

# Rehabilitation of maxilla with immediate implant placement and direct sinus lift procedure: A Case Report

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## ABSTRACT

Rehabilitation of posterior maxilla with implant prosthesis is most commonly encountered with a problem due to pneumatization of maxillary sinus leading to insufficient bone volume. Bone augmentation in this region requires direct sinus lift surgery with placement of graft. This case report presents the rehabilitation of the left maxillary molar region using direct sinus lift with conventional Caldwell luc technique followed by immediate placement of Implants. It helps in reducing the treatment time and increases the patient's comfort. The fixed implant retained fixed prosthesis offers good patient acceptance along with aesthetics, comfort and function.

## INTRODUCTION

Implant placement in the maxillary molar region have always been cumbersome because of poor bone quality and maxillary sinus issues. In the maxillary molar area, the height of alveolar bone may be reduced due to acute or chronic periodontal disease, sinus pneumatization, or atrophy of the residual alveolar ridge after extraction<sup>(1,2,3)</sup>. Thus, implant placement in this area can be difficult or even impossible. Therefore, at the time of implant placement in the maxillary molar area, bone grafting is performed using vertical alveolar bone graft, sinus lift, or onlay bone graft, of which sinus lift is simple and widely used<sup>(4,5,6,7)</sup>. Sinus lift is generally performed before or simultaneously with implant placement using the lateral window or crestal approach<sup>(3,4,8,9,10)</sup>.

## CASE REPORT

A Female patient, aged 60 years reported to the department of Prosthodontics with chief complaint of frequent decementation of upper fixed prosthesis and difficulty in chewing. On clinical examination 11,12,13,14,15,16,21,22, 23,24,25 were present and all were root canal treated. Tooth number 26 and 27 were missing (Figure 1,2,3). Root stump was present w.r.t 17. Prosthesis wrt 14,15,16 was intact and did not require a removal. Teeth no. 11,12,13,17,21, 22,23,24,25 were mobile and decayed so, extraction was planned for these teeth. Cone beam computed tomography findings revealed that the bone height was insufficient w.r.t 26 and 27 (Figures 4) and so direct sinus lift was planned w.r.t 27 and immediate implant placement w.r.t 11, 13, 21, 23, 24. D3 type of bone present in that region. Blood investigations were carried out, and informed consent was taken after discussing the treatment plan with the patient.

## MAXILLA: THE CBCT FINDING AND SELECTED IMPLANT SIZE

	<u>CBCT scan finding(mm)</u>		<u>Implant size(mm)</u>	
	Length	width	Length	width
Left central incisor	19.0mm	6.8mm	13mm	4.5mm
Left canine	17.0mm	6.8mm	13mm	4.5mm
Left 1 <sup>st</sup> premolar	16.0mm	8.1mm	13mm	4.5mm
Left 2 <sup>nd</sup> molar	2.2mm	8.2mm	9.5mm	4.5mm
Right central incisor	19.9mm	6.6mm	13mm	4.5mm
Right canine	20.4mm	7.9mm	13mm	4.5mm



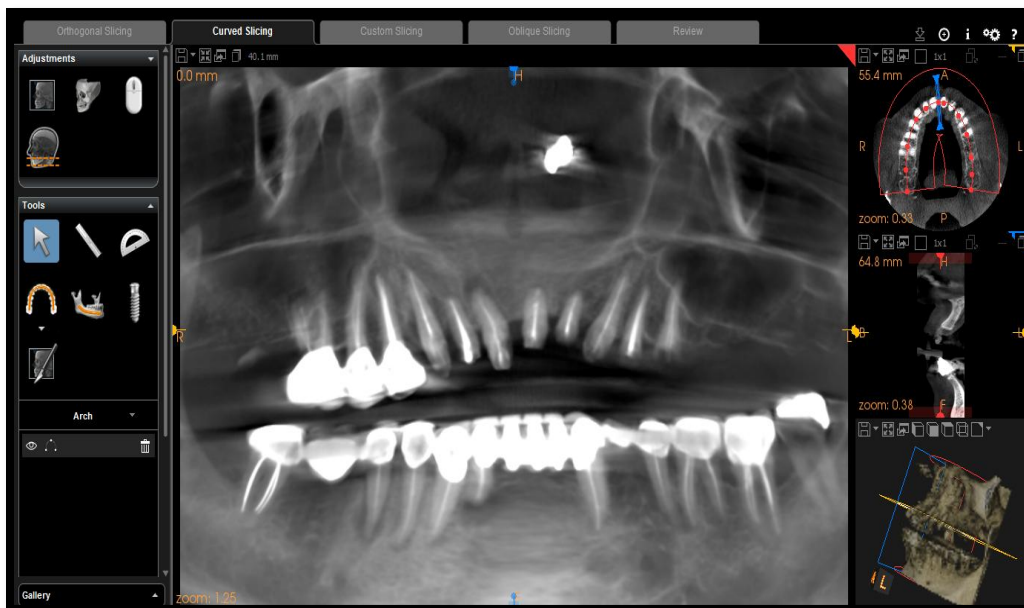
**Fig 1: Preoperative frontal view**



**Fig 2: Pre operative occlusal view**



**Fig 3: Failed prosthesis**





**Fig 4: A & B: Cone Beam Computed Tomography report**

### **SURGICAL PHASE**

1) Prior to the surgical procedure, patient's preparation was done. The maxillary posterior and anterior segments were anaesthetized with PSA, Infraorbital and GP nerve block using local anaesthesia of 2% lignocaine with 1:80,000 adrenaline( Figure 5,6).



**Fig 5: PSA nerve block**



**Fig 6: GP nerve block**

2) Crestal incision was made using no.15 surgical blade extending from the distal surface of 25 up to the distal surface of 27.

3) A vertical incision was extended until the end of the buccal vestibule. A full thickness mucoperiosteal buccal flap was raised, and a bony window was then created using a no.8 round surgical bur in very slow speed with copious amount of cold saline irrigation (Figure 7,8).





**Fig 7: Crestal incision**



**Fig 8: Mucoperiosteal flap elevated**

4) A very thin plate of buccal bone been left over the sinus lining. A direct sinus lift instrument no. 4 tip was then used to fracture the remaining buccal plate (Figure 10). The fractured section of bone was kept attached to the antral lining and no attempt was made to separate it from the lining.



**Fig 9: Lateral window creation**



**Fig 10: lateral window in-fractured**

5) The partially raised lining was then lifted to a greater extent using the direct sinus lift instrument tip no 3,4 and 8 (Figure 11,12)



**Fig 11: Schneiderian membrane separated from antral wall**



**Fig 12: Schneiderian membrane elevated**

6) An osteotomy was done in the usual way, protecting the raised sinus lining from any damage with the implant drills (Figures 13).



**Fig 13: Osteotomy done for implant site**

7) Then Equinox implant of size 4.5#9.5 was then placed and tightened (Figure 14). One cc of cancellous particulate allograft from novabone, was placed in the space between the raised sinus lining and the floor of the sinus (Figure 15).



**Fig 14: Implant placement w.r.t 27**



**Fig 15: Bone graft packed around implant**

8) After getting satisfactory torque the lateral window is then covered with “GTR” membrane, flap was repositioned and approximated, and primary sutures were placed using 000 vicryl suture (Figure 16).



**Fig 16: Flaps sutured w.r.t 27**

9) Extraction w.r.t 11,12,13,,21,22,23,24,25 was carried out and immediate implant of size 4.5#13 were placed wrt 11,13,21,23,24.



10) Flaps were approximated and sutured (Figure 17,18,19). Post operative radiograph was taken (Figure 20) The patient was given postoperative antibiotic and anti inflammatory coverage. After postoperative instructions were given, the patient was recalled after 10 days for reevaluation and suture removal.



**Fig 17: Extracted root stumps**



**Fig 18: Implant placement wrt 21,23,24**



**Fig 19: Flap sutured**



**Fig 20: Post operative radiograph after implant placement**

#### PROSTHETIC PHASE

1) After a healing period of 10 days sutures were removed and alginate impression was made for interim prosthesis. Conventional procedures were followed to fabricate interim removable dentures to establish vertical dimension of occlusion and for patient adaptation to it (Figure 21,22).



**Fig 21: Interim wax trial denture**



**Fig 22: Interim removable prosthesis**

2) After a period of 7 months of implant placement, the implant covering screws were removed and gingival formers were placed (Figure 23). The gingival formers were removed after 15 days



**Fig 23: Healing cap placement**

3) An impression with addition silicone was made by placing direct abutments with impression copings over the implants (Figure 24,25).



**Fig 24: Abutment with impression copings**



**Fig 25: Implant level impression**

4) After making impression, cast was poured and abutment jig was made with pattern resin for jig trial. Then the jig trial was done in patient's mouth and checked for its passivity (Figure 26).



**Fig 26: Trial jig in patient mouth**



5) Customized trial denture bases with maxillary wax occlusal rim was fabricated on the casts to record the maxillomandibular relations (Figure 27).



**Fig 27: Bite registration**



**Fig 28: Metal trial copings in patient mouth**

6) After a week, metal coping trial was prepared on the milled abutment to check for proper positioning of the crowns. A cement retained prosthesis was planned with two separate units from 13 to 23 and 24 to 27. Metal coping trial was done and and prosthesis was sent for ceramic veneering (Figure 28).

7) Proximal contacts were checked thoroughly to ensure proper seating and the occlusion was adjusted for centric and lateral movements. Shade A2 (VITA classic shade guide) was selected for the final porcelain fused to metal crown. Finally the PFM crown cementation with Glass Ionomer cement was done over the milled abutments. All excess cement was removed. The patient was comfortable and aesthetically satisfied after prosthesis insertion (Figure 29-32).



**Fig 30: Occlusal view with milled abutments**



**Fig 31: Metal ceramic final prosthesis cemented**



**Fig 33: Occlusal view of final prosthesis**



**Fig 34: Smile of satisfaction with final prosthesis**



## MAINTENANCE PHASE

The patient was given postoperative instructions and was advised to maintain her oral hygiene with the use of chlorhexidine mouthwash, inter-dental brushes and dental floss. Recall visit was scheduled for the patient every 3 months and 1 year for regular checkup.

## DISCUSSION

Bone quality of the maxilla is poor than that of the mandible. Atrophy of the alveolar ridge can be more severe in cases of maxillary tooth loss. To overcome these problems, maxillary sinus lift with an accompanying bone graft serves as a simple, widely accepted procedure. A sinus lift for implant placement is considered one of the most predictable procedures for augmenting bone in the maxilla<sup>(11,12)</sup>. Several approaches have been developed and are currently used. The lateral approach using a Caldwell Luc osteotomy is the main technique most commonly used, where the maxillary sinus floor is grafted to provide a sufficient quantity of bone for the placement of endosteal dental implants<sup>(13-16)</sup>.

In this present case, on CBCT examination, the available bone height in the left 2<sup>nd</sup> molar region was found to be around 2.2 mm from the maxillary sinus lining. Since the patient had a missing left 1st molar and 2<sup>nd</sup> molar for couple of years, there was atrophy of the edentulous area. This could have caused continuous loss of bone height and density and an increase in antral pneumatization. Hence, direct sinus lift using conventional caldwell luc approach was planned and immediate implant placement was carried out.

## CONCLUSION

Good treatment result in sinus lift procedure depends on a good and serious patient's evaluation, Sufficient bone density is required for placement of dental implants in non dentate areas of the maxillary posterior region. Bone density may be reduced due to pneumatization of the maxillary sinus involving the residual ridge area. Success of the dental implant with sinus augmentation mainly depends on the skill of the operator, adequate preoperative planning, technique used to place an implant and the type of graft material used.

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