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

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**Hypothesis**

The long term implant success in periodontal diseased patients is closely related to oral microbial enviroment, however alveolar ridge characteristics and mucogingival conditions remaining from the previous periodontal disease have not been emphasised enough

**The role of transmissioning periodontal pathogens from teeth to implants**

* Biofilm formation around implants could be different between periodontally healthy and nonhealthy patients

*Mombelli, A., Marxer, M., Gaberthüel, T., Grunder, U. & Lang, N.P. : The microbiota associated with successful or failing osseointegrated titanium implants. Oral Microbiology and Immunology. 1995 2: 145-151*

* Periodontitis has a strong tendency to develop similar infections around implants

*Klinge B, Hultin M, Berglundh T: Peri-implantitis. Dent Clin North Am. 2005 Jul;49(3):661-76, vii-viii.*

**Implant success- and survival rate in periodontitis-controversial data?**

* Bone loss around screw-shaped titanium implants, machined surface (Brånemark system). Periodontal destruction around teeth has no influence on periimplant conditions

Quirynen M, Peeters W, Naert I, Coucke W, van Steenberghe D: Peri-implant health around screw-shaped c.p. titanium machined implants in partially edentulous patients with or without ongoing periodontitis. Clin Oral Implants Res. 2001 Dec;12(6):589-94.

* Implant survival **96,5%** in healthy, vs. **90,5%** in periodontitis patients. Implant success **79.1%** vs. **52.4%,** respectively. Success criteria at 10 years were set at: pocket probing depth (PPD) ≤ 5 mm, bleeding on probing negative, bone loss < 0.2 mm annually.

Karoussis IK, Salvi GE, Heitz-Mayfield LJ, Bragger U, Hammerle CH, Lang NP: Long-term implant prognosis in patients with and without a history of chronic periodontitis: a 10-year prospective cohort study of the ITI Dental Implant System. Clin Oral Implants Res. 2003 Jun;14(3):329-39.

**Implant survival and success rate**

* **Implant survival:**

Existing implants after x years

* **Implant success:**

No mobility

No subjective complaints (Pain, sensation problems)

No recurrent periimplant inflammation or suppuration

No long term periimplant radiolucency (Buser 1990)

Pocket depth (PD) < 5 mm (Mombelli & Lang 1994)

PD < 5 mm and „bleeding on probing“ (BOP) negative (Mombelli & Lang)

After the first year max. 0,2 mm bone loss per year (Albrektsson 1994)

***Less than 0,3 mm in the first 5 years?! (EAO 2009)***

**Hard- and soft tissue changes following tooth extraction**

After tooth extraction, severe alveolar and mucogingival defects can develop due to individual anatomical and pathological conditions.

**Benefits of hard- and soft tissue augmentation**

Improved hard- and soft tissue conditions maintaining crestal bone levels at the level of the first implant threads

**Hard- and soft tissue changes following tooth extraction**

Placing implants in a compromised hard- and soft tissue environment can jeopardize the long-term success of dental implants.

**Benefits of hard- and soft tissue augmentation**

Alveolar ridge reconstruction can result in healthy peri-implant conditions corresponding with periodontal tissues of neighbouring teeth.

**Need for hard tissue augmentation**

in the past

*„bone-driven implant placement“*

nowadays

*„restoration-driven implant placement“*

***New era with moderately rough implant surfaces***

**Hard tissue augmentation success criteria**

* + - Clinically and radiographically proven bone formation
    - Possible osseointegration of implants
    - Long term bone maintenance, load bearing capacity (progressive osseointegration, remodelling after implant loading)

**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 |

**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®)

**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)

**Augmentation in periodontally compromised patients**

* Very limited data in literature exists dealing with alveolar ridge augmentation in periodontitis patients
* The existing data of case reports present good results (high succes rate of augmentation and survival rate of inserted implants)

**Augmentation in periodontally compromised patients /Chronic periodontitis/**

* Implants after maxillary sinus augmentation: no difference in success rate to healthy patients
* Simultaneous periodontal regeneration and ridge augmentation

**Augmentation in periodontally compromised patients /Aggressive periodontitis/**

* 100% Survival rate after 3 years in augmented sites
* Simultaneous periodontal regeneration and ridge augmentation

**Abutment connection**

1. Partial thickness flap elevation on both sides of the flap following a midcrestal or slightly buccal incision
2. Implant cover screws were replaced by healing abutments.
3. Bone block fixation screws were removed
4. Oral and vestibular flap sides were fixed by mattress sutures