

## Bone Regeneration with Bond Apatite in Complete Absence of Vestibular Bone Table, a Case Report

Zaera Le Gal Ramiro<sup>1\*</sup> and Baranes David<sup>2</sup>

<sup>1</sup>Professor of Implant Surgery, Prosthetics and Periimplantology, Alfonso X El Sabio University, Madrid, Spain

<sup>2</sup>Periodontal, Basal Implantology and Bone Grafting in Jerusalem and Natanya, Israel

\*Corresponding Author: Zaera Le Gal Ramiro, Professor of Implant Surgery, Prosthetics and Periimplantology, Alfonso X El Sabio University, Madrid, Spain.

Received: March 20, 2020; Published: May 13, 2020

### Abstract

Calcium Sulfate has been used since 1892 (Dreesman) as a graft material to regenerate bone in cases of tuberculosis, it being the most studied material for its osteoconduction and biocompatibility.

The difficulty of Calcium Sulfate's clinical manipulation and its setting time in the maxillofacial area led Dr. Amos Yahav to create a single product made of two matrices: one formed by a mixture of calcium sulfate hemihydrate and calcium sulfate dihydrate, and the other formed by hydroxyapatite. The Calcium Sulfate matrices is activated with sodium chloride meanwhile the hydroxyapatite does not undergo any changes.

The product is called Bond Apatite® and comes in syringe to facilitate the mixing of the powder with the liquid and its clinical use on bone defects.

The advantage it has on other materials is its easy handling, primary graft stability and high porosity, favoring angiogenesis and intragranular reabsorption, leaving less than 10% graft material in the new formed bone, exclusively hydroxyapatite, the Calcium Sulfate having completely disappeared.

**Keywords:** Calcium Sulfate; Graft; Extraction

### Introduction

Guided bone regeneration (GBR) with Bond Apatite is a surgical technique used to increase limited alveolar bone for implant placement.

Calcium sulfate, a synthetic material, has been used for decades in orthopedics, plastic surgery and oncologic and maxillofacial surgeries for the treatment of osseous deficiencies caused by trauma or inflammation.

Bond Apatite: 66% Biphasic calcium sulfate combined with 33% synthetic hydroxyapatite granules (different size particle distribution) is a bone graft type that will resorb over 3 - 6 months, and new vital bone is formed in the process. The graft is completely transformed into the native bone of the patient. No graft is left behind; only the patient's bone with 90% regeneration [1-19].

### Aim of the Study

This case report aims to publicize the benefits of the AUGMA Bond Apatite, especially in bone regeneration, fast procedure, fast healing, easy to manipulate and reasonable costs.

### Clinical Case Report

50 year old female patient in good general health condition.

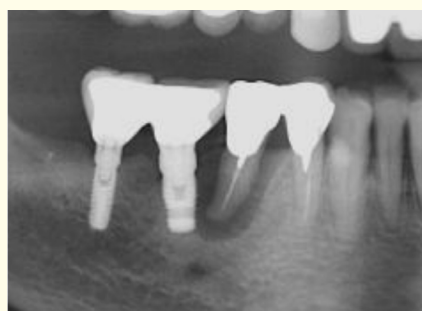


Figure 1: Periapical X-rays.

The evaluation of the panoramic radiograph showed a mandibular residual cyst in area 45 and progressive atrophy of the corresponding alveolar process. The patient was told that it would not be possible to insert implants into this edentulous ridge without significant augmentation of the alveolar ridge. It was decided, in accordance with the patient, that the lesion would be extracted and the augmentation would be regenerated with Bond Apatite.



**Figure 2:** Periodontal abscess.

The patient carries ceramic metal crowns on the pieces 44 - 45, reveals periapical pain and injury that made it impossible to chew in that area.

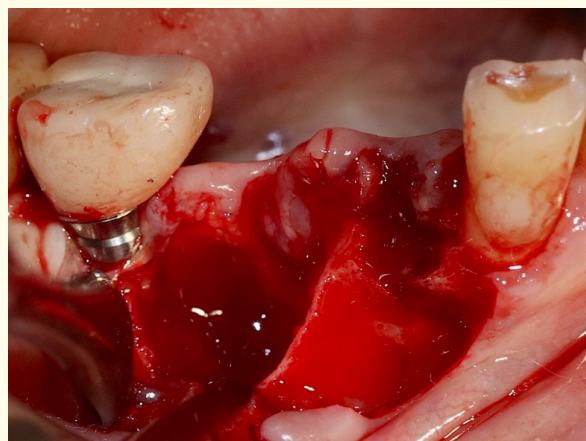
**Case planning**

Removal of pieces 45 and 45, curettage of the area and bone regeneration with Bond Apatite.

Implant placement on 44 - 45 once the bone has regenerated.

**Surgical procedure**

Infiltrative anesthetic with adrenaline.

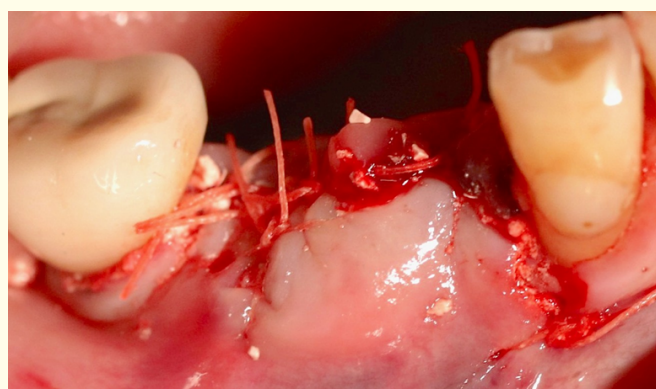


**Figure 3:** Absence bone table.

Removal of pieces 44 - 45, mucoperiosteal detachment, curettage of the area, noticeable complete absence of vestibular bone table on the 45 and mesial bone loss on the implant 46.



**Figure 4:** Bond apatite.



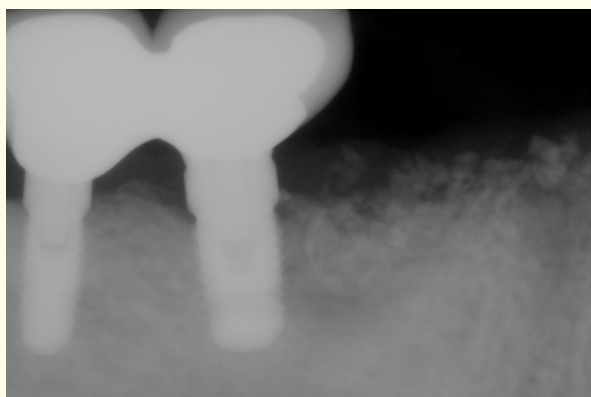
**Figure 5:** Reabsorbable sutures

Bone defect filling with Bond Apatite syringe, compression with dry gauze and wound closure with absorbable suture.

Bond Apatite has a barrier effect so membrane use is not required, and it can be used in infected areas as it is bacteriostatic.

**Three months later**

A 3D CBCT is performed and shows vestibular table bone regeneration.

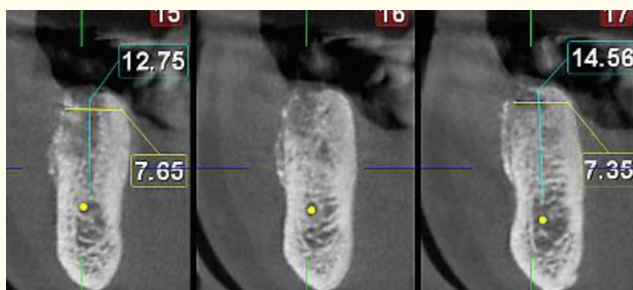


**Figure 6:** Periapical X-rays 3 months later.

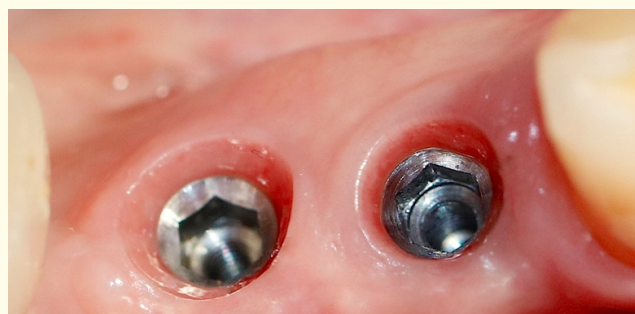


**Figure 9:** Implants placement.

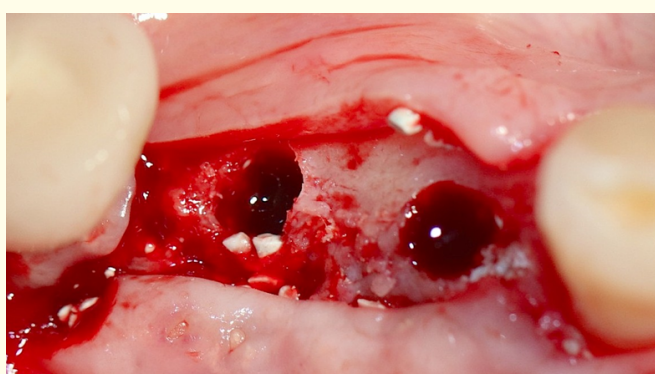
Ncm, the neoformed bone is the patient's own bone without bone grafting, there is only some bigger HA particle left that represents less than 10%. The rest of the Biphasic Calcium Sulfate material has been completely absorbed and transformed in vital bone.



**Figure 7:** 3D CBCT new vestibular bone table.



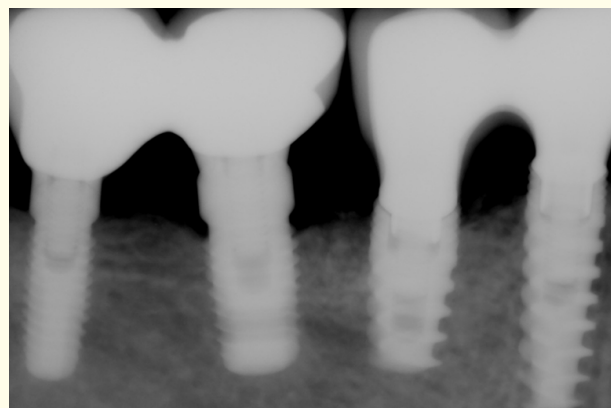
**Figure 10:** Keratinized tissue.



**Figure 8:** Normal density when drilled for the placement of dental implants 44,45. New bone around implant 46.

Infiltrative anesthetic with adrenaline.

Mucoperiosteal detachment. New bone is formed around the implant 46. Implant insertion on 44 and 45 with a torque of 35



**Figure 11:** Final Periapical X- rays 2 years later.

## Bibliography

1. Alderman NE. Sterile plaster of Paris as an implant in the infrabony environment: A preliminary study. *J Periodontol.* 1969;40(1):11-13.
2. Dreesman H. About bone healing [in German]. *Beitr Klin Chir.* 1892;9:804.
3. Machtei EE, Mayer Y, Horwitz J, Zigdon-Giladi H. Prospective randomized controlled clinical trial to compare hard tissue changes following socket preservation using alloplasts, xenografts vs no grafting: Clinical and histological findings. *Clin Implant Dent Relat Res.* 2019;21(1):14-20.
4. Robert Horowitz, Michael D Rottner, Hari S Prasad, Nick Tovar, Ziv Mazor. Enhancing extraction socket therapy with a Biphasic Calcium Sulphate. *Compend Contin Educ Dent.* 2012;33(6):420-426.
5. James Rudolph Collins, Ely Jiménez. Clinical and Histological Evaluation of Socket Grafting Using Different Types of Bone Substitute in Adult Patients. *Implant Dentistry* 2014;23(4):489-495.
6. Robert A Horowitz, Michael D Rohrer. Enhancing Extraction Socket Therapy with a Biphasic Calcium Sulfate. *Compend Contin Educ Dent.* 2012;33(6):420-426.
7. Ricci JL. Report on the use of calcium sulfate cement with dental cement. In: *Use of Calcium Sulfate cement for Dental and maxillofacial Bone Repair*, edited by Pecora G and De Leonardis D. Elite Publishing. Rome, 2001:7.
8. Ricci JL, Alexander H, Nadkarni P, Hawkins M, Turner J, Rosenblum S, Brezenoff L, DeLeonardis D, Pecora G. Biological mechanisms of calcium sulfate replacement by bone, In: *Bone Engineering*, edited by Davies JE, EM2 Inc., Toronto, Ont. Canada, chapter 30 2000:332-344.
9. Ricci JL, Weiner MJ, Di Iorio D, Mamidwar S, Alexander H. Evaluation of times release calcium sulfate (CS-TR) bone graft substitute. *Microc Microanal.* 2005;11(2):1256-1257.
10. Sbordone L, Bortolaia C, Perrotti V, Pasquantonio G, Petrone G. Clinical and histologic análisis of calcium sulfate in treatment of a post-extraction defect: A case Report. *Implant Dent.* 2005;14(1):82-87.
11. Shi B, Zhou Y, Wang YN, Cheng XR. Alveolar ridge preservation prior to implant placement with surgical- grade calcium sulfate and platelet-rich plasma: A pilot study in a canine model. *Int J Oral Maxillofac Implants.* 2007;22(4):656-665.
12. Sottosanti J. Calcium sulfate: A Biodegradable and biocompatible barrier for guided tissue regeneration. *Compend Cont Educ Dent.* 1992;13(3):226-234.
13. Sottosanti J. Calcium sulfate: An aid to periodontal, implant and restorative therapy. *CDAJ.*1992;20(4):45-62.
14. Strocchi R, Orsini G, Iezzi G, Scarano A, Rubini C, Pecora G, Piattelli A. Bone regeneration with calcium sulfate: Evidence for increased angiogenesis in rabbits. *J Oral Implant.* 2002;28(6):273-278.
15. Thomas MV, Puleo DA. Calcium sulfate: A review. *J Long Term Eff Med Implants.* 2005;15(69):599-607.
16. Turner TM, Urban RM, Gitelis S, Haggard WO, Richelsoph K. Resorption evaluation of a large bolus of calcium sulfate in a canine medullary defect. *Orthopedics.* 2003;26(5):s577-S579.
17. Walsh WR, Morberg P, Yu Y, Yang JL, Haggards W, Sheath PC, Svehla M, Bruce WJM. Response of a calcium sulfate bone graft substitute in a confined cancellous defect. *Clin Orthop Rel Res.* 2003;406:228-236.
18. Kim HM. Calcium sulfate, dihydrate (CAS N: 10101-41-4), OECD SIDS Initial Assessment Report for SIAM 17, UNEP Publications, 2003.
19. Kim JY, Cho BC. Effect of calcium sulfate pellets on early bone mineralization in distraction osteogenesis for craniofacial microsomia in adults. *J Craniofac Surg.* 2007;18(6):1309-1321.

**Volume 3 Issue 6 May 2020**

**© All rights are reserved by Zaera Le Gal Ramiro and Baranes David.**