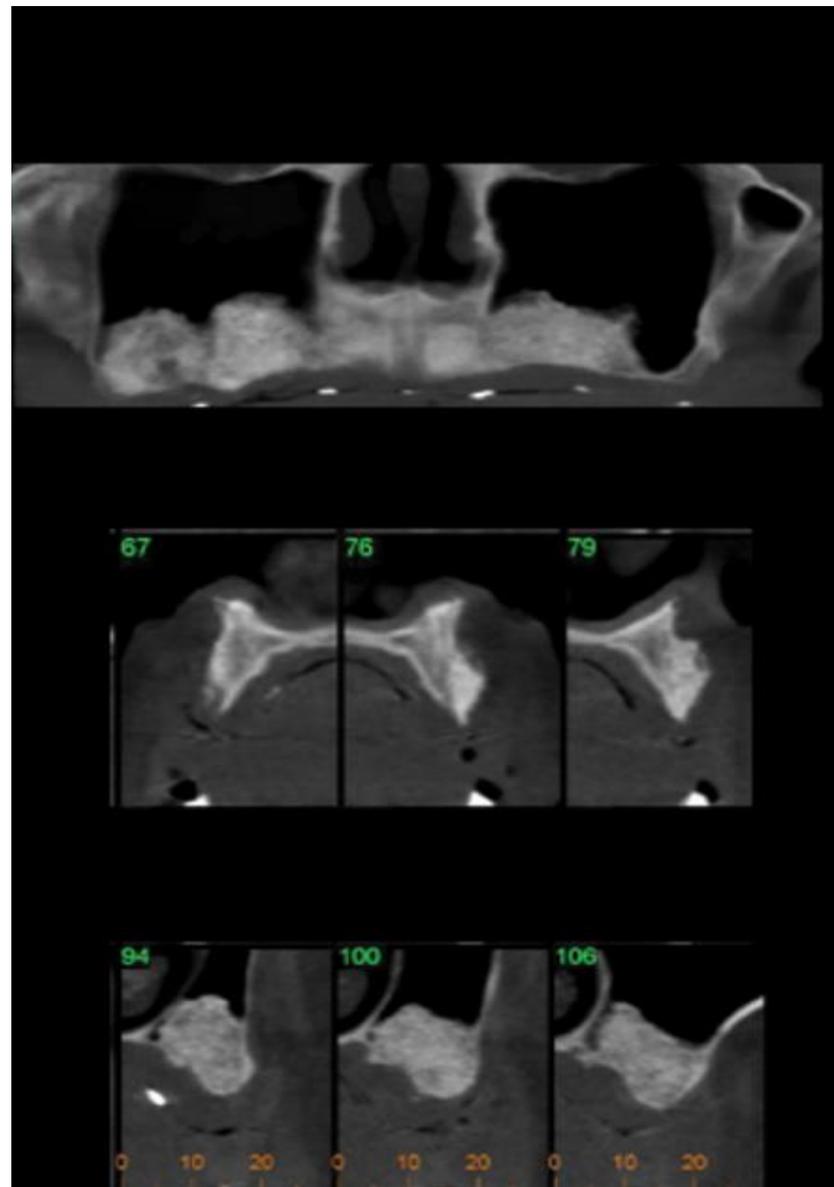
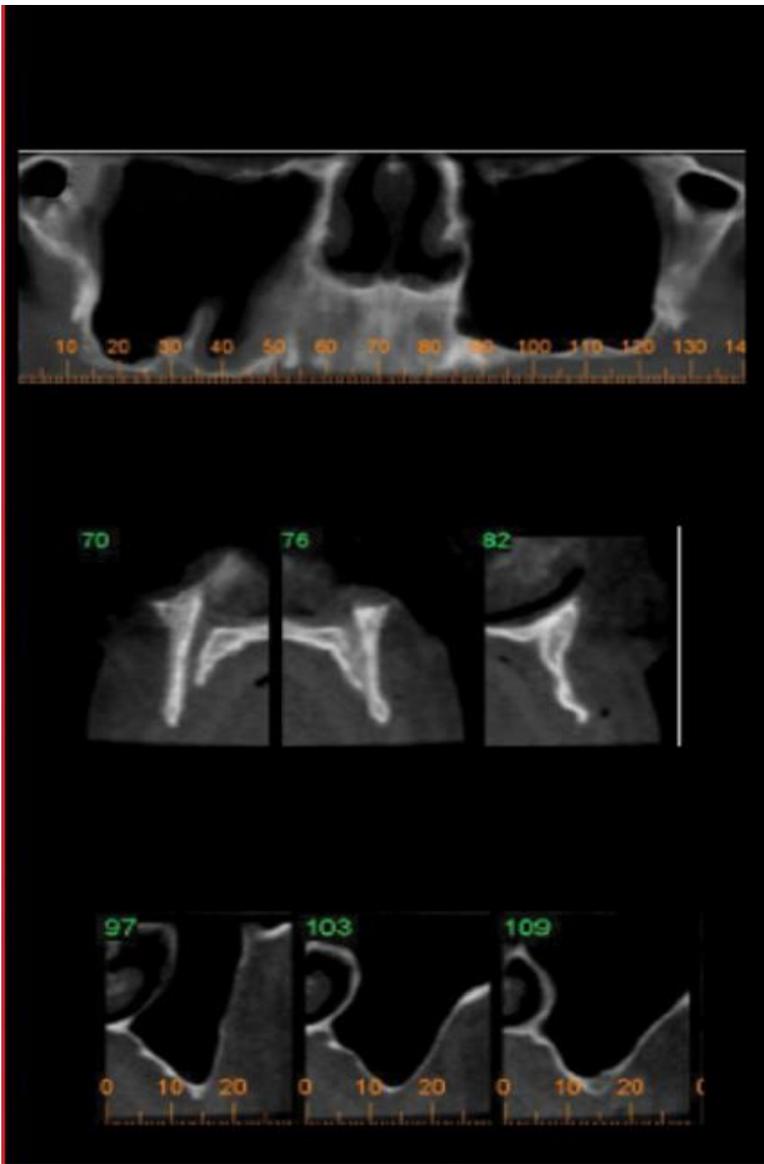


Ridge Augmentation Procedures

- ▶ after a tooth is extracted, approximately 25% of the bone volume has been reported to be lost after the first year. Over time, this deterioration may progress and is often reported to be responsible for a 40–60% loss of alveolar volume during the first 3 years after a tooth is lost.
- ▶ Successful ridge augmentation procedures consider basic biologic and physical principles of bone to enhance the regenerative potential of the host.



Some of the most important modifiable factors to consider and assist in proper wound management are discussed below

- ▶ Promoting primary wound closure
- ▶ Enhancing cell proliferation and differentiation
- ▶ Protecting initial wound stability and integrity

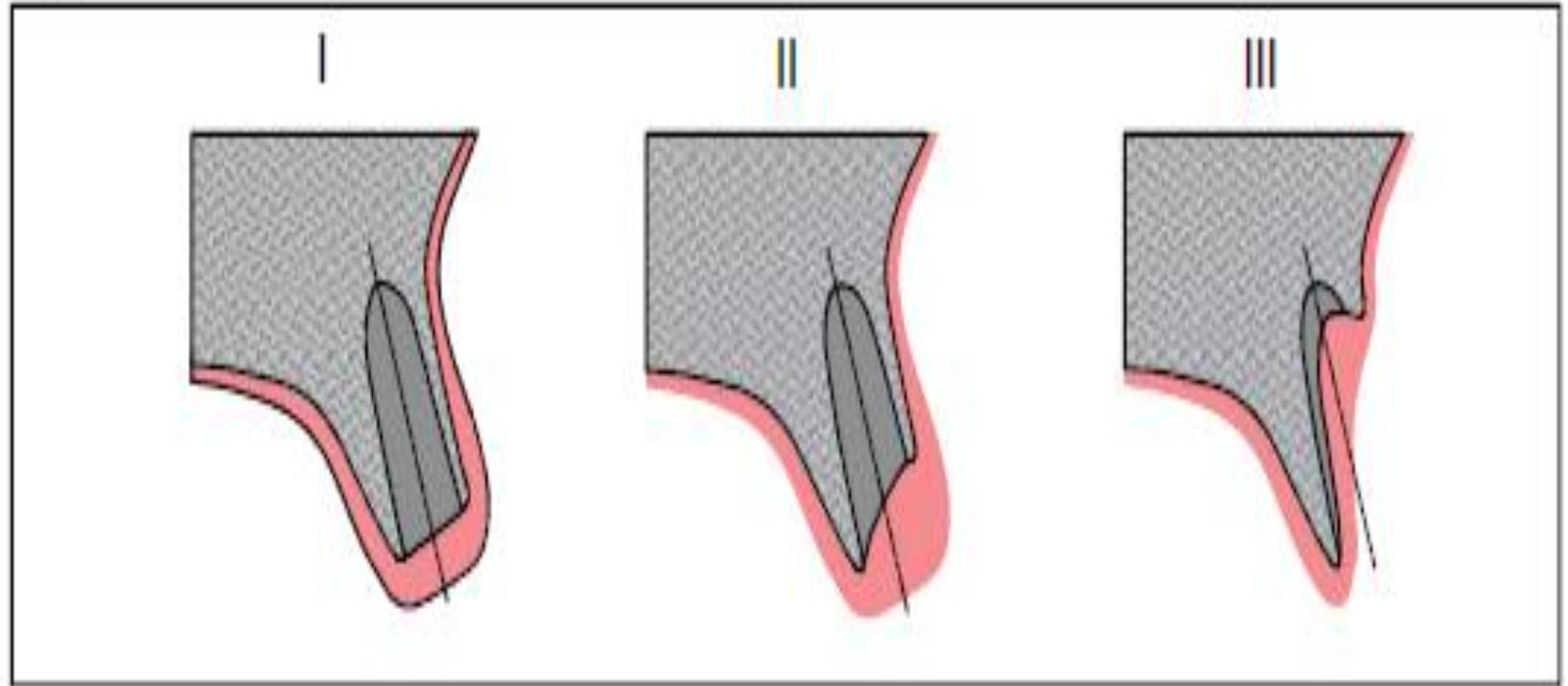
Treatment objectives

- ▶ Spray *et al.* (2000) evaluated the influence of bone thickness on the marginal bone response at second-stage uncovering surgeries, and reported that as the bone thickness approached 1.8–2 mm, bone loss (i.e. implant dehiscence) decreased significantly.
- ▶ The prevalence of these peri-implant diseases affecting the implant-supporting bone

Diagnosis and treatment planning

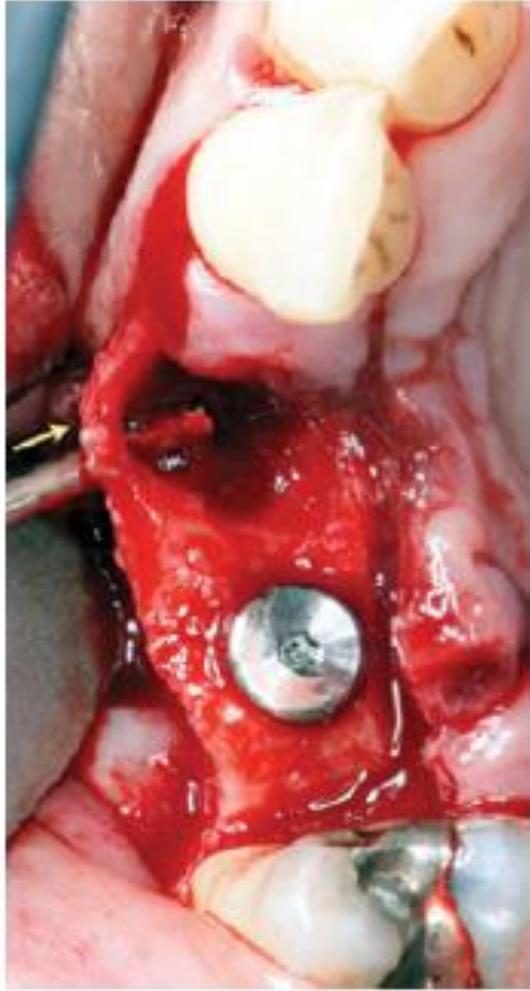
Patient

- ▶ diabetes group,
- ▶ smoking



Defect classification

- ▶ According to Seibert (1983), alveolar crest defects are classified into three categories (Fig. 50-3):
 - ▶ • *Class 1 defects*: when the bone deficiency is predominantly in the horizontal dimension
 - ▶ • *Class 2 defects*: when the bone deficiency is predominantly in the vertical dimension
 - ▶ • *Class 3 defects*: when the bone deficiency affects both the vertical and horizontal dimensions.



Biologic principles of guided bone regeneration

- ▶ Based on the same biologic principle, the GBR treatment concept was mechanical exclusion of the soft tissues from filling the osseous defect, thus allowing the cells with osteogenic cells to colonize the wound (Dahlin *et al.* 1988). The key prognostic factor in GBR was enough space under the barrier membrane to allow for bone regeneration of the crestal defect. Depending on the morphology of the defect, this space could be maintained with either a particulated graft or a block graft. Different biomaterials, natural and/or synthetic, have been developed, investigated, and used as grafts for bone augmentation procedures.

Regenerative materials

Barrier membranes

non-resorbable membranes

Resorbable membran

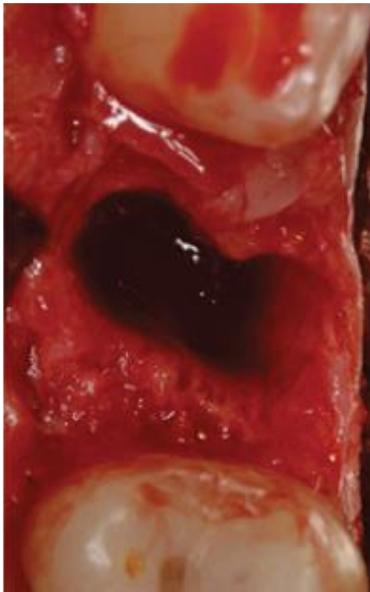
Bone grafts and bone substitutes

- ▶ Autogenous bone grafts
- ▶ Allograft
- ▶ Xenograft
- ▶ alloplasts

Ridge preservation

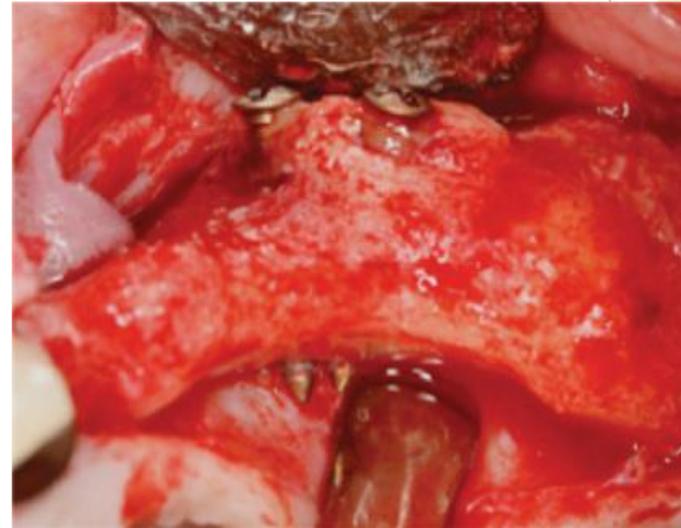
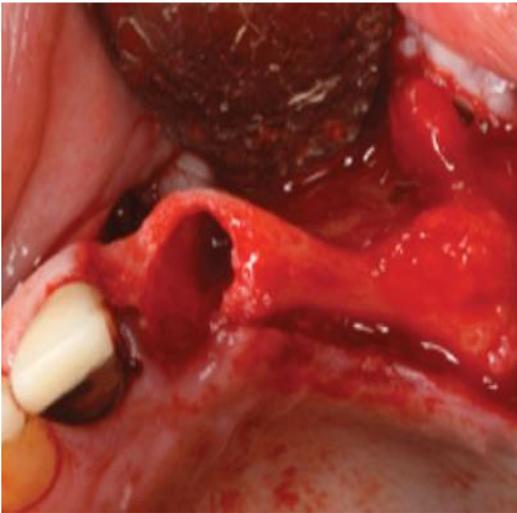
- ▶ Important structural changes of the edentulous ridge take place after tooth extraction and eventually lead to dimensional changes of the alveolar crest. A recent systematic review assessed the hard and soft tissue changes occurring 6 months after tooth extraction in humans and demonstrated a horizontal bone loss of 29–63% and vertical bone loss of 11–22% from the dimensions of the alveolar bone crest at the time of extraction
- ▶ • Use of membranes gave better results than for use of grafts alone in terms of horizontal bone changes.
 - A slight tendency towards less bone loss in the horizontal direction was observed when the sockets healed by primary intention.
 - Flapped surgical procedures demonstrated significantly less horizontal bone resorption of the socket, when compared to flapless surgeries.

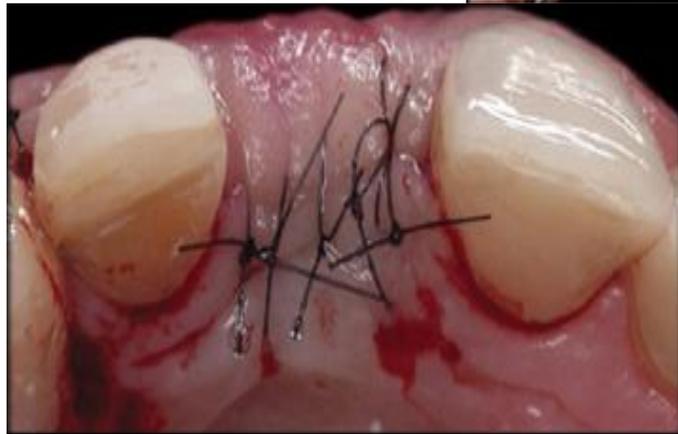
Bone regeneration in fresh extraction sockets





Horizontal ridge augmentation





Vertical ridge augmentation

