Development of Nasopalatine Duct Cyst in Relation to Dental Implant Placement

Hashem Motahir Al-Shamiri, Samir Elfaki¹, Sadeq Ali Al-Maweri¹, Nader Ahmed Alaizari¹, Bassel Tarakji¹

Departments of Oral and Maxillofacial Surgery and ¹Oral Medicine and Diagnostic Sciences, Al-Farabi Colleges, Riyadh, Saudi Arabia

Abstract

Background: Dental implantation is considered as one of the most widely employed procedures in dental practice. Nasopalatine duct cyst (NPDC) is one of the most common developmental cysts in the oral cavity that develops from the proliferation of embryological epithelial remnants of nasopalatine duct. Aim: The aim of this study was to highlight the development of NPDC after the placement of dental implants. Materials and Methods: A literature search was carried out in March 2015 using PubMed, EMBASE, and Cochrane library databases, searching for articles relating the development of NPDC after placement of dental implants. Results: Our search identified only four case reports of NPDC related to dental implants as reported in the literature published in English. Conclusion: Placement of dental implants can induce development of NPDCs, indicating that placement of dental implants requires well-trained specialists with perfect skills in dental implantology. Additionally, critical selection of appropriate cases is of great importance in order to avoid the development of such complications.

Keywords: Dental implant, nasopalatine duct cyst (NPDC), nonodontogenic cyst

Address for correspondence: Dr. Hashem Motahir Al-Shamiri, Department of Oral and Maxillofacial Surgery, Al-Farabi Colleges, Riyadh, Saudi Arabia. E-mail: hashem_alshamiri@yahoo.com

Introduction

Dental implantation is considered as one of the most widely employed procedures in dental practice. Even though biocompatible osseointegrated dental materials are used for fabrication of dental implant, some complications correlated with dental implants may occur.[1] Moreover, placement of dental implants in the maxilla may be complicated by certain anatomical landmarks such as the nasopalatine duct, maxillary sinus, and nasal cavity.[2] This may jeopardize the surgical osteotomy preparation.[3,4]

Nasopalatine duct cyst (NPDC) is an intraosseous developmental nonodontogenic cyst in the midline of the anterior palate. It is one of the most common developmental cysts in the oral cavity.[5] It develops from the proliferation of embryological epithelial remnants of nasopalatine duct.[6] It represents about 1% of the maxillary cysts.[5,7] The etiology of NPDC is unknown, but the possible causes may include local trauma, infection, and spontaneous proliferation.[8] The cone beam computerized tomography (CBCT) with its potential for 3D CT-based surgical planning and measurement helps in the evaluation of the nasopalatine canal dimensions before any surgical procedures in this region.[9] It has been reported that CBCT is superior to the conventional CT in that it reduces the size of the

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Al-Shamiri HM, Elfaki S, Al-Maweri SA, Alaizari NA, Tarakji B. Development of nasopalatine duct cyst in relation to dental implant placement. North Am J Med Sci 2016;8:13-6.
irradiated area of the patient and it has higher image accuracy.[10]

The aim of this study was to highlight the development of NPDC after the placement of dental implants.

**Materials and Methods**

A literature search was carried out in March 2015 using MEDLINE, accessed via the National Library of Medicine PubMed Interface, EMBASE, and Cochrane library databases, searching for articles, published in English, relating the development of NPDC after the placement of dental implants. We used a combination of the following keywords: Nasopalatine duct cyst, nonodontogenic cyst, developmental cyst, and dental implants. The search was limited to articles published during the past 20 years. We also used the “related article feature” of PubMed to identify further references of interest within the primary search. These references were obtained, and their bibliographies and pertinent secondary references were also identified and acquired. This process was repeated until no further new articles could be identified. The abstracted literature was reviewed.

**Inclusion criteria**

All evaluated studies should involve the occurrence of NPDC in relation to the dental implant placement.

**Exclusion criteria**

All studies that do not support the occurrence of NPDC after the placement of dental implants should be excluded.

**Results**

Only four articles were identified related to the occurrence of NPDC after the placement of dental implants in the literature published in English. All of these articles were case reports [Table 1]. Table 1 demonstrates some details about each case that included preoperative radiographs, preoperative condition of the site of implant placement, type of the implant used (either immediate or delayed), the period from placement of implant till discovery of the lesion, cyst treatment, and the postoperative clinical outcomes.

**Discussion**

NPDC is more common in males than in females (3:1).[11-13] Although the etiology of NPDC is not clear as yet, it may result from spontaneous proliferation of embryonic tissues remnants. Also, it has been attributed
to some factors including local trauma, poorly fitting dentures, and local infection.\cite{12,14} NPDC is usually asymptomatic and it appears radiographically as a heart-shaped radiolucency due to the superimposition of the nasal spine and the resistance of the adjacent roots.

As a treatment protocol, marsupialization alone may be sufficient in small lesions, but in case of large lesions marsupialization should be followed by cystectomy and autogenous bone grafting.\cite{12}

To our knowledge, this is the first review reporting NPDC cases after the placement of dental implants. McCrea\cite{15} reported a case of NPDC in a close proximity to a dental implant. No any pathological conditions were detected in the medical history of the patient. The author clarified that the implant presented a formally successful osseointegration. The bone on the implant surface was not lost due to infection, but as a by-product of the expansive nature of the NPDC in that area. The author proposed that with the removal of this expansive force induced by the NPDC, the bone-implant contact could be restored, though he did not explain clearly the possible relation between the formation of NPDC in reference to the placement of dental implant.

Takeshita et al.\cite{2} reported a case of a 45-year-old male patient, who received an implant in the maxillary left central incisor due to root fracture. Unfortunately, an asymptomatic oval-shaped radiolucency surrounding the apical area of the implant was revealed, even though there was no special finding in the physical condition of the patient. This radiolucency was diagnosed later as the NPDC. The authors suggested that the nasopalatine duct was traumatized or at least part of the canal was anteriorly positioned during the osteotomy procedures for dental implant. They postulated that the previously mentioned trauma stimulated the development of the NPDC as indicated by Brode and Araiche.\cite{16}

Casado et al.\cite{17} reported a case of NPDC formation following the placement of an immediate dental implant. The immediate implant was placed after extraction of a tooth in an alveolus contaminated by prior endodontic infection, following careful curettage and debridement. They suggested that the placement of dental implant in the area with a preexisting infection could have facilitated the secondary bone infection.

Sivolella et al.\cite{18} reported a case of NPDC that occurred following the placement of two dental implants positioned 4 years after the teeth extraction without any previous local endodontic pathology or radiolucency. They concluded that the occurrence of NPDC maybe correlated with implant surgery, because surgery is considered a possible irritant cause.

**Conclusion**

From the literature, the development of NPDC following the placement of dental implant maybe related to some factors, such as local trauma during surgical procedures, which may traumatize the nasopalatine duct and the presence of infection at the time of implantation.

Therefore, critical selection of appropriate cases as well as the use of CBCT views to visualize the exact position of the nasopalatine duct is of great importance in order to avoid the development of such complications. Furthermore, the use of tapered implants in this region may be beneficial.\cite{19}

**Financial support and sponsorship**

No financial support for this study.

**Conflicts of interest**

The authors declare that there is no conflict of interests regarding the publication of this paper.

**References**

1. Olmedo DG, Paparella ML, Brandizzi D, Cabrini RL. Reactive lesions of peri-implant mucosa associated with titanium dental implants: A report of 2 cases. Int J Oral Maxillofac Surg 2010;39:503-7.
2. Takeshita K, Funaki K, Jimbo R, Takahashi T. Nasopalatine duct cyst developed in association with dental implant treatment: A case report and histopathological observation. J Oral Maxillofac Pathol 2013;17:319.
3. Artzi Z, Nemcovsky CE, Bitlitum I, Segal P. Displacement of the incisive foramen in conjunction with implant placement in the anterior maxilla without jeopardizing vitality of nasopalatine nerve and vessels: A novel surgical approach. Clin Oral Implants Res 2000;11:505-10.
4. Liddelow G, Klineberg I. Patient-related risk factors for implant therapy. A critique of pertinent literature. Aust Dent J 2011;56:417-26; quiz 441.
5. Escoda Francoli J, Almendros Marqués N, Berini Aytés L, Gay Escoda C. Nasopalatine duct cyst: Report of 22 cases and review of the literature. Med Oral Patol Oral Cir Bucal 2008;13:E438-43.
6. Nortjé CJ, Wood RE. The radiologic features of the nasopalatine duct cyst. An analysis of 46 cases. Dentomaxillofac Radiol 1988;17:129-32.
7. Swanson KS, Kaugars GE, Gunsoolley JC. Nasopalatine duct cyst: An analysis of 334 cases. J Oral Maxillofac Surg 1991;49:268-71.
8. Ely N, Sheehy EC, McDonald F. Nasopalatine duct cyst: A case report. Int J Paediatr Dent 2001;11:135-7.
9. Thakur AR, Burde K, Guttal K, Naikmasur VG. Anatomy and morphology of the nasopalatine canal using cone-beam computed tomography. Imaging Sci Dent 2013;43:273-81.
10. Scarfe WC, Farman AG, Sukovic P. Clinical applications of cone-beam computed tomography in dental practice. J Can Dent Assoc 2006;72:75-80.
11. Vasconcelos R, de Aguiar MF, Castro W, de Araújo VC, Mesquita R. Retrospective analysis of 31 cases of nasopalatine duct cyst. Oral Dis 1999;5:325-8.
12. Gnanasekhar JD, Walvekar SV, al-Kandari AM, al-Duwairi Y. Misdiagnosis and mismanagement of a nasopalatine duct cyst and its corrective therapy. A case report. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1995;80:465-70.
13. Elliott KA, Franzese CB, Pitman KT. Diagnosis and surgical management of nasopalatine duct cysts. Laryngoscope 2004;114:1336-40.
14. Velasquez-Smith MT, Mason C, Coonar H, Bennett J. A nasopalatine cyst in an 8-year-old child. Int J Paediatr Dent 1999;9:123-7.
15. McCrea SJ. Nasopalatine duct cyst, a delayed complication to successful dental implant placement: Diagnosis and surgical management. J Oral Implantol 2014;40:189-95.
16. Brode H, Araiche M. Nasopalatine cyst: Report of a case. J Oral Surg Anesth Hosp Dent Serv 1959;17:64-5.
17. Casado PL, Donner M, Pascarelli B, Derocy C, Duarte ME, Barboza EP. Immediate dental implant failure associated with nasopalatine duct cyst. Implant Dent 2008;17:169-75.
18. Sivolella S, Valente M, Gasparini E, Stellini E. Nasopalatine duct cyst as a complication of dental implant placement: A case report. Minerva Stomatol 2013;62:235-9.
19. Chatriyanuyoke P, Lu CI, Suzuki Y, Lozada JL, Rungcharassaeng K, Kan JY, et al. Nasopalatine canal position relative to the maxillary central incisors: A cone beam computed tomography assessment. J Oral Implantol 2012;38:713-7.