Acta Scientific DENTAL SCIENCES (ISSN: 2581-4893)

Volume 4 Issue 12 December 2020

Review Article

Crestal Sinus Lift Using Osseodensification Burs: Clinical Cases

Cardarelli Angelo[1]* and Arun K Garg[2]

[1] *Specialist in Oral Surgery, Adjunct Professor, Department of Dentistry, San Raffaelle University of Milan IRCCS, San Raffale Hospital, Italy*

[2] *Former Professor of Surgery, Division of Oral and Maxillofacial Surgery, Department of Surgery School of Medicine, University of Miami Florida, USA*

***Corresponding Author:** Cardarelli Angelo, Specialist in Oral Surgery, Adjunct Professor, Department of Dentistry, San Raffaelle University of Milan IRCCS, San Raffale Hospital, Italy.

DOI: 10.31080/ASDS.2020.04.0992

Received: November 05, 2020

Published: November 30, 2020

Abstract

The purpose of this work is to present an alternative technique to normal sinus lift in the upper jaw with minimal invasive approach in order to reduce biological costs using the osseodensification mode. Infact following this technique is possible at the same time place the implant with high primary stability and increase the vertical bone height with and without bone graft. Compared to the traditional technique like lateral sinus lift or crestal approach with manual osteotomes, this procedure is less invasive and more predictable and precise.

Keywords: Osseodensification; Crestal Sinus Lift; Sinus Membrane; Bone Graft; Osseointegration

Introduction

The traditional burs work cutting the bone in order to create an implant site according to the implant's shape and diameter. In these circumstances, the implant insertion torque is reduced leading to poor primary stability and potential lack of integration [1-5]. Unlike traditional bone drilling technologies, osseodensification does not cut the bone tissue. It preserves bone, so bone tissue is simultaneously compacted and autografted in an outwardly expanding direction to form the osteotomy. It is possible using the counterclockwise direction under saline irrigation. As we know the primary stability, is a crucial factor to achieve implant osseointegration. High primary implant stability is even more necessary in immediate loading protocols, and it was reported that an implant micromotion above 50 to 100 mm could induce periimplant bone resorption or implant failures. The factors that mainly involved in enhancing implant primary stability are bone density, surgical protocol, and implant thread type, and geometry.

Compared to the traditional sinus floor augmentation with lateral approach and crestal approach using the manual osteotomes, this procedure is more precise and less invasive allowing to preserve the sinus membrane also in very important vertical augmentation.

Our previous cases report involved a Sinus elevation and implant placements in the maxilla using osseodensification approach and bone graft [6-12].

The purpose of this work is to present an alternative technique to normal maxillary sinus lifting procedures reducing the invasivity and morbility for the patients.

Osteotomy procedure

Protocol I

ALVEOLAR residual bone height 4-5 mm. Minimum alveolar width needed = 5 mm.

Step 1

Measure the residual bone height to sinus floor.

Full thickness flap used.

Figure 1: Intraoral Situation.

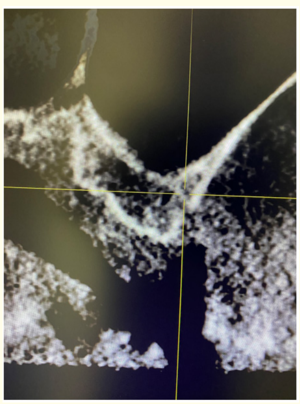

Figure 2: Initial CBCT 4mm of height residual bone

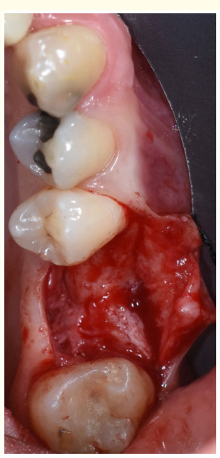

Figure 3: Full Thickness flap

Step 2

Use the Densah Bur (2.3) in counterclockwise direction to sinus floor. Avoiding the use of a pilot drill(counterclockwise drill speed 800-1500 rpm– with copious irrigation).

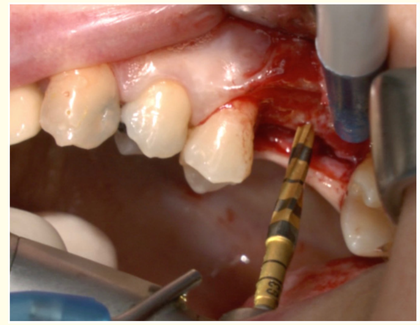

Figure 4: Densah Bur (2.3) Avoiding the pilot drill. counter-clockwise drill speed 800-1500 rpm–Densifying Mode w ith copious irrigation).

Step 3

Use the Densah® Bur (3.3) in counterclockwise direction up to 3mm past the sinus floor advancing with modulating pressure and a pumping motion in the sinus floor in 1 mm increments, up to 3mm. We must not exceed 3 mm in order to preserve the sinus membrane.

Figure 5: Densah® Bur (3.3) and advance it into the previously created osteotomy with modulating pressure and a pumping motion

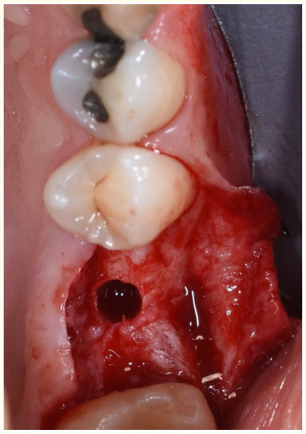

Figure 6: Implant site preparation after osseodensification with intact sinus membrane

Step 4

Bone grafting

After implant site preparation, we fill the osteotomy with bovine bone (Bonefill Bionnovation Brasil). Use the last Densah® Bur used in step 4 in Counter clockwise mode with low speed 150-200 rpm with no irrigation to push the allograft into the sinus.

Figure 7: Fild the osteotomy with bovine bone (BONEFIL)Use the last Densah® Bur used in Densifying Mode (Counterclockwise) with low speed 150-200 rpm with no irrigation

Step 5

Implant placement

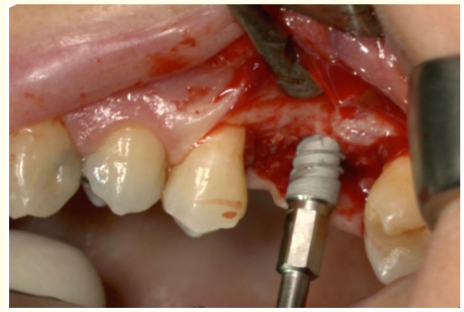

Figure 8: Implant placement 4,2 x 8 AB Dental Implant

Figure 9: Implant placed (AB DENTAL IMPLANT)

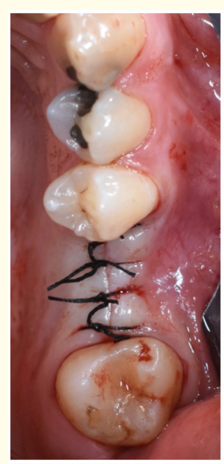

Figure 10: Interrupted sutures

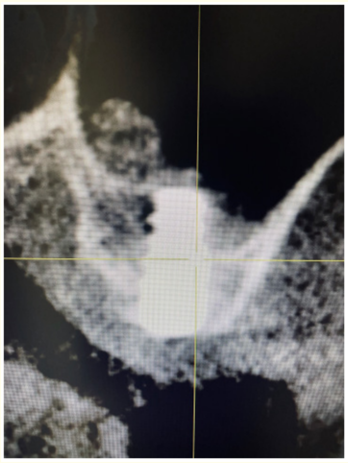

Figure 11a: CBCT post to shows the bone augmentation

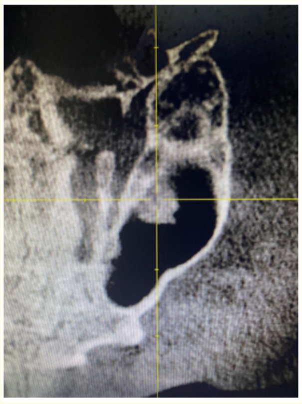

Figure 11b: CBCT post to shows the bone augmentation

Figure 11c: CBCT post to shows the bone augmentation and the intact memebrane

Protocol II

AlveolAR residual bone height ≥ 6 mm. Minimum alveolar width needed = 4mm.

Step 1

Measure THE RESIDUAL bone height to the sinus floor.

Full thickness flap used

Figure 12: Initial clinical situation

Figure 13: XRAY PRE OP

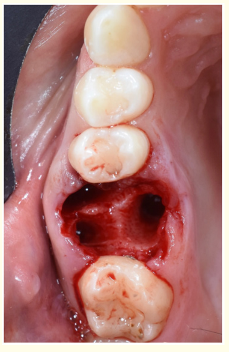

Figure 14: Tooth Extraction

Step 2

USE THE Pilot drill 1 mm below the sinus floor. (clockwise drill speed 800-1500 rpm with copious irrigation).

Figure 15: Pilot drill clockwise drill speed 800-1500 rpm with copious irrigation

Step 3

According the implant type and diameter selected for the site, USE the narrowest Densah® Bur (2.0) IN counterclockwise drill speed 800-1500 rpm with copious irrigation. When we are in the proximity of the sinus floor we need to stop and confirm the vertical position with a radiograph.

Figure 16: Densah® Bur (2.0). Change the drill motor to reverse-Densifying Mode (counterclockwise drill speed 800-1500 rpm with copious irrigation).

Step 4

Use the Densah® Bur (3.0) in counterclockwise mode up to 3mm past the sinus floor with modulate pressure and a gentle pumping motion to advance past the sinus floor in 1 mm increments. Maximum possible advancement past the sinus floor at any stage must not exceed 3 mm.

Figure 17: Densah® Bur (3.0) OD mode up to 3mm past the sinus floor.

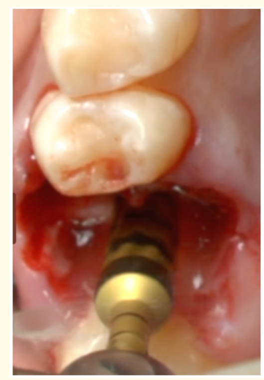

Figure 18: Densah® Bur (4.0) OD mode up to 3mm past the SINUS FLOOR

Step 5

After implant site preparation fill the osteotomy with bovine bone (Bonefil Bionnovation Brasil). Use the last Densah® Bur used in step 4 in Densifying Mode with low speed 150-200 rpm with no irrigation to push the allograft into the sinus.

Figure 19: Fild the gap with bovine bone graft (BONEFIL)

Step 6

Place implant

Place the implant into the osteotomy.

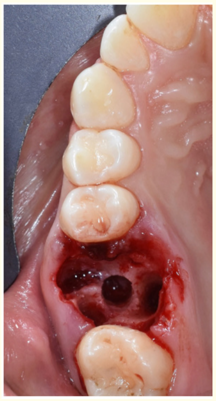

Figure 20: Implant site preparation with intact sinus membrane

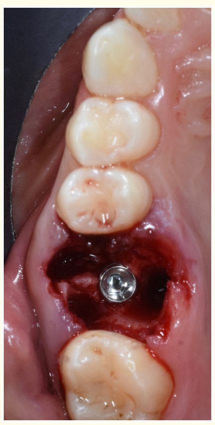

Figure 21: Implant placement 4,2 x11,5 (AB DENTAL IMPLANT)

Figure 22: Suture and sponge collagene

Figure 23: Xray post op

Conclusion

Osseodensification utilizing the Densah Bur technology produces stronger osteotomy for any implant. It preserves the bone to enhance the host. This allows for clinical versatility, which may facilitate enhanced implant stability and efficient sinus lift preserving the sinus membrane in order to reduce the invasivity and morbiliy for the patients.

Bibliography

1. Ciarelli MJ., *et al*. "Evaluation of orthogonal mechanical properties and density of human trabecular bone from the major metaphyseal regions with materials testing and computed tomography". *Journal of Orthopaedic Research* 9 (1991): 674-682.

2. Frost HM. "A brief review for orthopedic surgeons: Fatigue damage (microdamage) in bone (its determinants and clinical implications)". *Journal of Orthopaedic Sciences* 3 (1998): 272-281.

3. Trisi P., *et al*. "Implant micromotion is related to peak insertion torque and bone density". *Clinical Oral Implants Research* 20 (2009): 467-471.

4. Trisi P., *et al*. "Implant Stability Quotient (ISQ) vs direct in-vitro measurement of primary stability (micromotion): Effect of bone density and insertion torque". *Journal of Osteol Biomat* 1 (2010): 141-151.

5. Szmukler-Moncler S., *et al*. "Considerations preliminary to the application of early and immediate loading protocols in dental implantology". *Clinical Oral Implants Research* 11 (2000): 12-25.

6. Kold S., *et al*. "Compacted cancellous bone has a spring-back effect". *Acta Orthopaedica Scandinavica* 74 (2003): 591-595.

7. Gibson LJ. "The mechanical behaviour of cancellous bone". *Journal of Biomechanics* 18 (1985): 317-328.

8. Pugh JW., *et al*. “Elastic and viscoelastic properties of trabecular bone: Dependence on structure”. *Journal of Biomechanics* 6 (1973): 475-485.

9. Krafft T., *et al*. “Use of osteotomes for implant bed preparation—Effect on material properties of bone 485. and primary implant stability”. *Journal of Oral Implantology* 39 (2013): 241-247.

10. Cehreli MC., *et al*. “Mechanotransduction and the functional response of bone to mechanical strain”. *Calcified Tissue International* 57 (1995): 344.

11. Murat Cavit Cehreli., *et al.* “Implant stability and bone density: Assessment of correlation in 358. fresh cadavers using conventional and osteotome implant sockets”. *Clinical Oral Implants Research* 20 (2009): 1163-1169.

12. Ottoni JM., *et al*. “Correlation between placement torque and survival of single-tooth implants”. *International Journal of Oral and Maxillofacial Implants* 20.5 (2005): 769-776.