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Case Report

Implant Placement in Posterior Maxillary Ridge after graftless Indirect Sinus Lift: A Case Report

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ABSTRACT:
The posterior maxilla presents several challenges to the implantologist. Implant dentistry has become an excellent treatment modality since its inception into the modern era of dentistry. When patients present with deficient alveolar ridges, it could jeopardize the application of implant dentistry. This problem is especially magnified in the posterior maxilla where ridge resorption and sinus pneumatization are often encountered. The procedure of choice to restore this anatomic deficiency is maxillary sinus floor lift up. The indirect approach for sinus lift is less invasive and less complex and therefore a better alternative for such cases. In the present case closed sinus floor elevation method without the use of any bone graft or bone augmentation material was done and the result was satisfactory.
Key words: Maxillary sinus floor lift up, Implant, Indirect approach, Posterior maxilla, Implant.

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INTRODUCTION

The complex clinical challenges which must be overcome when attempting to reconstruct the posterior maxilla utilizing implant supported fixed prostheses [1-3] has given rise to a number of innovative surgical and restorative techniques. An important requirement for the correct placement of the implant is the presence of an adequate quantity and quality of residual bone. [4] As compared to the other areas of the mouth, the posterior edentulous maxilla presents a special challenge to the implantologist with the presence of maxillary sinus. As the edentulous area continues to atrophy, there is a continuing loss of bone height and density and an increase in antral pneumatization.[5,6] It is therefore common to find the sinus floor close to the alveolar crest. This finding is related to two phenomena: (1) The enlargement of the sinus at the expense of the alveolus after tooth extraction because of the increased osteoclastic activity of the periosteum of the Schneiderian membrane[7] and (2) increased pneumatization of the sinus because of the increase in positive intra-antral pressure.[8]

Two different techniques of sinus augmentation are described in the literature: Direct[9] and Indirect.[10-11] The indication for indirect sinus augmentation is a minimum bone thickness of 5 mm underneath the sinus; otherwise, the direct sinus floor augmentation or a 2-stage indirect augmentation technique must be implemented.[12] The indirect approach being less invasive is more preferred over the direct one.[13] This case report describes one such indirect approach for maxillary sinus lift up in which implant placement was carried out simultaneously with elevation of the sinus floor.

CASE REPORT

A 72year old lady presented with chief complaint of difficulty in chewing from right side because of a loss of teeth in right upper back region. She had under gone removable prosthetic option over the time again and again, but to no avail. She wanted fixed prosthetic option to get rid of this problem. No significant medical and personal history was reported. Intraoral examination revealed missing molar on upper right side with opposing fixed prosthesis. She had good healthy and even alveolar ridge without any spicules and devoid of any lesion. Patient was advised to undergo detailed radiographic examination for further evaluation (Figure 1). On radiographic examination OPG revealed

atrophic maxilla with dipping of maxillary sinus bilateral. On preoperative RVG assessment, a residual bone height in edentulous region was found to be around 7-8mm from the maxillary sinus lining (Figure 2). Various other criteria such as position of the implant, pre-existing tooth form, its relation with the opposing arch, maxillary sinus anatomy and bone dimensions were considered (Figure 3). After thoroughly oral radiographic examination two stage surgery was planned. It was decided to lift the sinus lining with an indirect approach through alveolar crest and simultaneously placement of implant. The treatment was phased out in following manner.

1. Under strict aseptic environment and proper antibiotic coverage, Dexona (2ml) as premedication was given intramuscularly 1 hour prior to surgery.
2. After proper draping with sterile sheets, local anesthesia in the required area was given. A midcrestal, full- thickness incision was performed . A full – thickness flap was reflected.
3. Osteotomy was started with lanc drill which was stopped 1mm short of sinus floor (Figure 4). A drill speed 800 rpm along with copious sterile saline irrigation was used. Then successive twist drill of 2mm were used to prepare osteotomy 1mm short of the sinus floor.
4. Concave shaped osteotome 2.65mm was used to infracture the sinus floor (Figure 5) and attain a lift of 2mm. The osteotomy was further widened using successive osteotomes of larger sizes. The final osteotomy site was prepared upto a diameter 3.65mm using concave osteotome of the same diameter. The osteotomy was prepared using osteotomes in order to compress the bone and was kept smaller than the implant size in order to achieve primary stability. The surgical approach compressed the bone below the antrum caused a green stick type fracture in antral floor and slowly elevated the unprepared bone and sinus membrane over the broad- based osteotome. No intervening graft material was used.
5. ADIN 4.2 D / 8L mm implant was placed. A final torque of 30Ncm was attained (Figure 6).
6. For the second site drill of 2mm was used to engage the septa. Same protocol as explained for the first implant was used (Figure 7).
7. After placing chlorhexidine gel in the implants, the cover screws were placed(Figure 8).
8. After 10 days sutures were removed. There were no sinus related complications and no other complications related to the procedure. After 6 months prior to implant exposure, radiograph was taken so as to check for osteointegration (Figure 9) after satisfactory results the implant was exposed and covered with the gingival former so as to get the proper contour of the gingiva (Figure 10).
9. After two weeks 15 degree angulated abutments were chosen and a direct impression was made using the triple tray technique. So as to register the impression and the bite registration together. Transfer coping could not be used because of angulation of implant (Figure 11).
10. The implant supported cement retained metal ceramic fixed prosthesis was fabricated (Figure 12A & Figure 12B).

Figure 1: PRE – OP OPG

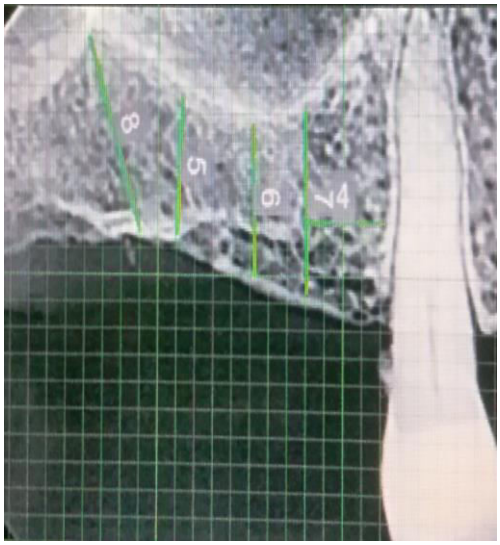

Figure 2: Pre – OP RVG ASSESMENT

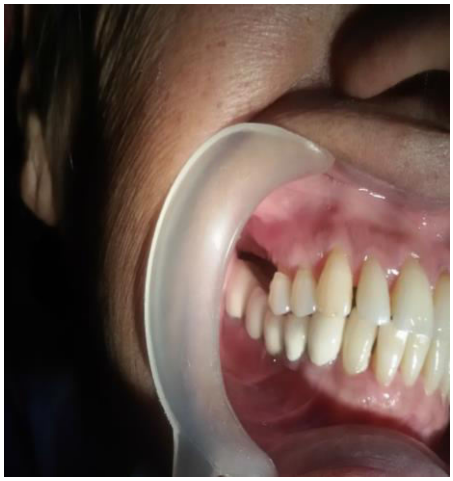

Figure 3: PRE – OP OCCLUSION

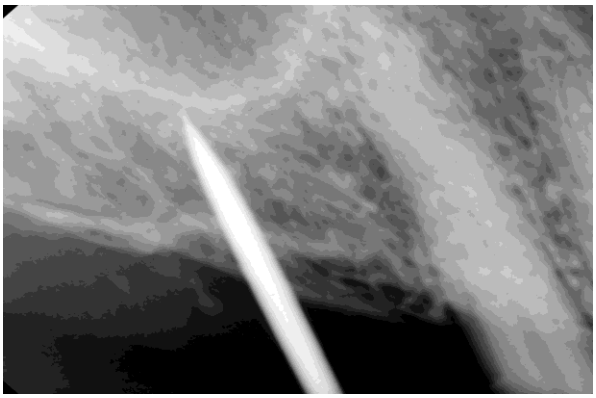

Figure 4: CORTICAL DRILL 1 mm SHORT OF SINUS FLOOR

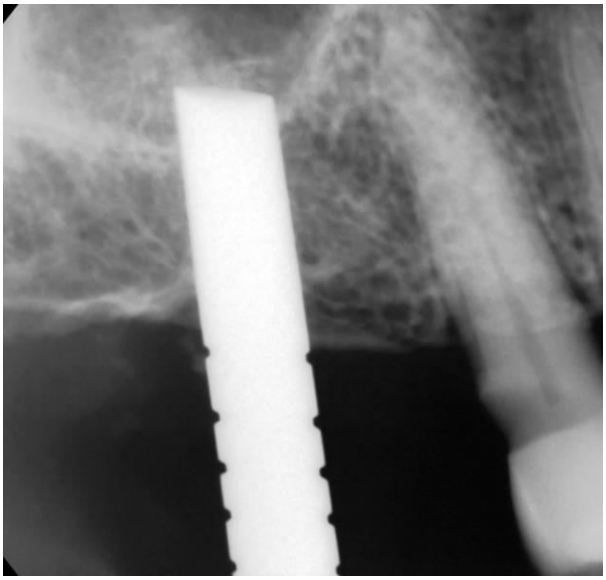

Figure 5: INFRACTURE OF THE SINUS FLOOR WITH OSTEOTOME

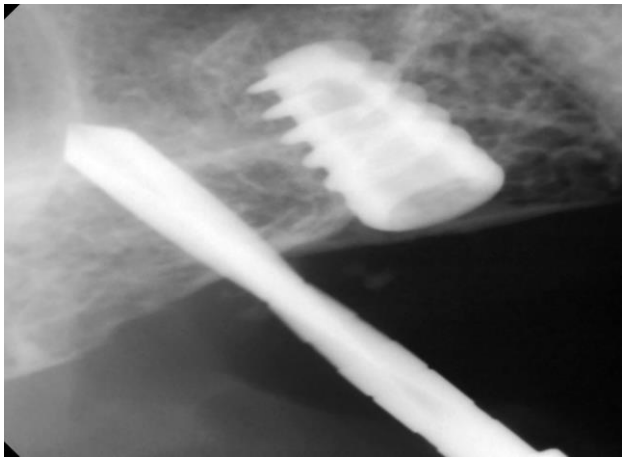

Figure 6: ADIN 4.2D/8L mm IMPLANT PLACED DRILL FOR 2ND IMPLANT ENGAGING THE SEPTA

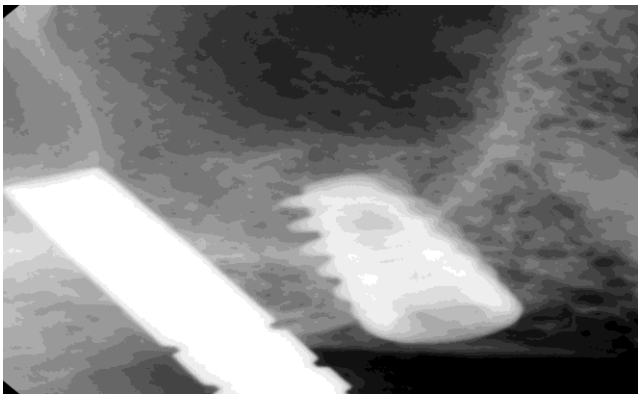

Figure 7: OSTETOMY AND THE SINUS LIFT CAN BE WELL APPRECIATED

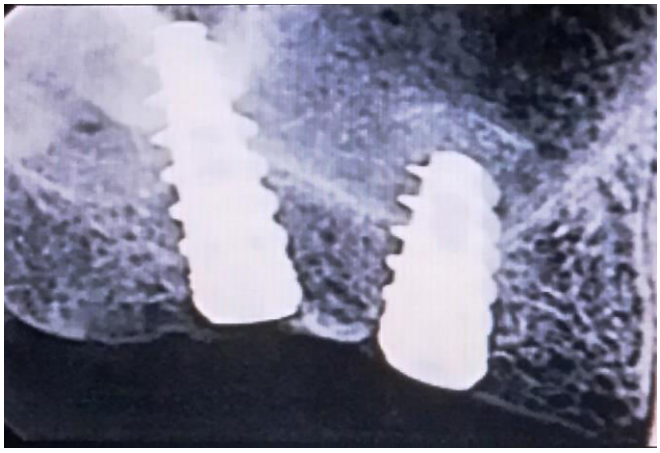

Figure 8: FINAL PLACEMENT ADIN 4.2D/8L & 4.2D/10L IMPLANTS

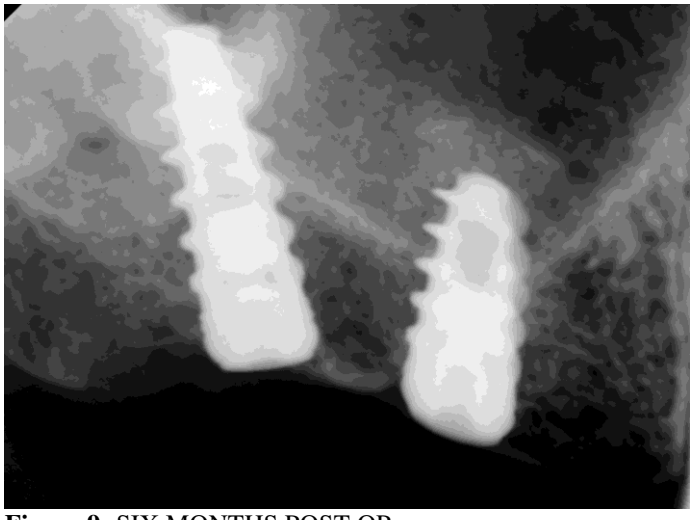

Figure 9: SIX MONTHS POST OP

Figure 10: LOADING PHASE

Figure 11: ABUTMENTS PLACED AT FINAL SEATING TORQUE OF 30 NCM

Figure 12 A: POST – OP

Figure 12 B: POST – OP

Patient was instructed about the maintenance of oral hygiene by means of dental floss, interdental brush and mouth wash. Also the patient was called upon for recall visits after 1 week, 1 month and 3 months.

DISCUSSION

The maxillary posterior edentulous region presents many unique and challenging conditions in implant dentistry. The most important among these is the presence of maxillary sinus. An adequate quality and quantity of bone is required for successful implant therapy.

The schneiderian membrane which lines the sinus is adherent to the underlying bone. The structure beneath the sinus consists of the alveolar ridge and the posterior maxillary teeth. As the edentulous area continues to atrophy there is a continuing loss of bone height and density and increase in antral pneumatisation. It is therefore common to find the sinus floor close to the alveolar crest. To increase the amount of bone in the maxilla sinus lift procedure have been developed

The most widely used approaches for sinus lift are:

- Direct approach which includes approaching the sinus laterally using either one step or two step antrostomy
- The indirect approach which include approaching the sinus through alveolar crest using an osteotome.[12]

In Indirect approach the endosteal implant osteotomy is prepared as determined by the density of bone protocol, which is usually D3 bone. The depth of the osteotomy is approximately 1 to 2 mm short of the floor of the antrum. The implant osteotomy is prepared to the appropriate final diameter, short of the antral floor, following the established protocol for bone density. A flat-end or cupped-shape osteotome of the same diameter as the final osteotomy is selected. The osteotome is inserted and tapped firmly in 0.5- to 1.0-mm increments beyond the osteotomy until reaching its final vertical position, up to 2 mm beyond the prepared implant osteotomy. A slow elevation of the sinus floor is

less likely to tear the sinus mucosa. This surgical approach compresses the bone below the antrum, causes a greenstick-type fracture in the antral floor, and slowly elevates the unprepared bone and sinus membrane over the broad based osteotome.[14]

Hanan MR Shokier and Naglla shawky in 2009 conducted a study to evaluate the success rate of closed sinus lift with simultaneous implantation at 60 months postoperatively. The result of the study showed that at the end of the followup period all implants showed proper osseointegeration, the bone density and height below elevated sinus lining increased in both grafted and ungrafted sides. The increase in the grafted side was not significant.[12]

Professor Sohn of Seoul University has established that graft less maxillary sinus lifts could lead to alveolar bone formation around implants provide as long as tenting is achieved and provided sinus lining is maintained intact. This has been done by Stefan Lundgren et al as well as Hanan M.R Shokier and Naglaa Shawky. Animal studies also confirm graftless sinus lifts also can form bone below the lining. Lundgren also showed that though tenting with machined implants may encourage bone formation in the sinus, an implant with specially treated / created implant surface attracted more bone and encouraged bone apposition all around it. Prof. Lundgren over and above attributed the success of bone formation to what he calls "replaceable bony window" in which he replaced the bone window flap into the place from where he had removed it. Though this was not done in the case presented above bone formation did take place quite well.[15]

Considering all these factors, the present case report evaluated the closed sinus floor elevation method without the use of any bone graft or bone augmentation material. In this case report, the radiographic examination revealed sinus to be 6 mm and 8 mm from the alveolar ridge. ADIN Touareg S implants of size 4.2D/8L and 4.2D/10L were used after elevation of sinus lining. Around 2 mm of rise in the sinus membrane was done so that after placement of implant, sufficient amount of space remains between the implant and sinus membrane. The advantages of using indirect method over the direct one is that this procedure is less complex, less invasive and have a shorter healing and waiting period.

The advantage of not using graft is that the procedure is less time-consuming, and comparatively inexpensive. Morbidity is lower than autogenous bone grafting since no extra graft material is needed.[12]

CONCLUSION

Even though there are various treatment modalities to restore the posterior maxilla like direct sinus lift, bone augmentation and use of bone grafts etc. The goal of an indirect sinus lift technique without graft placement is to reduce the number of surgical procedures and to shorten the time-frame between surgery and restoration placement without compromising the implant success rate. Even in compromised situation, by good evaluation of both patients desires and the available possibilities and by choosing suitable technique, keeping the technique as simple as possible, the likelihood of success increases greatly.

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