



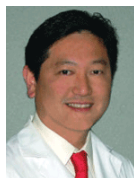
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## Dental Implant CASE REPORT

### Ridge Preservation Bone Graft (RPBG) : A Simple Technique to Manage the Extraction Site to Achieve Predictable Clinical Outcome in Implant Surgery



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**Figure 1a-b.** a) Pre-Operative radiograph displaying bone loss. b) 23-month Post-Operative outcome.

#### Introduction

After an extraction, the surrounding alveolar bone will go through different stages of healing and remodeling, resulting in alveolar dimensional changes, which results in horizontal and vertical alveolar bone loss. Studies have showed that most of the horizontal and vertical bone resorption is from loss of bundle bone within two weeks after extraction.<sup>1-2</sup>

After extraction, bundle bone loses its function and resorption will occur due to osteoclastic activity, which is observed in the outer and inner surfaces of the buccal and lingual walls.

Even though autogenous bone is the gold standard for bone grafting, many bone graft substitutes, such as xenograft, allograft, alloplast, and BMP, have all been used in ridge preservation bone graft (RPBG) but there is no consensus on one bone graft material being superior to the others.<sup>4</sup> Among all bone grafting substitutes, bovine bone mineral is the most frequently used material in the studies for RPBG.

No matter what bone grafting materials or surgical technique is utilized, the ultimate goal of RPBG is to preserve the alveolar bone for future implant placement. The most overarching theme of RPBG studies



is, after extraction, it will reduce the alveolar bone loss and, thereby, resulting in a lesser need for additional bone augmentation at the time of implant placement but it will not prevent inherent alveolar bone loss.

Therefore, after an extraction, it is imperative that an extraction site is managed properly if a delay implant surgery is planned. This case report will show how to manage the extraction site with RPBG to achieve predictable implant surgery.

## Case History

The patient is a 53-years old female who presented with fractured mesial root of tooth #19 with buccal gingival recession and swelling. (Fig. 2)

Pre-operative peri-apical (PA) radiograph showed radiolucency around mesial root of #19, which indicates severe bone loss. (Fig. 3)



**Figure 2.** Pre-operative clinical view of #19 with buccal gingival recession and swelling.



**Figure 3.** Pre-operative peri-apical radiograph showing bone loss around mesial root of #19.

Treatment options were discussed, including immediate vs. delay implant placement, and the patient opted for ridge preservation bone graft and delay implant placement under local anesthesia.

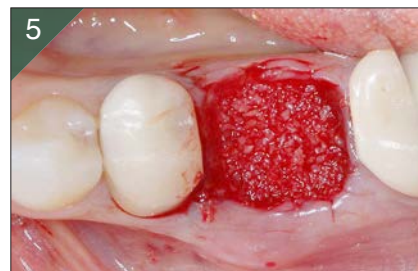
## Ridge Preservation Bone Graft (RPBG)

Using periostomes and modified lower forcep, flapless extraction was performed without any major trauma to the soft tissue. In addition, no bone was removed during the extraction, which is one of the critical factors for achieving predictable clinical outcome in RPBG. Missing buccal plate, from the localized infection, was confirmed via clinical exam after the extraction. After the extraction, a resorbable collagen membrane (Cytoplast™ RTM Collagen) was placed, inside the socket, up against soft tissue where the buccal bone was missing. (Fig. 4)



**Figure 4.** Flapless extraction and placing resorbable membrane up against the soft tissue in the missing mesio-buccal bone site.

The bone grafting materials were then placed in the socket (Osteokor Allograft Particulate Bone). (Fig. 5)

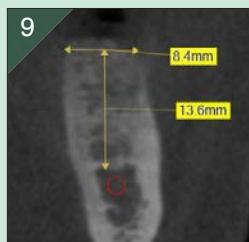


**Figure 5.** Bone graft in the socket.

## Series of Clinical Views



**Figure 8.** Six month post-operative RPBG.



**Figure 9.** CBCT of six month post-operative RPBG.

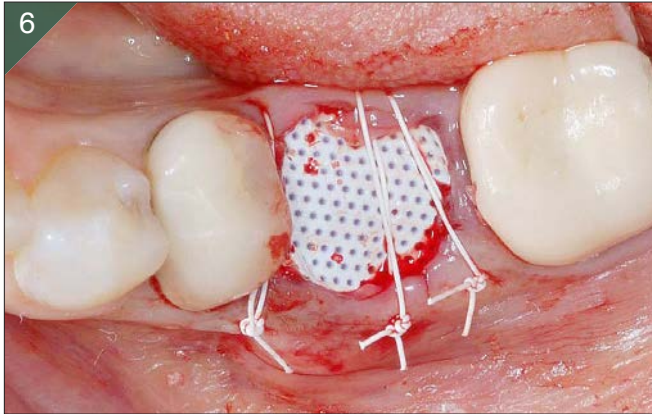


**Figure 10.** Adequate alveolar bone for implant surgery after RPBG



**Figure 11.** Final drill site.

After bone grafting, resorbable (Cytoplast RTM Collagen) and non-resorbable membranes (Cytoplast™ TXT-200) were passively placed over the grating materials, without detaching any periosteum from the buccal or lingual bone. Non-resorbable sutures (Cytoplast™ PTFE) were then placed over the socket to prevent membranes from dislodging too easily. (Fig. 6)



**Figure 6.** Non-resorbable membrane and sutures.

Non-resorbable membranes and sutures will be removed within one to four weeks, depending on the patient's healing. (Fig. 7)



**Figure 7.** Non-resorbable membrane is removed 1 month post-operative RPBG. Thin granulation tissue seen after the removal.

During this time, granulation tissue will generate underneath the non-resorbable membrane, which will prevent bone grafting materials from dislodging. One of the main objectives of RPBG is to maintain the bone graft in the socket to allow adequate time for native bone to form by osteoconductive process.

## Implant Surgery

Approximately four to six months after RPBG, the socket should be adequately healed for the implant surgery. (Figs. 8 & 9)

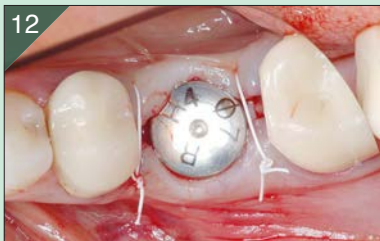
In most of the cases, there should be adequate bone for an implant placement without the need for additional bone grafting. At six months after RPBG, implant surgery was performed. (Figs. 10–13)

Implant surgery was simple due to adequate alveolar bone, which was achieved by RPBG. At four months after implant placement, ISQ (Implant Stability Quotient, Osstell) was recorded at 86-87. (Fig. 14)

Implant was now ready for the abutment and final restoration. Predictable clinical outcome is seen 23 months post-operative implant surgery. (Fig. 15)

## Conclusion

No matter what bone grafting materials or surgical technique is utilized, the ultimate goal of RPBG is to preserve the alveolar bone for future implant placement. The most overarching theme of RPBG studies is, after extraction, it will reduce the alveolar bone loss, thereby resulting in a lesser need for additional bone augmentation at the time of implant placement but it will not prevent inherent alveolar bone loss.<sup>3</sup>



**Figure 12.** Immediate post-operative implant surgery (Ø5.0 x 11.5 mm).



**Figure 13.** Immediate post-operative CBCT.



**Figure 14.** Four month post-operative implant placement.



**Figure 15.** Final restoration after 23 month post-operative implant surgery.

## References

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2. Araujo MG and Lindhe J: Dimensional ridge alterations following tooth extraction. An experimental study in the dog. J Clin Periodontol 32:212, 2005.
3. Ten Heggeler JM, Slot DE and Van der Weijden GA: Effect of socket preservation therapies following tooth extraction in non-molar regions in humans: a systematic review. Clin Oral Implants Res 22(8):779, 2011.
4. Allegrini S, Koening B, Allegrini MR, et al: Alveolar ridge sockets preservation with bone grafting-review. Amm Acad Med Stetin 54(1):70-81, 2008.

## Products Used

1. **Cytoplast RTM Collagen, Osteogenics Biomedical (Lubbock, TX, USA)**  
Resorbable membrane
2. **Cytoplast TXT-200, Osteogenics Biomedical (Lubbock, TX, USA)**  
Non-resorbable membrane
3. **Osteokor, Surgikor (Los Angeles, CA, USA)**  
Allograft
4. **Cytoplast PTFE, Osteogenics Biomedical (Lubbock, TX, USA)**  
Non-resorbable suture

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