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DIRECT SINUS LIFT AND IMMEDIATE IMPLANT PLACEMENT USING PIEZOSURGICAL APPROACH- A CASE SERIES

Periodontology

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ABSTRACT

Introduction Numerous studies have shown that placement of implants in the maxillary region with resultant successful osseointegration can be achieved by the use of sinus lift procedures using piezosurgical technique. In my case report a middle-aged patient had come to the department of periodontology with a chief complaint of missing left posterior molar. Since her showed only 4 mm bone below the sinus in #26 region, direct sinus lift procedure was done for placement of a dental implant. To stabilize the implant in the maxillary sinus region and also to stimulate bone regeneration BIO-OSS xenogenic bone graft was used. Radiographs were taken 7 months after implant placement which showed good bone growth over the implant collar. Bone formation in the maxillary antrum was seen clearly in the panoramic radiograph. **Discussion** Chiriac et al., in his research had shown that the healing process after the surgical procedure is facilitated with the use of piezoelectric surgery and reduces inflammatory reaction when the graft is healing, which helps in stabilizing the live bone tissue after it has been grafted. **Conclusion** Using piezosurgical unit, sinus lift procedure with sinus grafting proved to be less traumatic and more successful.

KEYWORDS

Sinus Lift, Direct Sinus Lift, Piezosurgical Unit, Bone Graft, Implants

INTRODUCTION:

Dental implant has become a useful and common treatment for the restoration of missing tooth. Furthermore, implant placement in the maxillary molar region is relatively tough, because of its bone quality, quantity and anatomical structure around it. Thus, implant placement in this area can be difficult or even impossible. Several techniques have been developed to enter this cavity and elevate the membrane to enable implant placement.

These methods may involve the use of bone grafts and membranes, and simultaneous implant placement. Sinus lift is generally performed before or along with implant placement using the lateral window or crestal approach to increase the amount of bone and improve the implants fixation. It is a procedure that allow the formation of new bone improving primary stability and future osseointegration.[1,2,3]

The two main ways to access the maxillary sinus cavity in order to lift Schneiderian membrane are: The lateral approach is the most known despite being, invasive, complicated and long-lasting procedure and the osteotome sinus floor elevation (OSFE) which was first introduced by **Tatum (1986)**.

Implant placement can be combined with sinus augmentation as a "one-stage" technique. On the other hand, sinus augmentation may be carried out sometime before implant "two-stage" technique can also be done in which sinus augmentation can be done prior to the implant placement, which requires an additional surgery.[4,5]

Also, several studies have shown that placement of implants in the maxillary region with resultant successful osseointegration can be achieved by the use of sinus lift procedures using piezosurgical technique. [6]

In our first case, a middle-aged patient had come to the Department of Periodontology with a chief complaint of missing left posterior molar. Since her CBCT showed only 4 mm bone below the sinus in #26 region, direct sinus lift procedure was done for placement of a dental implant.

While in our second case, a middle-aged patient had come to the Department of Periodontology with a chief complaint of retained deciduous tooth. Since his CBCT showed only 3.5 mm bone below the sinus in #15 region, direct sinus lift procedure was done for placement of a dental implant.

Case Report:

Case 1:

A female patient, aged 54 years came to the Department of Periodontology, at College of Dental Sciences and Research Centre, Ahmedabad, Gujarat, with the chief complaint of missing upper left and right back tooth region and finding difficulty in chewing. History revealed that the teeth were extracted due to caries couple of years back and wanted to replace them with the fixed option. On clinical examination, teeth no. #26 was missing. The cone beam computed tomography (CBCT) findings showed that the bone height was insufficient i.e., 4 mm [Figure 1] and therefore, the direct sinus lift was planned with the immediate placement of implant i.r.t. 26. Blood investigations were done, and informed consent was taken after discussing the treatment plan with the patient.

Alginate impression was recorded, and presurgical diagnostic casts were prepared. In the cast, the interocclusal distance was measured, and the treatment plan was discussed with the patient.

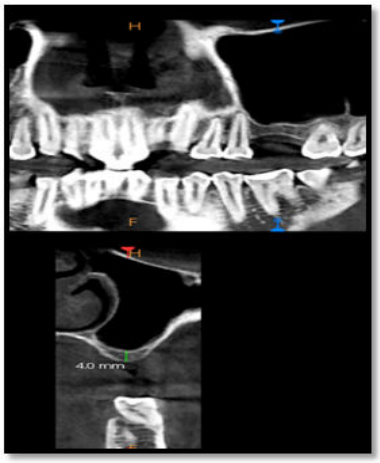

Figure 1: Pre-operative CBCT

Surgical Phase:

Preparation of the patient was done prior to the surgery. Patient's maxillary posterior segment was anesthetized with buccal and palatal infiltration using local anesthesia of 2% lignocaine with 1:80,000 adrenaline [Figure 2]. Once the patient was anesthetized, an incision was made using #15 surgical blade and extending from the distal surface of 2nd premolar to the mesial surface of 2nd molar [Figure 3]. Vertical incisions were given extending until the end of the buccal vestibule. A full thickness buccal flap was raised, and a bony window was created using Piezo-surgical unit in this patient.

Figure 2: Pre-operative View

Initially bone marking was done using tip #BS5, then it was deepened using #SL1 and #SL3 tips in both the patients [Figure 4]. Sinus curette was used to lift the lining of the window [Figure 5]. The osteotomy site was prepared in a usual way, protecting the sinus lining from the damage with implant drills [Figure 6]. Neodent implant was then placed i.r.t. 26.

Figure 3: Incision & Reflection

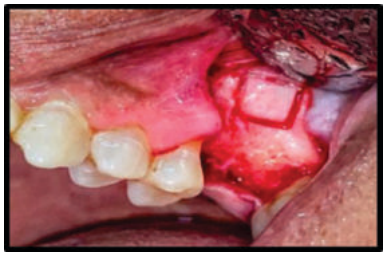

Figure 4: Creating Window by BS5 and Deepening by SL3 Inserts

Figure 5: Lifted by Sinus Curettes

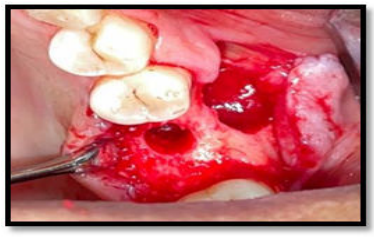

Figure 6: Final Osteotomy Site

Figure 7: Implant Placed with Bio-Oss Graft

Figure 8: Periocol Membrane was Placed

Figure 9: Suturing

Figure 10: Follow up after 7 Months

Figure 11: Final Prosthesis in #26

Figure 12: Final Prosthesis RVG

Once the implant was placed, the remaining space was filled with bone graft (Bio-Oss, Geistlich) in this case [Figure 7]. This was then stabilized with a bio-resorbable collagen membrane (PerioCol-GTR, Eucare) [Figure 8]. Flaps were approximated and the primary sutures were placed using non-absorbable silk sutures [Figure 9]. Patient was given post-operative antibiotic and anti-inflammatory medications. After post-operative instructions were given, the patient was recalled after 10 days for re-evaluation and suture removal.

After a healing period of 3 months of implant placement, the implant sealing screw (cover screw) was removed and a gingival former (GH) was placed in this patient [Figure 10]. The final prosthesis was delivered at 7 months [Figure 11]. Radiograph was taken after the prosthesis was given [Figure 12]. Increase in the bone height was seen after 7 months [Figure 13 & 14].

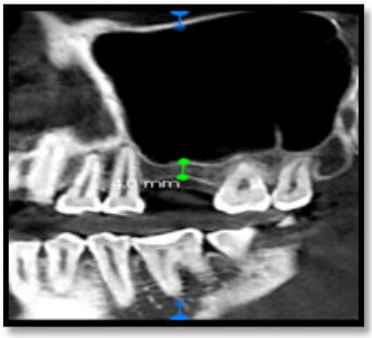

Figure 13: Pre-Operative Bone Height CBCT

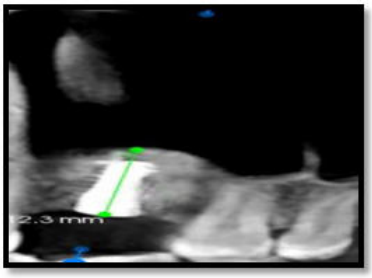

Figure 14: Post-Operative Bone Height CBCT

Case 2:

A male patient, aged 35 years reported to the Department of Periodontology, at College of Dental Sciences and Research Centre, Ahmedabad, Gujarat, with the chief complaint of retained deciduous tooth in the upper right back tooth region. On clinical examination, tooth #D was present in first quadrant. The CBCT findings showed that the bone height was insufficient i.e., 3.5 mm [Figure 15] and so similarly in this patient, the direct sinus lift was planned with the immediate placement of implant i.r.t. 15. Blood investigations were done, and informed consent was taken after discussing the treatment plan with the patient.

Alginate impression was recorded in the same way, and presurgical diagnostic casts were prepared. In the cast, the interocclusal distance was measured, and the treatment plan was discussed with the patient.

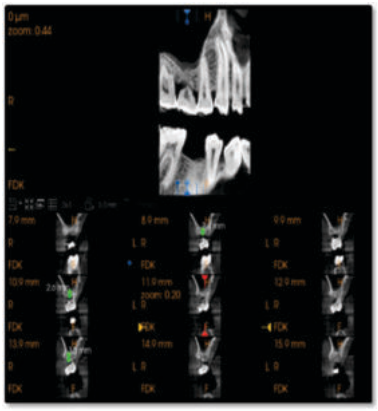

Figure 15: Pre-operative CBCT

Surgical Phase:

Preparation of the patient was done prior to the surgery. Similarly, in this patient the maxillary posterior segments were anesthetized with buccal and palatal infiltration using local anesthesia of 2% lignocaine with 1:80,000 adrenaline [Figure 16]. Once the patient was anesthetized, in this patient, the incision was extended from distal surface of 1st premolar to mesial surface of 1st molar. Vertical incisions were given extending until the end of the buccal vestibule. A full thickness buccal flap was raised, and a bony window was created using Piezo-surgical unit [Figure 17].

Figure 16: Pre-operative View

Initially bone marking was done using tip #BS5, then it was deepened using #SL1 and #SL3 tips in this patient [Figure 18]. Sinus curette was used to lift the lining of the window [Figure 19]. The osteotomy site was prepared in a usual way, protecting the sinus lining from the damage with implant drills [Figure 20]. Neodent implant was then placed i.r.t. 15.

Figure 17: Incision & Reflection

Figure 18: Creating window by BS5 and deepening by SL3 inserts

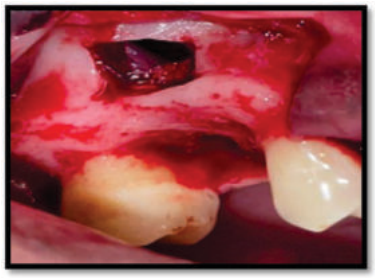

Figure 19: Schneiderian Membrane lifted by Sinus Curettes

Figure 20: Final Osteotomy Site

Figure 21: Implant Placed with Bio-Oss Graft

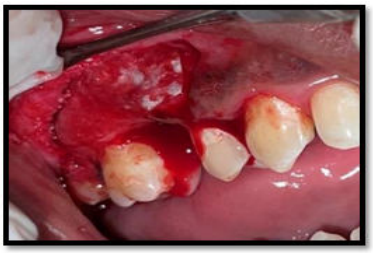

Figure 22: PRF Membrane placed

Figure 23: Suturing

Once the implant was placed, the remaining space was filled with bone graft (Bio-Oss, Geistlich) [Figure 21]. This was then stabilized with a PRF membrane [Figure 22]. Flaps were approximated and the primary sutures were placed using non-absorbable silk sutures [Figure 23]. Patient was given post-operative antibiotic and anti-inflammatory medications. After post-operative instructions were given, the patient was recalled after 10 days for re-evaluation and suture removal.

After a healing period of 3 months of implant placement, the implant sealing screw (cover screw) was removed and a gingival former (GH) was placed [Figure 24]. The final prosthesis was delivered at 8 months [Figure 25]. Radiograph was taken after the prosthesis was given [Figure 26].

Figure 24: Follow up after 8 Months

Figure 25: Final Prosthesis in #15

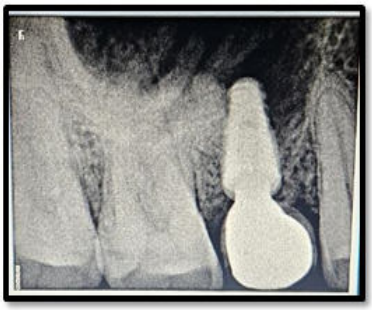

Figure 26: Final Prosthesis RVG

DISCUSSION:

Compared with anterior region, the tooth loss in the molar area is higher due to caries, periodontal diseases, mastication or several other reasons. Also, the bone quality of maxilla is poorer than that of mandible, atrophy of maxillary alveolar ridge will be much more. To avoid these complications, maxillary sinus lift along with bone graft should be done. Sinus floor elevation with bone augmentation of the maxillary sinus is now well-accepted procedures which are used to increase bone volume in the posterior maxilla.

In these two cases, on CBCT examination, the available bone height in Case 1 was found to be only 4 mm while in Case 2 it was 3.5 mm from the sinus lining. Hence, direct sinus lift using piezosurgical approach following immediate implant placement was planned.[7] This technique prevents perforation of the "Schneiderian Membrane" and cause minimal postoperative complications. In piezosurgery the cutting tip is inactive when it comes in contact with the soft tissue so its damage is not seen. Short- to long-term clinical studies of dental implants placed into grafted sinus shows high survival rate than without a sinus augmentation procedure.[8]

CONCLUSION:

Even though the placement of implants can be tough at times due to compromised situations, and using the several techniques to provide a good treatment outcome. Sufficient bone density is required for the placement of dental implants in edentulous areas in maxillary posterior region. In these cases, with reduced vertical bone height and sinus pneumatization, we planned for direct sinus lift using piezosurgical approach allowing sinus membrane integrity to be maintained during the surgical procedures when compared to conventional techniques. The success of the dental implant with sinus augmentation mainly depends on the skill of the operator, also the adequate preoperative treatment planning is important and the technique which is used to place an implant and the type of graft material used.

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REFERENCES:

1. Vidhya G, Nesappan T. A piezoelectric surgery for direct sinus lift with immediate implant placement. J Dent Implant 2016; 6:79-84.
2. Tasoulis G, Yao SG, Fine JB. The maxillary sinus: Challenges and treatments for implant placement. Compend Contin Educ Dent 2011; 32:10-4, 16, 18-9.
3. Nedir R, Nurdin N, Szmukler-Moncler S, Bischof M. Osteotome sinus floor elevation technique without grafting material and immediate implant placement in atrophic posterior maxilla: Report of 2 cases. J Oral Maxillofac Surg 2009; 67:1098-103.
4. Marx RE, Garg AK. A novel aid to elevation of the sinus membrane for the sinus lift procedure. Implant Dent 2002; 11268-71.
5. Jurisic M, Markovic A, Radulovic M, Brkovic BM, Sándor GK. Maxillary sinus floor augmentation: Comparing osteotome with lateral window immediate and delayed implant placements. An interim report. Oral Surg Oral Med Oral Pathol Oral Radiol Endodontol 2008; 106:820-7.
6. Cha HS, Kim A, Nowzari H, Chang HS, Ahn KM. Simultaneous sinus-lift and implant installation: Prospective study of consecutive two hundred seventeen sinus lift and four hundred sixty-two implants. Clin Implant Dent Relat Res 2014; 16:337-47.
7. Purushotham S, Raveendran AM, Kripalani BK, D'Souza ML. Direct sinus lift and immediate implant placement using piezosurgical approach - A case report. J Clin Diagn Res 2016; 10: ZD 20-2.
8. Johansson LA, Isaksson S, Lindh C, Becktor JP, Sennerby L. Maxillary sinus floor augmentation and simultaneous implant placement using locally harvested autogenous bone chips and bone debris: A prospective clinical study. J Oral Maxillofac Surg 2010; 68:837-44.