

Implant restorative procedure for a patient with funnel shaped nasopalatine foramen - A case report.

Sibi Shalma M¹, Geerthana J¹, Jayasurya G¹, R Lambodharan²

¹ Post graduate student, Department of Prosthodontics, CSI College Of Dental Sciences and Research, Madurai, Tamil Nadu.

² Professor and Head, Department of Prosthodontics, CSI College Of Dental Sciences and Research, Madurai, Tamil Nadu.

Abstract

Implant placement is a challenge in the anterior maxilla if the available bone is reduced and esthetics is challenging. The ideal implant position should be considered in all three dimensions: mesiodistal, apicocoronal, and orofacial. This article a case report for the anatomical and clinical perspective of implant placement bypassing the nasopalatine foramen (incisal canal) without any augmentation of the defect caused due to trauma. In this case report, conventional implant placement is followed with the existing anatomy without any augmentation due to the significant defect and the presence of scar tissue and 3.75 W/10.00 L implant (bone volume of 4 mm width and 11 mm length) have been placed. Radiographically, D2 bone quality was diagnosed. Before surgery, an emphasis was given over the proper implant selection to avoid oversized implants due to critical anatomical landmark. Careful and with minimal trauma, the soft tissue was managed and the implant was positioned correctly by utilizing the data from cone beam computerized tomography (CBCT) investigations. Since there was no reported swelling or numbness after 72 hours, the primary outcome was deemed satisfactory. Following a 24-week healing period, the patient has been called back for a permanent restoration.

Keywords: Dental implants, esthetics, nasopalatine foramen.

Address of correspondence: Sibi Shalma M, Post graduate student, Department of Prosthodontics, CSI College of Dental Sciences and Research, Madurai, Tamil Nadu

Email address: - sibishalma02@gmail.com

Phone no: 9003446222. **DOI:** 10.5281/zenodo.13367929

Submitted: -21-Jun-2024 **Revised:** 01-Jul-2024 **Accepted:** 15-Jul-2024 **Published:** 16-Aug-2024

Bibliographic details: Journal of Orofacial Rehabilitation Vol. 4(2), Aug 2024, pp. 46-51.

Introduction

Rehabilitation of the edentulous maxillary anteriors is very challenging because many factors affect the esthetics and function. The complicated premaxilla reconstruction necessitates careful and precise osteotomy planning due to the complex preexisting anatomy. During the post extraction phase, the high rate of maxillary resorption may be compromised through the retention of the prosthesis and surgical osteotomy preparation. ^[1] The crest of the alveolar ridge approaches the anatomic structures as bone resorption progresses. The crest of the ridge is where the nasopalatine contents arise as the anterior maxillary alveolus

migrates palatally.

Any trauma to the maxillary anterior region will result in bone defects, which makes implant surgery to replace the missing tooth even more difficult. Because of the Nasopalatine nerves and vessels, are close together, careful attention is required for placement of implant in the maxillary central incisors. ^[2,3]

- (a) a single canal;
- (b) two canals which are parallel;
- (c) variations of the Y type of canal, with two or more nasal openings (foramina of Stenson) and one oral/palatal opening (incisive foramen).

It is stated that the nasopalatine nerves and vessels are situated behind the maxillary central incisors in the palate's midline. The funnel shaped opening of incisive foramen, is in the anterior midline of the palate, is typically found directly below the incisal papilla. [4]

The Stenson foramina, which are one or two apertures on both sides of the septum, reflects the terminus of the canal at the nasal floor. In addition the way, the canal splits into two more canals. The terminals of nasopalatine nerve and the nasopalatine artery are situated in the canal, along with fat, fibrous connective tissue, and even microscopic blood vessels.

However, there is a shortage of literature regarding the variations in the anatomic nature of nasopalatine canal. The labial surface of a non resorbed ridge is 7.4 mm away from the average 4.6 mm wide nasopalatine foramen. The nasopalatine canal emerges through the incisal foramen (average length 8.1 mm). [5,6]

In this case report, the nasopalatine foramen has been bypassed for the implant placement because of the reduced bone density and complicated anatomy of the maxillary anterior region.

Case report

Following trauma, a 23-year-old male patient sought replacement of his anterior missing tooth. On clinical examination, the tooth missing is 21. Drifting of the adjacent teeth seen, making it challenging for the prosthetic replacement. The results of the clinical and radiographic examinations showed that the remaining teeth had no periapical pathology and were periodontally sound.

The patient was given an explanation of the various prosthetic treatment options. The patient's choice of treatment was a

fixed prosthesis with a dental implant. A complete medical history was documented along with the patient's case history. Additionally, a standard blood investigation, a dental and oral examination, and completed. Casts and impressions for diagnostic purposes were made.

CBCT analysis was used to check the available bone dimensions and determine the proper implant size. The bone measured 4 mm and 11 mm in breadth and in length, respectively, according to CBCT examination. The mesiodistally distance between the missing tooth (21) was only 8.5 mm in the edentulous region. The placement of MIS LANCE plus 3.75 W/10 L implant was chosen.

Surgical phase

The patient received preoperative antibiotics (1g of amoxicillin before 14 hour). The buccal sulcus and incisive foramina were penetrated by local anesthetic. A complete surgical flap protocol for the mucoperiosteum was designed and envelope flap protocol is followed. The incisive papilla's border was crossed during the incision. Incisal foramen is funnel shaped.

Sequential drilling was done in this order guide drill, lancet drill, 2mm guide drill, 2.4 & 2.8 mm was the final twist drill upto 10mm to avoid the fracture of labial plate, avoiding injury to the neurovascular bundle upon exiting the canal. violation of foramen wall is avoided. Implant dimensions of 3.75 x 10 mm was surgically placed in relation to 21 region. Final torque infinity is obtained. Simple interrupted sutures placed.

The radiograph taken after surgery revealed a single implant that was positioned precisely, with a clear space between the implant's surface and the canal.

The patient received postoperative care consisting of the following: analgesics (combination of aceclofenac and paracetamol), metrogyl (400 mg), and trypsin and chymotrypsin of noninflammatory enzymes prescribed BD.

Discussion

A large nasopalatine canal (average canal length 10.86-2.67 mm, average canal diameter 2.59-0.91 mm) make the placement of implant in the central incisor region challenging. In certain additional circumstances, the inadequate labial bone wall may be upgraded during surgery using an appropriate surgical approach, such as guided bone regeneration and barrier membranes, with bone grafts, and/or bone replacements.^[7]

The reason behind the "emergence profile" of an esthetic implant were examined, taking into account iatrogenic factors like incorrect implant selection, deficiencies of bone which includes horizontal and vertical deficiencies and malpositioning of implants.^[8,9]

In this case report, the inverted funnel shaped nasopalatine foramen made the implant placement challenging. Due to the significant defect and the presence of scar tissue, grafting is not a viable opinion. Consequently, we have planned to place the implant using the existing bone structure. Careful and sequential drilling sequences are followed to place the implant in the predetermined position so as to avoid the violation of the foramen wall. Prior to surgery, preplanning and a review of the area's anatomy helped to prevent issues. After three dimensional assessment, the implant was then properly positioned, which includes mesiodistal, buccolingual, and apicocoronal placement.

Conclusion

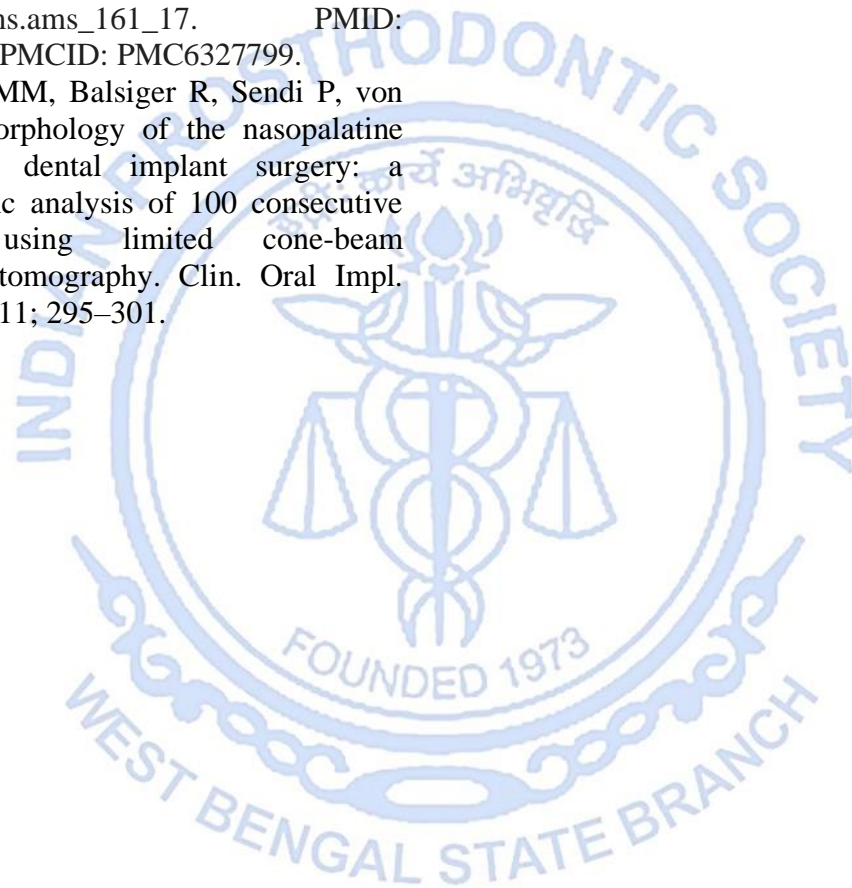
Understanding the anatomic components regarding the dental implants is crucial. In this case report, the nasopalatine arteries are preserved and protected from harm by placing the implant palatally and distally. The visible information of the maxillary arch obtained by CBCT allowed for perfect preprosthetic assessment of the treatment. The case ended well as a result of the prosthodontist and radiology team working together.

References:

1. Bosse LP, Taylor TD. Problems associated with implant rehabilitation of the edentulous maxilla. *Dent Clin North Am* 1998;42:117-27.
2. Buser D, Martin W, Belser UC. Optimizing esthetics for implant restorations in the anterior maxilla: Anatomic and surgical considerations. *Int J Oral Maxillofac Implants* 2004;19 Suppl: 43-61.
3. Radlanski RJ, Emmerich S, Renz H. Prenatal morphogenesis of the human incisive canal. *Anat Embryol (Berl)* 2004;208:265-71.
4. Kraut RA, Boyden DK. Location of incisive canal in relation to central incisor implants. *Implant Dent* 1998;7:221-5.
5. Liang X, Jacobs R, Martens W, Hu Y, Adriaenssens P, Quirynen M, et al. Macro- and micro-anatomical, histological and computed tomography scan characterization of the nasopalatine canal. *J Clin Periodontol* 2009;36:598-603.
6. Greenstein G, Cavallaro J, Tarnow D. Practical application of anatomy for the dental implant surgeon. *J Periodontol* 2008;79:1833-46.
7. Tözüm TF, Güncü GN, Yıldırım YD, Yılmaz HG, Galindo-Moreno P, Velasco-Torres M, et al. Evaluation of

maxillary incisive canal characteristics related to dental implant treatment with computerized tomography: A clinical multicenter study. *J Periodontol* 2012;83:337-43.

8. Singhal MK, Dandriyal R, Aggarwal A, Agarwal A, Yadav S, Baranwal P. Implant Placement into the Nasopalatine Foramen: Considerations from Anatomical and Surgical Point of View. *Ann Maxillofac Surg*. 2018 Jul-Dec;8(2):347-351. doi: 10.4103/ams.ams_161_17. PMID: 30693262; PMCID: PMC6327799.
9. Bornstein MM, Balsiger R, Sendi P, von Arx T. Morphology of the nasopalatine canal and dental implant surgery: a radiographic analysis of 100 consecutive patients using limited cone-beam computed tomography. *Clin. Oral Impl. Res.* 22, 2011; 295–301.



FIGURES

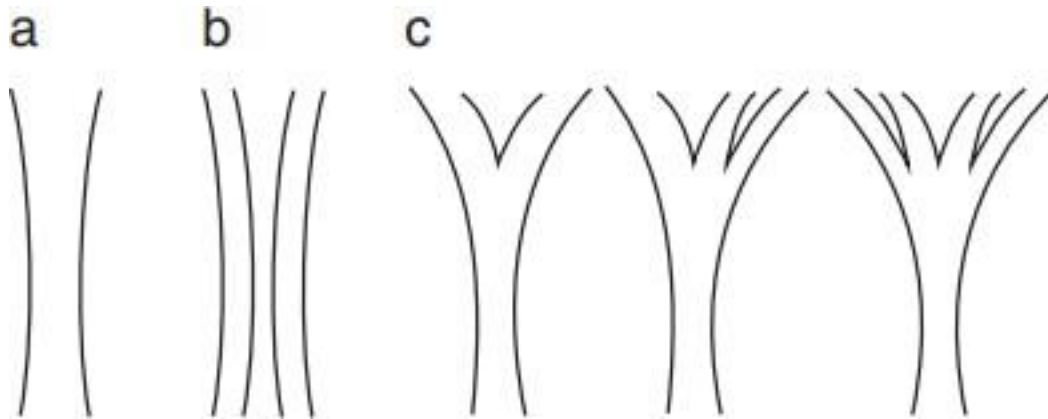


Figure 1.



Figure 2.

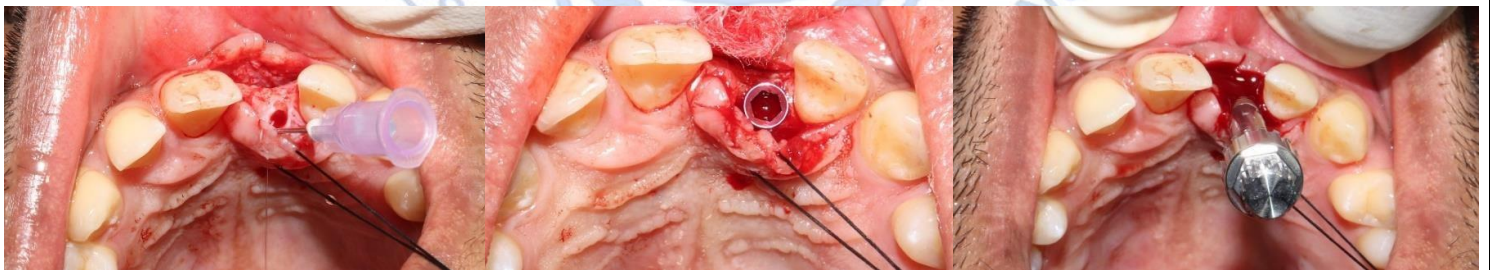


Figure 3.



Figure 4.

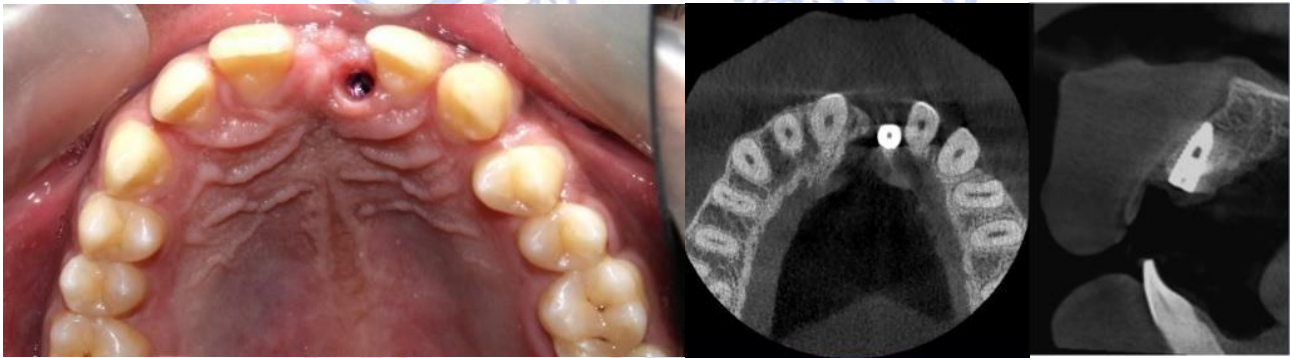


Figure 5.



Figure 6.