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Case Report

Maxillary sinus lifting using Osseodensification: Cynosure of the implant domain

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ABSTRACT

The posterior maxilla is indubitably the site reported with highest failures in implant literature so far as the bone availability beneath the sinus poses a major challenge for surgeons. Sinus lift both by direct and various indirect accesses were hitherto utilized to counter the compromising situation. But the risk of implant failure if the implant was simultaneously placed besides the parasthesia, perforation and morbidity were experienced more with more the cases documented. The osseodensification(OD), a relatively new technique provides a minimally invasive approach along with feasibility where the above-mentioned other modalities are contraindicated. The present article presents the novel case of indirect sinus lift with OD concept and simultaneous implant placement using an adjunct PRF (Platelet-rich fibrin).

1. Introduction

The goal of traditional prosthesis is to achieve the normal function, esthetics, comfort and speech, but the same is seldom restored for an edentulous patient.[1] Due to the high success rates, the dental implant rehabilitation is a recognized preferred solution for several patients today.[2] Highest levels of success rate are reported in anterior mandible, followed by the posterior mandible and anterior maxilla. The maxillary sinus retains its overall size during functioning dentition, however the ensuing osteoclastic activity on tooth loss causes both lateral, as well as inferior expansion. Unequivocally, the posterior maxilla has the lowest success of any region.[3]

A noteworthy limitation in the implant realm is pneumatization occurring at the cost of alveolar ridge height beneath the maxillary sinus,[4] as per the ample acoountabilities in this context. Also, both the internal and external bone architecture are impacted andthe compromised bone may cause both early and late failures. [5]Surgically manoeuvring the crestal sinus floor elevation (SFE), in turn effectively increases the height of bone available, wherein osseous biomaterials are condensed beneath the Schneiderian membrane. This approach can gain upto 5.0 mm in height within the sinus contemporaneous with implant placement.[5]

The Standard drilling (SD) served to prepare and cut bone for fixture installation so far. Relatively recent introduction is the Osseodensification (OD) technique, which takes advantage of the rotary densifying drills (Figure 1a,b) and thence both preserving and compacting the bone at site.[6] Bothmaintenance and conservation of bone during osteotomy preparation, hence improves upon the primary stability, which then enhances implant secondary stability.[6,7] The present article reports the novel case of indirect sinus lift using OD concept with simultaneous implant placement along with an adjunct PRF (Platelet-rich fibrin).

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2. Case Report

A fifty-five-year-old male with a healthy lifestyle devoid of smoking and oral parafunctional habits, such as teeth clenching visited the dental research centre, New Delhi with a desire to replace the tooth 17(Figure 2a), lost six months ago. All relevant investigations were done and no history of chronic sinusitis or long-standing nasal obstruction was noted. X rays and Computerized tomographic (CT) scan revealed (Figure 2b,c) an adequate bucco-lingual cortical bone width. Although, the separation between sinus floor and outer crest in the region of interest was assessed as less than 4 mm (Figure 2d), yet it was decided to perform the installation of implant of length 10 mm. Antibiotic prophylaxis was initiated one day preoperatively.

Upon explanation of the detailed procedure using audio-visual aids, the informed consent was obtained from the patient. Pre-procedurally, he was subjected to extraoral scrubbing and intraoral rinsing with chlorhexidine. The no. 15 Bard parker blade was used to give the required horizontal and circumcisional incisions under the appropriate anaesthetization for full- thickness flap elevation. To start with, the pilot bur was fitted onto the gear-reduction handpiece motor and moved in Clockwise fashion upto 1 mm distant from the sinus floor followed by the Densah^{TM} Bur (Figure 2e) at 900 rpm speed. Vertical orientation of the first bur (Figure 2f) was confirmed on the radiograph. As per the manufacturer's instructions, sequential widening (Figure 2g) was done turning over the drill motor to counter clockwise mode. This led to an added vertical depth by lifting the Schneiderian membrane 1mm incrementally, thanks to the gentle pumping motion at same speed. The stratagem was performed throughout with an intermittent pressure of 1 second on the bone and 1 to 2 seconds off the bone under copious saline irrigation.

Next, the patients' median cubital venous blood was drawn in a test tube and centrifuged in a Process TM, France assemblage emulating a standard protocol. (Figure 2h) The spin-off was perceived as three layers in following order top downwards; plasma, PRF and red corpuscular layer. The procured PRF clot mixed with the graft NB Dental Morsels, NovaBone® was placed as a sticky bone (Figure 2i) into the final width osteotomy (Figure 2j), warily with a drill speed 200-600 rpm and gentle pumping motion. As planned, insertion of 3.75 mm × 10 mm implant, removed from sterile vial (Figure 2k) drove the material into the final desired depth (Figure 2l) under 35 rpm. Upon ensuring a 25 Ncm torque stability (Figure 2m), a healing abutment was tightened with a hex driver (Figure 2n) over it and the site was sutured finally. Post-operative prescription for accelerated healing included analgesics, mouthwashing, Blue ®m oral gel application thrice daily and antibiotics for a week.

Fig. 1: a: Densah^{TM} Bur used for the study; **b:** Osseodensification cutting concept

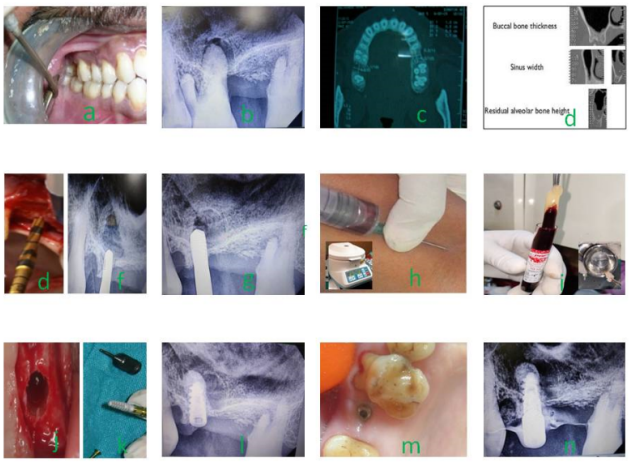

Fig. 2: a. preoperative; **b:** preop xray; **c:** preop CT Scan; **d:** Residual bone height; **e:** First Densah^{TM}Bur; **f:** Xray-first Bur position; **g:** Xray-Sequential bur in densifying mode; **h:** PRF & centrifuge protocol; **i:** sticky bone prepared; **j:** Final width osteotomy; **k:** Implant planned; **l:** Implant inserted; **m:** postoperative; **n:** Healing abutment for prosthesis.

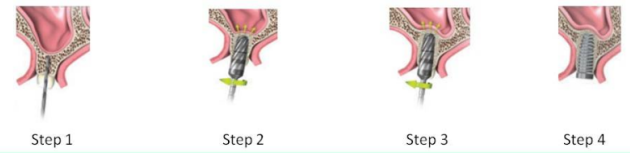

Fig. 3: Implant placement & sinus lift by densification

3. Discussion

Altering the maxillary anatomy and lifting sinus floor was first reported by the Boyne in 1960. Thereafter, various intra crestal SFE techniques were proposed including bone condensation by Summer's osteotomes, ballooning and Chen & Cha's hydraulic condensing technique, to name a few. Although an augmented elevation enables installation of standard- length fixture onto the corrected bone height at sinus proximity, the subject is surely

put through the prospects of parasthesia, perforation; and resulting morbidity. Moreover, the insertion of implants using osteotomes is technique sensitive and often results in microfractures in the peri-implant bone, thus jeopardizing the osseointegration (OI). Besides, an implant diagnosed as a clinical failure is easier to describe than one that is a success.[8] The absence of smoking and bruxism was taken into account in our case during case selection as its detrimental to osseointegration right from early healing stage.[9] Recent scientific documentation regarding certain short-length implants[9] have presented to bypass the SFE necessitation and are predictable alternative, as well.

Implant stability is pivotal for OI and the determining factors are bone density, surgical protocol, and implant thread type, and geometry.[3,8] Furthermore, accomplishment of a direct bone to –implant interface is the ultimate goal in implant dentistry.[10] In fact, a 100% success was demonstrated on low density jaw bones previously,[8] by virtue of an increased bone-to-implant -contact (BIC). SD for osteotomy preparation works by cutting the bone in order to create an implant site according to the implant's shape and diameter. Eventually, it brought about lowering of the insertion torque and circumstantially jeopardizing the implant stability.[6]

On the contrary, the OD technology uses tapered, multi-grooved burs in the counterclockwise direction (Figure 1 a, b) that favorably undersizes the implant bed preparation. It is hypothesized that osseous structure would be pushed upwards raising the sinus membrane in an outwardly expanding direction (Figure 3). The same was evident on stage-by- stage radiographs. (Figure 2 f,g,l,n) All the intraoral radiographs in our case were standardized as exemplified in earlier research.[8]It is interesting to note thatan increase in the bone area fraction occupancy was observed as a secondary finding in a very recent systemic literature review.[11] Nonetheless, few further long term randomized evidences are needed to assist in establishing the needed veracity in this direction.

4. Conclusion

OD preserves bone by facilitating the vertical residual ridge expansion in the osteotomy site. The explicated implant methodology is considerably feasible in dental clinical set-up for its ease and non-invasiveness.

4.1. Clinical significance

Dental profession is challenged with ever increasing demand for permanent prosthetic rehabilitation in jaw bone sites with marked limitation. OD demonstrated in our study provides a choice of modality in SFE for apprehensive patients and where lateral- approach sinus- invasiveness is contraindicated.

5. Conflict of Interest

The authors declare that there is no conflict of interest with regards to this case report.

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None.

References

1. Misch CE. Rationale for dental implants. In: Misch C, editor. Contemporary Implant Dentistry. St. Louis, Mosby; 1999. p. 3–12.
2. Mendonca G, Mendonca GB, Fernandes-Neto AJ, Neves FD. Management of Fractured Dental Implants; A Case report. *Implant Dent*. 2009;18(1):10–6. doi:10.1097/ID.0b013e318192cafe.
3. Misch CE. Density of bone: effect on treatment plans, surgical approach, healing, and progressive loading. *Int J Oral Implant*. 1990;6(2):23–31.
4. Ulm CW, Solar P, Krennmair G, Matejka M, Watzek G. Incidence and suggested surgical management of septa in sinus-lift procedures. *Int J Oral Maxillofac Implants*. 1995;10(4):462–5.
5. Tan WC, Lang NP, Zwahlen M, Pjetursson BE. A systematic review of the success of sinus floor elevation and survival of implants inserted in combination with sinus floor elevation. Part II: Transalveolar technique. *J Clin Periodontol*. 2008;35(1):241–54.
6. Huwais S, Meyer EG. A novel osseous densification approach in implant osteotomy preparation to increase biomechanical primary stability, bone mineral density, and bone-to-implant contact. *Int J Oral Maxillofac Implant*. 2017;32(1):27–36.
7. Trisi P, Perfetti G, Baldoni E, Berardi D, Colagiovanni M, Scogna G, et al. Implant micromotion is related to peak insertion torque and bone density. *Clin Oral Implants Res*. 2009;20(5):467–71.
8. Munjal S, Munjal S, Hazari P, Mahajan H, Munjal A, Mehta DS, et al. Evaluation of specifi cally designed implants placed in the low-density jaw bones: A clinico-radiographical study. *Contemp Clin Dent*. 2015;6(1):40–3. doi:10.4103/0976-237X.149290.
9. Munjal S, Short MS. 0 x 5.0 mm) Dental Implant Placement: A Case Report with 3 Year Follow Up. *Mod App Dent Oral Health*. 2019;4(5):316–9.
10. Munjal S, Munjal S. Immediate implant loading: current concepts: a case report. *J Orofac Res*. 2011;1:34–8.
11. Padhye NM, Padhye AM, Bhatavadekar NB. Osseodensification – A systematic review and qualitative analysis of published literature. *J Oral Biol Craniofac Res*. 2020;10(1):375–80.

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