TOOTH COLORED
INLAY and
ONLAY “I”

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Introduction

The need for amalgam alternatives and the growing demand for more esthetic restorations has led to increased popularity of resin composite restoration in posterior teeth.

Interest in esthetic dentistry lead to the introduction of new materials and techniques to be used for larger posterior restoration.
Tooth Color Inlays and Onlays

Have certain advantages over direct resin composite and bonded ceramic restorations.

- Highly esthetic
- Can be fabricated intraorally or on a cast.
Tooth Color Inlays and Onlays

- Highly successful in larger restoration.
- Have many materials and techniques.
- Require special equipment and skilled technician.

● COSTLY
Composite Resin Inlays and Onlays
[Compared with direct composite resin restoration]

- Contours and contacts can be developed outside of the mouth.
  → if contact is inadequate, it can be easily corrected prior to cementation.

- Polymerization shrinkage should be less because they are polymerized before cementation.
- Less microleakage
- Greater strength and hardness
- Less post-operative sensitivity

[Compared with ceramic]

- Less abrasive to opposing tooth structure.
- Repairable
- Cheaper
Advantages of Composite Resin Inlays

- High esthetics
- Better control of the contact areas
- Excellent marginal adaptation
- Reduced or no laboratory fee if done in the office
- Ready repairability of material intraorally
Advantages of Composite Resin Inlays

- **Cross-splinting** of the compromised tooth and easy removal if replaced becomes necessary

- **Compensation for complete polymerization shrinkage by curing the materials outside of the mouth**

- **Increased** composite resin strength because of the heat-curing process
Disadvantage

- Wear faster than ceramic
- Less stable

Than direct composite restoration

- Higher cost, time
- Difficult to modify extrinsic color chairside
- More tooth reduction to create path of insertion
Indication

Replacement of:

- Large amalgam restoration
- Direct resin composite restoration in premolar and molar
  - Large caries
  - Esthetic
**Contraindication**

- Heavy occlusal forces
- Inability to maintain dry operative field
- Deep subgingival preparation
Direct Resin Inlay and Onlays

- Fabricated directly on the tooth (tooth as a die)
- After preparation → water soluble separating medium and a matrix placed on the tooth.
- Preparation filled with composite.
- Light cured from all directions.
- Matrix removed.
Direct Resin Inlay and Onlays

- Inlay teased out of preparation
- Postcured
- Finally - try-in adjusted bonded into preparation

One Appointment
Direct/Indirect Resin Inlays and Onlays

- Impression is made after preparation
- Cast is poured
- Done on one appointment
- Master cast be ready

(5 minutes)
Direct/Indirect Resin Inlays and Onlays

- Restoration fabricated on die
- Master die made from silicon material
- Master cast made from die stone
- Light cure - primary secondary
Indirect Resin Inlays and Onlays

- Can be constructed from:
  - Hybrid resin composite
  - Microfilled resin composite
- There is a newer generation of resin material
  - Ceromer (ceramic optimized polymers)
    a. Artglass
    b. Belleglass
    c. Targis
    d. Skulpture fiberker
Indirect Resin Inlays and Onlays

They have:

- Greater durability
- Fracture toughness
- Wear resistance
- Esthetic
- Repairability

Fiber-reinforced ceromer
Outline of Clinical Procedures

1. Select shade
2. Isolate with rubber dam
3. Pre-wedge for proximal lesions
4. Cavity preparation
   - All margins in enamel when possible
   - Break proximal contact
   - Tapered preparation (path of insertion)
     - Divergent wall 8-12 degree
**Direct/Indirect Composite Inlays and Onlays Systems (Chairside Fabrication)**

- **Rounded** internal line angles
- *Eliminate undercuts* (glass ionomer cement for block-out)
- **Ends of enamel rods** exposed for etching — try to avoid bevels

5. Matrix and wedge
6. Apply separating medium following manufacturers’ instructions
Direct/Indirect Composite Inlays and Onlays Systems (Chairside Fabrication)

7. Place composite resin in an incremental fashion, curing thoroughly 60 sec.

8. Remove restoration from tooth (scaler)
9. Clean restoration and provide additional curing (this is system dependent – possible modes of polymerization include intense or prolonged light curing, light plus vacuum, light plus heat and heat plus pressure)

7 minutes

10. Check fit, contour and contact and adjust/add resin as necessary
Direct/Indirect Composite Inlays and Onlays Systems *(Chairside Fabrication)*

11. Clean internal surface of restoration (sandblast, etching gel)

12. Apply “special bond” (Vivadent)

13. Protect adjacent teeth (celluloid strips, matrix)
Direct/Indirect Composite Inlays and Onlays Systems *(Chairside Fabrication)*

14. Clean and etch enamel *(condition dentin if using dentin bonding system)* and apply appropriate bonding resin

15. Cement inlay following manufacturers’ instructions
   - **Always use dual-cure cement**
   - **Apply cement to tooth and restoration**
Several factors must be considered when the luting agent is selected, applied and cured.

- Hybrid composite resin with a soft, small particle glass (Barium, Strontium) → more resistant to wear
- Filler 70% by volume → to minimize amount of available resin to break down at the margin.
Composite Resin Luting Agents

• Hybrid resin has → good marginal seal and stain resistance because has the highest potential degree of filler and good tensile and compressive strength.

• Must be dual-cure composite resin? activated by white light and undergoes chemical polymerization.
**Application**

- Thin end of **superfloss** is placed interproximally and apical to the finish line.
- Interproximal contact separated with **ultra thin strip**.

**Light curing**

- **Time → 60 seconds** per surface
- **Shade of resin → darker require more curing time**
- **Angle of contact → curing light at right angle** to the resin interface
- **Distance → light source ↓ 1mm** from the surface
Direct/Indirect Composite Inlays and Onlays Systems (Chairside Fabrication)

Outline of Clinical Procedures:

- Seat with gentle pressure and remove as much excess as possible
- Seat firmly (should remove excess of cement at all margins) and hold in place with instrument (amalgam condenser, etc.)
Outline of Clinical Procedures:

• **Apply curing light from several angles (60 seconds each angle)** while maintaining pressure on restoration

• **Allow cement to continue polymerization for 10 minutes with no curing/light or pressure**

16. Finish restoration
Indirect Composite Inlay and Onlay Systems
(Laboratory Procedure)

Outline of Clinical Procedures
1. Isolate Select shade
2. with rubber dam
3. Pre-wedge for proximal lesions
4. Cavity preparation – same as for direct/indirect inlay systems
Impression

- Elastomeric impression material
  - Polysulfides
  - Polyethers
  - Condensation silicones
  - Vinyl polysiloxanes (addition silicones)
Impression

- Should have
  - High tensile strength
  - Good surface detail
  - Low deformation
  - Able to disinfect it without distortion
Indirect Composite Inlay and Onlay Systems
(Laboratory Procedure)

Outline of Clinical Procedures:

5. Take impression
   - Use addition silicone
   - For onlays or large inlays take impression for opposing model and bite registration
**Provisional Restoration**

The provisional restoration should:

1. Stabilize the existing occlusal relationship
2. Protect the prepared teeth from any anxious stimuli
Provisional Restoration

A. Direct/Indirect Method
   - Self-curing acrylic resin with:
     • Vacuform shell
     • Preoperative alginate impression

B. Direct Method
   - Direct composite resin with or without vacuform matrix
Provisional Restoration

C. Indirect Method

- Indirect composite resin/acrylic resin provisional restoration

- Fabricated in a laboratory on a working cast.

Must be cemented with a non-eugenol-based temporary cement.
Indirect Composite Inlay and Onlay Systems (Laboratory Procedure)

6. Temporize

- Use appropriate material
- Always cement temporary with a non-eugenol luting agent such as Temp-Bond NE (Kerr) or zone (Cadco) Fermi, Fermi In
Indirect Composite Inlay and Onlay Systems

AT SECOND APPOINTMENT

7. Isolate with rubber dam
8. Remove all temporary material
9. Follow steps 10 through 16 listed under direct/indirect inlays systems
THANK YOU
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<thead>
<tr>
<th>Material</th>
<th>Manufacturer</th>
<th>Address</th>
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<tbody>
<tr>
<td>Temp-Bond NE</td>
<td>Kerr Mfg</td>
<td>28200 Wick Rd., Box 455, Romulus, MI 48174</td>
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<tr>
<td></td>
<td></td>
<td>737-7123</td>
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<tr>
<td>Nogenol</td>
<td>GC America</td>
<td>West 127th St., Chicago, IL 60658</td>
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<tr>
<td></td>
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<td>323-7063</td>
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<tr>
<td>Zone</td>
<td>Cadco Dental</td>
<td>East Hueneme Rd., Oxnard, CA 93033</td>
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<tr>
<td></td>
<td>Products</td>
<td>(800) 833-8267</td>
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<tr>
<td>Proviscell</td>
<td>Septodont, Inc</td>
<td>PO Box 11926, Wilmington, DE 19850</td>
</tr>
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<td>(800) 872-8305</td>
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Advantages of Composite Resin Inlays

There are several reasons for using composite resin inlays rather than porcelain and directly placed composite resin restorations. **Composite resin inlays have been in use in clinical practice, and clinical trials of more than 3 years have shown results equal to or better than those achieved with posterior composite resin restorations.**
Tooth Color Inlays and Onlays

Have certain advantages over direct resin composite and bonded ceramic restorations.

- Highly esthetic
- Can be fabricated intraorally or on a cast.
- After polymerization out of the mouth the restoration is bonded in place with a resin luting cement
Advantage

- Less microleakage
- Greater strength and hardness
- Less post-operative sensitivity

[Compared with ceramic]
- Less abrasive to opposing tooth structure.
- Repairable
- Cheaper