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The Severely Degenerated Maxilla: Making Decisions with Dental Implants that are Zygomatic or Pterygoid

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Abstract

Communication between those performing the surgical and prosthetic aspects of the treatment, as well as communication with the patient regarding what is being suggested for treatment, can present some challenges for the severely atrophic maxilla during treatment planning. Based on the Bedrossian classification, this article provides a guideline for the surgical approach that can be adapted based on the patient's residual anatomy and simplifies communication and comprehension for treating the severely atrophic maxilla.

Keywords: Dental implants; Zygomatic; Pterygoid

Introduction

Significant alveolar resorption, which makes it difficult to place an implant, is a problem that occurs frequently in patients who have had a removable full arch maxillary prosthesis [1]. Negative volumetric changes that are exacerbated in the posterior maxilla by sinus enlargement occur when the bone is not stimulated by teeth or implants. The alveolar ridge undergoes the unavoidable process of bone remodeling in a cascade following tooth extraction or periodontal bone loss. The residual ridge is reduced in both height and width as a result of this three-dimensional remodeling, leaving insufficient bone for implant placement without augmentation procedures. Only a small number of surgical options are available when the maxilla has experienced an advanced level of bone resorption. These may include tilted implants to avoid pneumatized sinuses and produce prosthesis with premolar occlusion, as well as extensive osseous grafting in deficient regions to enable implant placement in deficient regions with insufficient bone. In order to place implants and provide a restoration that will enable the patient to return to their normal activities, augmentation procedures increase the duration of treatment as well as the total cost. Zygomatic implants have been successfully used to avoid osseous grafting of the maxillary sinus and deficient ridge and still permit implant placement in distant available bone. Zygomatic implants' survival rates are comparable to those of standard endosteal implants, despite the fact that they are more difficult to implant and necessitate more advanced surgical skills. Zygomatic inserts are valuable in treating and dealing with the seriously atrophic maxilla.

Clinical evaluation utilizing panoramic and/or CBCT radiographs The right incisal edge position, the need for lip support, and the right vertical dimension of occlusion must all be determined during the evaluation.

Literature Review

Physiological bone remodeling occurs more rapidly and profoundly in the maxilla than in the mandible, suggesting a genetically low maxillary bone density. Traumatic-induced resorption, for example, may accelerate this process. long-term denture wear) resulting in bone availability in the anterior and posterior regions that cannot be augmented to enable implant placement [2]. The Bedrossian classification of the maxilla is used to identify potential bone sites where implants can be placed. The Bedrossian classification provides a framework for modifying the surgical approach. Examining the patient's panoramic radiograph is used to accomplish this. There are various zones in the maxilla; Zone I is between canines, Zone II is between bicuspids, Zone III is between molars, and Zone IV is between zygomas. The modified surgical approach is determined by the presence or absence of bone in these zones [3].

Following the Bedrossian classification, a radiographic classification based on the systematic assessment of the available bone, is one method for making decisions in the atrophic maxilla [4,5]. This considers the connection between the alveolus, the floor of the nose, and the position and size of the maxillary sinus. When there is sufficient bone to allow for implant placement without augmentation, treatment would follow the Bedrossian zone classification [6]. 4–8 axial (non-angled) implants would be used to treat the adequate volume of bone in zones I, II, and III. The ALL-on-X approach would be used with 4–6 implants placed axially or angled (tilted) to achieve the widest arch spread for a better A-P ratio when zone III has insufficient bone but sufficient volume in zones I and II. When bone is also present in zones I and IV, pterygoid implants can be placed into zone III to augment the implants in zones I and IV. With dual bilateral (quad) zygomatic implants, inadequate bone in zones I and II can be treated without bone augmentation. Treatment would allow for the placement of 2-4 implants in zone one and a zygomatic implant bilaterally in zone IV. When bone is also present in zones I and IV, pterygo Pterygoid implants can be added to increase the A-P spread in order to restore the arch when the spread of the zygomatic implants in each quadrant is inadequate and there is sufficient bone in zone III [6-8].

Discussion

Patients may present after wearing maxillary dentures for an extended period of time or after losing their dentition due to severe periodontal issues that cause the maxilla to atrophy severely and prevent implant placement to restore the arch. It is possible to perform

extensive bone grafting, but these procedures raise treatment costs [8]. Additionally, some patients may decline treatment because of the significantly increased treatment duration. The clinical basis for this decision-making is the patient's radiographic appearance, which was obtained during treatment planning. When formulating the joint treatment plan, which will then be discussed with the patient, this will assist the practitioner in discussing the available treatment options with the patient as well as those only performing the restorative aspects of treatment with the surgeon.

Conclusion

The purpose of this human cadaver study was to evaluate the precision with which custom-made bone-supported laser sintered titanium templates were used to place zygomatic and pterygoid implants. Pre-surgical planning was carried out using each cadaver's computed tomography scans for this purpose. Direct metal laser sintering was used to print surgical guides. The guided protocol and associated instruments were used to insert two pterygoid and four zygomatic implants in each case. The deviations between the planned and inserted implants were evaluated using post-operative computed tomography (CT) scans. By overlaying the actual post-operative CT position on the virtual presurgical placement of the implant in a CT image, accuracy was measured. The data were analyzed using descriptive and bivariate methods. Consequently, ten cadavers received a total of 40 zygomatic and 20 pterygoid implants. The planned and implanted zygomatic and pterygoid implants had the following mean deviations (mean SD): For angular deviation, $1.69°$, $1.12°$, $4.15°$, $3.53°$ are required. Abnormalities in linear distance: 0.93 mm is less than 1.23 mm at platform depth, 1.35 mm is less than 1.45 mm at apical plane, 1.07 mm is less than 1.47 mm, and 1.22 mm is less than 1.44 mm at apical depth. In conclusion, regardless of the complexity of the case, the surgical guide system enabled acceptable and accurate implant placement and demonstrated accuracy for all of the studied variables.

Acknowledgement

None

Conflict of Interest

None

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