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.

Classification and treatment options of gingival recessions around teeth

- Lack of keratinized gingiva
  - Autogenous free gingival graft (FGG), xenograft
  - Shallow vestibulum
  - Autogenous free gingival graft (FGG), xenograft
- Gingival recession (apical displacement of marginal gingiva) distance from the CEJ
  - Autogenous subepithelial connective tissue graft (SCTG), xenograft, allograft
- Healthy conditions can be kept even with gingival recession and minimal amount keratinized tissue around teeth

Classification and treatment options of gingival recessions around implants

- Non-sufficient amount of periimplant mucosa
  - Autogenous subepithelial connective tissue graft (SCTG), xenograft, allograft
- Lack of keratinized periimplant mucosa
  - Autogenous free gingival graft (FGG), xenograft, allograft
- Periimplant recession
  - Autogenous free gingival graft (FGG)
- The role and importance of periimplant keratinized tissue – Still under discussion

Role of biologic width around teeth

Combined connective tissue and epithelial attachment from the crest of the alveolar bone to the base of the gingival sulcus.

The biologic width is patient specific, may vary between 2.5-3 mm, including a required amount of soft tissue barrier to maintain underlying tissue(s) healthy.
The biologic width

The biologic width is patient and site specific, but always higher around implants than natural teeth.


The biologic width

Tooth Sulcus 0.69 mm
Junctional Epithelium 0.97 mm
Connective Tissue Attachment 1.07 mm
Biologic width 2.04 mm

Implant Sulcus 0.5-1.0 mm
Junctional Epithelium 1.5 ± 0.5 mm
Connective Tissue Attachment 1 mm
Biologic width 2.5 mm ± 0.5 mm

Keratinised oral epithelium

The biologic width is patient and site specific but always higher around implants than natural teeth (Lindhe 1976).

Alterations of gingival biotype around different anatomic regions of both jaws

Bennani et al. 2008

Implant Sulcus 0.5-1.0 mm
Junctional Epithelium 1.5 ± 0.5 mm
Connective Tissue Attachment 1 mm
Biologic width 2.5 mm ± 0.5 mm

Characteristics of periimplant soft tissues

- Lack of cementum layer
- Hemidesmosomal attachment
- Parallely oriented collagen fibers


Biologic width development around implants

The reduced amount of soft tissues resulted in crestal bone loss at an external hex abutment/implant interface.
Saucerisation of crestal bone (typical phenomenon for two-stage implants after abutment connection.


Characteristics of periimplant soft tissues

Human proof-of-principle study: Achieving a physical connective tissue attachment to the Laser-Lok microchannel collar of a dental implant. In: 2 mm collar has been micromachined to encourage bone and connective tissue attachment while preventing apical migration of the epithelium.


Biologic width

Biologic width around implants with different amount of soft tissue.

Dr. C.I. epithelium & bone, soft, junctional epithelium: the periimplant mucosa.

Predictive factors determining functional stability and esthetics

- Area (mm²)
- Vascular supply of the mucosa
- Type of the bone
- Shape of the tooth
- Position of the tooth (axial)


Vestibuloplasty technique

- If the buccal deflection is too shallow vestibular deepening is needed additionally the enlargement of keratinized tissue is still required
- Aim is to achieve conditions which are more similiar for plaque control
- Classical mucogingival or preprosthetic surgical approach mostly applied in implant dentistry

Aesthetically driven implant positioning

- „As shallow as possible, as deep as necessary”

Immediate implant placement, socket seal / full thickness flap /

Evaluation of aesthetics

Implant Crown Aesthetic index

1. Maxillary distal crown width
2. Position of incisal edge
3. Labial convexity of the crown
4. Colour and translucency
5. Structure of the crown
6. Vestibular level of the periimplant mucosa
7. Approximal level of the mucosa
8. Vestibular contour of the mucosa
9. Colour and surface of keratinised gingiva

Evaluation of esthetics

Pink Esthetic Score (PES)

1. Mesial papilla
2. Distal papilla
3. Height of gingival contour
4. Shape of gingival contour
5. Shape of a healthy jugum alveolare
6. Texture of gingiva
7. Colour of gingiva


Single gingival recession coverage techniques - natural teeth

Coronally advanced flap - CAF

Double papillary technique

Laterally rotated flap technique

Envelope technique

- No vertical incision, less damage
- Increased revascularization
- Faster Healing


Gingival recession coverage - envelope, FCG with epithelial collar/

Before - after


Single gingival recession coverage techniques - implants

Coronally advanced flap - CAF


Envelope technique and partially epithelialized connective tissue graft


Gingival recession (Miller III) coverage, prosthetic rehabilitation

Before - after

Gingival recession coverage and periodontal regeneration

Before - after


Limits of papilla regenerative techniques around teeth and implants

Conclusions

- Ideal hard- and soft tissue surroundings are needed of an optimally positioned implant.
- Soft tissue correction around a previously loaded implant has its limits; neoclastic surgical technique can be only partially applied.
- The treatment predictability is always more favorable for natural teeth than for implants - soft tissue improvements after implant uncoverment are more preferable.
- Anatomical restoration can help to achieve ideal emergence profile and thus esthetics if proper width and thickness of keratinized periimplant tissue exist.

Radiological changes /after alveolar preservation/

2 wks postop  3 mths postop  9 mths postop

Radiological changes /after alveolar preservation/

2 wks postop  3 mths postop  9 mths postop
Thank you for your kind attention!

peter.windisch@gmail.com