Studies Confirm βTCP Is Equal to or Better than Both Autografts and Allografts

"Modern beta tricalcium phosphate bone grafts perform as well or better than allografts or autografts. The negatives of autograph morbidity and cadaver harvesting makes high performing βTCP a superior choice." Int J Oral Maxillofac Surg. 2017 Apr0

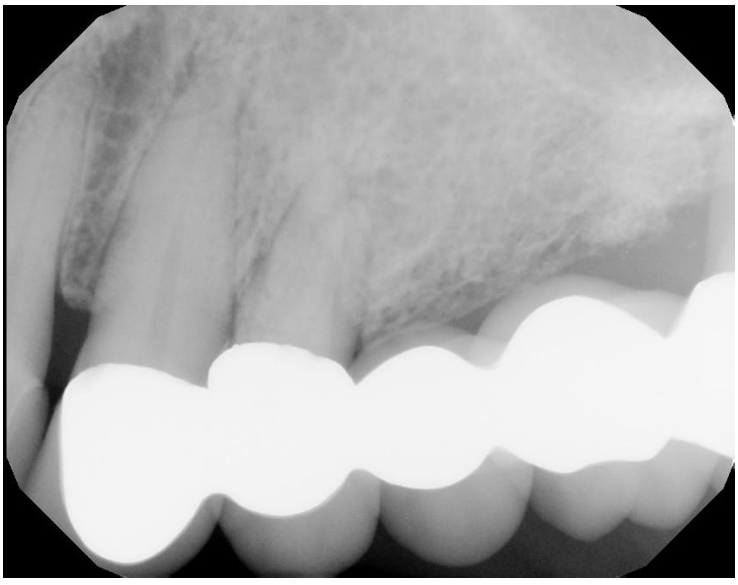
New Dispensing Syringe for Ease of Application

Why graft with beta tricalcium phosphate granules? The reason is performance. Many factors go into choosing the best bone graft material for your patients. Most clinicians are trained that autographs are the gold standard and allografts are an acceptable alternative. That may have been true 5-10 years ago, but science has evolved, and studies now prove that beta tricalcium phosphate granules are equal to or superior than the performance of both allografts and autografts.

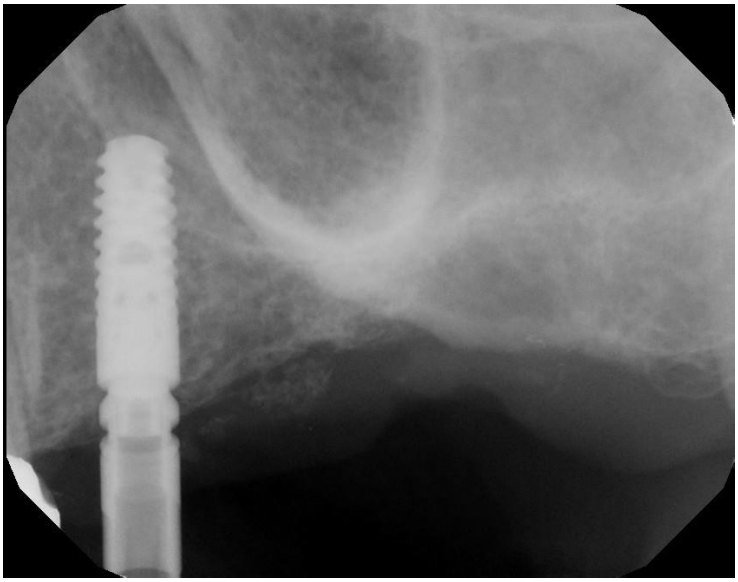
The following case illustrates a crestal access sinus augmentation performed by Dr. John Diana, Clinical Associate Professor of Periodontology at Stony Brook University School of Dental Medicine.

Following the case presentation, please scroll down for the literature review of these findings.

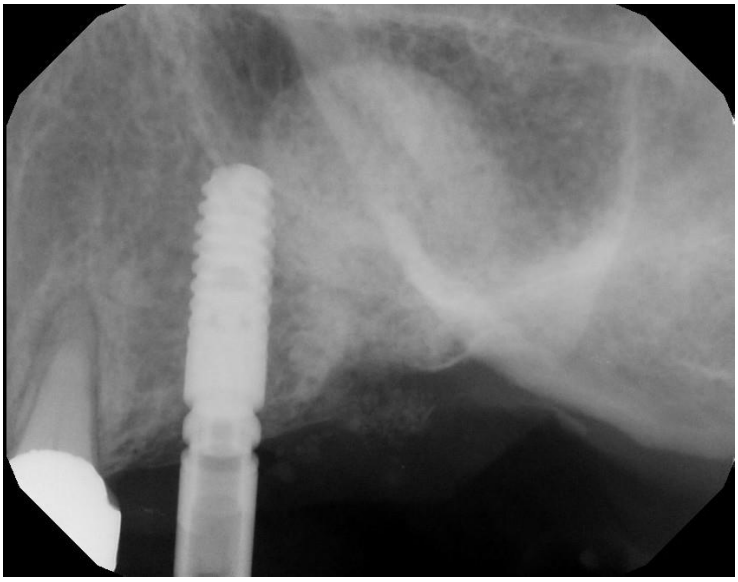
OsseoConduct™ case presentation curtesy of Dr. John Diana



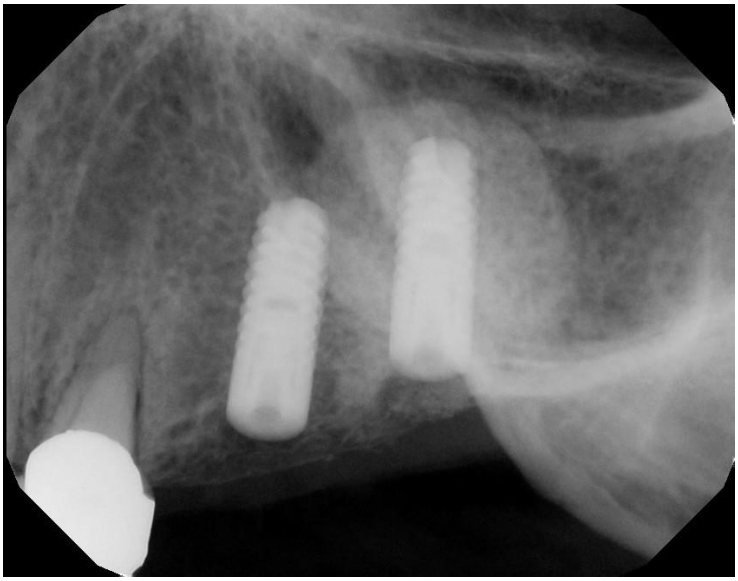
The molar was failing, and the bridge was sectioned distal to the bicuspid.



The first implant was positioned in the second bicuspid area.



Due to the position of the sinus, a crestal approach was taken to access the sinus membrane.



OsseoConduct βTCP granules were placed into the osteotomy and packed into the sinus.
The presence of a dome shape indicates where the granules were packed into the sinus maintaining the integrity of the membrane.
With the graft is in place, the implant is inserted into the grafted sinus.

This case is an example of a minimally invasive surgery that provided implant placement at the same time the bridge was removed.
Creating a large lateral window and packing cadaver bone into the sinus requires 4 to 6 months to lapse before an implant can be placed. Using a large lateral wall and either autografts or allografts also requires months before the implants can be restored.
This minimally invasive sinus augmentation is a simple technique that reduces the surgical intervention to one visit, shortens the time until restoration by half and the patient will experience minimum post-operative pain.

As clinicians, it is important to offer the best quality of care we possibly can along with using the best materials available. As technology in dentistry advances, it is critical we have a full understanding of the materials we are using and seek the latest scientifically proven materials that will continue to improve our patient's oral health.

Below is a list of studies that prove these findings:

J Oral Maxillofac Surg. 2018 Apr;76(4):761-769. doi: 10.1016/j.joms.2017.11.002. Epub 2017 Dec 2.
Does Graft Particle Type and Size Affect Ridge Dimensional Changes After Alveolar Ridge Split Procedure?

- **Conclusion: This ridge split study found that beta tricalcium phosphate granules produced statistically superior results over allograft granules for all particle sizes. In addition, larger particles (1-2mm) performed superior to smaller particles (.5-1 mm).**

Int J Oral Maxillofac Implants. 2005 May-Jun;20(3):371-
A prospective multicenter randomized clinical trial of autogenous bone versus beta-tricalciumphosphate graft alone for bilateral sinus elevation: histologic and histomorphometrically evaluation.

- **Conclusion: At 6 months there was no difference in the amount or quality of bone between the two groups.**

Clin Oral Implants Res. 2009 Jul;20(7):691-700. doi: 10.1111/j.1600-0501.2008.01697. x.
Longterm changes in graft height after maxillary sinus floor elevation with differed grafting materials: radiographic evaluation with a minimum follow-up of 4.5 years.

- **Conclusion: After 4.5 years there was no difference in the amount of bone regeneration between the autograft and beta tricalcium phosphate groups.**

Int J Oral Maxillofac Implants. 2005 May-Jun;20(3):432-40.
Maxillary sinus floor augmentation using a beta-tricalcium phosphate alone compared to autogenous bone grafts.

- **Conclusion: Both autograft and beta tricalcium phosphate grafts produced adequate bone for implant placement and both materials had a 100% implant success rate after one year.**

Proc Natl Acad Sci U S A. 2010 Aug 3;107(31):13614-9. doi: 10.1073/pnas.1003600107. Epub 2010 Jul 19.
Osteoinductive ceramics as a synthetic alternative to autologous bone grafting.

- **Conclusion: This was a critical size defect in sheep that found a third-generation beta Tricalcium phosphate yielding significantly more bone production than autograft and BMP2.**

J Oral Maxillofac Surg. 2010 Jul;68(7):1642-5. doi: 10.1016/j.joms.2009.08.028. Epub 2010 Apr 10.
Early implant survival in the posterior maxilla with or without beta-tricalcium phosphate sinus floor graft.

- **Conclusion: Sinuses were grafted with beta tricalcium phosphate with simultaneously placed implants. This group was compared to maxillary posterior implants that were placed without the need to do sinus augmentation. Both groups experienced 99% success rate after approximately 30 months.**

Int Orthop. 2018 Feb;42(2):385-393. doi: 10.1007/s00264-017-3693-x. Epub 2017 Nov 28.
Chronic infection and infected non-union of the long bones in pediatric patients: preliminary results of bone versus beta-tricalcium phosphate grafting after induced membrane formation.

- **Conclusion: In the treatment of chronic osteomyelitis, beta tricalcium phosphate performed better than allograft.**

Int J Oral Maxillofac Surg. 2017 Apr;46(4):503-510. doi: 10.1016/j.ijom.2017.01.002. Epub 2017 Feb 6.
Use of autogenous bone and beta-tricalcium phosphate in maxillary sinus lifting: histomorphometrically study and immunohistochemical assessment of RUNX2 and VEGF.

Modern beta tricalcium phosphate bone grafts perform as well or better than allografts or autografts. The negatives of autograph morbidity and cadaver harvesting makes high performing bTCP a superior choice.

- **Conclusion: Beta tricalcium phosphate alone performed better than bTCP when combined with autograft and better than autograft alone.**