Egyptian Prosthodontic Association (EPA Newsletter)

Posterior Indirect Adhesive Restorations Versus Full Coverage Based on Biomimetic Approach

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Prosthetic restoration aims to restore oral function and aesthetics using artificial replacements for damaged or missing teeth. Clinically, choosing between full or partial coverage restorations is common, with a conservative approach preferred to preserve natural tooth structure. (1)

Clinical protocol for decision making depends on:

1. Following the biomimetic concept (This approach focuses on restoring the biomechanical integrity of the natural tooth using materials that closely mimic its properties) to reduce the risk of fracture in a bonded restoration in the posterior region. (2)
2. Clinical evaluation of the remaining healthy tooth structure, and the masticatory forces exerted during chewing. (3,4)
3. Defect removal:

- Usually starts with soft tissue removal either by laser or Therma cut or surgical to clear if hidden caries or destruction below.

- Then remove the caries or defect using long shank ball bur or stone under illumination.

- In managing deep carious lesions in vital teeth, the clinical goal is to

preserve pulpal vitality while ensuring a durable restoration**.**

During caries excavation**,** complete caries removal should be performed circumferentially—about 2 to 3 mm around the lesion—to create a sound peripheral seal zone**,** which is essential for bonding and sealing the restoration effectively.

In the central, deeper portion of the cavity, particularly near the pulp, **selective caries removal** should be performed. This involves removing only the soft, infected dentin**,** while leaving firm, affected dentin in place to prevent pulp exposure. (5) That confirmed by caries detecting dye staining or using confirmatory DIAGNODENT(Kavo). (6) **Figures 1-3**.

1. Restorability check: Ensure the following criteria are met:

- Proper C/ R ratio , minimum(1:1).

- Ferrule check (2mm in height & 1mm thickness to engage the

restoration for acceptable clinical performance).

- Mobility check.

- Guarantee the seal (either apical or coronal seal).

5. Structural and Esthetic Analysis:

- For long-term clinical performance the remaining wall thickness and numbers, gingival margin position, occlusion, presence of cracks must be clinically assed for proper decision making to do either partial coverage or full coverage first, then decide any type of partial coverage will be selected. (7)

- Measuring the cusp at the bio-rim area using dental caliber, if the cusp thickness (< 1.5 mm) it is undermined cusp that should be removed especially if it involves a fracture or crack. (8)

- Complete coverage restorations are used when tooth structure loss is more than 50%. (9)

6. Restorative foundation:

There was a new nomenclature that describes the functional zone of the tooth (Bio-Dome & Bio-Rim)

- It is important to preserve the bio-rim area intact (the cervical half of the tooth (2–3 mm below the contact area) to avoid catastrophic failure as it supports the coronal compression dome. (10) **Figure 4**

- restoration of structurally compromised teeth requires materials with elastic properties closely matching those of natural dental tissues to ensure optimal stress distribution. (11)

-Enamel Bio emulation: it can be restored with (ceramic restoration materials or Enamel replacement nanohybrid composites).

-Dentin Bio emulation: need to emulate with more flexible and resilient materials. It can be restored with (resin dental composites (RDCs)or nanohybrid composites to restore the dentin near DEJ and glass ionomer composites (GICs)for deep dentin replacement that are filled in teeth on chairside to restore the lost tooth tissues. (12)

- Dentino Enamel Junction (DEJ): it is a crack inhibiting zone restored with either (hybrid ceramic materials or fiber reinforced composite base +ceramics).

- Bio base: It is better to apply Deep dentin composite replacement with short reinforcement fibers (Ever-X posterior, or Ever GC) that:

*Modulate stress levels through the creation of Monoblock effect.

*Reinforce the core build up composite materials.

*Crack deviation property and mechanical properties improvement. (13)

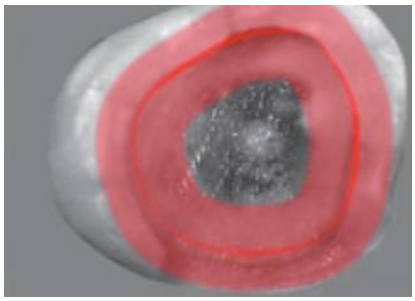
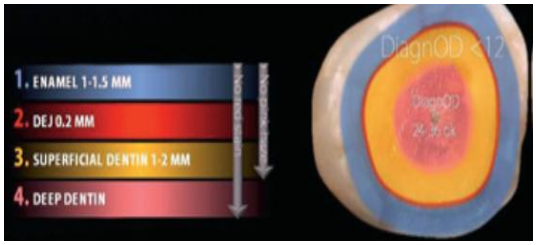


Figure 1: The concept of a peripheral seal zone is that the enamel, DEJ, and superficial dentin constitute the caries-free area of a highly bonded adhesive restoration. *Photo credit:* Dr David S Alleman.



dye and DIAGNOdent technologies. *Photo credit:* Dr David S Alleman.

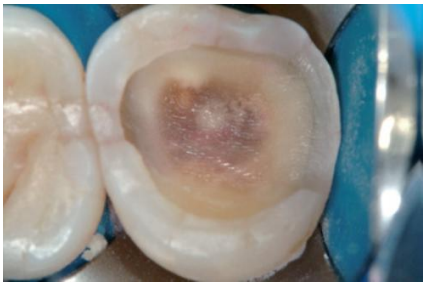


Figure 3: Ideal caries removal end points and peripheral seal zone developed

in an intermediate-depth lesion using combined technologies. *Photo credit:* Dr David S Alleman.

Figure 4: Clinical example showing an overlay preparation (left) with the BioRim marked in red (right). *Photo credit:*

Dr Steven Schiffenhaus

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