Let's Be Direct

Being Bioactive

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(Subjects may be in a different order or not presented)

Anterior Direct Composites

- Anterior Composite Layering Techniques
    - Build inside out
    - Build opaque to translucent (high to low chroma)
    - Build dark to light (high to low value)
    - Build larger to smaller filler particle size
    - Start with dark opaque dentin shade to block shine through
    - Calset composite warmer
    - Miris or Aura-Shades 1-7 (primarily 4-7 unless trying to lighten tooth)
    - Next add all-purpose type composite (Spectra TPH, Venus Pearl, Aura MC 2-5, Harmonize Dentin)
    - Make sure junction between restoration is invisible
    - Add characterization (SDI Shade Mod, Kulzer Color, Kerr, others)
    - Outer layer spherical, nano-hybrid or microfill (Esthelite Sigma Quick, Beautifill II, G-aenial Sculpt, Harmonize Enamel)
    - Optrasculpt (Ivoclar)
    - Proper thickness is important for final color-build to contour (too thick is gray)
    - Schedule AM
    - Start with simple cases-Practice Makes Perfect!
    - Charge what you are worth

- Anterior Composite Finishing & Polishing Techniques
    - Sandpaper disks for incisal edge-Super-Snap X-Treme
    - Fine diamonds for bulk removal (stay off actual tooth surface)
    - Finishing carbides for shaping
    - Look at incisal edge with a Flecta mirror
    - Enhance wheels to blend restoration and tooth
    - DiaComp Feather Light

Anterior Composite Matrices

- Margin Perfect Matrix (www.marginperfectmatrix.com)
- Pre-bend in fingers
- Slide the curved neck around the gingival
- Pull the 2 long ends through the contact while placing apical pressure on the gingival margin
- Seat below the free gingival margin
- Use instrument to shape form of mylar
- Trim with scissors the excess matrix
- Dry gingival and apply Heliobond and cure
- Apply composite at cervical and work apically
- Add more composite until shaped-smooth w brush

Universal Composites

- Choose according to opacity
- Fewer shades
- Omnichroma (opaque and translucent)
- SimpliShade (Bleach, Light, Medium, Dark)
- G-aenial A’Chord (5 shades-blocks out stains)

Class II Composites
- Bulk fill composites
  - Initiators more sensitive to light
  - Delayed gel state
  - Flexible filler particles
  - Greater depth of cure
- Composi-tite 3D XR or Strata-G
- Triodent V-3/Palodent Plus
- P-1 posterior placement instrument (Ivoclar)
- Optrasculpt NG-3 different shapes
- Test curing lights weekly with Check UP www.bluelightanalytics.com

Improved Dentin Bonding

- Total etch technique
  - Often under-etched enamel, over-etched dentin
  - Proper moisture
  - Technique sensitive
  - Solvents-Acetone, Alcohol, Water
  - Hemaseal & Cide-HEMA & chlorhexidine
    - disinfectant
    - desensitizer
    - inhibits MMPs
    - increases dentin bond strength

- Self etch technique
  - Decreased bond strength to un-etched enamel
    - Selective etching of enamel only
  - Bond incompatibility to self cure & dual cure resins
    - Use a dual cured activator
  - Hydrolytic degradation
    - Use MDP containing bonding agents
  - Enzymatic collagen attack-MMP's (Matrix Metallo-Proteases)
  - MMP Inhibitors
    - Chlorhexidine
      - Total etch-apply after etching for 30 sec-do not wash off
      - Self etch- apply 2 coats before applying primers
    - Benzalkonium Chloride, MDPD, GLUMA

- Selective etch technique
  - Universal bonding agents-single bottle
    - Can be total or self etch *but* recommended with selective etch
    - Can be used for direct or indirect restorations *but* recommended with direct only (use self or dual cure for indirect)
    - Can be used inside all indirect restorations *but* recommend using separate porcelain, zirconia or metal primer
  - Universal bonding agents-single bottle plus activator
  - Universal bonding agents-two bottle-2 separate applications

Bioactive Materials

- Definition
- Smart Technology
- Dental Materials
    - Bases & Liners
    - Restorative Material
    - Pulp Capping Material
    - Cements
    - Preventative
    - Others

- Glass Ionomer Materials
    - Self-curing: acid/base setting reaction
    - Ionic bond to calcium of tooth structure
    - Elimination of polymerization shrinkage stress
    - More highly filled-reduced wear compared to RMGI
    - Expansion/contraction similar to tooth
    - Highest fluoride release/re-uptake
    - Slight moisture is advantageous
    - Bulk placement
    - Anti-bacterial properties
    - Reduced post-operative sensitivity

- Glass Ionomer Uses
    - Class III, V restorations
    - Pediatric patients
    - Sealants
    - Sandwich technique (open & closed)
    - Crown buildups
    - Posterior restorations
    - Long term interim restorations

- Posterior Glass Ionomers Uses
    - 5-10% of teeth restored
    - High-caries risk patients
    - Thin buccal or lingual walls
    - Deep internal cracks
    - Deep sub-gingival molar interproximal restorations
    - Decalcified chalky margins
- Resin-modified Glass Ionomer Materials
    - Dual curing: acid/base setting polymerization reactions
    - Ionic & micromechanical bonding
    - Shrinkage stress if cured prior to set
    - Higher tensile, bond strength and wear compared to GI
    - More translucent than GI`
    - Fluoride release/re-uptake

- Resin-modified Glass Ionomer Uses
    - Liner or base
    - Class V restorations
    - Pediatric Patients
    - Sandwich technique
    - Crown buildups
    - Short term Provisionals
    - Cements
    - Bonding agent

- Bioactive Releasing Resins
    - Responds to an acidic oral environment
    - Exchanges ions to and from biologic structure
    - Releases Calcium, phosphates, fluoride & other ions
    - Regeneration/Remineralization
    - Maintains an alkaline environment
    - Antimicrobial
    - Promotes healing

- Resin Based Bioactives vs, Glass Ionomers
    - Resin Matrix
    - Primarily micro-mechanical retention-self adhesive
    - Releases Calcium, phosphates, fluoride & other ions
    - Calcium & Phosphate release
    - Lower fluoride release
    - Higher compressive strength
    - Dual cured

- Philosophical Differences Resin Based Bioactives vs, Glass Ionomers
    - Technology differences
    - Importance of Calcium vs Fluoride
    - Strength vs shrinkage
    - Experience and bias

- Ca, Phosphate, Fluoride Releasing Resin Deep Liners
    - Thera-Cal near pulp exposure
    - Lime-Lite-all purpose value
    - Ceramir Protect LC-highest Ca release

- Ca, Phosphate, Fluoride Releasing Resin Bases
    - Activa
        - Ion Resin Matrix
        - “Rubberized” resins-tough fracture resistant
        - Reactive Ionomer Glass-fluoride release
        - No Bis phenol A
        - Self-adhesive to dentin
        - Rub 20 seconds
        - Light cure

    - Thera-Base
        - Hydrophilic Calcium Silicate Matrix
        - Contains MDP
        - Radiopaque
        - Self-adhesive
        - Spread out & light cure

- Ca, Phosphate, Fluoride Releasing 2 component Resin Restoratives
    - Activa Base & Restorative

- Fluoride Releasing single component Resin Restoratives
    - FIT SA F03, F-10-self-adhesive flowable
    - Beautifil II
    - High viscosity flowable Beauifil Flow Plus X
    - Beautifil II, LS. Bulk Fil Flowable
    - Filler particles are set glass ionomers
    - Giomers sPRG glass core with surface modified layer
    - Release F, Sr, B, Si, Al, Na
    - Beautifil Gingiva

- Composite Resin w/ calcium phosphate-Activa Presto
    - Releases & recharges calcium, phosphates, & fluoride
    - Higher compressive & flexural strength
    - UDMA & bis (2-(methacryloyloxy) ethyl) phosphate
    - Light cure

- Resin-modified calcium silicate-Theracal
    - Light cured apatite forming MTA in a hydrophilic resin-releases calcium
    - Nearly as effective as self-setting MTA
    - Easy to use and cost effective
    - Direct and indirect pulp caps
    - Pulp exposure-criteria for successful treatment
        - Asymptomatic
        - 1 small exposure
        - Able to control bleeding

- Tri-calcium silicate-Biodentine
    - High purity calcium silicate
    - Antimicrobial
    - No shrinkage
    - High calcium release
    - 12 minute set time
    - Can be covered with RMGI bonding agent and then proceed
    - XL available in 200mg & 500mg capsules-use 6200 rpm tritrator
    - Expanded Uses
        - Indirect pulp cap bases
        - Interim restoration
        - Direct Pulp Cap

- Selecting between resin-based MTA (listed first) vs non-resin MTA
  - Dual cure vs. self cure
  - Immediate set vs. 12 minute set
  - $1 vs $18
  - Titrator vs syringe delivery
  - Can irritate pulp vs kindest to pulp
  - Good results vs best long-term results
  - Practical Alternative vs. Gold Standard

- Self-adhesive resin & calcium aluminate cement-Theracem-all purpose
  - Dual cured-68% conversion w/o light
  - Calcium & fluoride releasing & recharging
  - Bonds well to zirconia (contains MDP)
  - Sets in <5 minutes-easy cleanup
  - Radiopaque
  - Becomes alkaline
  - Promotes apatite formation
  - Inhibits bacteria growth

- Activa Bio-Active Cement
  - Dual Cure
  - Neutralizes sensitivity
  - Ionic & Micromechanical bonding
    Moisture tolerant
  - Fluoride, Calcium, Phosphate Release/Recharge
  - No Bis phenol A
  - Radiopaque

- Ceramir Cement
  - Forms apatite crystals
  - High release of Ca Ions
  - Extremely low sensitivity-due to high pH
  - Low film thickness
  - Fills in small marginal gaps
  - Easy cleanup
  - Works well with implants

  Recaldent-ACPCPP
  - MI Paste, MI Paste Plus, MI Paste One
  - MI Varnish

Aging Population

- Challenges
  - Xerostomia, Root exposures, Difficulty maintaining oral hygiene
  - Unable to tolerate long appts**,** Difficulty coming to office**,** Ltd finances
- Age-Appropriate Restorations
  - Long Term Interim Restorations (Bioactive materials)
  - Direct Bonded Provisional Crown
  - Immediate Natural Tooth Pontic-Ever Stick Fiber

Visual Communication

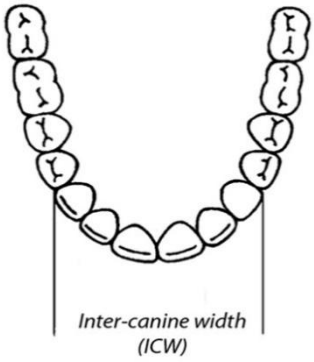
- Patient
  - Must see it to believe it
  - Allow patients to make the best decision
  - Hm….
- Intra-Oral Cameras
  - EyeCam
- Smart Phones?
  - Disinfection
  - Distortion
  - HIPPA compliance
- Modified-Consumer Fixed Lens
- Dental Specialty Cameras
  - Eye-Special V
    - Lightweight, easy for staff to use
    - Standardized views
    - Touch screen
    - Makes photos the same size for standardized views
    - Multiple modes
    - Easy Disinfection
- SLR (Single Lens Reflex)- Use manual focus, set *f* stop, TTL aperture priority
  - Nikon 7500
  - Canon T8i
  - Canon EOS 90-D
- Mirrorless
  - Nikon Z5
  - Canon EOS RP
- Lens
  - 105 mm macro
- Flash
  - Ring Flash-most practical & easy to use but red eye
  - Point Flash-more 3-dimensional
- Accessories
  - Occlusal Mirror, Buccal Mirror, Combination Mirror
  - Full & split cheek retractors
  - TS retractors
  - Polar Eyes
- Sources
  - Internet: www.BHPhotoVideo.com (800-947-5525)
  - Specialized dental camera companies
  - Photo-Med (800-998-7765)
- CariVu
  - Transillumination with light and camera
- Pearl Second Opinion
  - Detects 35% more lesions than visible with the human eye
  - Great visual depiction educates patients
  - Patients are markedly impressed

Proportional Smile Design-Digital Smile Design

- 78% w/l ratio of central incisors
- RED Proportion 70% average, 62% tall, 75% short
- (The successive tooth-to-tooth width proportions as viewed from the frontal remain constant as you move distally)
- Divide Inter-canine width by 4.4 for average central incisor width
- Divide Inter-canine width by 3.4 for average central incisor length

Using ICW to determine size of maxillary anterior teeth

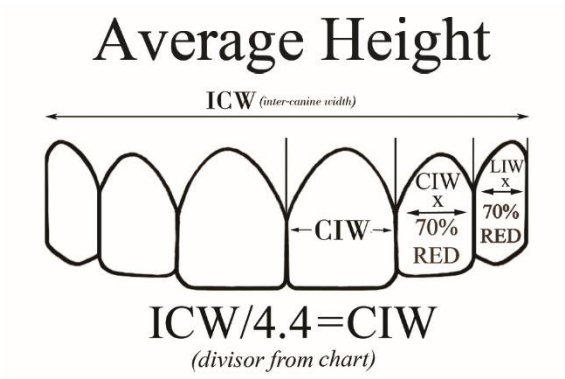
- **Step 1 Measure frontal view Intercanine width (ICW)**



- **Step 2 Determine Relative Tooth Height Desired**

- **Step 3 Lookup Inter-Canine Width Divisors for each tooth**

Calculating RED & anterior total widths from inter-canine width (ICW)				
Tooth Height	RED	Central Incisor Width	Lateral Incisor Width	Canine Width
Very Tall	62% RED	ICW/ *4.0*	*CIW *.62*	*LIW *.62*
Tall	66% RED	ICW/ *4.2*	*CIW *.66*	*LIW *.66*
Average	70% RED	ICW/ *4.4*	*CIW *.7*	*LIW *.7*
Short	75% RED	ICW/*4.6*	*CIW *.75*	*LIW *.75*
Very Short	80% RED	ICW/*4.8*	*CIW *.8*	*LIW *.8*



- **Step 4 Divide CIW by 0.78 (78%) for CIL**