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Zygomatic implant, a new beginning in Nepal: A case report and review of literature

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Abstract

Zygomatic implant (ZI) has become a promising alternative to bone grafting techniques in the rehabilitation of severely atrophied maxillae. High survival rates and easily manageable complications are key to its increased application in experienced hands. Here, we report a case of ZI placement in Nepal and review the literature. A 58-year-old female presented to the Oral and Maxillofacial Surgery Department, concerned about difficulty in chewing food. Clinical examination and 3D Cone Beam Computed Tomography evaluation deemed her a good candidate for ZIs. The classic zygoma concept was employed. Two 45^0 angulated, 35mm long ZIs were inserted bilaterally with two 4.2x10 implants placed in 12 and 23 regions. The procedure was carried out under local anaesthesia. Prosthetic rehabilitation was completed after six months, and 1-y follow-up revealed osseointegration of implants and prosthesis.

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Introduction

Zygomatic implants (ZI) are now an evidence-based and increasingly accepted alternative for the rehabilitation of patients with severe maxillary bone atrophy.[1-3] Their use eliminates the need for extensive grafting procedures and allows for more predictable outcomes in cases where conventional implants are not viable. Long-term follow-up studies report high survival rates ranging from 95.2% to 100%, reinforcing their clinical reliability and efficacy over more than 10 years.[2] Among the complications reported, sinusitis remains the most prevalent, highlighting the anatomical and technical challenges involved.[2]

Despite the promising outcomes, the use of ZI remains a topic of debate due to its technical complexity.[3] The placement of implants requires expertise and careful preoperative planning, and collaboration among prosthodontists, radiologists, and Oral and Maxillofacial (OMF) surgeons.[2,3] Limited case-based evidence is available focusing on postoperative complications in unusual anatomical scenarios or among patients with comorbidities, which leaves a gap in current literature and clinical guidance.

This case report presents a rare and challenging example of ZI placement in a patient with complex maxillary anatomy, emphasizing the importance of a multidisciplinary approach. The objective is to highlight both the surgical considerations and postoperative outcomes to contribute to existing literature and inform future clinical practice regarding risk management and procedural planning.

Case history

A 58-year-old female visited the OMF surgery department with complaints of difficulty in chewing and requested fixed dental prostheses. Clinical examination and 3D Cone Beam Computed Tomography (CBCT) evaluation determined that she was a suitable candidate for ZIs. She had no underlying medical conditions. Intraoral examination revealed a partially edentulous maxilla with the presence of teeth 12, 11, and 21 with mobility grade 2, a root stump 26, and a partially edentulous mandible.

Implant 3D planning revealed insufficient bone in zones 1 and 2, making conventional implants unfeasible in these regions. The treatment plan included two zygomatic implants, one on each side, and two anterior conventional implants. Informed and written consent was taken. The classic zygoma concept was applied, and two 45° angulated platforms, 35mm long ZIs (Nobel Biocare™), were placed bilaterally, with two 4.2 × 10mm conventional implants (Nobel Biocare™) positioned in the 12 and 23 regions.

The procedure was performed under local anaesthesia. Although the final torque values permitted immediate loading, a decision was made to delay loading until osseointegration due to the patient's less-than-optimal soft tissue condition. Prosthetic rehabilitation was completed after six months. One-year follow-up showed osseointegration of the implants and the prosthesis, and the patient was in good condition, both clinical and radiographic evaluation.

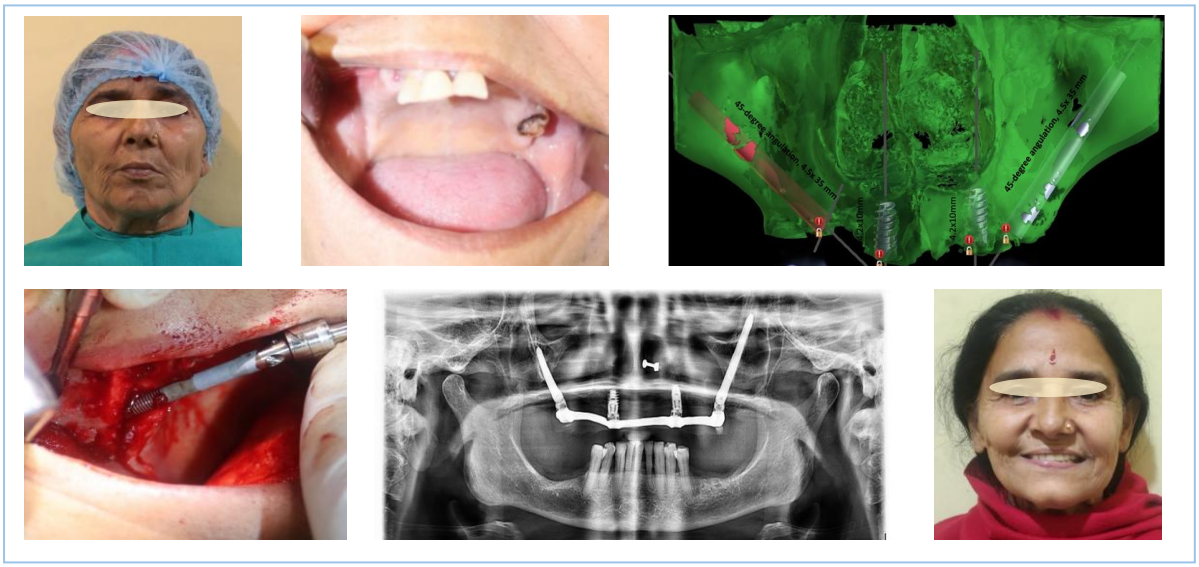

Figure 1-6. Pre-operative frontal profile photo; 2. Pre-operative intraoral-maxillary arch photo; 3. Pre of 3D CBCT image; 4. Intra Intraoperative photo during ZI loading; 5. Post-operative DPT after prosthetic rehabilitation; 6. Post-operative frontal profile photo after prosthetic rehabilitation

Discussion

The ZI was introduced by Branemark in 1998 for oral rehabilitation in patients with extensive jawbone loss, in which the anchorage for ZI was provided by the zygoma or cheekbone.[5] Maxillary bone atrophy is, therefore, the main indication for ZI. In addition, ZI is also indicated in other conditions, such as a salvage treatment for unsuccessful previous bone or implant treatments, in patients with undesirable conditions for bone grafting procedures, or upon patients' requests.[1,2]

The ZIs are commercially available titanium implants with a variety of lengths ranging from 30 to 52.5 mm. The implant head is 45^0 angulated to compensate for insertion inclination with respect to the zygoma and has an inner thread for abutment connection. The diameter of the threaded apical and crestal parts is 4 mm and 4.5 mm, respectively.[4]

Since its initial intra-sinus technique in which entire implant is anchored in maxillary sinus, modifications such as Sinus Slot technique[5] and extra-sinus technique[6] have been introduced.

Two approaches are used in ZI placement: 1) the quad zygoma concept, where two ZIs are placed bilaterally, and 2) the classic zygoma concept, where one ZI is placed bilaterally, and the ZIs are then further splinted to conventional anterior implants. This is followed by immediate or delayed loading of the prostheses.[3] Osseointegration post-implant is between three to six months.[7,8]

Although ZIs are considerably less invasive than traditional bone grafting techniques, complications such as transient infraorbital nerve (V2) paraesthesia, oro-antral communications, peri-abutment soft tissue recession/hyperplasia, ZI malposition, orbital cavity penetration, and subcutaneous peri-malar emphysema characterized by air or gas trapped under the skin in the cheek area have been reported. Sinusitis is the most reported complication.[9,11]

Despite the complications, ZI-based rehabilitation of maxillary edentulism has consistently produced superior results.[1,-3,8-10,12] The International Team for Implantology (ITI) Consensus Workshop on ZI reported a long-term

mean ZI survival rate of 96.2% [95% CI 93.8; 97.7] over a follow-up period of 75.4 months (6.3 years), ranging from 36-141.6 months (3-11.8 years). The workshop also reported that immediate loading of the prosthesis showed a significant survival rate over delayed loading, and prevalence of sinusitis, the most reported complication, was 14.2% (95% CI 8.8, 22.0).[2] Patients rehabilitated with ZI-supported reconstructions have reported increased satisfaction with the results.[10] The results from patients' outcome reported measures (PROMs) using Oral Health Impact 14 score (OHIP14), Oral Health Impact Profile Edentulous questionnaires (OHIP EDENT), and a Likert scale, rehabilitation of aesthetics, function, and phonetic, using ZIs, have demonstrated excellent results with an improvement in the quality of life (QoL).[10,11]

The ZI placement is considered a complex procedure requiring a team of skilful and experienced surgeons and restorative specialists.[2] A 3D assessment of the maxillary and zygomatic bone volume with CT/CBCT and other methods is crucial in ensuring the longevity of ZIs and the success of the treatment.[1,2]

The only report of a case from Nepal reports a quad ZI, for the rehabilitation of atrophic edentulous maxilla in a 42-year male allowing a six months period for osseointegration, prosthetic rehabilitation of upper and lower arch.[13]

In present case, the patient had been struggling for many years with difficulty in chewing, missing upper teeth, and was told that bone loss was too severe for regular dental implants. She was anxious and disappointed after multiple consultations, and an advice for either bone graft or nothing could be done easily. This time when she was explained about the option of ZI, she was hopeful but also a bit nervous because she had never heard of this treatment before.

The procedure was successfully performed under local anaesthesia using an intra-sinus approach, demonstrating a minimally invasive and effective technique. However, the limitation was the inability to achieve immediate loading in the same sitting.

Conclusion

This case demonstrates a successful beginning of zygomatic implant placement using an intra-sinus approach under local anaesthesia, a tailored minimally invasive procedure in a middle-aged lady with maxillary atrophy, partially edentulous maxilla and difficulty in chewing. Careful preoperative multidisciplinary team approach and planning, and a staged loading approach are crucial for a successful outcome.

Author contribution

Concept and design: SKA; Literature search: SKA, YFC; Data collection: SKG, KB, MR; Data analysis: AS; Draft Manuscript: YFC, KB, AS, MR; Final manuscript and accountability: All

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Conflict of interest

None

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Consent

All the appropriate patient consents have been taken in the form of verbal and written. In the consent form, the patient gave consent for her images and other clinical information to be

reported in the journal. The patient was counselled that her name and initials would not be published and due efforts would be made to conceal her identity, but anonymity cannot be guaranteed.

Supplementary material

The data and supplementary material that support the findings of this study are available from the corresponding author upon reasonable request.

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