for an accurate diagnosis. Therefore, dental surgeons should diagnose periapical lesions based on more than one available source of information and on patient's progress in order to determine whether further investigation and procedures are necessary or not.

In conclusion of the present case report, a correct differential diagnosis between AP and NPDC was crucial for planning an appropriate treatment that favored periapical tissue repair. The probable diagnosis of the present case was AP, however, a long-term follow-up was essential to enable complete assessment of periapical healing.

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