# Guided Bone Regeneration using Titanium-Reinforced PTFE Membrane


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## Abstract


- The Guided Bone Regeneration (GBR) procedure entails the use of a long-lasting membrane to the bone defect to isolate the site and protect the clot. The membrane acts as a scaffold to facilitate the spread of osteoprogenitor cells and blood vessels and a physical barrier to epithelial and connective cell invasion from the surrounding soft tissues. GBR protocols call for filling the space underneath the membrane with autogenous bone or a mixture composed of autogenous and allogeneic/xenogeneic bone particles.
- GBR has a high degree of predictability when some basic requirements are fulfilled that Wang et al. described as PASS: Primary closure to facilitate a protected environment from microbiota and mechanical forces, Angiogenesis to promote de novo bone formation, Space to assure the different compartments and avoid the collapse of the biomaterial, and Stability of the blood clot.


## Clinical Case

- The goal of this work is to exhibit a clinical case of a 70 yr. female who presented to Grad Perio Clinic seeking to improve her masticatory function on the maxillary left side. However, clinical and radiographic examination revealed vertical and horizontal defect of the corresponding alveolar ridge.
- The case was approached using a Titanium-Reinforced High-Density d-PTFE (Polytetrafluoroethylene) membrane with a mixture of allo/xeno/autograft. Then, three prosthetically driven dental implants were placed following seven months of healing.

## Preoperative & Postoperative Radiograph

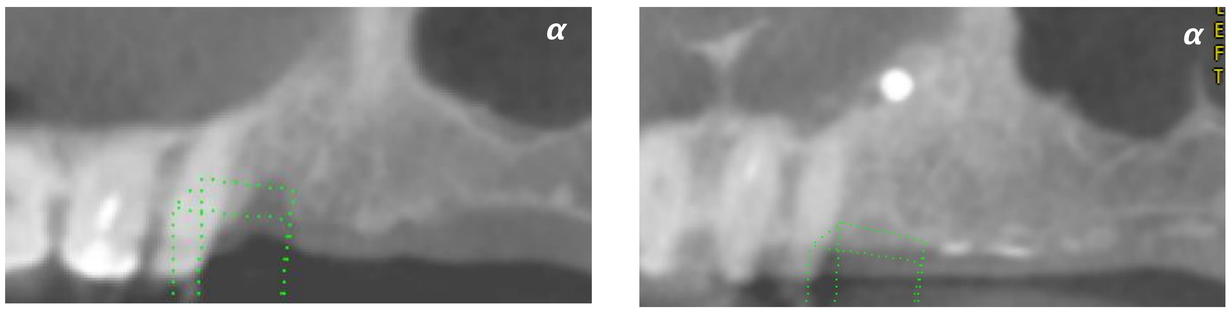


**Fig 5: (a)** GBR preoperative panoramic radiograph. (b) Preoperative CBCT cross-sectional view demonstrating horizontovertical alveolar ridge resorption

**Fig 6:** (a) GBR postoperative panoramic radiograph. (b) Postoperative CBCT cross sectional view showing horizontal and vertical bone defect restoration

## Phase I: Guided Bone Regeneration

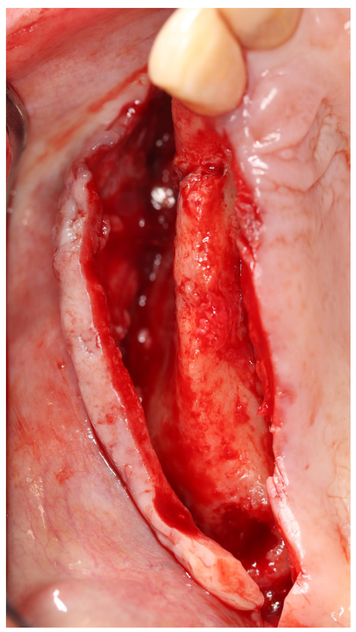

**Fig 1:** Pre-operative intraoral occlusal view of edentulous maxilla. Full-thickness flap preparation. Note the extent of the bone dehiscence

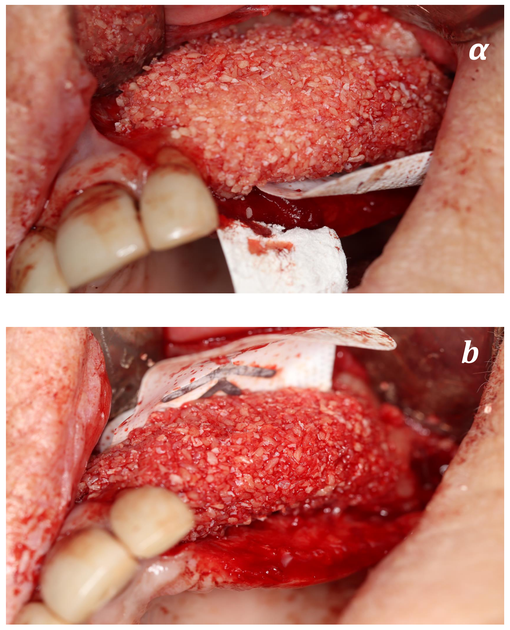


**Fig 2:** IPRF was mixed with autogenous bone chips and granules of allograft/xenograft bone to form sticky bone. Sticky bone was adapted at the defect site. Non-resorbable Titanium-Reinforced High Density PTFE membrane was stabilized using Pro-fix Precision Fixation System. (a) Buccal view. (b) Occlusal view

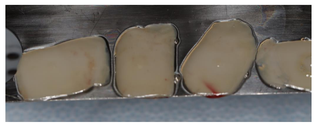

**Fig 3:** The augmented site was further protected with PRF membranes

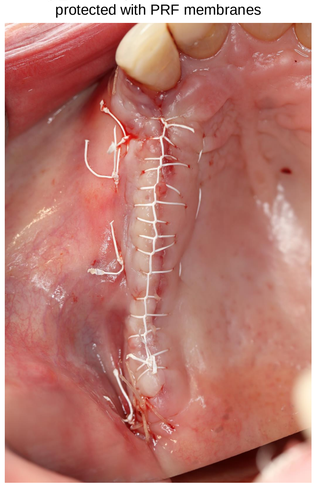

**Fig 4:** Periosteal release allowed tension free closure over the GBR, which is crucial for success. Flap was sutured with double-layer horizontal mattress and continuous interlocked technique using PTFE sutures

## Phase II: Implants Placement Surgery

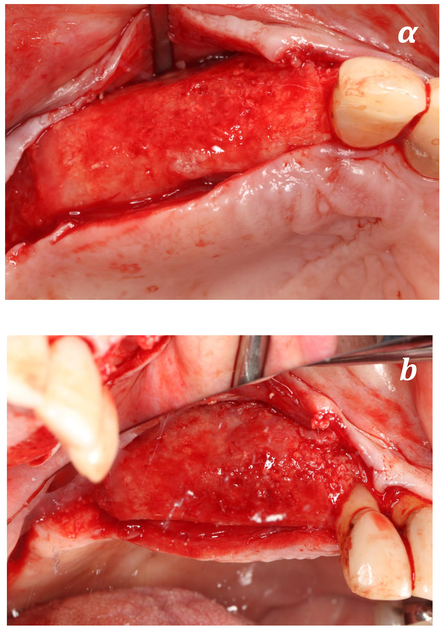


**Fig 7:** Seven months post augmentation, second surgery was performed for membrane retrieval and implants placement. (a) occlusal view display the uneventful healing of the recipient site. (b) Frontal view

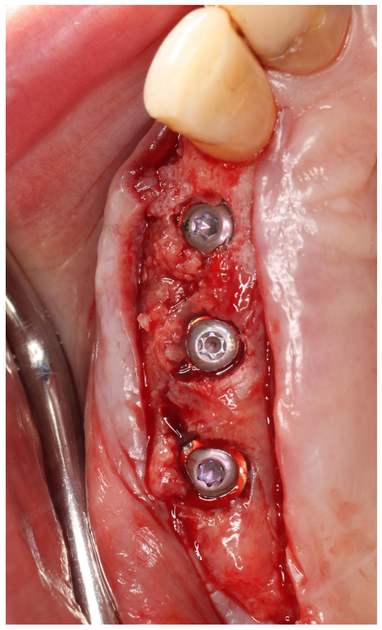

**Fig 8:** Dental implants placement with good primary stability. Both implants #11 and #12 are 4.1*10 mm BLT SLActive Straumann. Implant #13 is 4.8*10 mm BLT SLActive Straumann. Implants were covered with RC closure caps

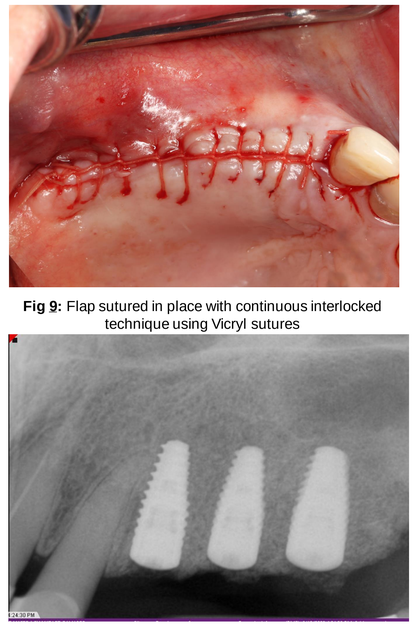

**Fig 9:** Flap sutured in place with continuous interlocked technique using Vicryl sutures

**Fig 10:** Post-surgical peri-apical x-ray exhibiting prosthetically driven implant positioning


**References:** PMCID: PMC4238035 I PMID: 25419250
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