Goals: This series of lectures should enable first year residents to:
1. Define the basic components of bonding and banding.
2. Understand the important aspects of each component.
3. Recognize and follow the sequential steps in order to achieve optimal bonding and banding conditions.
4. Manage the different atypical bonding / banding conditions.
5. Prepare themselves to the hands on typodont course on Straight wire bonding.

Objectives: The residents should know:
1. The 3 major components of bonding.
2. The important aspects of each component.
3. Recognize and follow the sequential steps for optimal bond conditions; mainly during tooth surface preparation:
4. Proper and accurate bracket positioning in all planes.
5. The different bonding techniques (direct and indirect)
6. How to deal with abnormal bonding situations.
7. The basis of banding.
8. How to deal with abnormal banding situations.
9. The advantages and disadvantages of bonding / banding
10. The indications and contra indications of bonding / banding

At the end of this course, residents should be ready for the hands on typodont course on straight wire bonding and if successful, start chairside clinical application on patients.
COURSE DURATION AND SCOPE: This course is scheduled between November and December for the first year residents. It is given every Thursday at a 2-hour session between 10:00 a.m. and 12:00 a.m. It includes the basics of bonding and banding that are elementary for the merge of the residents in the clinical management of patients.

POLICY ON EXAMINATIONS: One examination is given for this course, usually scheduled in the progress examination in December.

BONDING AND BANDING

SUMMARY OUTLINE  
1. BONDING  
   A. ATTACHMENT BASE  
   B. BONDING MATERIAL  
   C. TOOTH PREPARATION  
2. BANDING  
   A. CONTEMPORARY ORTHODONTIC BANDING  
   B. INDICATIONS FOR BANDING  
   C. CONTEMPORARY BANDING

COURSE OUTLINE

1. BONDING  
   A. Basis of Bonding  
      Three Major Components  
      a. Attachment base (bracket / tube)  
         a.1. Early bracket base design  
            a.1.1. Metal brackets: Mesh base (mechanical interlocking)  
            a.1.2. Tooth Colored Brackets: Mechanical and/or chemical interlocking  
      b. Bonding material  
         b.1. Essential Properties  
            b.1.1. Dimensionally stable  
            b.1.2. Fluidity  
            b.1.3. Penetration into etched enamel surface  
            b.1.4. Adequate strength  
            b.1.5. Ease in clinical use  
            b.1.6. Minimal enamel damage upon debonding  
      b.2. Basic types  
         b.2.1. Acrylic resins (monomer + powder)  
         b.2.2. Diacrylate resins (Bowen’s resin bis-GMA): Filled or Unfilled forms  
      b.3. Resin Polymerization  
      b.4. Continuous revisions in the chemical composition  
         b.4.1. Two-paste or No-Mix presentation
b.4.2. Thermal and chemical curing combination
b.4.3. Light cured: UV – VLC…
b.4.4. Pre-coated brackets - Light cured
b.5. Plastic / Ceramic Primers
b.6. Fluoride in bonding material
b.7. Major bond forces in orthodontics

c. Tooth preparation
c.1. Surface cleaning
c.1.1. Rubber cup
c.1.2. Polishing bur
c.1.3. Tungsten carbide bur
c.2. Enamel conditioning
c.2.1. Enamel Pretreatment - Moisture Control & Patient Set-Up
c.2.1.1. Lip expanders and / or cheek retractors
c.2.1.2. Saliva ejectors (surgical preferred)
c.2.1.3. Tongue guards with bite blocks
c.2.1.4. Saliva duct obstructers (Dri-Angle)
c.2.1.5. Combination of several of the above
c.2.1.6. Cotton rolls
c.2.1.7. Antisialogogues (tablets – injections)
c.2.2. Etching
c.2.2.1. Application
35-50% unbuffered phosphoric acid liquid or gel
15-60 second application (more = < retention)
c.2.2.2. Unetched versus Etched Enamel
c.2.2.3. Etched Enamel Depth Areas
c.2.3. Build-up: Crystal growth build-ups on enamel surface
c.3. Resin sealing. Sealant application
c.4. Bonding techniques
c.4.1. Direct bonding technique
c.4.1.1. Steps
c.4.1.1.1. Adhesive transfer on base
c.4.1.1.2. Positioning on tooth surface
c.4.1.1.3. Bracket fitting and checking
c.4.1.1.4. Excess removal
c.4.1.1.5. Occlusal view checking
c.4.1.1.6. Final Bonding
c.4.1.2. Premolar bonding and rotations
c.4.1.3. Second molar bonding
   c.4.1.4. Successful bonding
      c.4.1.4.1. Excellent moisture control technique
   c.4.1.4.2. Close bracket/attachment fitting to the teeth
   c.4.1.4.3. Adhesive setting must go undisturbed
   c.4.1.4.4. Strong adhesive
      c.4.1.5. Bonding to porcelain
      c.4.1.6. Bonding to amalgam
      c.4.1.7. Bonding to gold
      c.4.1.8. Bonding to composites
   c.4.2. Indirect bonding technique
      c.4.2.1. Indirect bonding with silicone transfer trays
      c.4.2.2. Indirect Bonding with the Double-Sealant technique
         c.4.2.2.1. Simple cleanup
         c.4.2.2.2. Little flash
         c.4.2.2.3. Unfilled sealant only
   c.4.3. Direct versus indirect bonding
   c.4.4. Disadvantages of indirect bonding
   c.4.5. Jewelry bonding

2. BANDING
   A. Contemporary orthodontic banding

   B. Indications for banding
      a. Posterior teeth
      b. Surgical cases
      c. Teeth requiring buccal and lingual attachments
      d. Safety and easiness for both orthodontist and patient
      e. Short clinical crowns
      f. Teeth with surfaces incompatible for bonding
      g. Amalgam, precious metals, porcelain veneers…
      h. Fluorosis, Amelogenesis imperfecta…

   C. Contemporary Banding
      a. Separation
         a.1. Elastomeric separation
         a.2. Separating springs
         a.3. Brass wire
b. Band selection and fitting
   b.1. Banding procedure
      b.1.1. Maxillary teeth
      b.1.2. Mandibular teeth
      b.1.3. Maxillary and mandibular premolars
   b.2. Band adaptation and occlusal anatomical irregularities
      b.2.1. Carabelli’s palatal cusp
      b.2.2. Restoration limits
      b.2.3. Buccal and lingual grooves
   b.3. Fitting on restoration
   b.4. Band fitting/Ideal anatomy
   b.5. Improper/poor banding

Cementation
   c.1. Advantages of glass ionomer cements
      c.1.1. Long term fluoride release
      c.1.2. Cement retention onto enamel via chemical liaisons
   c.2. Disadvantages
      c.2.1. Slow setting time (now available in light-cured)
   c.2.2. Excellent moisture control required
   c.3. Cementation procedure
      c.3.1. Sand blasting band’s inner surface increase retention
      c.3.2. Wax covering on all attachments to prevent clogging
      c.3.3. Occlusal tape to hold cement
      c.3.4. Cement application on all surface walls in uniform coating
      c.3.5. Excess cement should be allowed to flow gingivally and occlusally
      c.3.6. Band adaptation as in fitting procedure
      c.3.7. Setting time is a factor (unless light-cured)
      c.3.8. Excess cement wiped off with cotton rolls, toothbrush, floss and cavitron cleaning

REFERENCES

Books
   Chapter 12: Contemporary Fixed Appliances.
   Chapter 12: Bonding In Orthodontics.
   Chapter 14: Fixed Edgewise Orthodontic Appliances and Bonding Techniques.
   Chapter 6: The Edgewise Appliance Today.

**Articles (by sequence in lecture)**

FACULTY: Felipe Rezk-Lega, DDS.

Goals: This hands-on course should enable the resident to:
1. Complement the didactic knowledge about bonding and banding.
2. Be able to manage a smooth transition towards chairside bonding on patients.

Objectives: At the end of this course, the resident should:
1. Have a global knowledge of the sequential steps for bonding.
2. Become familiar with the bonding procedure and armamentarium (brackets, gauges...).
3. Achieve ideal bracket positioning along with removal of all excess material.
4. Get a first glance at archwire insertion and ligating techniques.
5. Be prepared to the eventual clinical application on chairside patients.

COURSE DURATION AND SCOPE: This course is scheduled in December after the completion of the didactic banding/bonding course. It is given every Thursday at a 2-hour session between 10:00 a.m. and 12:00 a.m for 3 to 4 weeks. It includes bonding/banding on typodonts with review of the basics and the clinical applications. Upon completion of this course, the resident is allowed to start active treatment in the clinic.

POLICY ON EXAMINATIONS: The residents work is evaluated at the end of the course, when done with banding/bonding and wire insertion. They will be graded on their knowledge of the material, performance and cleanliness. One examination is given for this course, usually scheduled in the progress examination in December.