Periodontal and Peri-Implant Considerations
In The Esthetic Zone
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Periodontal and Peri-Implant Considerations in Esthetic Dentistry

Classification of periodontal disease and conditions

• Previous classification
  – 1989 world workshop
• Current classification
  – 1999 international workshop
• A standard classification provides a framework for the scientific study of disease etiology, pathogenesis and treatment as well as a standard mean of communication

1999 Gingival and Periodontal Disease Classification
Armitage GC. Ann Periodontol 1999;4:1-6

Periodontal disease classification "Key Changes"

Previous
• No section on gingival diseases
• "Adult" Periodontitis
• "Early-onset" Periodontitis
• "Refractory" Periodontitis

Current
• Entire new section on gingival diseases
• "Chronic" Periodontitis
• "Aggressive" Periodontitis
• Additions
  - Periodontal abscess
  - Perio-endo lesions
  - Acquired deformities and conditions

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

Weakness 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

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
Classification of periodontal disease and conditions

**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

**Gingivitis**

- **Clinical Signs**
  - Gingival erythema
  - Edema
  - Bleeding on probing
  - PPD up to 3mm (unless pseudo pocket)
  - Soft tissue contour changes
  - Increased GCF
  - No attachment loss

- **Treatment**
  - Scaling/Prophy with OHI
  - Phase I Re-eval
  - 4-6mo PST

**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

**Slight Periodontitis**

- **Clinical Signs**
  - Gingival erythema
  - Edema
  - Bleeding on probing
  - Slight attachment loss
  - Pocket depths 4mm

- **Treatment**
  - SRP + behavior mod
  - Periostat
  - Phase I Re-eval
  - 3-6mo PST

**Gingivitis**

- **Clinical Signs**
  - Gingival erythema
  - Edema
  - Bleeding on probing
  - Slight attachment loss
  - Pocket depths 4mm

- **Treatment**
  - Scaling/Prophy with OHI
  - Phase I Re-eval
  - 4-6mo PST

**Biofilm and inflammation management**

**Moderate Periodontitis**

- **Clinical Signs**
  - Gingival erythema
  - Edema
  - Bleeding on probing
  - Moderate attachment loss
  - Slight furcation invasion
  - Pocket depth > 5mm

- **Treatment**
  - SRP + behavior mod
  - Rx Periostat
  - Phase I Re-eval
  - Additional RP + Armacan
  - Pocket reduction surgery if needed
  - Phase II Re-eval
  - 3-4mo 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 3835 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

Periodontal Biotype

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

**Thin**
- Long tapered teeth
- Thin friable gingiva
- Long pointed papilla
- Susceptible to recession

Dimensions of the Dentogingival Junction in Humans

- Gingival sulcus ~1mm
- Junctional Epithelium ~1mm
- Connective Tissue Attachment ~1mm


Sulcus

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 LM (Osseointegration)

Peri-implant biologic width

- Sulcus
- Junctional Epithelium
- Connective Tissue

Peri-implant Histology

- Junctional Epithelium
  - Presence of hemidesmosomes
  - James R, Shultz RL JOCI 1973
Peri-implant Histology

- **Connective Tissue**
  - Parallel fiber arrangement around smooth titanium
  - Perpendicular fiber arrangement can be found around rough surfaces
  - Adhesion
  - Fiber dense

Peri-implant probing

- Probe extends to base of connective tissue
- Deep pockets difficult to maintain
- Deep pockets increase risk for bone loss
- Over contoured restorations will prevent accurate probing
- Deep pockets around implants do not necessarily represent bone loss

Esthetic Crown Lengthening Techniques

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


Understanding Biologic Width is Important to Avoid Complications with Restorative Dentistry

Esthetic crown lengthening - case 1

Gingivectomy using Ellman™ Radiosurgery
Esthetic crown lengthening - flapless osseous reduction

Esthetic crown lengthening - flapless osseous reduction

Esthetic crown lengthening - Osseous surgery w flap

Esthetic crown lengthening - Osseous surgery w flap

Esthetic crown lengthening - case 1

Esthetic crown lengthening - case 1

Esthetic crown lengthening - case 2

Esthetic crown lengthening - case 2

Esthetic crown lengthening - case 3

Esthetic crown lengthening - case 3
Esthetic crown lengthening – Gingivectomy guided by stent

Root coverage procedures

Esthetic crown lengthening – osseous flap surgery

Placement of interpositional CT graft guided by stent

Esthetic crown lengthening-case 3

Root coverage procedures
### Miller Recession Classification

<table>
<thead>
<tr>
<th>Class</th>
<th>Recession above MGJ - No AL</th>
<th>Expectation</th>
<th>Success rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Recession above MGJ - No AL</td>
<td>Complete root coverage</td>
<td>100%</td>
</tr>
<tr>
<td>II</td>
<td>Recession to or beyond MGJ - No AL</td>
<td>Complete root coverage</td>
<td>100%</td>
</tr>
<tr>
<td>III</td>
<td>Recession to or beyond MGJ - Minor interproximal AL</td>
<td>Partial root coverage to the height of interproximal tissues</td>
<td>50-70%</td>
</tr>
<tr>
<td>IV</td>
<td>Recession to or beyond MGJ - Severe interproximal AL</td>
<td>Unpredictable root coverage</td>
<td>&lt;10%</td>
</tr>
</tbody>
</table>


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### 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

**Results and Conclusions**

- Autogenous connective tissue grafts in conjunction with a coronally repositioned flap is most effective in achieving predictable root coverage

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

**Combination Esthetic Crown Lengthening, Root Reshaping, and Root Coverage Procedure**

**Root Coverage Required to Reduce Anterior Tooth Length**

**Root Reshaping Eliminates Existing Restorative Margins**

**Placement of Interpositional CT Graft Guided by Stent**

**Esthetic Crown Lengthening in Posterior and Root Reshaping of the Anterior Teeth**
Esthetic Crown Lengthening, Root Reshaping and Root Coverage

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

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


Immediate or Delayed Placement?

Questions
- Is the alveolus intact?
- Will implant stability be achieved?
- Is pathology present?
- Is ideal implant position achievable?
- Are there multiple sockets?
- Will the majority of implant be in bone?

Realities
- Immediate placement more challenging
- Physiologic post extraction resorption can lead to a loss of buccal and/or crestal bone
- Operator experience and comfort level driven
- Implant failure can result in soft or hard tissue deficit

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


Immediate Dental Implant

- Basic Principles for Success
  - Primary stability an absolute requirement
  - Majority of implant should be within bone
  - Place implant 2mm lingual of buccal plate
  - Graft residual defect
  - Case selection
    - consider what may happen if implant fails

44 y/o female with chronic alveolar abscess of maxillary left lateral incisor

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

Small buccal plate perforation therefore immediate implant placement performed in conjunction with site preservation including an interpositional connective tissue graft.

Prior to surgery, patient prepared for additional adjacent restorations as needed.

Prototype development.

Delayed Placement - Site preservation

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

Site preservation begins with atraumatic tooth extraction followed by extremely thorough socket debridement and placement of a bone graft EDS-3 Extraction Defect

Autologous Connective Tissue Graft can function as a membrane to contain graft as well as to repair soft tissue deficit
Successful site preservation allows for prosthetically driven implant placement

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

Ideal bone leads to ideal treatment outcomes
EDS-1 extraction defect

Successful site preservation allows for prosthetically driven implant placement

Final Outcome

Delayed Implant Placement
EDS-2 Extraction Defect

Radiographic case progression

Site preservation with socket and CT Graft
Site development EDS-4 Defect
- Post extraction following Site preservation
- 3 or more bony walls missing or compromised
- Challenging defects require autogenous bone or BMP-2

37 y/o female. Congenitally missing lateral incisors with constricted arch form
Lost left central incisor due to trauma as a child

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 using Healing abutments as space maintainers
**Periodontal and Peri-Implant Considerations in Esthetic Dentistry**

**Site development**

- Interproximal bone to tooth contact point
  - ≤5mm 100% papilla presence
  - 6 mm 56%
  - 7mm 27%
- Tarnow et al., J Perio 1992

**Implant placement guidelines - spacing**
- Tooth to Implant 2mm
  - Esposito et al., Clin Oral Imp Res 1993
- Implant to Implant 3mm
  - Tarnow et al., J Perio 2000

**CDA Journal Nov 2005**

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

**Papilla Preservation**

- Excessive platform depth compromises maintenance

**Implant placement guidelines - Emergence Profile**
- 3 mm below restorative margin

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**Nicholas Caplanis DMD MS**

**6/4/2012**
Communication Devices- Surgical guides

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Thank You for your Attention!