Zygomatic Implants- A Viable Option for Patients With Atrophic Maxilla: A Systematic Review

Dr. Adrish Misra[1], Dr. AN Bharat[2], Dr. Sonali Perti[3], Dr. Ritu Sabharwal[4], Dr. Dev Darshan Deo[5], Dr. Sweta Sulagna Tripathy[6]

[1]*Undergraduate Student, Kalinga Institute of Dental Sciences, Campus 15, KIIT University, Patia, Bhubaneswar, Odisha, India*

[2]*Undergraduate Student, Kalinga Institute of Dental Sciences, Campus 15, KIIT University, Patia, Bhubaneswar, Odisha, India*

[3]*Professor, Department of Prosthodontics, Kalinga Institute of Dental Sciences, Campus 15, KIIT University, Patia, Bhubaneswar, Odisha, India*

[4]*Post Graduate Student (Department of Pedodontics), Kalinga Institute of Dental Sciences, Campus 15, KIIT University, Patia, Bhubaneswar, Odisha, India*

[5]*General Dental Practitioner (BDS), D Care, Kanan Vihar Phase 2, Patia, Bhubaneswar, Odisha, India*

[6]*General Dental Practitioner (BDS), Pro Dental Clinic, Raghunathpur, Nandan Kanan Road, Bhubaneswar, India*

Corresponding Author: Dr. Adrish Misra
adrishmisra@gmail.com

Abstract

Endosseous dental implants have gained popularity in recent years as a popular alternative to dentures for restoring missing or lost teeth. Dental implants are now a viable alternative for a sizable portion of the population due to advancements in effectiveness, efficiency, and affordability made possible by the nearly continuous research progress in this area. It is challenging to rehabilitate patients with atrophic maxilla with dental implants .Various treatment options have been suggested for restoring atrophic maxilla. The zygomatic implant, however, might offer a far simpler solution. Patients with significant maxillary atrophy may benefit from zygomatic implants as a therapy option. Within 24 hours, this treatment option enables the delivery of immediate repaired teeth. There is 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. The review article focuses on the success of zygomatic implants among the atrophic maxilla.

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

DOI: 10.48047/ecb/2023.12.8.512

Introduction

It is well-known that one of the main requirements for implant support is the amount of accessible bone. The success of implants is in doubt if enough bone is not present for their placement.[1] 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 challenging. For example, tilting implants, short, wide, micro implants, varied grafts, grafting the maxillary floor, and zygoma implants have all been proposed as approaches to the atrophic maxilla.[2] Both surgeons and prosthodontists struggle with the total restoration of the severely atrophy maxilla as well as implant placement. If just conventional implants are used to treat this disease, substantial bone grafting, sinus upliftment, and onlay grafts made of more donor bone are typically necessary to install the implants. The patient's discomfort, the lengthier course of the procedure, 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 finished, the patient will have a removable or fixed prosthesis that is stable, well-tolerated, and aesthetically pleasing; increasing patient compliance.[4-6] 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] 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 endooseous 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 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. Friberg B 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.[9] 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. A dental prosthesis can be attached to the implant once it has completely fused with the bone to replace the lost teeth.[9] Zygomatic implants are a specialized type of dental implant that require 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. Endosseous dental implants have gained popularity in recent years as a preferred alternative to dentures for replacing missing or lost teeth. Dental implants are now a viable choice for a sizable portion of the population. This is mostly because to increase in cost, efficacy, and efficiency made possible by the practically constant research advances in this field. However, there are still restrictions. Dental implants still depend on adequate bony height and breadth. The Branemark system advocated the surgical procedure for placing intra-sinus zygomatic implants. Intra-sinus zygomatic implants have been used for patients who have undergone maxillectomy. Along with Branemark other authors have suggested numerous surgical procedures for placing zygomatic implants. 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

Sinus infection, any pathology in the maxillary bone pathology and malignancy.

Discussion

Success rate in zygomatic implant has been extensively studied. 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 than10 years follow-ups compared to conventional implants. A systematic review conducted by Sola Perez A et al observed 98.5% (after >1 years), 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. Hence it was concluded that zygomatic implants were safe and predictable option for rehabilitating patients with atrophic maxillary bone. Similar 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. Despite of successful results of these implants few shortcomings have been mentioned in literature. 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. Apart from this placement of these implant is technique sensitive and requires proficiency of the clinician.

Conclusion

Apart from various treatment options available zygomatic implants have shown to be more effective in patients with atrophic maxilla and improves life quality. Its long term endurance, success rate conceal the minor feasible complications that arise after placement of these implants.

References

1. Aparicio C, Manresa C, Francisco K, Claros P, Alández J, González-Martín O,Albrektsson T. Zygomatic implants: indications, techniques and outcomes, and the zygomatic success code. Periodontol 2000. 2014 Oct;66(1):41-58.
2. Friberg B. The posterior maxilla: clinical considerations and current conceptsusing Brånemark System implants. Periodontol 2000. 2008;47:67-78.
3. Petrungaro PS, Kurtzman GM, Gonzales S, Villegas C. Zygomatic Implants for the Management of Severe Alveolar Atrophy in the Partial or Completely Edentulous Maxilla. Compend Contin Educ Dent. 2018 Oct;39(9):636-645.
4. Starch-Jensen T, Jensen JD. Maxillary Sinus Floor Augmentation: a Review of Selected Treatment Modalities. J Oral Maxillofac Res. 2017 Sep 30;8(3):e3.
5. Ali SA, Karthigeyan S, Deivanai M, Kumar A. Implant rehabilitation for atrophic maxilla: a review. J Indian Prosthodont Soc. 2014 Sep;14(3):196-207.
6. Candel-Martí E, Carrillo-García C, Peñarrocha-Oltra D, Peñarrocha-Diago M. Rehabilitation of atrophic posterior maxilla with zygomatic implants: review. J Oral Implantol. 2012 Oct;38(5):653-7.
7. Jokstad A, Sanz M, Ogawa T, Bassi F, Levin L, Wennerberg A, Romanos GE. A Systematic Review of the Role of Implant Design in the Rehabilitation of the Edentulous Maxilla. Int J Oral Maxillofac Implants. 2016;31 Suppl:s43-99.
8. ten Bruggenkate CM, van den Bergh JP. Maxillary sinus floor elevation: a valuable pre-prosthetic procedure. Periodontol 2000. 1998 Jun;17:176-82.
9. Rosenstein J, Dym H. Zygomatic Implants: A Solution for the Atrophic Maxilla. Dent Clin North Am. 2020 Apr;64(2):401-409.
10. Gracher AHP, de Moura MB, da Silva Peres P, Thomé G, Padovan LEM, Trojan LC. Full arch rehabilitation in patients with atrophic upper jaws with zygomatic implants: a systematic review. Int J Implant Dent. 2021 Feb 26;7(1):17.
11. Solà Pérez A, Pastorino D, Aparicio C, Pegueroles Neyra M, Khan RS, Wright S, Ucer C. Success Rates of Zygomatic Implants for the Rehabilitation of Severely Atrophic Maxilla: A Systematic Review. Dent J (Basel). 2022 Aug 12;10(8):151.

12. Ramezanzade S, Yates J, Tuminelli FJ, Keyhan SO, Yousefi P, Lopez-Lopez J. Zygomatic implants placed in atrophic maxilla: an overview of current systematic reviews and meta-analysis. Maxillofac Plast Reconstr Surg. 2021 Jan 6;43(1):1.
13. Gebretsadik HG. An update on the success rate of the zygomatic implant in Orofacial reconstructive surgery: A 20 years systematic review. Clin Surg J. 2023;4(1):1–6.
14. Chrcanovic BR, Abreu MH. Survival and complications of zygomatic implants: a systematic review. Oral Maxillofac Surg. 2013;17:81–93.
15. Chrcanovic BR, Albrektsson T, Wennerberg A. Survival and complications of zygomatic implants: an updated systematic review. J Oral Maxillofac Surg. 2016;74:1949–1964.
16. Goiato MC, Pellizzer EP, Moreno A, Gennari-Filho H, dos Santos DM, Santiago JF, Jr, et al. Implants in the zygomatic bone for maxillary prosthetic rehabilitation: a systematic review. Int J Oral Maxillofac Surg. 2014;43:748–757.
17. Schmidt BL, Pogrel MA, Young CW, Sharma A. Reconstruction of extensive maxillary defects using zygomaticus implants. J Oral Maxillofac Surg. 2004;62:82–89.
18. Tuminelli FJ, Walter LR, Neugarten J, Bedrossian E. Immediate loading of zygomatic implants: a systematic review of implant survival, prosthesis survival and potential complications. Eur J Oral Implantol. 2017;10(Suppl 1):79–87.
19. Wang F, Monje A, Lin GH, Wu Y, Monje F, Wang HL, et al. Reliability of four zygomatic implant-supported prostheses for the rehabilitation of the atrophic maxilla: a systematic review. Int J Oral Maxillofac Implants. 2015;30:293–298.
20. Aboul-Hosn Centenero S, Lázaro A, Giralt-Hernando M, Hernández-Alfaro F. Zygoma Quad Compared With 2 Zygomatic Implants: A Systematic Review and Meta-analysis. Implant Dent. 2018 Apr;27(2):246-253.