

## Case Study: Bone Regeneration in a Simple Extraction Socket with NovaBone Dental Putty

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### History:

A 35 year old female patient presented with an unrestorable mandibular first molar. Upon assessment, extraction with delayed implant placement offered the best prognosis due to the peri-apical infection and mobility of the tooth.

### Surgical Procedure: Extraction & Graft Placement

The tooth was extracted atraumatically under local anesthesia. The granulation tissue was excavated and the socket was completely debrided. NovaBone Dental Putty was placed incrementally to the height of the surrounding crestal bone. Immediate post-operative radiograph confirmed complete fill of the socket with the Putty and intimate contact and adaptation to the socket walls. NovaBone Dental Putty is available in premixed, single patient use syringes that go directly from package to placement in the defect. Sufficient mucosal tissue was available to achieve primary closure eliminating the need for a membrane in this case.



Figure 1: Immediate post-op radiograph

### Radiographic Analysis:

A periodic radiographic evaluation was done to visualize the stages of graft resorption and bone regeneration. Initially NovaBone Dental Putty appeared radio-dense on the radiograph. It was differentiated from the native bone by its lack of trabecular pattern. A two month post-operative radiograph clearly revealed the initial trabecular organization of the grafted area indicative of clot reorganization and osseous regeneration (Figure 2). The six month post-operative radiograph however revealed excellent trabecular pattern in the grafted site indicating that the bone in the socket was fully regenerated. (Also noteworthy is the lack of any shrinkage in the grafted area.) Prior to implant placement, a 3.0mm ID trephine bur was used to obtain the sample tissue section from the regenerated area. Care was taken to obtain the core from the center of the regenerated area.

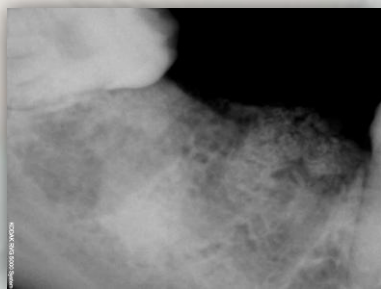


Figure 2: Two month post-operative radiograph



Figure 3: Six month post-operative radiograph

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### Histological Analysis:

After decalcification, the histological sections reveal several fragments of dense, vital bone along with some osteoid tissue and fresh hemorrhagic debris (blood cells). This is indicative of healthy bone tissue as seen in Figure 4. No evidence of residual NovaBone Dental Putty particulate was observed in the histology sections.

### Discussion:



Figure 4: Six month histology showing mature bone tissue

Radiographic and histologic evidence confirm excellent bone regeneration after use of NovaBone Dental Putty. Despite not using a membrane, no shrinkage in the ridge height was observed six month post-operatively on the radiograph. This suggests that a good primary closure is sufficient for bone regeneration with the Putty material thus improving productivity and reducing cost of the surgical procedure. The absence of residual particulate in the histology sections validates complete resorption of the Putty while simultaneously regenerating new bone by a unique phenomenon called ‘Osteostimulation’.

NovaBone Dental Putty is the only synthetic, non-settable, completely resorbable bone graft substitute that is extremely easy to use. It does not require any mixing or special handling procedures prior to placement. NovaBone Dental Putty, with its unique presentation, exhibited excellent retention characteristics and molded easily into the desired size and shape. Both tissue healing and bone regeneration was superlative. NovaBone Dental Putty, being completely synthetic, demonstrated no allergic reaction, inflammation or patient concern for disease transmission risks.

NovaBone Dental Putty enhances the rate of bone regeneration by a mechanism known as “Osteostimulation” that ensue the upregulation of several genes responsible for an increased osseous activity at the defect site. It is also available in single use syringes that further simplify delivery and graft handling.