2014: The Future of Dentistry
Optimizing Success through Materials Choice, Proper Diagnosis and Planning

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1) Hands-On, Functional Occlusion Course see www.davidhornbrook.com

a) Deprogrammer
   i) Eliminates muscle engrams that can cause mandibular deviation during closure.
   ii) Elimination of tooth interferences in determining ideal joint position
   iii) Types of deprogrammers
       (1) Leaf Gauges
       (2) NTI
       (3) Lucia Jig
       (4) Pankey deprogrammer
       (5) Kois appliance
       (6) Best Bite
       (7) Centric Location Appliance (www.Golddustdentallab.com)
   iv) Tripod bite taken to mount models to determine presence and location of posterior interferences

2) Lasers in dentistry
   a) Soft tissue
      i) Diode laser
         (1) Picasso Lite (AMD)
         (2) Navigator (Ivoclar)
      ii) Procedures accomplished with the diode
         (1) Gingivoplasty
         (2) Gingival troughing
         (3) Ovate pontic
         (4) Frenectomies
(5) Implant uncovering
(6) Fibroma removal
(7) Periodontal treatment
(8) Aphthous ulcer treatment

iii) Choosing a laser
(1) Cost and anticipated use
(2) Manufacturer reputation and stability
(3) Portability
(4) Delivery system
(5) Articulating arm, handpieces, fiber, tips, etc.

iv) Designing the smile
(1) Zenith (apex) of tissue moves distally as you move from central to canine
(2) The lateral zenith is ideally 0.75 mm below central and canine
(3) Width to height ratio of central incisor approximately 75%

v) Gingivoplasty
(1) Evaluate Biologic width: >2.5 mm between osseous crest and free gingival margin

vi) Frenectomies, ovate pontics, gingival troughing, periodontal treatment, etc.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Electrosurgery</th>
<th>Diode Lasers</th>
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<tbody>
<tr>
<td>Work around Metals</td>
<td><strong>No - causes sparks, pulp death etc.</strong></td>
<td><strong>Yes and safe.</strong></td>
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<tr>
<td>Pacemakers</td>
<td><strong>No cannot be used</strong></td>
<td><strong>Yes can be used</strong></td>
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<tr>
<td>Anesthetic</td>
<td><strong>Local Anesthetic needed</strong></td>
<td><strong>Sometimes topical only</strong></td>
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<tr>
<td>Antibacterial</td>
<td><strong>No antibacterial qualities</strong></td>
<td><strong>Yes kills bacteria.</strong></td>
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<tr>
<td>Lateral Thermal damage</td>
<td><strong>Can cause recession when used.</strong></td>
<td><strong>Less Likely to cause recession.</strong></td>
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<tr>
<td>Uses</td>
<td><strong>Good for large tissue removal.</strong></td>
<td><strong>Multiple uses</strong></td>
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b) Hard & soft tissue:
   i) Erbium-YAG (VersaWave [HoyaConBio], Picasso ATL [AMD])
      (1) All soft tissue applications as diode
          (a) Gingivectomies, ovate pontics, fibroma removal, troughing, etc.
      (2) Hard tissue: direct restorations
          (a) Enamel, dentin, caries
          (b) Closed-Flap osseous recontouring
              (i) Remove soft tissue first
              (ii) Position tip into sulcus and remove bone and re-establish biological width

3) CAD:CAM
   a) Digital impressions
      i) Lava C.O.S (3M)
      ii) Cadent (Itero)
      iii) Cerec Connect (Sirona)
   b) Cerec 3D: It’s now time to look seriously at this technology

4) SonicFill (Kerr)
   a) Sonic technology to alter viscosity of composite resin to facilitate easier placement and minimize voids
   b) Matrix system:
      i) Garrison Dental Solutions

5) Lithium disilicate ceramics (e.Max)
   a) Fabrication techniques
      i) Lost wax
          (1) Wax, Invest, burn out wax pattern, heat and press e.Max ingot into burned out tooth mold
      ii) CAD:CAM
          (1) Cerec and/or Cerec-inLab
              (a) Blue Block
   b) Finishing techniques
Advantages of e.Max lithium disilicate

i) Strength: 400 mPa
   (1) New York University Mouth Motion Fatigue Study
   (2) Dental Advisor: “its performance has exceeded that of traditional PFM restorations…”
   (3) Failures
      (a) Bond failures
      (b) Material failures
   (4) Flexural strength
      (a) Powder/liquid ceramics alone or over a core (ZnO2, AlO2, metal): 90-110 mPa
      (b) Leucite reinforced (Empress, Authentic, etc.): 190-220 mPa
      (c) Lithium disilicate (e.Max): 360-400 mPa
      (d) Bruxzir (Monolithic ZnO2) crown: 900+ mPa, but some concerns about wear compatibility, intra-oral polishing, and…

ii) Aesthetics: Empress still my favorite, but e.Max is very close, especially in A1 and darker shades. Difficult at this time to achieve very white (B0 shade) with e.Max without graying out
   (1) Ingots
      (a) HT: Dentin shaded preparation
      (b) MO/HO: Blue build-up, metal core, implant abutment
      (c) LT: Dark or stained preparation
      (d) V (Value Ingots): Anterior, dentin shaded preps, improved aesthetics

iii) Ability to see final contour before it becomes glass

iv) Marginal integrity
   (1) 45-60 um (gold like margins)
v) Wear compatibility: Most wear compatible material we have in dentistry (Sorenson, et al.)

vi) Conversation of tooth structure
   (1) Supragingival margins
   (2) Only 1.0 mm facial and lingual thickness required
   (3) Bondable
   (4) Replace enamel only if need be

vii) Versatility
   (1) Prepless and minimal prep veneers (www.Emprethins.com)
      (a) E.Max will provide great aesthetics, marginal integrity, and strength in applications as thin as 0.2 mm
   (2) Bridges
      (a) anterior bridges
         (i) 11.0 mm pontic width
      (b) Posterior bridges
         (i) 9.0 mm pontic width
      (c) Cantilever bridges replacing laterals
   (3) E.Max CAD-On: Lithium disilicate bonded to Zirconium-oxide framework
      (a) Sirona Cerec In-Lab
         (i) Software mills ZrO2 frame and Lithium disilicate over structure
         (ii) Bonded together using a flowable ceramic
   (4) Implant abutments
      (a) UCLA abutment (NobelBioCare: Gold Adapt abutment): e.Max is waxed and pressed and then bonded to metal platform.
   (5) Dark tooth block-out
      (a) All-Bond 2 or 3 over metal.
      (b) Kerr Kolor +
         (i) Shades
            1. red, white, A1, and A3
   (6) Correction copings: Taking control of shade on cementation day
(a) E.Max waxed and pressed as thin opaque, dentin shaded copings to hide dark prep
(b) Full coverage all-ceramic crowns or veneers are then bonded to the copings
viii) Bondability: Silanate and bond as you would Empress or Feldspathic ceramic

6) Dentinal adhesion
   a) Generation of adhesives
      i) 4th generation
         (1) 3 bottle systems: etch, primer, resin
            (a) All-Bond 2 and All Bond 3 (Bisco)
            (b) OptiBond FL (Kerr)
         (2) Applications
            (a) Everything
      ii) 5th generation adhesives
         (1) 2 bottle systems: etch, primer/resin
            (a) Excite (Ivoclar)
            (b) One Step (Bisco)
            (c) Single Bond Plus (3M)
            (d) PQ1 (Ultradent)
            (e) P & B Plus (Dentsply)
         (2) Applications
            (a) Direct restorations
            (b) Indirect with adequate light polymerization
      iii) 6th/7th generation adhesives
         (1) Self-etching adhesives
            (a) OptiBond XTR (Kerr)
         (2) Applications
            (a) Direct restorations

7) Cements
   a) Cement requirements
i) Lack of post-operative sensitivity

ii) Strong bond and good seal

iii) -to the tooth and to the restorative material

iv) Easy placement and clean-up

v) Esthetics compatible with the restorative material

vi) Minimal film thickness

vii) Radiopaque (posterior)

b) Veneers and Anterior all-ceramic anterior crowns

i) Cement requirements
   (1) Light cure only resin cement (combined with a “total-etch system)
   (2) Very accurate water-soluble try-in gels
   (3) Non-sticky handling properties
   (4) High fluorescence and luminescence

ii) Total-etch

iii) 4th or 5th generations adhesive

iv) Light-cure only resin cement
   (1) Variolink Veneer (Ivoclar)
   (2) Relyx Veneer Cement (3M)
   (3) NX 3 (Kerr)

c) Posterior bonded crowns: (Empress, e.Max less than 1.5 mm thick or low retention preparations, Inlays/onlays)

i) On tooth:
   (1) Total-etch
   (2) 4th or 5th generation adhesive
   (3) Resin Cement
      (a) NX 3 (Kerr)
      (b) Relyx ARC (3M)

ii) On restoration
   (1) Clean with phosphoric acid and rinse
   (2) Apply Silane coupling agent for 1 minute and air dry thoroughly
   (3) Apply very thin layer of unfilled resin and blow thin.
d) Non-Bonded (Pseudo Bonded) Posterior crowns: *(e.Max greater than 1.5 mm, zirconium oxide supported, aluminum-oxide supported, metal supported)*

   i) Self-etching resin Cement
      
      (1) BisCem (Bisco)
      (2) MaxCem Elite (Kerr)

   ii) Treatment of internal of zirconium-oxide crowns:
      
      (1) Apply ZPrime + (Bisco) and air dry

8) Tack & Wave technique for veneer cementation

   a) Remove provisional and try-in restorations

   i) Clean teeth with H2O2 in Ultradent syringe

   ii) Try-in individually dry

      (1) Use Occlude (Pascal) to ensure complete seating if binding

      (2) Try-in collectively

      (a) Use Dry-erase marker to check and adjust tight contacts

         (i) Mark on mesial surface, adjust on distal surface

   b) Veneer cements

      i) Variolink Veneer (Ivoclar)

      ii) Relyx Veneer cement (3M)

      iii) NX 3 (Kerr)

   c) Try-in veneers using try-in gel (OptraGate-Ivoclar)

      i) Try-in right side with Clear (0) and left side with warm (-3)

         (1) If not bright enough, try-in left side with higher value cement (+2)

      ii) Clean out try-in gel from inside restoration when shade is chosen

   d) Prepare restoration for bonding

      i) Clean internal with phosphoric acid, rinse, and dry

      ii) Place Silane coupling gannet for 1 minute and dry

      iii) Place a very thinayer of unfilled resin, air thin

      iv) Place light-cure only resin cement inside restoration and place in light protective container (VivaPad- Ivoclar)

   e) Prepare teeth for adhesive bonding
i) Total-etch using phosphoric acid-limit etch to 15 seconds on dentin

ii) Rinse and lightly dry

iii) Apply Telio CS Desensitizer (Ivoclar)

iv) Place adhesive agent
   
   (1) 4th or 5th generation bonding system
      
      (a) 4the generation- Apply multiple coats and air-dry thoroughly, and light
          polymerize if there is a photo initiator
      
      (i) Examples of 4th generation adhesive systems
          1. OptiBond FL (Kerr)
          2. All-Bond 2 & 3 (Bisco)
          3. Scotchbond MultiPurpose Plus (3M)
      
   (b) 5th generation bonding systems
      
      (i) Apply 2 coats, air dry thoroughly and light polymerize for 10
          seconds
      1. Examples of 5th generation adhesive systems
         a. Excite (Ivoclar)
         b. One Step (Bisco)
         c. OptiBond Solo Plus (Kerr)
         d. Prime & Bond NT (Dentsply)
         e. PQ1 (Ultradent)
         f. SingleBond Plus (3M)
      
   (c) ADEC Warm Air Tooth Dryer-

f) Place all restorations at one time-Inward upward pressure using instruments to
   ensure complete seating- do not clean up excess

g) Tack- using a 2.0 mm light guide, tack each restoration into place for 1 second in
   the middle of the restoration away from margin

h) Place 8.0 mm or 11.0 mm light guide and “Wave”- all restorations for a total of 3-5
   seconds

i) For Variolink Veneer System
   
   (1) +2: 5 seconds
   (2) 0- 3 seconds
(3) -3: 5+ seconds
i) Remove excess resin gently using Bard Parker blades, scalers, and explorer
j) Floss through contacts using Serrated Saw (Brasseler)
k) Floss through contacts using waxed dental floss
l) Place Glycerin (DeOx-Ultradent) around all margins
m) Light polymerize for at least 60 seconds
n) Rinse
o) Remove excess cement using scalers, Bard Parker blades, etc.
p) Finish margins using 15 or 25 um finishing diamonds
q) Finish interproximals with finishing strips
   i) 1954N strip (3M)
   ii) Epitax Strips (GC)
r) Polish all margins (That were adjusted) using ceramic polishing points and cups
   i) OptraFine (Ivoclar)

Thank you for spending the day with me!