

Step By Step Preparation of Composite Inlay : Direct & Indirect Technique

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Abstract

An inlay may be defined as a restoration which has been constructed out of mouth from gold, porcelain or other material and then cemented into the prepared cavity of a tooth. A composite inlay may be defined as a solid mass of resin composite that is cemented into a dental cavity. The form of the inlay is established by either a direct or an indirect technique.

A major advantage of composite inlay systems is their ability to reduce the adverse consequences of polymerization shrinkage and stresses of directly placed posterior composites, as only the resin lute remains to be polymerized at cementation.

Keywords: Inlay, Composite inlay, luting

Introduction

An inlay may be defined as a restoration which has been constructed out of mouth from gold, porcelain or other material and then cemented into the prepared cavity of a tooth.

Class II inlay involves the occlusal and proximal surface(s) of posterior teeth and may cap one or more but not all of the cusps. Materials used for inlays are-

- **Tooth colored restorations:** Composites & Ceramics
- **Cast Metals :** Type I & II gold alloys
Low gold alloys

A composite inlay may be defined as a solid mass of resin composite that is cemented into a dental cavity. The form of the inlay is established by either a direct or an indirect technique. Claimed advantages of composite inlays include elimination of bulk polymerization contraction, enhanced physical properties, better control of restoration contours, improved marginal adaptation and economic benefits.

The physical properties of composite restorations are improved when the composite is free of voids, and the resin matrix is maximally polymerized. Generating dense, well-cured restorations is best accomplished in the dental laboratory using devices that polymerize the composite under pressure, vacuum, inert gas, intense light, heat, or a combination of these conditions. Several commercial systems use these techniques to optimize the physical properties of their composite materials.

Case Report

A 20- year old female was referred to the Department Of Conservative Dentistry & Endodontics for the restoration of 47 with mesial caries. She wanted esthetic restoration for the same.

A Composite Inlay restoration with DIRECT TECHNIQUE was planned as follows:-

- 1) Preoperative photograph showing mesial caries in 47 (Fig.I).
- 2) Cavity was prepared for inlay after the application of rubber dam (Fig. II).
- 3) Then a separating agent was applied in the cavity surface (Fig. III) and composite was placed incrementally in layers (Fig. IV).
- 4) Polymerization was done with Visible Light Curing Unit (Fig.V).
- 5) After that, restoration was removed from the mouth with the help of resin sprue former.
- 6) Heat curing/ Secondary curing of the restoration was done by placing it in the heat curing oven that exposes the composite to additional light and heat (Fig. VI).
- 7) The cured composite inlay is trimmed, finished and polished in the laboratory.
- 8) Finally, the restoration was luted with dual- cure resin cement (Fig. VII) after sand blasting, sialanization of the fitting surface & etching , bonding of the cavity surface (Fig. VIII).

Another 21- year old female was referred to the Department Of Conservative Dentistry & Endodontics for the restoration of 37 with distal caries. She also wanted esthetic restoration for the same. For this case, the Composite Inlay with INDIRECT TECHNIQUE was chosen.

- 1) Preoperative photograph showing distal caries in 37(Fig. I).
- 2) Cavity was prepared for inlay (Fig. II).
- 3) After impression, individual die was prepared (Fig. III).
- 4) The composite is built up in layers, polymerizing each layer with a brief exposure to a visible light curing unit after the application of separating agent(Fig. IV).
- 5) Final curing is accomplished by inserting the inlay into an ovenlike device that exposes the composite to additional light and heat in the heat curing oven (Fig. V).
- 6) The cured composite inlay is trimmed, finished, and polished in the laboratory.
- 7) Finally, the restoration was luted with dual- cure resin cement after sand blasting (Fig. VI), sialanization of the fitting surface & etching , bonding of the cavity surface (Fig. VII, VIII).

Discussion

Laboratory-processed composite inlays are more resistant to occlusal wear than direct composites, provide proper border seal particularly in occlusal contact areas. They offer easy adjustment, low wear of the opposing dentition, good esthetics, and potential for repair. However, they are less wear-resistant than ceramic restorations.

Processed composite restorations are indicated when:

1. Maximum wear resistance is desired from a composite restoration,
2. Achievement of proper contours and contacts would otherwise be difficult, and
3. A ceramic restoration is not indicated because of cost or concerns about wear of the opposing dentition.

Regarding the latter, the indirect composite would likely cause less wear of the opposing dentition than a similar ceramic restoration.

The disadvantage of gold inlay over composite inlay are-

- Cost
- Time consuming.
- Requires temporary restoration.
- Technique sensitivity.
- Splitting forces.

Barone A, Derchi G, Rossi A, Marconcini S, Covani U(2008) evaluated the Longitudinal clinical evaluation of bonded composite inlay over a period of 3-year study. He concluded that Composite inlays demonstrated a very high success rate (97.4%) after 3 years. Neither the size of the restorations nor the tooth type significantly affected the clinical outcome of the restorations.

Conclusion

Dentistry has benefited from tremendous advances in technology with the introduction of new techniques and materials. The combination of materials and techniques

are now beginning to emerge which aim to exploit the best features of each. There is still considerable space for the improvement of properties and microstructures of materials including a more critical attempt to mimic the structure developed by nature. The search for the ideal restorative material continues.....

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Legands

Direct Technique

- Fig. 1 Preoperative photograph showing mesial caries in 47
- Fig. 2 Prepared Cavity
- Fig. 3 Separating agent applied
- Fig. 4 Composite placed incrementally in layers
- Fig. 5 Polymerization done with visible light cure unit.
- Fig. 6 Heat curing/ Secondary curing done in heat curing oven
- Fig. 7 Dual Cure Resin Cement.
- Fig. 8 Finished Restoration

Indirect Technique

- Fig. 9 Preoperative photograph showing disto- proximal caries in 37.
- Fig. 10 Inlay cavity prepared
- Fig. 11 Individual die prepared
- Fig. 12 Composite layered incrementally using visible light cure after the application of separating agent
- Fig. 13 Additional polymerization in the heat curing oven
- Fig. 14 Sand blasting of the fitting surface done
- Fig. 15 Restoration fitted with Dual Cure resin cement
- Fig. 16 Final Restoration

