

What are the Most Important Factors for Composite Failures in the Posterior Teeth?

Introduction

Failure of composite depends on the definition of failure is summarized in leakage, discoloration or fracture. The failure could be attributed to the practitioner starting from patient selection passing through defective filling procedure and ending by illogical expectation of material like composite. We should never forget one of the factors for failure is the dentist's act. It is true that the larger the restoration, the faster it will wear, particularly with bruxers. But there are a lot of things a dentist can do to minimize failure.

Here are some of the critical factors for composite failures. I tried to summarize them and show how these mistakes could be prevented:

Dentist's Mistakes

It is clear that composite failure can be affected by dentist's work but knowing the proper procedures and applying them in the right place can decrease the incidence of failure. For example, a clinician should be prepared for micro composite fracture if a pin is placed by overstress.

Cavity Volume

The biggest factor in success or failure of posterior composites is cavity volume. Large composite restorations in posterior teeth are prone to failure over the long term. This is related to excessive polymerization shrinkage and possibly some inadequately cured resin. One of the best solutions to reducing the amount of resin in the tooth is to combine the composite with some Resin Modified Glass Ionomer or Glass Ionomer. Neither of these two materials have the polymerization shrinkage that Composite resin does. Net result in a large restoration is an inadequate cure. Every potential for error is magnified in a large restoration that is subject to large amounts of occlusal stress.

Shrink-Back of the Composite

This can be appeared be from the bonded area underlying dentin during curing. The manifestation could be resulted by soreness on the bite and can be confirmed by having the patient bite on a Q-tip. By replacement of the restorative material and greater steps in layering the resin on placement, you can prevent this problem.

Application of Un-appropriate Pins

If the pin is placed with high torque, self-shearing pins will cause micro-fractures. In case of amalgams as a restorative material, this might cause less problem but for composites could lead to micro-leakage and recurrent decay. If plan to use pins, tend to hand-tighten it in order to avoid overstress.

Unsupported, Unbraced Cusps

In order to prevent fracture, cap all unsupported and thin

Commentary

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cusps, brace with resin from the external surface.

Micro-Leakage

The experiments show resins will tend to show micro-leakage over time if it is not sealed properly in large composite build-up. It is obvious this leakage will result in root canal therapy failure.

Shear Fracture

When a resin opposes a plunger cusp or a composite is overbuilt beyond its foundation support, shear fracture can occur on the bulk of composite. The best way to prevent that tries to extend the retentive area to cover the enamel and round off the opposing plunger cusps. This could also occur in contact area on the proximal ridges.

Absence of Moisture Control

When composite are placed near the gingival margins this would be a disaster if the moisture has not been controlled well. Superior hygiene is required. Patient can use GC Dry Mouth Gel or GC MI Paste, or Biotene rinse and gel. A restoration sealed with bond can delay recurring decay. But this one is definitely a tough job.

Inadvertent Voids In Proximal Boxes

This can be minimized by using a flowing composite as a thin hydraulic under resin. When these voids are condensed and filed properly and are sealed afterwards with bonding material, the failure can be minimized or eliminated.

Butt Joint Margins on Occlusal Surface

They could be chipped off and show the beginnings of micro-leakage. That white line around margins when you trim will also start to leak. It is advisable to avoid butt joints and seal the filling when is done. Therefore, the butt joints should not be used everywhere.

Incisals of Anteriors

Chipped edges and micro-leakage is common. To avoid this matter use a long internal bevel, or the best way drape and overlap some of the Buccal and Lingual enamel and make chipping less likely.

Anterior Class IV

Using a short bevel to retain them will almost always lead to de-bond. The best suggestion use a long chamfer but to create expanded enamel surface area for bonding in order to create bulky area and therefore to be more resistance to fracture.

Bleeding Areas

Using hemostasis material can leave an iron residue that interferes with bonding. After filling placement, it leaks and leaves a black line between tooth and filling. Etching will remove the iron layer, but it might increase the risk of re-starting the bleeding. Alternatively using Hemodent doesn't interfere with bonding.

I believe these are the most common sources of composite failure that all dentists must strive to correct in their daily work. Understanding why there is a failure would help to prevent failure. Therefore, we should have in mind, both clinical factors and quality of products play important roles in this issue.