



Direct sinus augmentation using lateral approach and delayed implant placement - A case report

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Abstract: The posterior edentulous maxilla presents the greatest obstacle to implant placement.

The available bone height is insufficient for the primary stability of implants in this region due to the increased pneumatization of the sinus. Autogenous bone grafts, xenografts, and alloplastic material are among the grafting materials used for floor augmentation. Through a window that is cut into the lateral wall of the maxillary sinus, this method allows for direct visualization and instrumentation of the sinus membrane. This case report depicts direct sinus lift using lateral window approach with the help of TOLA kit and delayed implant placement after adequate bone formation.

Keywords: Direct sinus lift, Indirect sinus lift, Xenograft.

Introduction:

Edentulous posterior maxilla is the most challenging area for the implant placement. Because of increase pneumatization of sinus in this area available bone height is inadequate for primary stability of implants. Sinus lift procedure followed by floor augmentation is the only option to increase the availability of bone in this area. Sinus lift procedure can be direct or indirect type depending on available bone height. For augmentation of floor the grafting materials varies from Autogenous bone grafts to xenografts and alloplastic material. In this technique, sinus membrane is directly visualized and instrumented through the window created in the lateral wall of maxillary sinus.

A 59 year old male patient reported to department of Prosthodontics, Crown and Bridge and Oral Implantology with chief complaint of missing tooth. Clinical examination revealed missing 26 which was extracted 8 years ago. Patient did not have any relevant extra oral findings. Radiographic investigations Iopa and CBCT were done. It was found that the available bone height was insufficient for a conventional implant placement. Hence, patient was advised to undergo Sinus lift and augmentation procedure followed by implant placement.

Patient's informed consent and photography consent were obtained.

Treatment executed:

1. Patient's Pre operative clinical situation showed sufficient mesiodistal space for replacement of missing molar. Fig.1
2. There was adequate prosthetic restorative space (occlusogingival). Fig.2 and 3.

3. CBCT revealed insufficient bone height and width for implant placement. Fig.4
4. Prophylactic antibiotics were started , Local anaesthesia lignocaine 1:200000 was administered .Full thickness Mucoperiosteal flap was raised. Fig.5
5. TOLA - Tool Of Lateral Approach kit was used to lift and augment the sinus via lateral approach. Fig.6
6. Lateral window antrostomy- LASD (Lateral approach sinus drill) was used into the sinus wall at 1200rpm to remove the window entirely. Fig.7
7. Sinus curettes were used in the order 1 to 4 to lift the sinus membrane. Fig.8
8. Once sufficient lift was achieved, the site was grafted using 0.5cc Nova bone putty cartridge. Fig.9
9. Particulate graft Fixos 0.25cc was mixed with PRF and the site was secured using a 10*15mm Cologide membrane. Fig.10
10. The site was closed using 3-0 vicryl interrupted sutures and an intraoral periapical radiograph was made. Fig.11
11. After 8 months, CBCT was made to evaluate the gain in bone height. It revealed gain in bone height by 6mm. Fig.12
12. Full thickness Mucoperiosteal flap was raised and crestal sinus lift was done using osteotome. Fig.13
13. Cowellmedi implant 4.5*10 was placed with torque 35N. Fig.14
14. Radiographic picture of the implant. Fig.15
15. After a healing period of 3 months of implant placement, Implant level open tray impression was made using Addition silicone putty and light body and cast was poured. Fig.16
16. Screw retained PFM crown was fabricated using UCLA abutment.

17. Post operative clinical picture Fig.17

18. Radiographic picture Fig.18

Discussion:

The posterior edentulous maxilla always has insufficient bone available for implant placement. Sinus lift and floor augmentation have become routine procedures to address this issue. The direct sinus lift and the indirect sinus lift are the two types of techniques for sinus lift. Two approaches, the crestal approach and the lateral window approach, have been utilized the majority of the time among the various sinus floor elevation techniques that have been described in the literature. [1] Direct sinus lift was first given by Tatum in 1975 and published for the first time by Boyne and James in 1980. [2] The available bone height below the sinus floor typically influences the technique chosen. When available bone height is less than 5 mm, a direct sinus lift, as originally described by Tatum, is typically recommended. Summer invented the indirect sinus lift, also known as the Summer's osteotomy. He lifted the sinus via crestal approach with various-sized osteotomes. When the available bone height is greater than 6 millimeters, this method is recommended. [3] For grafting, a variety of materials can be used in place of bone. Because of their potential to be both osteoconductive and osteoinductive, autogenously grafted bone is consistently regarded as the best option. However, research has shown that implants grafted with a mixture of autogenously and synthetic materials outperform implants grafted solely with autogenously. Autogenous bone grafts are the best option, but they require a second surgical site, which many patients find uncomfortable. To stay away from second careful site other kind of uniting materials like allografts and xenografts are additionally extremely famous.

For maxillary posterior implants, sinus lift surgery has become increasingly popular in recent years.

Platelet-rich fibrin (PRF) is an autologous fibrin lattice that has a place with another age of platelet concentrates, with worked on handling and without biochemical blood taking care of. There are numerous growth factors in PRF, including insulin-like growth factor (IGF), platelet-derived growth factor (PDGF), and transforming growth factor (TGF). By increasing angiogenesis, chemotaxis, mitosis, stem cell proliferation, wound healing, bone growth and maturation, wound healing, and hemostasis, these growth factors accelerate early bone regeneration. A recent innovation in implantology is the use of PRF to accelerate osseointegration.[4] The major drawback associated with lateral antrostomy is that it requires the raising of a large flap for surgical access. [5] This approach is more technique sensitive and time-consuming. The procedure's success relies mainly on the amount of residual bone.[6]

In 2001, Vercellotti *et al.* introduced the piezoelectric technique. The advantage of piezoelectric osteotomy lies in being able to cut the bony window with great simplicity and precision while ensuring the membrane's integrity. This is due to the termination of the surgical action when the piezosurgery tips come in contact with nonmineralized tissue.[7]

TOLA-Kit enables to make sinus lateral window in safe and speedy way in case of 1-3mm residual bone, perforated membrane at crestal approach or placement of multiple implants. A mix of particulate graft with PRF gives optimum result. In this case report, conventional protocol of delayed implant placement was followed.

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Fig.1- Occlusal view of missing 26



FIG.2- Frontal view



Fig.3-Left lateral occlusal view showing prosthetic space

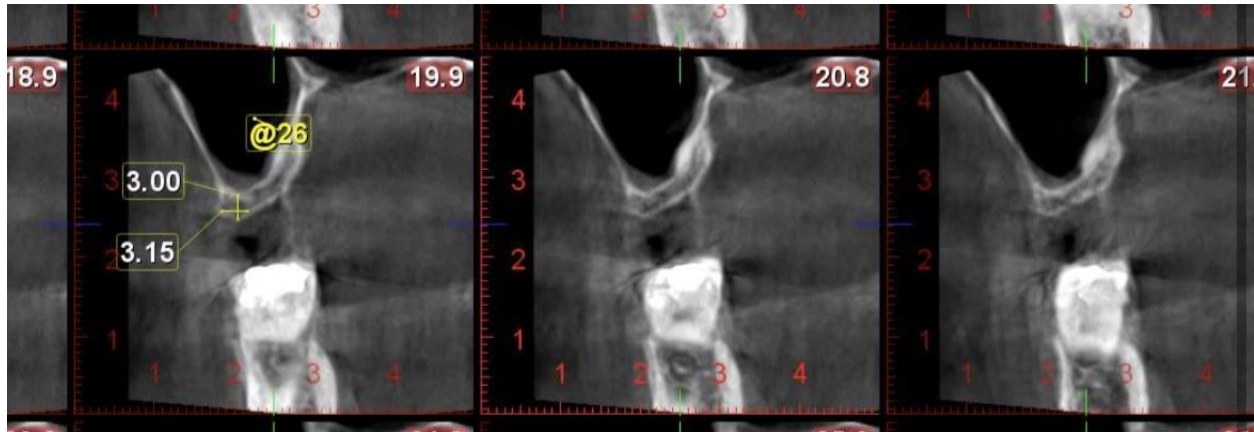


FIG.4 - CBCT showing inadequate bone height and width



FIG.5A and B- Full thickness mucoperiosteal flap



Figure 6 -TOLA kit



Fig 7- Lateral window



Fig 8-Lifting of lateral window using curette



Fig 9- Nova bone putty 0.5 cc

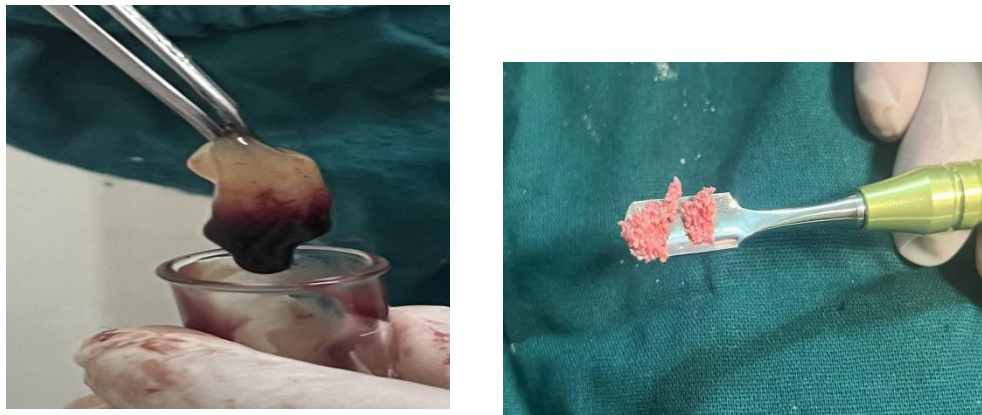


FIG.10A and B - PRF and Particulate graft FixOss



FIG.11- IOPA showing lift in sinus

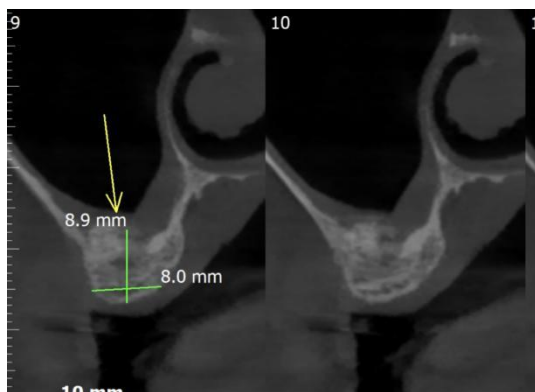


FIG.12- CBCT after 8 months

FIG.13- Indirect sinus lift using osteotome



FIG.14- Implant placement

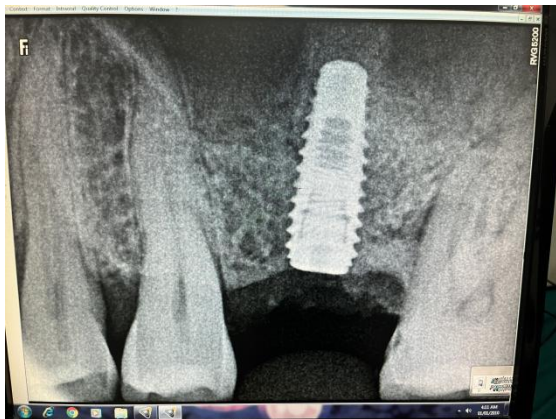


FIG.15- IOPA



FIG.16- Master cast



FIG.17 - PFM Screw retained prosthesis



FIG.18- IOPA with prosthesis