

Preventive Resin Restoration - A Narrative Review

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Abstract

Conventional restorative dentistry methods persist predominant in the treatment of carious, even incipient carious, lesions when deterrence or remineralization must be the treatment of choice. According to preventative extension, when the tooth is prepared, all pits and fissures are eliminated with a bur to comfort the placement of amalgam. Lacking to acknowledge the significance and advantage of conservation of as much tooth structure as possible is indefensible in light of the technique options that the acid-etch procedure and the new resin materials offer the profession. The preventive resin restoration has several advantages. One of the important advantages is minimal tooth structure is removed compared with a conventional preparation, leaving a much stronger tooth. This is in contrast to the extension for prevention method by which elimination of better tooth structure to prevent repetitive decay at the same time weakens the tooth. As mentioned, the sealed restoration can eliminate recurrent caries.

Keywords: Fissures, fluorides, preventive, sealants

INTRODUCTION

Current decennium has seen a growth in the identification of the causes and determinants of dental caries, with the apprehension that dental caries is avertable, infectious bacterial disease, but an associated change in treatment procedure, from the crashed method of attempting to reimpose one's way out of the disease, has not followed. Conventional restorative dentistry methods persist predominant in the treatment of carious, even incipient carious, lesions when deterrence or remineralization must be the treatment of choice. Minimally invasive treatment choices like preventive resin restoration (PRR) should also be contemplated and utilized where appropriate for the goal of the conservation of tooth structure. Lacking to acknowledge the significance and advantage of conservation of as much tooth structure as possible is indefensible in light of the technique options that the acid-etch procedure and the new resin materials offer the profession.^[1]

HISTORY

The preventive expansion of cavities for the treatment of occlusal caries in permanent molars in children has been in work for little time. According to preventative extension, when the tooth is prepared, all pits and fissures are eliminated with a bur to comfort the placement of amalgam. This meant that noncarious tooth structure was slaughtered during placement. Luckily, a

good perception of the caries process and remineralization has catalyzed the advancement in caries management from GV Black's "extension for prevention" to "minimally invasive."^[2] Simonsen^[3] reported minimally invasive preparation and restoration, which he termed as PRR. This preparation only eliminated carious pits and fissures, using small burs, with tooth removal hardly reaching into dentin while in some instances, only enamel was removed. For the prepared pits and fissures, the tooth was reconstructed using adhesive technique with a highly filled resin composite covering the remaining pits and fissures with a sealant. Simonsen, who named this technique PRR, endorsed it for restoring carious lesions at the initial stages with the elimination of very minimal tooth structure while at the same time safeguarding unprepared areas from later caries attack.^[4-6]

INDICATIONS

Several indications of PRR comprised of:^[4,7,8] questionable caries, or an explorer catch in a pit or fissure; very minimal,

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superficial pit and fissure caries; deep pits and fissures that could impede absolute penetration of sealant material or it might be carious at their bases; deep pits and fissures with considerable supplemental fissuring and minimal areas of decay; a smeared, chalky appearance along pits and fissures that could stipulate incipient caries. PRRs are contraindicated for huge, deep, or multisurface carious lesions.^[4,7] At present, PRR can be done with ionic composite resins, which reinstate the lesions in pits and fissures and help to eliminate recurrent caries in the rest of the fissure system.^[9]

Mertz-Fairhurst *et al.* conducted a landmark study regarding the effects of sealing caries. Many of her publications along the way peaked in 10-year data.^[4,10,11] Mertz-Fairhurst's 10-year study investigated bonded and sealed composite restorations placed directly over frank cavitated lesions extending into dentine versus sealed conservative amalgam restorations. The results imply that both types of sealed restorations show higher clinical performance and longevity compared with unsealed amalgam restorations. Furthermore, the bonded and sealed composite restorations placed over the frank cavitated lesions stopped the progress of these carious lesions for the duration of the study, 10 years.

Anyways this must be considered only as a temporary halt to lesion progress, only good for as long as the seal holds permanently. Since we do not have “forever” sealing capability, the judicious choice, in my opinion, is to eliminate the carious tissue when definitively diagnosed in dentine and restore it with a bonded restorative material like resin composite. If not eventually it will cause the underlying lesion which is temporarily sealed, to become active rather quickly once the seal is broken or worn down when the oral fluids once again have contact with the diseased tissue. Thus, we should investigate the original concept of the PRR limelight of the limitations of its remineralization capabilities. Of course, the practicality of remineralization of incipient lesions will definitely remain as a question mark particularly since the extent of incipient lesions may be difficult to determine accurately without mechanical exploration. Alternatively, for incipient lesions, a glass ionomer sealant can be applied initially, with the expectation that the fluoride content of the glass ionomer material would provide some remineralization capability for an incipient lesion, before the sealant is lost (glass ionomer sealants have not been shown to have very long-lasting retention).^[12]

Diagnosis of preventive resin restoration

The clinical diagnosis for PRRs has three primary elements:

1. Assessment of the patient's caries risk
2. Investigate and note the patient's medical history and do testing as necessary to determine caries risk
3. Diagnosis of lesion depth not only cavitated lesions diagnose enamel lesions too. This is the major step as the progression of the enamel lesion can be stopped
4. Diagnosis of lesion activity both the activity of the lesion and the risk of caries are very important for diagnosis and treatment planning.

ADVANTAGES

The PRR has several advantages. One of the important advantages is minimal tooth structure is removed compared with a conventional preparation, leaving a much stronger tooth. This is in contrast to the extension for prevention method by which elimination of better tooth structure to prevent repetitive decay at the same time weakens the tooth. As mentioned, the sealed restoration can eliminate recurrent caries.^[10,13] The patient undergoes very less discomfort and usually does not require anesthesia as less mechanical preparation is required.^[13,14] At last, the restoration may be added to, restored, or mended without further tooth preparation.

DISADVANTAGES

The first and very important is the need for absolute, conscientious adherence to the principles of acid-etch technique (isolation from moisture). This can generate a more time-consuming clinical procedure. Furthermore, long-term wear and retention, as compared with amalgam restorations, have not been proved.

TYPES OF PREVENTIVE RESIN RESTORATION

Based on the extent and depth of the lesion, it was classified into three categories.

1. Type A-Suspicious pits and fissures where caries removal is restricted to enamel
2. Type B-Incipient lesion in dentin that is very minimal and constricted
3. Type C-Characterized by the need for greater investigative preparation in dentin.

PLACEMENT TECHNIQUE OF PREVENTIVE RESIN RESTORATION

Several options in the PRR technique are practicable, depending majorly on the size of the preparation needed. Nevertheless, the procedure involves a sequence of basic steps. The tooth was first inspected radiographically for any evidence of interproximal or occlusal caries. Then, the occlusal surface is carefully investigated with a sharp explorer. The practitioner must examine for an explorer catch and resistance to removal, soft or opaque areas, or discontinuity of the enamel surface. Each of these factors can indicate the presence and degree of caries.^[4,15] Next, occlusion is examined and marked with articulating paper. The tooth is perfectly isolated with cotton rolls or rubber dam; the latter is preferable. Regardless of which method is used, adequate isolation is extremely important. A small round bur is made worn at high or low speed to make less exploratory preparation into deep pits and fissures.^[6] If caries are experienced, good access should be gained with a pear-shaped bur (no. 329 or 330).^[7] No effort was to create retention, remove less undermined enamel, or extend each standard acid-etching procedures are used. All unprepared pits and fissures, minimal exploratory preparations must be

restored with a pit and fissure sealant. Simonsen refers to this as the Type 1 PRR. If the preparation was made a little larger, a wear-resistant posterior composite resin is indicated for its restoration. After application of a liner (on exposed dentin) and bonding agent, the filled resin is smoothly placed. Using a brush or plastic instrument, the resin is extended into adjacent fissures to create a filled sealant. Any caries-susceptible areas on the tooth, which are not directly adjacent to the preparation, are treated with a conventional pit and fissure sealant. In Simonsen's classification, this method is called the Type 2. Type 3 technique is different from the other two in that the filled resin is used only to restore the prepared cavity.^[4] Adjacent fissures are covered with a pit and fissure sealant and they can be cured simultaneously if light-cured materials were used. Alternatively, the posterior composite resin may be placed and cured first, then covered, along with adjacent fissures, with a sealant.^[4,10] At last, the rubber dam was removed and the occlusion is checked carefully for any high spots. If necessary adjustment were needed, white stones or finishing burs can be used.

NEW ADVANCES IN PREVENTIVE RESIN RESTORATION

Brand new materials may help to decrease the risk of early failure in difficult-to-seal teeth. With the use of an intermediate bonding layer between enamel and sealant, it shows effectiveness in major saliva contamination^[15-17] as well as a clinical study. Many advancements such as ACP releasing sealant, amorphous calcium proteins, restorations which release fluorides, without BISPHENOL, BIS GMA and natural white, light restorations were introduced and available in practice. A new adhesive fissure sealant was developed which comprised of a solution of 3% 2-hydroxy-3- β -naphthyl propyl methacrylate in methyl methacrylate (MMA), poly-MMA powder, and an oxidized-n-butyl borane, a polymerization initiator.

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Conflicts of interest

There are no conflicts of interest.

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