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## SECTION 5. MEDICINE, LIFE-SCIENCE, BIO-MEDICINES

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### Masoud Kiani, Pankevych A.I., Hohol A.M., Kolisnyk I.A. Surgical Management of Nasopalatine Duct Cyst: A Case Report

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**Abstract.** Nasopalatine duct cyst (abbreviated NPDC) is one of many pathologic processes that may occur within the jaw bones, but it is unique in that it develops in only a single location, which is the midline anterior maxilla [1,2,4].

Nasopalatine duct cysts are the most common non-odontogenic cysts of the mouth, representing up to 1% of all maxillary cysts [5]. These lesions are almost three times frequent in males than in females [6]. The maximum prevalence is between 45 and 60 years of age [7], often mistaken for an enlarged nasopalatine duct, NPDCs are of uncertain origin.

The spontaneous proliferation theory appears to be the most likely explanation (a number of studies have reported cystic degeneration in the incisor duct and on the midline of the palate in human fetuses) [8].

NPDCs are normally asymptomatic, constituting casual radiological findings, though sometimes (in 17% of cases) patients report pain due to the compression of structures adjacent to the cyst, particularly when the latter becomes overinfected, or in patients who wear dentures that compress the zone. The more caudal the location of the cyst, the sooner symptoms appears [3,7,15].

In terms of histopathology the epithelium of cysts is very diverse and includes a combination of stratified, squamous, non-keratinized epithelium, false stratified columnar epithelium, stratified columnar epithelium and simple cubic epithelium [8,12]. The connective wall of cyst may contain nasopalatine vessels and nerves as well as the glandular structures [6,15].

The appropriate treatment for these cysts can be enucleation and in order to prevent damage to the nasopalatine nerve the enucleation is done from the side of the palate [4,11].

If the cyst is large and there is a risk of loss of teeth vitality or creation of a nasal fistula in the mouth and sinus, the surgeon may choose the marsupialization method [7,13].

The rate of recurrence of this lesion has been reported 2-30% and malignant changes have also rarely been reported [1, 2, 13, 14].

Here we report the case of a 28-year- old male who developed a nasopalatine duct cyst in the

maxillary central incisor region.

The aim of this study was to highlight the clinical presentation to describe the radiographic and pathological findings and to discuss surgical management of this entity.

A 28-year-old male with a complaint of an asymptomatic, nodular swelling located on the palate between the maxillary right and left central incisors since 6 months came to the Surgical Dentistry Department of Poltava Regional Clinical Stomatological Polyclinic. The swelling was associated with a dull aching intermittent pain.

Extraorally there was no detectable abnormality or lymphadenopathy. Intraoral examination revealed a well defined oval shaped bluish swelling measuring approximately 12×15 mm, located posterior to the palatine papilla in the midline. The swelling was fluctuant and non-tender.

**Keywords:** Nasopalatine duct cyst (NPDC), non-odontogenic cyst, maxillae.

**Introduction.** Nasopalatine duct cyst (abbreviated NPDC) is one of many pathologic processes that may occur within the jaw bones, but it is unique in that it develops in only a single location, which is the midline anterior maxilla [1,2,4].

Nasopalatine duct cysts are the most common non-odontogenic cysts of the mouth, representing up to 1% of all maxillary cysts [5]. These lesions are almost three times frequent in males than in females [6]. The maximum prevalence is between 45 and 60 years of age [7], often mistaken for an enlarged nasopalatine duct, NPDCs are of uncertain origin.

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These normally manifest as an inflammatory process (46% of cases) that rarely produces facial asymmetry, since growth or expansion is intraoral (palatine). The more advanced cases are able to cause pain and itching [9]. This developmental cyst forms

in the nasopalatine duct, and appears on x-ray above the apices of the maxillary incisors. The cyst may overlap the roots of the teeth. It is usually asymptomatic and discovered on routine dental films where it appears as an oval or heart-shaped radiolucent lesion. Rarely this cyst will expand the overlying mucosa. The nasopalatine duct cyst rarely becomes large enough to destroy bone, therefore, no surgical treatment is necessary for an asymptomatic small cyst. If the cyst shows signs of infection or shows progressive enlargement, then surgical intervention may be warranted. Treatment in majority of cases involves complete surgical removal as soon as possible after diagnosis. A relapse rate of up to 30% has been reported [6,10,11].

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Here we report the case of a 28-year-old male who developed a nasopalatine duct cyst in the maxillary central incisor region.

Purpose of the Study. The aim of this study was to highlight the clinical presentation to describe the radiographic and pathological findings and to discuss

surgical management of this entity.

**Case Report.** A 28-year-old male with a complaint of an asymptomatic, nodular swelling located on the palate between the maxillary right and left central incisors since 6 months came to the Surgical Dentistry Department of Poltava Regional Clinical Stomatological Polyclinic. The swelling was associated with a dull aching intermittent pain.

Extraorally there was no detectable abnormality or lymphadenopathy. Intraoral examination revealed a well-defined oval shaped bluish swelling measuring approximately 12×15 mm, located posterior to the palatine papilla in the midline. The swelling was fluctuant and non-tender (Figure 1).



**Figure 1.** A swelling, almost 1cm in diameter in the nasopalatal region between the maxillary right and left central incisors.

Panoramic radiography, occlusal cross-sectional of the maxillary and periapical of the maxillary anterior teeth revealed a single radiolucency, unilacunar, heart shaped with a well defined, regular and cortical border in the anterior and in the midline that was approximately extended to the periapical region of the second premolar tooth on both sides.

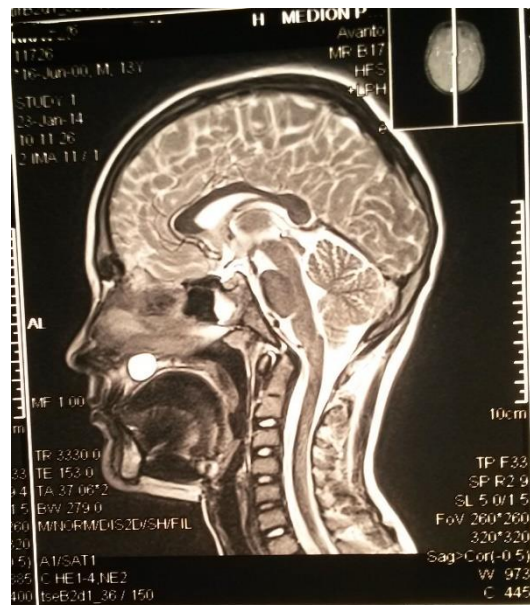
The lesion had been extended to left and right nasal cavities. In the intra-oral images lamina dura is not seen around the anterior teeth and apex resorption of the lateral tooth root of the right incisor is evident. The central tooth of right incisor underwent the root canal therapy (RCT) (Figure 2).

In magnetic resonance imaging, (MRI) defined cystic formation size of 12×15 mm having a hyperintense signal on T<sub>2</sub> and hypointense on T<sub>1</sub>. Erosion is observed on the hard Palate, the floor of nasal cavity and anterior of maxilla. (Figure 3).

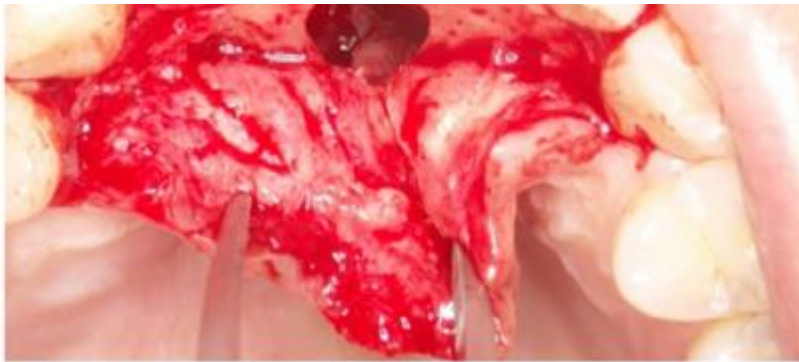
A clinical diagnosis of a nasopalatine duct cyst was made. Therefore, surgical excision of the lesion was proposed to the patient. The surgical intervention was carried out under local anesthesia by infraorbital block injection and infiltration with 4% Articain containing 1:100,000 epinephrine. Crevicular incision is given and the palatal flap elevated (Figure 4).



**Figure 2.** The lamina dura is not seen around the anterior teeth, and apex resorption of the lateral tooth root of the right incisor is evident. (White arrow).



**Figure 3.** MRI defined cystic formation size of 12×15 mm having a hyperintense signal on T<sub>2</sub> and hypointense on T<sub>1</sub>. Erosion is observed on the hard Palate, the floor of nasal cavity and anterior of maxilla.



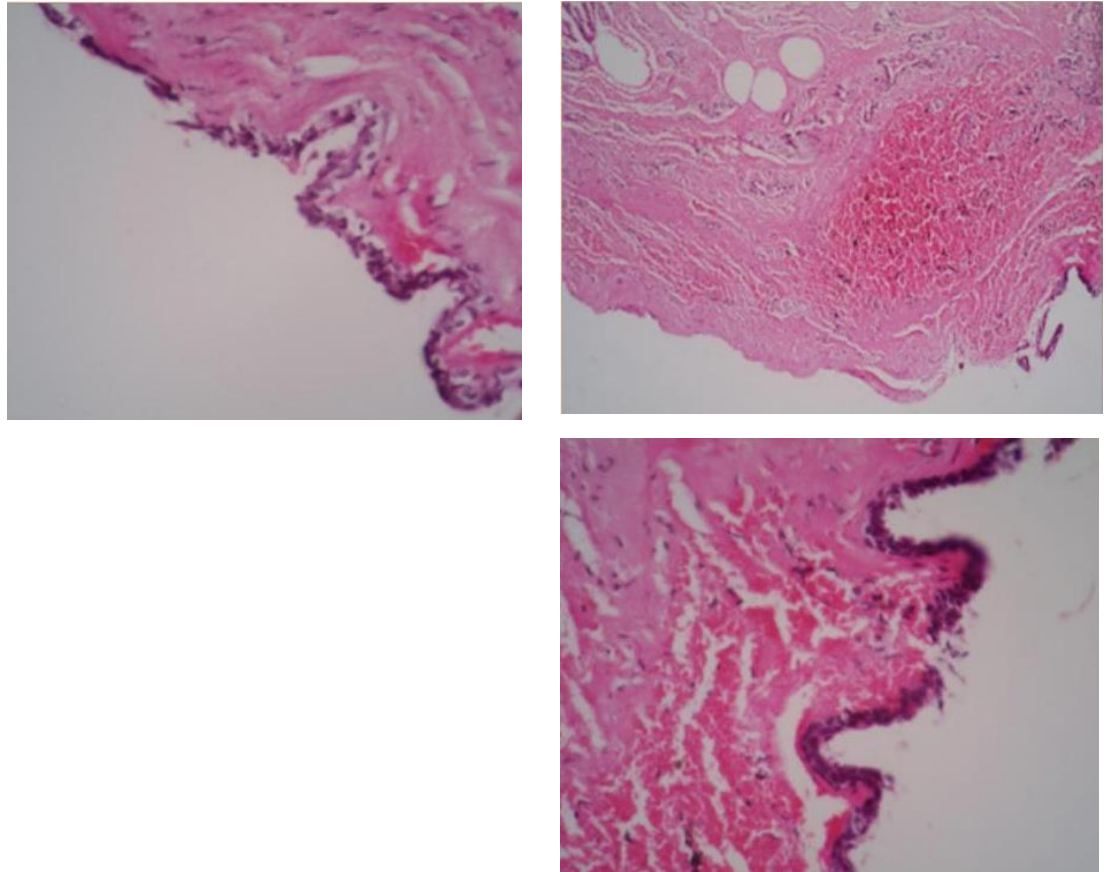
**Figure 4.** A crevicular incision is placed and a palatal flap is raised. The cystic lining and contents are removed and the lesion is completely enucleated.

The lining of the cyst was removed and the specimen was subjected for histopathological examination (Figure 5).



**Figure 5.** The surgical specimen demonstrates that the nasopalatine neurovascular bundle is continuous with the lesion.

In a microscopic examination, cyst epithelium can be seen from stratified, squamous to simple cubic. In the lower connective wall the average Infiltrates of the chronic inflammatory cells of lymphocyte, plasma cell, and histiocyte and some acute neutrophilic inflammatory cells as well as nervous bundle sections, arteriole and vein are visible. The final diagnosis was a nasopalatine duct cyst (Figure 6).



**Figure 6.** Photomicrograph of nasopalatine duct cyst showing from stratified, squamous to simple cubic. Infiltration of the chronic inflammatory cells of lymphocyte, plasma cell, and histiocyte and some acute neutrophilic inflammatory cells as well as nervous bundle sections, arteriole and vein are visible.

Post surgical analgesic treatment was performed with 100 mg Nimesulide twice daily for 3 days. The patient had a soft diet for 3 days and oral hygiene instructions were provided.

**Discussion.** The nasopalatine duct cyst is a developmental, nonneoplastic cyst that is the most common of the non-odontogenic cysts of the oral cavity, occurring in about 1% of population. Most studies show a higher incidence of nasopalatine duct cyst among males than females with the ratio being 1.7: 15. The age distribution is broad, with most cases being discovered in the fourth through sixth decade [3,4,7]. In spite of being a developmental cyst, it is rarely seen in the first decade of life.

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Nasopalatine cysts are believed to develop from epithelial remnants of paired embryonic nasopalatine ducts within the incisive canal [2].

The stimulus for cyst formation from the epithelial remnants of the nasopalatine canal is uncertain, although trauma and bacterial infection are thought to have a role. It has also been suggested that the mucous glands within the lining may cause cyst formation as a result of mucin secretion.

Most of these cysts are asymptomatic or cause such minor symptoms that they are tolerated for very long periods. Usually patients complain of a small asymptomatic swelling just posterior to palatine papilla. If the cyst is near the surface the swelling will be fluctuant and blue. The deeper cyst is covered with normal appearing mucosa which may be ulcerated due to masticatory trauma [11,13,15]. In some cases, the swelling may occur in the midline on the labial aspect of the alveolar ridge and in some patients through and through fluctuation can be palpated between the labial and palatal swellings. The cyst may produce bulging of the floor of nose. In various cases, the swelling is associated with a burning sensation, numbness over the palatal mucosa and pain as a result of pressure on the nasopalatine nerves. Various combinations of swelling, discharge and pain may occur.

Discharge may be mucoïd, in which case the patients describe a salty taste, or it may be purulent and the patients may complain of a foul taste. Displacement of teeth is a rare finding.

Even though definitive diagnosis of a nasopalatine cyst is more easily made on plain films, other advanced imaging modalities such as magnetic resonance imaging are being used to differentiate this entity from other lesions. MRI findings of a nasopalatine cyst reveal a midline location, smooth expansion with sclerotic margins [10.15].

As the incisive canal and foramen may normally vary greatly in size, the clinician may have some difficulty in distinguishing between a large incisive foramen

and a small asymptomatic incisive canal cyst on the basis of radiographic evidence alone. Some clinicians follow the rule of thumb that radiolucencies of the incisive canal measuring less than 0.6 cm in diameter should not be considered cystic in the absence of other symptoms.

A radicular cyst or a granuloma associated with the central incisor should also be considered in differential diagnosis as these entities may be similar in appearance to an asymmetric NPDC. The presence or absence of the lamina dura and enlargement of the periodontal ligament space around the apex of the central incisor indicates an inflammatory lesion. NPDC and radicular cysts can also be differentiated by taking a second periapical view at a different horizontal angle, which show an altered position of the image of a NPDC, whereas a radicular cyst should remain centered about the apex of involved tooth [2].

A vitality test of the regional teeth may also be useful. Nasopalatine cysts are usually treated by enucleation, in case of large cysts, marsupialization may be considered before definitive enucleation. Recurrence rate ranges from 0 % to 11%.

**Conclusions.** Nasopalatine duct cysts occur in approximately 1% of the population with mean age of 42.5 years. The lesions may be asymptomatic or may manifest as swelling, pain, and drainage from the hard palate. A well-circumscribed, round, ovoid, or heart-shaped radiolucency is seen on radiograph. Enucleation is the preferred treatment with low recurrence rates.

**Perspective for Further Research.** Further studies involve the use of biological substitutive materials for filling bone defects. Comparison of healing time and quality of new bone will allow to offer the best technique.

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