# Achieving Optimal Implant Aesthetics Using a Team Approach



# Presentation PDF

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- Other (please list role): None



### dental





#### Restorative

#### Restorative



#### Technology

## reatment Planning

Surgical

#### Restorative

### reatment Coordination

Technology



Achieve Optimal Aesthetics Reduce Coordinated Visits ✓Decrease Treatment Time Improve Patient Care



#### Treatment Planning



Surgical & Restorative Parameters

#### Patient Presentations

#### Treatment Coordination





















# One Abutment/One Time

# Prevention of peri-implant marginal bone loss

**Tallarico M, et al.** Definitive abutments placed at implant insertion and never removed: Is it an effective approach? A systematic review and meta-analysis of randomized controlled trials. J Oral Maxillofac Surg 2018; 76:316-324.











#### mplant Placement

#### Abutment Connection

### tion Provisionalization



#### mplant Placement Abutment Connection

#### Definitive Restoration

# What have we learned in 20+ years?

#### Patient Selection

# iterature Review

#### Surgical Skill

#### Bone Quality

#### Implant Length

Gapski R, et al. Critical review of immediate implant loading. Clin Oral Impl Res 2003;14:515-527.

#### Occlusal Forces

#### Bone Quantity

#### Primary Stability

#### Implant Design

### **Patient Selection**

#### Surgical Skill

#### **Bone Quality**

Implant Length

# Minimum Torque = 35 Ncm

Gapski R, et al. Critical review of immediate implant loading. Clin Oral Impl Res 2003;14:515-527.

# iterature Review

#### **Occlusal Forces**

#### **Bone Quantity**

#### Primary Stability

#### Implant Design

# mmediate Loading

# Similar peri-implant tissue response occurs whether the implant is loaded or not.

Cochran DL, et al. Biologic width around titanium implants. A histometric analysis of the implantogingival junction around unloaded and loaded nonsubmerged implants in the canine mandible. J Periodontol 1997; 68:186-198.

Barndt P, et al. Immediate Loading: From biology to biomechanics. J Prosthetic Dent 2015; 133:96-107.















Wadhwani C, Piñeyro, A. Technique for Controlling the Cement for an Implant Crown. J Prosthetic Dent 2009;102:57-58.







Philosophy



#### Surgical & Restorative Parameters

# Surgical

00

### Implant Position

## Peri-implant Complex

# Restorative

## Prosthetic Design

## Materials

# Implant Position

### ✓ 3-4 mm apical to gingival crest ✓ ≥ 2 mm of labial bone

Grunder U, Gracis S, Matteo C. Influence of the 3-D Bone-to-Implant Relationship on Esthetics. Int J Periodontics & Restorative Dent 2005; 25:113-119.
Lim HC, et al. Cone-beam computed tomographic analysis of the alveolar ridge profile and virtual implant placement for the anterior maxilla. J Periodontol Implant Sci 2019; 49(5):299-309.

#### ≥ 2 mm

### 3-4 mm
### Implant Position

√3-4 mm apical to gingival crest √ ≥ 2 mm of labial bone

### Palatal placement Cingulum access opening



### Angulated Screw Channel



Hu E, et al. Effect of Screw Channel Angulation on Reverse Torque Values of Dental Implant Abutment Screws. J Prosthodont 2019;28(9):969-72.



### Implant Position

- $\sqrt{3-4}$  mm apical to gingival crest
- $\checkmark \ge 2 \text{ mm of labial bone}$
- ✓Palatal placement
- ✓Cingulum access opening
- $\checkmark \ge 1.5 \text{ mm implant-tooth}$

**Esposito M, et al.** Radiological Evaluation of marginal bone loss at tooth surfaces facing single Brånemark implants. Clin Oral Implant Res 1993;4:151-157.

≥ 1.5 mm

### Implant Position

- $\sqrt{3-4}$  mm apical to gingival crest
- $\checkmark \ge 2 \text{ mm of labial bone}$
- ✓Palatal placement
- ✓Cingulum access opening
- $\checkmark \ge 1.5$  mm implant-tooth  $\checkmark \ge 3.0$  mm implant-implant



**Tarnow, D et al.** The Effect of Inter-Implant Distance on the Height of Inter-Implant Bone Crest. J Periodontol 2000;71:546-549.

### 1.3-1.4 mm

**3 mm** 

### Smaller diameter implants



### ✓Smaller diameter implants

### Platform switching

Lazzara RJ, Porter SS. Platform switching: A new concept in implant dentistry for controlling postrestorative crestal bone levels. Int J Periodontics Restorative Dent 2006;26:9–17.

### Implant

## Microgap Abutment

### √Smaller diameter implants

### Platform switching

**Monje A, Pommer B.** The Concept of Platform Switching to Preserve Peri-implant Bone Level: Assessment of Methodologic Quality of Systematic Reviews. J Oral Maxillofac Implants 2015:30:1084-1092.

- ✓ Smaller diameter implants
- ✓Platform switching
- Vertical Soft Tissue Thickness (VSTT)= 2-3 mm

Berglundh T, Lindhe J. Dimensions of the periimplant mucosa. J Clin Periodontol, 1996;23:971-973.7-508.
Linkevicius T, et al. Crestal Bone Stability around Implants with Horizontal Matching Connection after Soft Tissue Thickening: A Prospective Clinical Trial. Clin Implant Dental Relat Res 2015:17:497-508.

### = 2-3 mm 2-3 mm

- √Smaller diameter implants
- $\checkmark$  Platform switching
- √Vertical Soft Tissue Thickness (VSTT) 2-3 mm
- ✓ Horizontal Soft Tissue Thickness (HSTT)  $\ge 2 \text{ mm}$ 
  - **Rungcharassaeng K, et al.** Implant Placement and Provisionalization With and Without a Connective Tissue Graft: An Analysis of Facial Gingival Tissue Thickness. Int J Periodontics & Restorative Dent 2017;32:656-663.

# $\geq 2 \text{ mm}$

## Bone grafting & provisional, results in thicker soft tissue.

**Chu S, et al.** Flapless Postextraction Socket Implant Placement, Part 2: The Effect of Bone grafting and Provisional Restoration on Peri-implant Soft Tissue Height and Thickness—A Retrospective Study. Int J Periodontics & Restorative Dent 2015; 35:803-809.



### ✓Contact point-Bone Crest = 5 mm

**Choquet V, et al.** Clinical and radiographic evaluation of the papilla level adjacent to singletooth dental implants. A retrospective study with maxillary anterior region. J Periodontol, 2001;72:1364-71.



### $\checkmark$ Contact point-Bone Crest = 5 mm $\checkmark$ Mean papillary height = 3.4 mm

**Tarnow D, et al.** Vertical Distance from the Crest of Bone to the Height of the Interproximal Papilla. J Periodontol 2003;74:1785-1788.



## Contact point-Bone Crest = 5 mm Mean papillary height = 3.4 mm



Contact point-Bone Crest = 5 mm
Mean papillary height = 3.4 mm
Abutment dis/reconnection

**Abrahamsson I, et. al**. The mucosal barrier following abutment dis/reconnection. J Clin Periodontol 1997; 24:568-72.



### **Disruption of Mucosal Barrier**

- Epithelial proliferation
- Bone resorption

**Koutouzis T, et al.** Abutment Disconnection/Reconnection Affects Peri-implant Marginal Bone Levels: A Meta-Analysis. Int J Oral Maxillofac Implants 2017;32:575-581.



√Contact point-Bone Crest = 5 mm

- $\checkmark$ Mean papillary height = 3.4 mm
- ✓Abutment dis/reconnection

### Concave abutment subgingival contour

**Rompen K, et al.** Soft tissue stability at the facial aspect of gingivally converging abutments in the esthetic zone: A pilot clinical study. J Prosthet Dent 2007;97:S119-S125.



 $\checkmark$  Contact point-Bone Crest = 5 mm

- $\checkmark$  Mean papillary height = 3.4 mm
- ✓Abutment Dis/reconnection
- ✓Concave abutment subgingival contour
- Abutment shoulderless finishing line

Canullo, L, et al. Soft and hard tissue response to an implant with a convergent collar in the esthetic zone. Int J Periodontics Restorative Dent 2020; 40:9-17.



### Abutment options





Zirconia

Titanium



Alumina

### Lithium Disilicate



Gold



## Abutment options Physical properties





### Translucency

### Willems G, et al. Composite resins in the 21 century. Quintessence Int.1993;24(9):641-58.



Abutment options
Physical properties
Aesthetics



## Zr & Ti abutments are unnoticeable when the soft tissue thickness is > 2mm.

### Titanium

van Brakel, et al. The Effect of Zirconia and Titanium Implant Abutments on Light Reflection of the Supporting Soft Tissues. Clin Oral Implants Res 2011;22(10):1172-1178.

### Zirconia



✓ Abutment options
✓ Physical properties
✓ Aesthetics

✓ Soft tissue response



### **Abrahamsson I, Cardaropoli G**. Peri-implant hard and soft tissue integration dental implants made of titanium and gold. Clin Oral Impl Res 2007:18:269-274.



### Titanium



**Abrahamsson I, et al.** The mucosal attachment at different abutments. An experimental study in dogs. J Clin Periodontol 1998; 25:721-727.



### Gold Metal Ceramic

## Ti, Zr, and Alumina all support binding of epithelial cells through hemidesmosomes.

### Titanium

### Zirconia

**Obake E, et al**. Adhesion Properties of Human Oral Epithelial-Derived Cells to Zirconia. Clin Implant Dent Relat Res 2016;18:906-916.

### Alumina

### Zr Abutment

### Minimum Thickness = 0.5 mm

### LD Crown

### Ti Base



### Implant Position

- 3-4 mm Subgingival
- Palatal Placement
- 2 mm Bone
- $\geq$  1.5 mm Implant-Tooth
- $\geq$  3 mm Implant-Implant

### Peri-implant Complex

- Smaller Diameter Implants
- Platform Switching
- VSTT = 2-3 mm
- HSTT  $\ge 2 \text{ mm}$

### Restorative

### Prosthetic Design

- Bone-Contact Point = 5 mm
- Mean Papillary Height = 3.4 mm
- Abutment Dis/Reconnection
- Concave Subgingival Contour
- Shoulderless Finishing Line

- Multiple Materials are Acceptable
- Ti & Zr ↑ Strength
- Zr, Alumina, & LD 1 Aesthetics
- Cell Adhesion on Smooth Surfaces
- Polish & Clean Subgingival Materials
- Minimum Thickness = 0.5 mm



### Materials



### Treatment Planning



Surgical & Restorative Parameters



### reatment Planning



### Restorative

### Technology



### CBCT

### Technology



### Intraoral Scanner





### Intraoral Scanning







### ntraoral Scan




# Advantages

- Fabricate the Surgical Guide
- Fabricate the Abutment
- Fabricate the Provisional









# -Loading----

#### Immediate -















# 

#### 4 Year Follow Up





### -Loading- -

#### Immediate -



























#### Treatment Planning



#### Surgical & Restorative Parameters



#### **F**reatment Coordination

Immediate Provisionalization





Decoronation





#### Ti Base

Screw Access

# Immediate Povisionalization Serial Extraction





Immediate Povisionalization

✓ Serial Extraction

Prosthesis Conversion

















✓Immediate Povisionalization

✓ Serial Extraction

✓Prosthesis Conversion

Orthodontic Therapy







**Salama H, Salama M.** The way Role of Orthodontic Extrusive Remodeling in Enhancement of Soft and Hard Tissue Profiles Prior to Implant Placement: A Systemic Approach to the Management of Extraction Site Defects. Int J Periodontics Restorative Dent 1993;13:313-333.



















#### Treatment Planning



#### Surgical & Restorative Parameters

#### Patient Presentations



#### Treatment Coordination






## Asial view



mplant aligned : 90°



8 4.40 0000

















































## ake Home Messages

Primary stability Correct implant position Adequate hard and soft tissue ✓One Abutment/One Time Proper prosthetic design Biocompatible restorative materials



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