Periodontal and Peri-Implant Considerations in Esthetic Dentistry

Periodontal and Peri-Implant Considerations in The Esthetic Zone
Nick Caplanis DMD MS
Private Practice Periodontics and Implant Surgery
Mission Viejo, California
Nick@drcaplanis.com
Assistant Professor Loma Linda University

Presentation Outline
- Anatomic concerns
- Procedures to improve restorative outcomes
- Periodontal and Peri-implant disease management

Periodontal and Peri-Implant Considerations in Restorative and Implant Therapy
- Subgingival margins should be considered a compromise
- 2-3mm of healthy, natural, supra-alveolar tooth needed for attachment
- Margins should not be placed deeper than 0.5mm


Tissue reactions around artificial crowns
- Minimum distance required for periodontal health, between restorative margin and "biologic width" 0.5mm

Waerhaug J. J Periodontol 1953;24:172-185

The Restorative Periodontal Interface: Biologic Parameters
- Crestal bone positions
  - Narrow
  - Low
  - High
- The location of a restorative margin in relationship to the alveolar bone crest is more important for preserving gingival health than its distance below the free gingival margin


Periodontal Characteristics in Individuals with Varying form of the Upper Central Incisor
- 113 subjects in long term periodontal surgery study
- Thin "biotypes" had more buccal recession


Periodontal Biotype
- Thick
  - Short square teeth
  - Thick robust gingiva
  - Wide blunted papilla
  - Resistant to recession

- Thin
  - Long tapered teeth
  - Thin friable gingiva
  - Long pointy papilla
  - Susceptible to recession

Dimensions of the Dentogingival Junction in Humans
- Gingival sulcus – 0.69mm
- Junctional epithelial attachment – 0.97mm
- Connective tissue attachment – 1.07mm

Biologic Width and Its Importance in Periodontal and Restorative Dentistry

Tooth vs. Implant Histology
- **Tooth**
  - Sulcus
  - Epithelial Attachment
  - Connective Tissue Attachment
  - Bone Attachment via Sharpy's fibers
- **Implant**
  - Sulcus
  - Epithelial Adhesion
  - No Connective Tissue Attachment
  - Direct Bone to Implant Union (Osseointegration)

Peri-implant biologic width
- Junctional Epithelium
- Connective Tissue

Probing around implants: a standard of care
- Rationale for probing around implants
  - Probing reveals level of inflammation through BOP and presence of suppuration
  - Pocket depth changes can indicate bone loss
  - Deep pockets increase risk of harboring pathogens
  - Deep pockets increase risk of developing bone loss

Smile Lines

Understanding Biologic Width is Important to Avoid Complications with Restorative Dentistry

Presentation Outline
- Anatomic concerns
  - Periodontal biotype
  - Biologic width
  - Bone crest position
  - Gingival display and smile line
- Procedures to improve restorative outcomes
- Periodontal and Peri-implant disease management
**Presentation Outline**

- Procedures to improve restorative outcomes
  - Esthetic crown lengthening
  - Root reshaping
  - Gingivectomy with osseous surgery
  - Gingivectomy with osseous surgery with or without flap elevation
  - Gingivectomy with osseous surgery apically repositioned flap with osseous surgery
  - Orthodontics
  - Ridge defect repair
  - Biotype enhancement during implant placement
  - Root reshaping
  - "Reverse crown lengthening"
  - Site preservation
  - Orthodontic extrusion
  - Papilla management

**Esthetic Crown Lengthening Techniques**

- Gingivectomy
- Gingivectomy with osseous surgery
- Gingivectomy with osseous surgery with or without flap elevation
- Apically repositioned flap with osseous surgery


42 y/o female normal crest medium biotype

Gingivectomy using Ellman™ Radiosurgery

6 week post-op evaluation

45 y/o female normal to high crest medium biotype

Gingivectomy with osseous surgery with full thickness flap

3 month post-op evaluation
Esthetic crown lengthening - Gingivectomy guided by stent

Osseous surgery with full thickness flap

1 year post op evaluation

Contemporary Crown Lengthening Therapy: A Review
• Results and Conclusions
  - First prosthetic treatment should wait at least 3 months and up to 6 months for esthetically critical areas

Hempton TJ, Dominici JT. JADA 2010;14(6):647-655

Root coverage procedures

• Free gingival graft
• Interpositional connective tissue graft
• Coronally advanced flap
  - with or without connective tissue
• Pedicle graft
  - lateral
  - semilunar
• Regeneration
  - bone grafts, membrane, growth factors

Treatment of Gingival Recession
Purpose
• To evaluate the outcome of various gingival grafting techniques to assess which provides optimal results

Materials and Methods
Review of controlled clinical trials

Kassab MM, Cohen RE. JADA 2002;133(11):1499-1506

Miller Recession Classification

<table>
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<tr>
<th>Class</th>
<th>Recession above MGJ</th>
<th>No AL</th>
<th>Complete root coverage</th>
<th>Success rate</th>
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<tr>
<td>I</td>
<td>No AL</td>
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<tr>
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<td></td>
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Mucogingival surgery – interpositional CT graft

Mucogingival surgery – interpositional CT graft

Mucogingival surgery – Free gingival graft + CTG

Root coverage procedures

Placement of interpositional CT graft guided by stent

3 month post op evaluation

58 y/o female with failing maxillary anterior 3 unit bridge

Debridement and Regeneration surgery

Interpositional CT graft via tunnel approach
Interpositional CT Graft with coronally repositioned flap

Interpositional CT Graft via Tunnel Flap

Semi-Lunar Pedicle Graft

Ridge Defect Repair

Autologous Connective Tissue Graft can function as a barrier to contain graft as well as to repair soft tissue deficits.

Provisional prosthesis with ovate pontic design used to guide healing

Connective tissue graft harvest

Successful site preservation allows for prosthetically driven implant placement

Radiographic site progression
Final Outcome

First procedure - extraction of teeth, site preservation with Bio-Oss + DBM and connective tissue graft

Second procedure – site development using a symphyseal block graft and membrane

Third procedure – implant placement with connective tissue graft and healing abutments used as space maintainers

Ridge Defect Repair

Facial gingival tissue stability after connective tissue graft with single immediate tooth replacement in the esthetic zone
• 20 consecutive patients
• Immediate implant placement with associated connective tissue graft
• Follow-up 1-4 yrs

Biotype Enhancement Followed by Implant Placement

Site preservation with socket and CT Graft
Root reshaping, an integral part of periodontal surgery.

Procedure:
Alternative to conventional osseous surgery involving reshaping of the existing tooth and root surface with conservative removal of supporting bone to create the width needed for biologically acceptable restorations.

Melker DJ, Richardson CR. Int J Perio Rest Dent 2001;21(3):296-304

Root Coverage Required to Reduce Anterior Tooth Length

Crown Lengthening in Posterior and Root Reshaping of the Anterior Teeth

Root Reshaping Eliminates Existing Restorative Margins

Placement of Interpositional CT Graft Guided by Stent

Esthetic Crown Lengthening, Root Reshaping and Root Coverage

Purpose:
To compare efficacy of immediate vs. delayed implant placement in maintaining soft tissue margin position following tooth extraction.

Materials and Methods:
24 patients randomly received either immediate or delayed implant placement. Delayed sites received FDBA and collagen membrane and re-entered for implant placement 3-6 months later.

A Prospective Randomized Clinical Study of Changes in Soft Tissue Margins Following Immediate and Delayed Implant Placement

Results and Conclusions
- No differences between immediate or delayed approaches with respect to midbuccal and interproximal soft tissue margins

Socket graft with a membrane improves ridge height and width following extraction but may interfere with normal healing/bone fill within defect


Extraction, Socket Debridement, Bone Graft Placement

Site preservation biomaterials
- Membranes serve to contain the graft and minimize epithelial downgrowth
- Bone Grafts likely minimize clot shrinkage and thus alveolar resorption

Orthodontic Extrusion
- 44 y/o female with chronic alveolar abscess of maxillary left lateral incisor
- Papilla Management through CTG and adjacent restorations pre planned
Prior to surgery, patient prepared for additional adjacent restorations as needed.

Prototype development.

Biotype Enhancement

Papilla Management

• Interproximal bone to tooth contact point
• ≤ 2mm: 100% papilla presence
• 2-3mm: 56%
• > 3mm: 27%

Tarnow et al. J Perio 1992

Implant placement guidelines - spacing
Tooth to Implant: 2mm
Implant to Implant: 3mm

Tarnow et al. J Perio 2000

Implant placement guidelines - position
Avoid adjacent implants in the esthetic zone

CDA Journal Nov 2005
Implant placement guidelines – Emergence Profile

3 mm below restorative margin

Communication Devices - Surgical guided

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  - Papilla management

• Anatomic concerns
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  - Periodontal and Peri-Implant disease management

Presentation Outline

• Periodontal and Peri-Implant disease management
  - Diagnosis
  - Treatment
  - Maintenance

Classification of periodontal disease and conditions

• Previous classification
  - 1989 world workshop
  - “Adult” Periodontitis
  - “Early-onset” Periodontitis
  - “Refractory” Periodontitis
  - “Localized Juvenile” Periodontitis

• Current classification
  - 1999 international workshop
  - “Chronic” Periodontitis
  - “Aggressive” Periodontitis
  - Additions
    - Periodontal abscess
    - Perio-endo lesions
    - Acquired deformities and conditions

Weaknesses of 1989 classification

• Criteria for diagnosis unclear
• Disease categories overlapped
• Too much emphasis on age of disease onset and rate of progression which are difficult to determine
• No classification for diseases limited to gingiva

1999 Gingival and Periodontal Disease Classification

Armitage GC. Ann Periodontol 1999;4:1-6

Periodontal disease classification "Key Changes"
Classification of periodontal disease and conditions

- Chronic periodontitis
  - Typical adult onset plaque induced
  - Previously referred to as "adult" peri
- Aggressive periodontitis
  - Previously known as pre-pubertal, juvenile peri, localized juvenile peri, rapidly progressive peri, early onset peri

Armitage GC. Ann Periodontol 1999;4:1-6

Chronic and Aggressive Periodontitis

- Distribution
  - Localized < 30% sites
  - Generalized > 30% sites
- Severity
  - Slight 1-2mm CAL
  - Moderate 3-4mm CAL
  - Severe > 5mm CAL

Armitage GC. Ann Periodontol 1999;4:1-6

Systemic Connections

- Periodontal disease increases CRP levels
- Link between periodontal disease and cardiovascular disease; MI, CVA
- Link between periodontal disease and the delivery of premature, underweight babies
- Link between periodontal disease and Diabetes
- Recent link with Alzheimer’s disease
- Periodontal Pathogens are transmissible

Biofilm and inflammation management

Gingivitis

- Clinical Signs
  - Gingival erythema
  - Edema
  - Bleeding on probing
  - PPD’s up to 3mm (unless pseudo pocket)
  - Soft tissue contour changes
  - Increased GCF
  - No attachment loss
- Treatment
  - Scaling/Prophy with OHI
  - Phase I Re-eval
  - 4-6 mo PST

Slight Periodontitis

- Clinical Signs
  - Gingival erythema
  - Edema
  - Bleeding on probing
  - Slight attachment loss
  - Pocket depths 4mm
- Treatment
  - SRP + behavior mod
  - Rx Periostat
  - Phase I Re-eval
  - 3-6mo PST

Moderate Periodontitis

- Clinical Signs
  - Severe Attachment Loss
  - Pocket Depths > 6mm
  - Moderate to Advanced Furcation involvement
  - Inflammation, BOP
- Treatment
  - SRP + behavior modification
  - Phase I Re-eval
  - Pocket Elimination Surgery
  - Phase II Re-eval
  - Bacterial Culture and Sensitivity
  - Localized and Systemic Antibiotics
  - 3mo PST

Severe Periodontitis

- Clinical Signs
  - Severe Attachment Loss
  - Pocket Depths > 6mm
  - Moderate to Advanced Furcation involvement
  - Inflammation, BOP
- Treatment
  - SRP + behavior modification
  - Phase I Re-eval
  - Pocket Elimination Surgery
  - Phase II Re-eval
  - Bacterial Culture and Sensitivity
  - Localized and Systemic Antibiotics
  - 3mo PST

Manual vs. Powered tooth brushing for oral health

Materials and Methods

- 42 trials involving 3855 participants included in review

Results and conclusions

- Powered brushes removed plaque and reduced gingivitis more effectively than manual brushes

The efficacy of interdental brushes on plaque and parameters of periodontal inflammation: a systematic review

Materials and Methods
- 218 Medline-PubMed and 116 Cochrane papers identified
- 9 studies met eligibility criteria

Results and conclusions
- As an adjunct to brushing, interdental brushes remove more plaque than brushing alone.
- Clinical improvements noted in PI, BOP, PD
- Improvement in PI better than using floss

Dorfer CE, Slot DE. Int J Dent Hyg 2008;6(4):253-64

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Thank You for your Attention!