



Current Concepts and Applications of Zygomatic Implants as Related to Resorbed Maxilla: A Comprehensive Review

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(Received: 27 October 2023

Revised: 22 November

Accepted: 26 December)

KEYWORDS

Dental Implants, Atrophy, Maxilla, Zygomatic Implant, Success Rate

ABSTRACT:

Dental implants are highly popular these days because of its conservative nature of approach. The ultimate success of any implant depends upon the quality and quantity of bone in which it is being installed. Majority of patients are suffering from some or another infectious disease of jaw. These jaw diseases primarily affect and reduce the available bone height and depth. Therefore many of the recent researchers have concluded that rehabilitation of patients with atrophic maxilla with dental implants are quite difficult than otherwise normal situations. The basic etiology and underlying cause of these deleterious processes are microbial only. These are usually mix micro flora those initiate the bone resorption procedure. Also these are widespread controversy around the subject because various success rates have been reported in numerous peer-reviewed articles. As a result, there is still debate over its clinical success. Therefore considering all these facts and concepts, this review was planned to highlight and focus the success of zygomatic implants among the atrophic maxilla.

Introduction

Implant therapy is highly recommended and favorite choice for replacing missing teeth.¹ The missing teeth replacement can be conservatively done by implants without altering adjacent tooth. However, implant therapies mostly need comprehensive after care in their long term usage. Any carelessness in hygiene maintenance can lead to ultimate failure of implants. These events can be highly frustrating for dentist and

patients both. Due to the absence of supporting bone, soft tissues, and muscles in severe maxillary defects following surgical resection, implant insertion and the subsequent prosthetic therapy become highly tough. For instance, slanting implants, short, wide, micro implants, varied grafts, grafting the maxillary floor, and zygoma implants have all been planned as approaches to the atrophic maxilla.² Both surgeons and prosthodontists effort with the full restoration of the severely atrophy



maxilla as well as implant placement. If just predictable implants are used to cure this illness, considerable bone grafting, sinus lifts, and onlay grafts made of more donor bone are characteristically needed to install the implants. The patient's uneasiness, the long course of the process, any potential adverse effects, the likelihood of implant failure being lower, the morbidity of the donor site, and the expense are crucial factors to be taken into account.³ The patient's inability to wear a prosthesis for a lengthy period of time, which prevents many patients from pursuing the treatment, complicates things further. The benefits of zygoma implant rehabilitation include avoiding bone grafts when not necessary, a shorter treatment time, no need for donor sites, and patient-continuous use of a transitional prosthesis. When therapy is over, the patient will have a removable or fixed prosthesis that is stable, well-tolerated, and aesthetically pleasing; increasing patient compliance.⁴⁻⁶ These concepts and techniques were discussed by Jokstad and colleagues in 2016 in their research titled 'a Systematic Review of the Role of Implant Design in the Rehabilitation of the Edentulous Maxilla.' They stated that severely resorbed maxilla refers to a condition in which the upper jawbone (maxilla) has experienced significant bone loss. The decreased amount of bone in the region can occur due to periodontal disease, trauma or tooth loss. When the maxilla is severely resorbed, it can cause a number of problems, such as difficulty chewing, speaking, and swallowing, as well as changes in facial appearance. In addition, severely resorbed maxilla can make it difficult to place dental implants in the area.⁷ These facts were put forwarded by ten Bruggenkate and coworkers in the year 1998 in their research titled 'Maxillary sinus floor elevation: a valuable pre-prosthetic procedure.' There are several treatment options available for severely resorbed maxilla, depending on the severity of the condition and the individual patient's needs. It is important for individuals with severely resorbed maxilla to seek treatment from an experienced dental professional who can evaluate their condition and recommend the most appropriate course of treatment. It has been advocated that rehabilitating a patient with severely resorbed maxilla with endosseous implants is challenging. Bone grafting before or along with implant placement has to be an option to improve the bone quality to aid in implant

anchorage. Bone grafting procedures is not only time consuming and expensive but has shown 10-30% of failure rate as documented in systematic review published by many authors. Apart from these facts bone grafting may not be indicative in a given situation, thus alternatives have to be opted. Zygomatic implants are a specialized type of dental implant that requires specialized training and expertise to place. They may not be appropriate for all patients, and a thorough evaluation by a dental specialist is typically required to determine whether zygomatic implants are the best treatment option. Zygomatic implants become a viable option in severely resorbed maxillary bone. In the posterior region of maxilla, 10 mm bone height is optimal. As a result, traditional dental implants will have adequate success rates without the need for bone augmentation methods. Rosenstein suggested that short implants can be a risk free option in posterior atrophic maxilla if the residual bone height is 6-7mm. However, there are reports that the implant survival rate was substantially decreased by short implants that were less than 6 mm in length.⁸ These concepts were initially discussed by Rosenstein and colleagues in the year 2020 in their research titled 'Zygomatic Implants: A Solution for the Atrophic Maxilla.' Gracher and coworkers performed a review in 2021 on full arch rehabilitation in patients with atrophic upper jaws with zygomatic implants. They stressed on the role of zygomatic implants in upper arch. A dental prosthesis can be attached to the implant once it has completely fused with the bone to replace the lost teeth.⁹ Endosseous dental implants have gained popularity in recent years as a preferred alternative to dentures for replacing missing or lost teeth. In case of deficient maxillary bone in the anterior region, it is indicative of placing 2 or more zygomatic implants on each side of the posterior maxilla where as if the bone in the anterior maxillary region is enough, than the conventional implants can be inserted in the anterior region along with zygomatic implants in the posterior maxilla on each side. Contraindication includes mainly sinus infection, any pathology in the maxillary bone pathology and malignancy. Solà Pérez and other researchers had studied in 2022 about the success Rates of Zygomatic Implants for the Rehabilitation of Severely Atrophic Maxilla. They experimented about the Zygomatic Implants and their



success rate in upper arch as related to the functional outcome and results.¹⁰ Zygomatic implants are typically recommended for patients who have lost a significant amount of bone in the upper jaw due to periodontal disease, trauma, or other factors. They are also sometimes used in patients who have been unable to wear dentures or other dental prostheses due to a lack of bone support. The placement of zygomatic implants typically involves a surgical procedure under local or general anesthesia. During the procedure, the implant is placed through the gum and into the cheekbone, where it fuses with the bone over time. Dental implants still depend on adequate bony height and breadth.

Discussion

Zygomatic implants are mainly installed in alveolar ridge and maxillary sinus including zygomatic bone for enhanced bony support. Researchers have confirmed that involvement of maxillary sinus is important for precise visualization and angulations of zygomatic implants during osteotomy procedure. Wang and other researchers studied in 2015 about the reliability of four zygomatic implant-supported prostheses for the rehabilitation of the atrophic maxilla. They studied in detail about the success rate in zygomatic implant and concluded that zygomatic implant has been extensively researched.²⁰ The Branemark system advocated the surgical procedure for placing intra-sinus zygomatic implants.¹⁻³ Intra-sinus zygomatic implants have been used for patients who have undergone maxillectomy. Although there were difference in study population, study design and surgical methods, it was discovered that the survival rate was higher. Studies have documented 95.2% survival rates, even in more than 10 years follow-ups compared to conventional implants. A systematic review conducted by Sola Perez A et al observed 98.5%, 97.5% (after 1-3 years), 96.8% (after 3-5 years) and 96.1% (after more than 5 years) success rate. Prosthetic failures, rhinosinusitis, and soft tissue dehiscence were the most often reported problems.⁴⁻⁸ Hence it was concluded that zygomatic implants were secure and conventional option for rehabilitating patients with atrophic maxillary bone. Comparable study done by Gebretsadik HG has reported 96.7% success rate after more than three years follow up period. An average range of 78.6-94.1% survival rate has

been observed in patients rehabilitated with zygomatic implants with resected maxilla. In spite of successful results of these implants few shortcomings have been mentioned in literature.⁹⁻¹⁸ The placement of zygomatic implant with intra sinus approach leads to increased palatal angulations resulting in bulky prosthesis which in turn constricts the tongue space and effects speech. To overcome this clinical challenge extra-sinus approach was suggested. Many researchers have studied in these regards.¹⁹⁻²⁹ Apart from this placement of these implant is technique sensitive and requires proficiency of the clinician. Dental implants are now a viable choice for a sizable portion of the population. This is typically because to enhance in cost, efficiency, and competence made possible by the practically constant research advances in this field. However, there are still restrictions. Along with Branemark other authors have recommended various surgical procedures for placing zygomatic implants.

Conclusion

Authors concluded highly significant and imperative facts about usage of zygomatic implants in maxillary arch. Within the limitations of the study it was concluded that various treatment options are available for rehabilitating upper arch including zygomatic implants. However, zygomatic implants have been shown to be more effective in patients with atrophic maxilla and improve life quality. Its long term endurance, success rate conceal the minor feasible complications that arise after placement of these implants. The recommendations and suggestions of this study must be clinically correlated before utilizing in clinical setups. Authors also recommend some other future comprehensive systematic reviews to test and authenticate the validity of zygomatic implants in maxillary arch.

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