



Anatomical Considerations for Implant Placement in Maxilla: A Review

Rajnandini Adhikary^{1*}, Amit Wadhawan², Prashant Tyagi³, Shashank Garg⁴, Prerna Mohan⁵ and Nancy Goel⁶

¹PG Student, Shree Bankey Bihari Dental College, Ghaziabad, Uttar Pradesh, India

²Professor and Head, Shree Bankey Bihari Dental College, Ghaziabad, Uttar Pradesh, India

³Professor, Shree Bankey Bihari Dental College, Ghaziabad, Uttar Pradesh, India

⁴PG Student, Shree Bankey Bihari Dental College, Ghaziabad, Uttar Pradesh, India

⁵Senior Lecturer, Shree Bankey Bihari Dental College, Ghaziabad, Uttar Pradesh, India

⁶PG Student, Shree Bankey Bihari Dental College, Ghaziabad, Uttar Pradesh, India

***Corresponding Author:** Rajnandini Adhikary, PG Student, Shree Bankey Bihari Dental College, Ghaziabad, Uttar Pradesh, India.

DOI: 10.31080/ASDS.2023.07.1539

Received: October 31, 2022

Published: December 23, 2022

© All rights are reserved by **Rajnandini Adhikary, et al.**

Abstract

Oral health and oral health care are very important to maintain proper mastication, digestion, phonation, appearance, and psychological well-being. Dental Implant is one of the most advance approaches for oral rehabilitation. Precise planning and a thorough understanding of the anatomy of the proposed implant site will reduce avoidable and predictable complications.

Keywords: Maxilla; Dental Implants; Sinus; Nasopalatine Canal; Septa

Introduction

Proper knowledge of anatomy provides dental professionals with the confidence to deal with hard or soft tissues in efforts to restore the exact aim of implantation whether esthetics or function [1]. This article examines the maxillary anatomical landmarks most closely associated with it and will help in the final decision regarding the indication for implantation procedures as well as the choice of the appropriate type and design of an implant.

Maxilla

The second largest bone of the face is the maxilla. Complications which occur in the maxilla regarding implant placement or bone grafting: are Lack of primary implant stability, placement of the implant tip in the maxillary sinus or nasal cavity, perforation of the Schneiderian membrane during sinus floor elevation, dislocation of implants or augmentation material and bleeding [2]. Poornima Chandra, Poornima Govind, Ramesh Chowdhary in 2016 had conducted a study and found that in the maxilla, the vertical bone height was markedly less in the molar region as compared to the premolar region [3].

In the maxilla, the main concern is the proximity to maxillary sinus, the nasal cavity, the nasopalatine foramen. The Anterior maxilla also known as the aesthetic zone, or "social 6" which is referred to as the area anterior to the lateral walls of the Nasal cavity and the anterior border of the sinus. The posterior maxilla is the region posterior to the second premolars and molars [4].

Nasopalatine canal

The nasopalatine canal (NPC) is a long slender passage also known as the anterior palatine canal [5]. Pakawat Chatriyanuyoke, Chun-I Lu, Yusuke Suzuki, *et al.* in 2012 suggested that to avoid NPC penetration more care must be exercised during immediate implant placement at the midroot level of a maxillary central incisor in women and younger patients. To overcome the anatomic limitation of NPC, several approaches proposed are bypass, enucleation and lateralization [5].

Nasal cavity

The nasal cavity is the most cephalic part of the respiratory tract is divided into two separate cavities by the septum and kept

patent by a bone and cartilaginous framework. The nasal septum contains the Kiesselbach plexus and the Internal Nasal Valve⁶ Won-Bae Park, Young-Jin Kim, Ji-Young Hang, *et al.* in 2020 did a case report to present radiographic and nasal endoscopic features in the anterior nasal floor when dental implants were in advertently perforated into nasal cavities [7]. Nasal floor augmentation is done for rehabilitation of the anterior-superior regions [7].

Maxillary sinuses

The largest cavity in the body of maxilla is the maxillary sinus, which is pyramidal in shape. The mucosal lining of the maxillary sinus also known as the Schneiderian membrane is made of respiratory mucosa. The risk of membrane perforation further increases in the presence of septation of the maxillary sinus.¹⁶ Since the presence of septa can complicate the creation of the bony window in the lateral wall and increase the risk of tearing the sinus membrane during its elevation, it is important to analyze these septa on CT scans prior to surgery. During sinus graft surgery, septa can be left intact by making two windows separated by the septum, or they can be removed with a thin curved hemostat or Kerrison forceps [8].

Incisive foramen

The incisive foramen is consider as an important structure because it serves as the exit point for the nasopalatine nerve and sphenopalatine artery at the incisal foramen terminating at the nasal floor and damage to this nerve there is risk of sensory loss to the anterior palate [9].

Canine fossa

The canine fossa is located lateral to the incisive fossa is a depression larger and deeper than the incisive fossa, and is separated from it by a vertical ridge, the canine eminence, corresponding to the socket of the canine tooth [10].

Conclusion

Having a thorough understanding of the anatomic structures of the periodontium and the surrounding hard and soft tissues is essential for periodontal and implant surgical procedures. Knowledge of anatomy and function is important for proper execution of surgical procedures, as well as to minimize the risk of injury and complications.

Bibliography

1. Prasad DK, *et al.* "Anatomical Considerations in Implant Selection and Positioning". *International Journal of Oral Implantology and Clinical Research* 4.1 (2013): 24-29.
2. Louie Al-Faraje. "Surgical and radiologic anatomy for oral implantology". 1st edition 37.
3. Chandra P, *et al.* "Radiographic evaluation of anatomical variables in maxilla and mandible in relation to dental implant placement". *Indian Journal of Dental Research* 27.4 (2016): 344.
4. Edward Dwayne Karateew. "Implant Aesthetics Keys to Diagnosis and Treatment". 1st edition. 58.
5. Chatriyanuyoke P, *et al.* "Nasopalatine canal position relative to the maxillary central incisors: a cone beam computed tomography assessment". *Journal of Oral Implantology* 38.6 (2012): 713-717.
6. Louie Al-Faraje. "Surgical and radiologic anatomy for oral implantology". 1st edition 102.
7. Park WB, *et al.* "Radiographic and Endoscopic Observation of Accidentally Perforated Anterior Nasal Cavity with Dental Implants: Case Reports with 5-23 Years of Follow-Up". *Journal of Oral Implantology* (2020).
8. Simoes A, *et al.* "Clinical importance of dental implants penetration in maxillary sinus". *Clinical Oral Implants Research* 28.S14 (2017).
9. Singhal MK, *et al.* "Implant Placement into the Nasopalatine Foramen: Considerations from Anatomical and Surgical Point of View". *Annals of Maxillofacial Surgery* 8.2 (2018): 347-351.
10. Gray's Anatomy of the Human Body". 20th edition (1918).