**PERIODONTAL ASPECTS OF IMPLANTOLOGY, AUGMENTATION II.** Hand out

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**Factors effecting long term functional and esthetic stability around teeth and implants**

1. Biotype, thickness of facial bone
2. Existence and shape of interdental papilla, level of proximal bone
3. Thickness and width of keratinized gingiva, maintained bone surrounding
4. Depth of the vestibulum
5. Contour and proximal height of the periodontium of neighbouring teeth
6. Shape and positioning of the teeth - „emergence profile”

There is an obvious need to achieve tooth-like harmonious pink and white esthetics via implant borne restorations. In order to achieve successful treatment:

1. proper planning
2. 3D positioning
3. required amount of bone and non-mobile soft tissue are the key factors.

**Post extraction dimensional changes of the alveolar ridge**

**Alveolar atrophy:** Decrease in the volume of alveolar process after tooth extraction / loss, decreased function & localised overloading.

**Alveolar jaw as a tooth dependent structure**

**Alveolar ridge resorption is an unavoidable consequence of tooth extraction**

**Regeneration**

Reconstitution of a lost or injured part of an organ so that form and function of lost structures are restored

Complete or partial regeneration?

GTR GBR

**Techniques for vertical hard tissue augmentation:**

* GBR
  + - * 2-8 mm vertical bone formation
      * 1-2 mm resorption during the first year
      * Less than 50% membrane exposure
      * Success rate 76-97% after 7 years
* Autogenous bone grafts
  + - * Up to 42% resorption (extraoral bone block)
      * Intraoral bone blocks more stabile
      * Success rate 90% after 5 years

**Differences between GBR and GTR**

|  |  |
| --- | --- |
| GBR  In case of appropriate flap design | GTR  Compromised postoperative blood supply |
| * Wound completely covered by flap (closed system) * Sterile condition maintained during healing * Membrane stabilisation - easy * Adaptation of membrane - easy * Spacemaking - easy * High predictability | * Open wound (open system) * Sterile condition not maintained * Membrane stabilization difficult * Adaptation of membrane difficult * Spacemaking difficult * Low predictability |

**Soft tissue management of augmented sites**

When?

* + Before, simultaneously or after implantation/augmentation

Indications

* + Reconstruction of lost or missing keratinised mucosa

„second surgery“

* + Esthetic reconstruction
  + Prior to hard tissue augmentation: creating sufficient amount of keratinized tissue for primary wound closure
  + To avoid early membrane exposure

Surgical techniques

* + Rotated flaps
  + Enrolled flaps
  + Subepithelial connective tissue grafting (CAF/tunnel)

**Materials and methods for GBR**

* GBR for 3D augmentation: nonresorbable membranes

Gore-tex membrane (e-PTFE)

Titanium membrane (mesh or shield)

Cytoplast membrane (n-PTFE)

* Bone particulate or bone substitues -filler materials
* Autogenous bone composite graft (60% autogenous bone + BDX BioOss®, Geistlich, or Cerabone®, botiss®)

**Non-resorbable membrane - Gore-tex®**

The sites accessed with the modified papilla preservation technique showed primary closure of the flap in all but one case, and no gingival dehiscence until membrane removal, in 73% of the cases (Fig. 20–40). This surgical approach has been also attempted in combination with non-supported bioresorbable barrier membranes (29), with positive results.

**Non-resorbable membrane - Cytoplast®**

Horizontally extended flap design at neighbouring teeth without vertical releasing incision

Midcrestal incision along the edentulous ridge

Full thickness flap to the mucogingival junction, partial thickness flap above

Dissected two layers: mucosa and periosteum

Harvesting particulate bone

Composite graft: particulate bone chips + xenogenic bone graft material

Nonresorbable nPTFE membrane

Layer by layer tension free suturing

Wound closure with primary intended wound healing

9 months post op wound healing

**Results**

**Treatment of chronic alvelolar defects**

Primary wound closure could be achieved over horizonto-vertically augmented sites with a novel horizontally extended bilaminar flap design

Reconstruction of the alveolar ridge was demonstrated radiographically and by direct clinical measurements allowing proper implant positioning

3D augmentation technique allows prosthetically driven implant positioning