ACTA SCIENTIFIC DENTAL SCIENCES (ISSN: 2581-4893)

Volume 4 Issue 1 January 2020

Clinical Case Report

The Use of Piezoelectric Device in the Rehabilitation of Narrow Ridge

Angelo Cardarelli*, M Grechi, L Lago and P Montemezzi

Department of Dentistry University "Vita-Salute" San Raffaele Milano, Dean Professor, E.F. Gherlone, IRCCS San Raffaele Hospital, Milan, Italy

***Corresponding Author:** Angelo Cardarelli, Department of Dentistry University "Vita-Salute" San Raffaele Milano, Dean Professor, E.F. Gherlone, IRCCS San Raffaele Hospital, Milan, Italy.

DOI: 10.31080/ASDS.2020.04.741

Received: December 13, 2019

Published: December 27, 2019

Abstract

Methods: We describe the use of a piezoelectric scalpel to perform split crest procedures with an aim to optimize outcomes and acceptability by patients.

Results: The survival and success rates of implants placed in expanded ridges are similar to those of implants placed in native bone.

Conclusions: This technique is a predictable approach for split crest procedures and has high acceptability by patients and is technically simple for surgeons.

Keywords: Alveolar Bone Loss; Alveolar Ridge Augmentation; Dental Implant; Piezosurgery; Ridge Splitting Technique

Introduction

Bone expansion is a surgical technique that achieve the management of horizontal bone atrophy. Cortical bone splitting allows for an expansion of the residual crest by displacement of the vestibular bone flap. The immediate placement of implants secures the widening and allows for a 97% survival rate. The use of piezo- surgery allows for a secured displacement of the selected bone flap as well as an immediate implant placement, avoiding the risk of slipping, overheating, or fracture, all within an undeniable operative comfort. In this article describe the atraumatic bone expension and immediate implant placement technique in the maxilla and illustrate it by a clinical case [1-10].

What are the Advantages of ultrasonic instrumentation? Selective cut for hard tissues:

- Micrometric and precise cutting
- Handy handpiece
- Improved accessibility of inserts
- Availability of inserts with a complex shape
- Micro vibration action
- Cavitation action (energy release phenomenon) which in turn: Facilitates the separation between soft and hard tissue
- Promotes hemostasis
- Removes debris from the surgical field.

Phisical charateristics of piezosurgery

- **Microvibration:** The microvibrations developed by the piezoelectric device are in a range between 27,000 and 29,500 Hz; the vibration amplitude, both on the horizontal plane (60 / 200μm) and on the vertical plane (20 / 60μm), varies in relation to the insert shape
- **Hammering action:** Derives from the alternation of two types of ultrasonic waves with different λ, one short and the other long, and allows the insert to be kept constantly clean (otherwise the pulverized bone tissue accumulating would be read by the instrument as non-mineralized tissue and all this would be the kinetic energy converted into heat causing necrosis of surrounding tissues)
- **Cavitation effect:** Physical phenomenon characterized by the formation of vacuum bubbles (at very low pressure steam that imploding give rise to mechanical cleaning action making the bloodless field).

Phisical charateristics of piezosurgery

The case reported shows an implant treatment for bilateral partial edentulous upper arch rehabilitation with initial thickness about 3 mm (Figure1 and 4). A full-split thickness flap was raised. The mucoperiosteal reflection permitted to identify alveolar crest contour where osteotomies had to be performed. Split thickness dissection allowed periosteal blood supply to be mainteined on the buccal bone plate. After horizontal and vertical osteotomies were

performed with OT7s-4 piezoelectric microsaw (Piezo-surgery, Mectron), a sequence of bone expanders was used to expand the crest in the both sites. Three implants 3,8 x11 mm were inserted in the upper left site and 2 implants 3,8x11 was inserted in the upper right site. The residual bone gap was packed with only collagen (Figure 5 and 8). 4 months later has been done the second surgery step and placed the healing caps and in the left site contestually has been done an soft tissue graft from the palat to increase a keratinized tissue around implants for a long terms survivor. After the healing of soft tissue has been done a final restorations with ceramic crowns screwed (Figure 9 and 12).

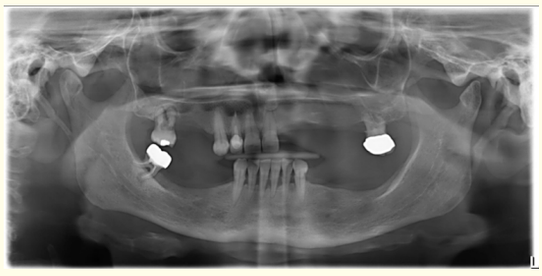

Figure 1: Initial Opt.

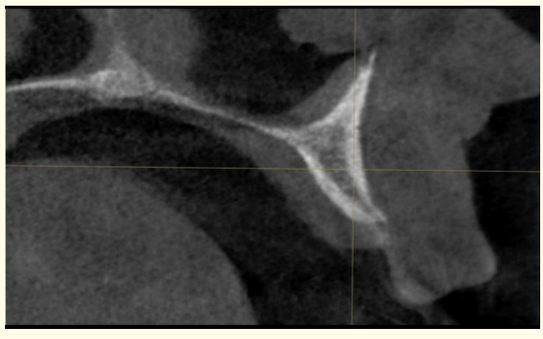

Figure 2a: CBCT.

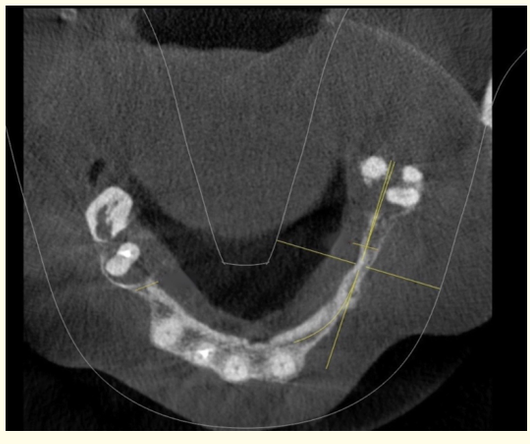

Figure 2b: CBCT Shows The Narrow Ridge 2.

Figure 3: Initial Case.

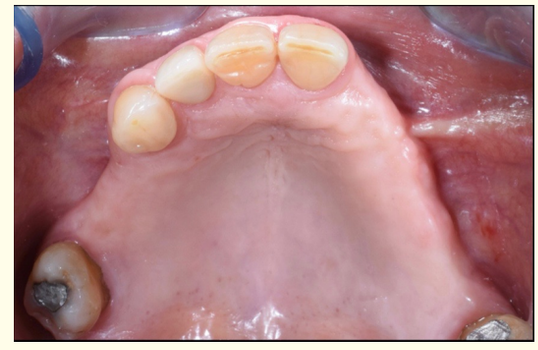

Figure 4: Occlusal Initial View.

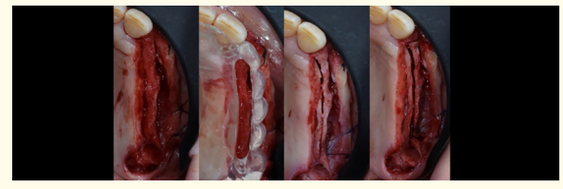

Figure 5: Bone Splitting With Piezo Insert.

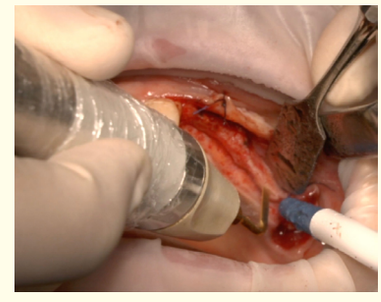

Figure 6: The Use Of Piezo Insert.

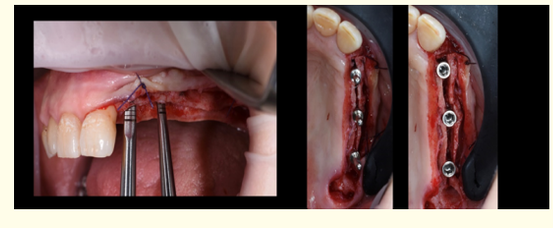

Figure 7: The Use Of Bone Expander and The Placemnt Of Implants.

Figure 8: Placement Implants In Both Sites and Sutures.

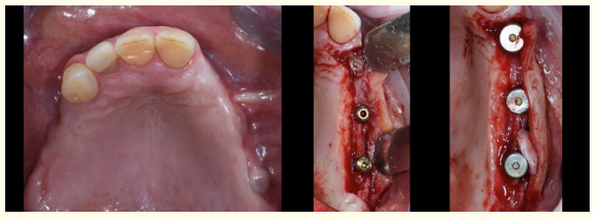

Figure 9: Tissue Graft During The Second Surgical Step.

Figure 10: Healing Of Soft Tissue.

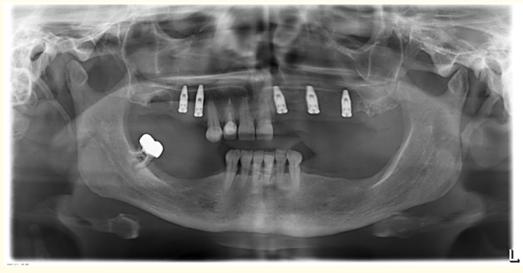

Figure 11: Xray Post Op.

Figure 12: Final Case.

Conclusion

Bone split/expansion appears to be a noninvasive technique for the correction of narrow ridges. The survival and success rates of implants placed in expanded ridges are similar to those of implants placed in native bone. The gap created by the sagittal osteotomy/expansion undergoes spontaneous ossification, following a mechanism similar to the process that occurs in fractures. Bone neoformation enables a consolidation between the vestibular and the palatine/lingual walls of the alveol and implants placed in expanded ridges seem to bear the amount of load demanded. In this clinical case, The residual bone gap was packed with only collagen , to allow a self bone regeneration by the blood supply.

Bibliography

1. Basa S., *et al*. "Alternative bone expansion technique for immediate placement of implants in the edentulous posterior mandibular ridge: A clinical report". *International Journal of Oral & Maxillofacial Implants* 19.4 (2004): 554-558.

2. Blus C and Szmukler-Moncler S. "Split-crest and immediate implant placement with ultra-sonic bone surgery: A 3-year life-table analysis with 230 treated sites". *Clinical Oral Implants Research* 17.6 (2006): 700-707.

3. Chiapasco M., *et al.* "Augmentation procedures for the rehabilitation of deficient edentulous ridges with oral implants". *Clinical Oral Implants Research* 17.2 (2006): 136-159.

4. Ferrigno N and Laureti M. "Surgical advantages with ITI TE ® implants placement in conjunction with split crest technique: 18-month results of an ongoing prospective study". *Clinical Oral Implants Research* 16 (2005): 147-155.

5. Triplett RG and Schow SR. "Autologous bone grafts and endosseous implants: Complementary techniques". *Journal of Oral and Maxillofacial Surgery* 54.4 (1996): 486-494.

6. Kumar NS and Piezo SN. "Surgical mandibular ridge expansion for immediate implant placement". *International Journal of Oral Implantology & Clinical Research* 3 (2012): 47–50.

7. Duncan JM and Westwood RM. "Ridge widening for the thin maxilla: A clinical report". *International Journal of Oral & Maxillofacial Implants* 12 (1997): 224-227.

8. Simion M., *et al.* "Jawbone enlargement using immediate implant placement associated with a split-crest technique and guided tissue regeneration". *International Journal of Periodontics & Restorative Dentistry* 12 (1992): 462-473.

9. Khairnar MS., *et al.* "Modified ridge splitting and bone expansion osteotomy for placement of dental implant in esthetic zone". *Contemporary Clinical Dentistry* 5.1 (2014): 110-114.

10. Engelke WG., *et al.* "Alveolar reconstruction with splitting osteotomy and microfixation of implants". *International Journal of Oral & Maxillofacial Implants* 12 (1997): 310-318.