Pulpal Protection: bases, liners, sealers, caries control
Module D: Pulp capping-caries control

Readings: Fundamentals of Operative Dentistry, 3rd Edition; Summitt, et al Chapters 5, 6 and 8
The American Association of Endodontists (AAE) “Glossary of Endodontic Terms” defines pulp cap as treatment of an exposed vital pulp by sealing the pulpal wound with a dental material such as calcium hydroxide or mineral trioxide aggregate to facilitate the formation of reparative dentin and maintenance of vital pulp.
Indirect pulp cap

Clinical considerations

- **Tooth must be vital** with no history of spontaneous pain
- Pain elicited from cold test or EPT should not linger
- Restoration must seal tooth from bacteria
- Periapical radiograph demonstrates no periapical pathology
- Tooth will not have casting as definitive restoration (fixed or removable casting)
Direct pulp cap

- Mechanical exposure
  - Trauma – tooth fracture
  - Iatrogenic- exposed during tooth preparation, no caries in area

- Carious exposure
How successful are direct pulp caps?

Success rates for vital pulp therapy as follows: the success rate of direct pulp capping was reported as

- >6 months-1 year, 87.5%;
- > 1-2 years, 95.4%;
- >2-3 years, 87.7%
- > 3 years, 72.9%.

Success rates compared mechanical vs carious exposures

- mechanical exposures of 92.2%
- carious exposed pulps, 33.3%.
- Larger preparations had less success, Class II (56.1%) than Class I (83.8%).
Recommendations for treatment

The clinical implications of this study was that direct pulp capping was recommended after mechanical exposure with immediate placement of a definitive restoration while endodontic therapy was the choice of treatment if the pulp exposure was due to caries.

Direct pulp cap

Clinical considerations

- Pulp tissue minimally exposed (usually less than 1 mm in diameter)
- **Tooth must be vital** with no history of spontaneous pain
- Pain elicited from cold test or EPT should not linger
- Restoration must seal tooth from bacteria
- Periapical radiograph demonstrates no periapical pathology
- Tooth will not have casting as definitive restoration (fixed or removable casting)
Indirect pulp cap

- Restorative
- Dycal
- Leathery dentin
- Vitrebond
Technique
Indirect and direct pulp capping same as deep cavity depth

Deep preparation, vital tooth, YOU do not Want to have pulp exposure: remove all caries except over the pulp (axial wall)- now proceed with indirect pulp cap.
Technique
Indirect and direct pulp capping same as deep cavity depth

Deep preparation, vital tooth, YOU do not Want to have pulp exposure: remove all caries except over the pulp (axial wall)-now proceed with indirect pulp cap.
Technique
Indirect and direct pulp capping
same as deep cavity depth

Dycal indirect pulp cap
Technique
Indirect and direct pulp capping
same as deep cavity depth

Dycal indirect pulp cap

Vitrebond covers Dycal
Technique
Indirect and direct pulp capping
same as deep cavity depth

Etch- adhesive-composite
Direct pulp cap

Success predicated upon

- Traumatic exposure better prognosis than carious exposure
- Good isolation of exposed tooth
- Minimizing manipulation - place liners quickly
- If necessary after liner placement then remove remaining caries
Critical to success with direct pulp capping

- Control bleeding with damp cotton pellet
- Don’t use explorer tip to verify exposure

An exposure can be subtle
Direct pulp cap

Restorative

Dycal

Vitrebond

Pulp Exposure
Technique: Indirect and direct pulp capping - same as deep cavity depth

Deep cavity depth

Calcium Hydroxide (Dycal) → glass ionomer (Vitrebond) → sealer (varnish - amalgam) (composite-adhesive) → restorative

Carious pulpal exposure → Dycal direct pulp cap → Vitrebond over Dycal
Temporary restoration (single tooth direct restorative)

Temporary restoration placed as intermediate step (part of definitive restoration)

- Time limitations for an emergency procedure
- Procedural problems during treatment, e.g., inadequate anesthesia
- Convenience
- Patient management problems

Not to be confused with caries control procedures
Caries Control
(for vital teeth)

When to do treatment with caries control:

- **Deep caries without pulpal invasion as determined by radiographs, symptoms and vitality testing.** Note: deep caries with pulpal involvement requires total caries removal to evaluate tooth restorability and endodontic therapy if tooth is restorable.

- Multiple teeth with extensive caries requiring placement of temporary restorations to stabilize active disease.

- As a diagnostic tool, will pulp survive treatment; tooth may be become symptomatic after treatment.
Caries control treatment (ADA code: sedative filling)

Removal of gross caries (very soft consistency caries) from the pulpal axial and lateral walls; leathery carious dentin adjacent to the pulp on the pulpal and axial wall may remain.

Treatment:
- Calcium hydroxide
- IRM or Fuji IX
- Fuji II LC

If the tooth will be restored with composite resin, a glass ionomer (Fuji II LC or Fuji IX) should be used.
Caries Control with Fuji IX

**GC Fuji IX** APPLICATION TECHNIQUE

1. Apply GC CAVITY CONDITIONER for 10 secs.
2. Wash and gently dry.
3. Activate GC Fuji IX with capsule. Mix for 10 secs.
4. Dispense directly into cavity. Form the contour.
5. Apply GC Fuji COAT LC. Light cure for 10 secs.
6. Start final finishing and polishing under water spray 6 mins. from start of mix.
7. Apply GC Fuji COAT LC. Light cure for 10 secs.

**STORAGE RECOMMENDATION**
Capsules should be stored in a cool, dark place (4-25°C/39.2-77.0°F). Avoid moisture contamination.

GC CORPORATION
TOKYO, JAPAN
© GC Corporation
Caries control with Fuji IX conventional glass ionomer

- Radiograph has no evidence of pulp exposure or periapical pathology
- Tooth has been asymptomatic
- Chief complaint that lingual cusp fractured when eating
- Diagnosis: deep caries
Caries removal

- Local anesthesia
- Dental dam
- Caries removed with slow speed handpiece with #4 round bur
- Axial wall has leathery caries remaining

Not all caries removed on axial wall
GC cavity conditioner applied to cavity preparation for 10 seconds
Cavity conditioner rinsed for 5 seconds with air-water spray, then dried but left slightly moist
Cavity conditioner is a 20% polyacrylic acid with 3% aluminum chloride hexadhydrate to enhance glass ionomer to dentin bond
Capsule Activation

**PUSH, CLICK, MIX!**

A. Tap or shake to loosen powder.
B. Depress plunger.
C. Click once in capsule applicer to activate.
D. Mix for 10 seconds.
E. Two clicks to prime capsule then syringe slowly.

GC CAPSULE ACTIVATION INSTRUCTIONS
Fuji IX capsule activation and application

- Tap or shake capsule to loosen powder
- Depress plunger on flat tabletop surface
- Place capsule in applicator and click applicator once to activate
- Mix with triturator for 10 sec
Fuji IX capsule activation and application

- Mix with triturator for 10 seconds
- Place capsule in applicator
- Two clicks of activator to prime capsule
- Syringe slowly into cavity preparation
Application into cavity preparation

- Syringe Fuji IX into cavity preparation
- Adapt Fuji IX with nib of a condenser
- Contour restoration
- Working time for Fuji IX GP is 2 minutes
Sealing of Fuji IX during setting reaction

- Apply Fuji Coat LC to all exposed Fuji IX surfaces
- Light cure for 10 seconds
- Wait 6 minutes for set from initial mix of Fuji IX
Finish-adjust occlusion

- Finishing and polishing with water spray and gentle touch with high speed using finishing burs and diamonds
- Final polish with polishing paste
- Check and adjust occlusion
Pulpal Protection: bases, liners, sealers, caries control

Module D: Pulp capping-caries control

REST 528A Operative #3D
THINK. COMMUNICATE. DO.