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Case Report

Nasopalatine duct cyst associated with dental implant treatment:
A case report

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ABSTRACT

Maxillary anterior implants are associated with the risk of nasopalatine canal damage. Here we present the case of a 37-year-old man who developed a nasopalatine duct cyst after maxillary implant placement. The patient received an implant 3 months after the extraction of a fractured maxillary right central incisor. At a maintenance visit 9 years after the procedure, he complained of swelling and mild pain in the palatal region of the implant. A panoramic radiograph and computed tomography (CT) scan revealed a large, well-circumscribed, periapical radiolucency surrounding the apical portion of the implant and extending to the nasopalatine duct. We removed the entire lesion without removing the implant. Histopathologic examination of the resected specimen revealed a nasopalatine duct cyst. Accidental contact with the nasopalatine canal during implant surgery may have led to the development of the nasopalatine duct cyst. Careful planning using a preoperative CT scan prior to implant placement may prevent such complications.

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1. Introduction

Dental implants are considered to play an important role in modern dental care and oral rehabilitation. In the maxillary anterior region in particular, implantation has to be considered carefully because of challenges related to aesthetic, phonetic, and functional needs. It is necessary to plan implant positioning after careful preoperative assessments. The maxilla, which contains the nasopalatine duct in the anterior palate, has an inherent unique anatomy in that region. Therefore, it is sometimes necessary to position dental implants in the anatomic space that is quite close to the nasopalatine canal. There are only a few reports on postoperative complications caused by damage to the nasopalatine duct during implant placement [1–4]. Here we report the case of a 37-year-old man who developed a nasopalatine duct cyst after dental implant placement in the maxillary central incisor region.

2. Presentation of case

In October 2005, a 37-year-old male with a complaint of mobility in his maxillary right central incisor after a bike accident visited a general dental practitioner. The tooth was found to have a fractured root and required extraction. After consultation regarding various prosthetic treatment options, the patient opted for dental implant treatment. After the patient had a 3-month healing period, a dental implant (Brånemark System Mk III TiUnite, Nobel Biocare, Gothenburg, Sweden) was placed in healthy, dense bone according to the manufacturer's instructions. After the patient had approximately 6 months of submerged healing, a permanent prosthesis was fixed on the implant.

No abnormalities were detected at the patient's quarterly maintenance visits after the implant procedure; however, at a maintenance visit in June 2014, the patient complained of swelling and mild pain in the palatal region of the implant. Clinical examination revealed swelling and erythema in this region. In July 2014, the patient was referred to our hospital for further evaluation of this swelling (Figure 1).

A panoramic radiograph revealed a large, well-circumscribed, periapical radiolucency measuring 11.3 × 11.6 mm in diameter and surrounding the dental implant (Figure 2A). A computed

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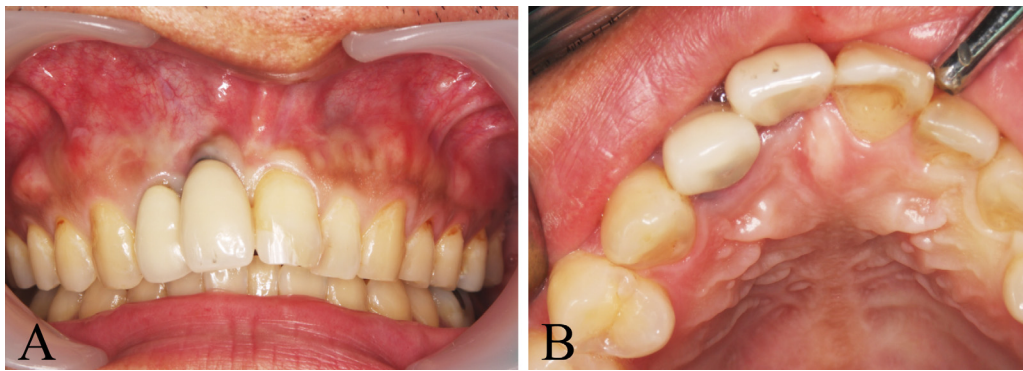


Figure 1. (A) An intraoral photograph of the labial aspect at the first visit intraoral labial examination reveals an obvious swelling around the dental implant in the maxillary right central incisor region. (B) An intraoral photograph of the palatal aspect at the first visit intraoral examination reveals a swelling in the nasopalatal region between the maxillary right and left central incisors.

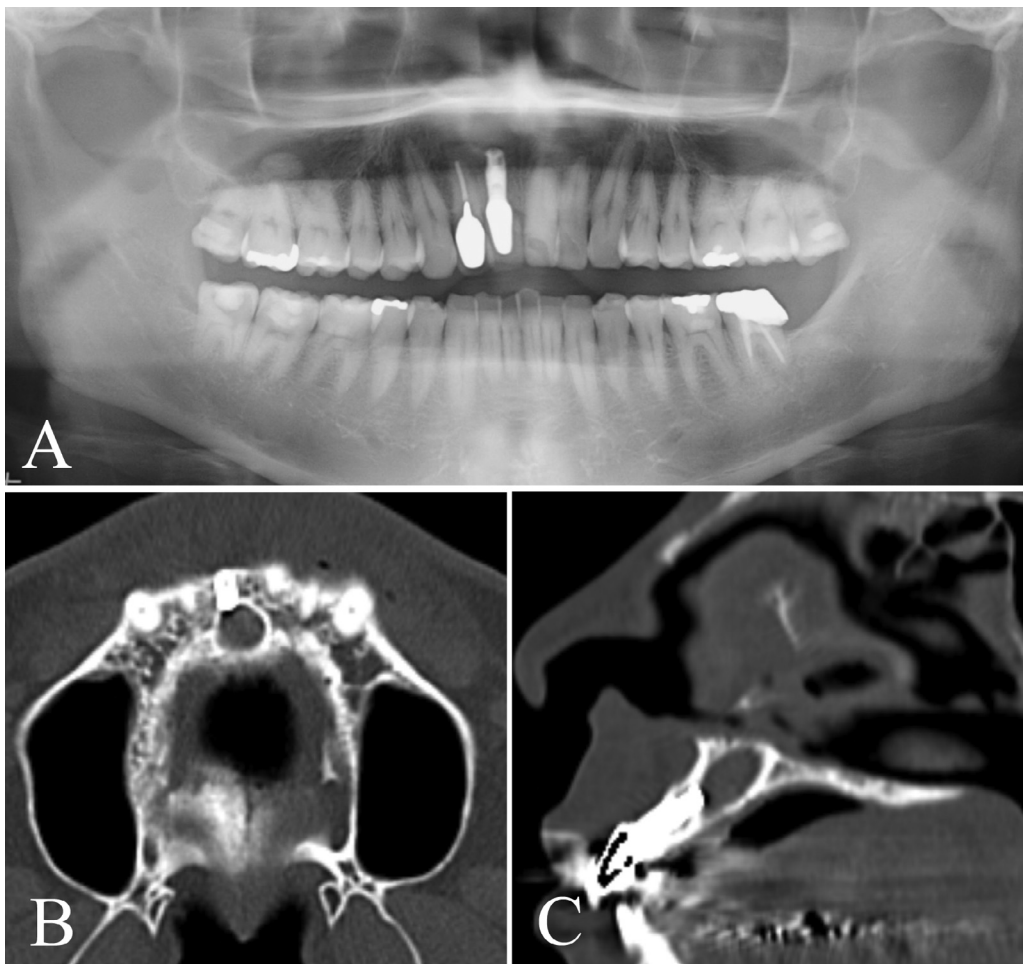


Figure 2. (A) A panoramic radiograph reveals a large, well-circumscribed, periapical radiolucency surrounding the dental implant. (B, C) A computed tomography scan reveals a hypointense cystic lesion measuring approximately $17 \times 12 \times 8$ mm, which is surrounding the apical portion of the implant and extending to the nasopalatine duct.

tomography (CT) scan confirmed a cystic lesion measuring $17.0 \times 11.8 \times 8.4$ mm in diameter, surrounding the implant apex, and extending to the nasopalatine duct (Figure 2B,C). Almost the entire implant was located in the alveolar bone, which showed no radiolucent areas. This suggested that osseointegration was complete.

We decided that early removal of the cyst was necessary because of the swelling and mild spontaneous pain. The implant was immobile, with no signs of peri-implant bone resorption. Therefore, we decided to remove the entire lesion but not the entire dental implant. In July 2014, the patient underwent cystectomy under local anesthesia. A crevicular incision was placed and a palatal

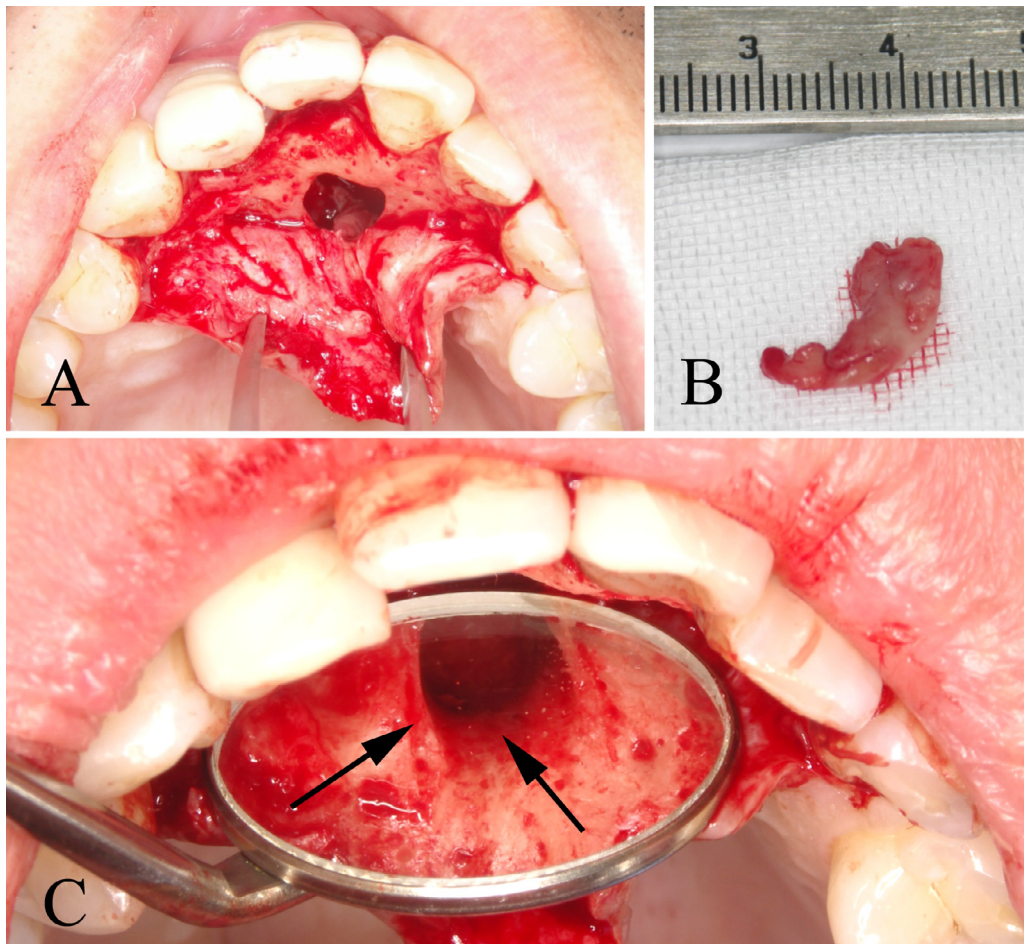


Figure 3. (A) A crevicular incision is placed and a palatal flap is raised. The cystic lining and contents are removed and the lesion is completely enucleated. (B) The surgical specimen demonstrates that the nasopalatine neurovascular bundle is continuous with the lesion. (C) The arrows indicate the apical portion of the implant in the fossa after cystectomy.

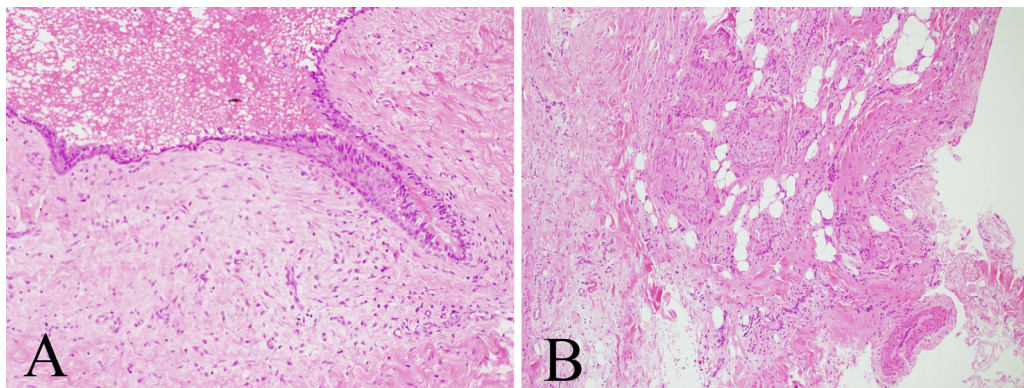


Figure 4. Histopathologic examination of the excised specimen. (A) Cyst wall is lined with stratified squamous epithelium or columnar epithelium. (B) Large vessels and nerves are observed within the cyst wall.

mucoperiosteal flap was elevated. Removal of cystic lining and contents and complete enucleation of the lesion followed, exposing areas of the implant apex (Figure 3). The wound was closed by repositioning of the palatal flap, and no bone grafting was performed to fill the defect.

Histopathologic examination of the excised specimen revealed that the cyst wall was lined with either stratified squamous epi-

thelium or columnar epithelium (Figure 4A). The cyst wall consisted of fibrous connective tissue, and relatively large vessels and nerves were observed within it. There were no signs of inflammatory cells (Figure 4B). Therefore, on the basis of the clinical and histopathologic findings, the lesion was diagnosed as a nasopalatine duct cyst that developed in association with dental implant placement.

3. Discussion

Nasopalatine duct cysts are developmental, epithelial, non-neoplastic cysts and are considered to be the most common type of nonodontogenic cysts [5,6], constituting approximately 1%–11.6% of all jaw cysts [5,7,8,9]. These lesions manifest mainly between the fourth and sixth decades of life [10,11]. They are more common in men than in women [6,8,10,11]. Radiologically, the lesions manifest as well-demarcated radiotransparencies and are located on or close to the midline of the upper maxilla. On plain radiography, lesions are predominantly rounded or ovoid, with heart-shaped lesions being less prevalent. In addition, asymptomatic radiotransparencies measuring <6 mm in size are regarded as a nonpathologic enlargement of the incisor ducts [8]. The etiology of such cysts is unknown, although nasopalatine duct infection, trauma, and spontaneous occurrence are suspected contributors [12]. In the present case, the implant was placed in an ideal position from the prosthetic perspective. The nasopalatine duct may have been traumatized during the surgical procedure (which may have been due to the drilling for implant placement) because of the relatively anterior position of the duct.

This observation suggests that the three-dimensional position of the nasopalatine duct differs substantially among patients, in line with the results of one study [13]. Therefore, preoperative CT is a necessary and an effective way to assess the dimensions of the nasopalatine canal as well as the proximity of the neighboring anatomic structures. As a result, with sufficient planning, it is easy to secure implant surgery.

Casado et al. [14] reported the removal of a placed implant because of a cystic lesion that negatively affected osseointegration; furthermore, the presence of the implant in the lesion could cause secondary infection of the bone, possibly leading to the development of osteomyelitis [15,16]. Takeshita et al. [4] reported the successful treatment of a peri-implant lesion that involved a third of the implant. If the implant is immobile (with good osseointegration) and the periapical lesion has not caused much damage to it, the implant can be kept in place by resecting the lesion with only the involved segment of the implant [4,14]. Accordingly, in our case, we decided to remove only the lesion because the implant itself showed no signs of mobility or peri-implant bone resorption and because only a small part of the implant was exposed to the lesion. This result was possible because of our early consultation with the Department of Oral and Maxillofacial Surgery in our institution, soon after the detection of dental implant apical lesion during the routine follow-up.

Complete bone formation after excision of nasopalatine duct cysts is not possible because the nasopalatine canal exists in the vicinity of the implant; therefore, the radiolucency will remain on CT scans [4]. We believe that no further surgical restoration will be required if there are no further clinical problems with the implant. Enucleation is usually curative; therefore, no further surgical treatment is planned with regard to the cyst, unless the implant shows evidence of a clinical problem. In fact, until our last follow-up, the patient had no problems with regard to implant function. Nonetheless, a thorough follow-up is necessary, including assessment of the clinical condition of the implant and the state of the surrounding bone.

4. Conclusions

The case presented in this article shows that a nasopalatine duct cyst can develop after surgical implant placement in the maxillary anterior region. Ideally, maxillary anterior implant placement should be performed with utmost care to avoid damage to the nasopalatine canal. If the proximity of the central incisors and incisor ducts is expected at the preoperative 2D radiograph assessment, it is necessary to confirm the position of the incisor ducts in CT or cone beam computed tomography scan imaging.

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Conflict of interest

The authors declare there are no conflicts of interest.

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