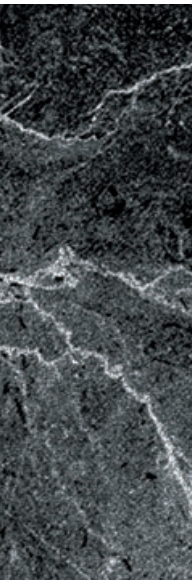

Critical Appraisal

ROOT CARIES

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The prevalence of root caries has increased in recent years, and the elderly population and irradiated patients are at particular risk. Prevention and treatment of root caries has become an important issue in restorative dentistry. The articles in this Critical Appraisal present different treatment options for this oral disease.

A CLINICAL COMPARISON OF GLASS IONOMER, RESIN-MODIFIED GLASS IONOMER AND RESIN COMPOSITE RESTORATIONS IN THE TREATMENT OF CERVICAL CARIES IN XEROSTOMIC HEAD AND NECK RADIATION PATIENTS

D. McComb, R.L. Erickson, W.G. Maxymiw, R.E. Wood
Operative Dentistry 2002 (27:430–7)

ABSTRACT

Objective: This clinical study evaluated the success of various tooth-colored restorative materials used as Class V restorations in xerostomic patients.

Materials and Methods: One hundred fifty carious cervical lesions of postradiation xerostomic patients were restored. One restoration of each of the following materials was placed per quadrant or sextant:

1. Conventional glass ionomer—Ketac Fil (3M ESPE, St. Paul, MN, USA): No conditioner was used. After finishing, restorations were covered with two coats of bonding resin. Finishing was done at a later visit.
2. Resin-modified glass ionomer—Vitremer (3M ESPE): As with the Ketac Fil restorations, no conditioner was used, but the material's primer was applied before the restorations were placed. After immediate finishing, a finishing gloss was applied to the surface of the restorations.

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3. Composite resin—Z100 (3M ESPE): After acid-etching, Scotchbond Multi-Purpose (3M ESPE) primer and adhesive were applied. Two increments of composite were used to restore larger preparations, and the restorations were finished immediately.

A daily neutral sodium fluoride gel tray application was prescribed for all patients after restoration placement. Patients that used fluoride for more than 50% of the time during a 6-month period were classified as fluoride users, whereas patients that reported the use of fluoride for less than 50% of the time were classified as nonusers. Restorations were evaluated at 6, 12, 18, and 24 months for marginal adaptation, anatomic form, and recurrent caries.

Results: Placement of Ketac Fil restorations was discontinued prior to the completion of the study because of the large number of failures. All of these failures were attributed to a significant loss of anatomical form and inadequate marginal adaptation. These failures were suggested to be related to the xerostomic condition and fluoride erosion. Overall, no difference in performance between Vitremer and Z100 was detected. No restoration failure resulting from secondary caries was present for patients classified as fluoride users. Sixty seven percent of the Z100 and 12.5% of the Vitremer restorations evaluated in the fluoride nonusers had secondary caries at 24 months. Vitremer was more effective in secondary caries inhibition than Z100.

Conclusions: Based on the findings of this study, fluoride-containing restorative materials can reduce the incidence of secondary caries in patients with reduced salivary flow. Resin-modified glass ionomer appears to be a good option for restoring carious cervical lesions in patients with poor compliance with fluoride treatment.

COMMENTARY

The results of this study must be interpreted with care. Fluoride has been suggested as an important aid in root caries prevention. However, the results of the present study link the use of fluoride to loss of anatomical form and poor marginal adaptation in Class V restorations done with a conventional glass ionomer material. The reason for this outcome is not clear, especially because other studies have shown good clinical performance of glass ionomer materials using the same clinical scenario (xerostomic patients).

Resin-modified glass ionomer and resin composite materials appear to be better choices in a long-term scenario because of their lower solubility when compared with conventional glass ionomers. In high caries-risk patients, where compliance to adjunct treatments such as fluoride or xylitol use is questionable, resin-modified glass ionomers seem to be the restorative material of choice.

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Chalmers JM. Minimal intervention dentistry: part 1. Strategies for addressing the new caries challenge in older patients. J Can Dent Assoc 2006;72:427–33.

COVERAGE OF PREVIOUSLY CARIOUS ROOTS IS AS PREDICTABLE A PROCEDURE AS COVERAGE OF INTACT ROOTS

M. Goldstein, E. Nasatzky, J. Goultschin, B.D. Boyan, Z. Schwartz
Journal of Periodontology 2002 (73:1419–26)

ABSTRACT

Objective: This study assessed whether the subepithelial connective tissue graft is a predictable procedure for coverage of previously carious root dentin.

Materials and Methods: Sixty periodontal patients participated in this clinical trial. Patients with Miller Class I and II recessions, meaning no interdental bone loss, qualified for the study. A total of 33 intact teeth and 27 teeth with cari-

ous roots were included in the statistical analysis. The latter group contained 18 teeth with primary root caries and 9 teeth with cervical restorations with secondary caries.

In the carious group, all caries and restorative material (when present) were removed prior to the graft procedure. All exposed roots were thoroughly planed and covered without any further root treatment or conditioning. The root coverage procedure was performed using a connective tissue graft from the palate.

Residual recession, defect coverage, and caries incidence were periodically assessed over 6 years.

Results: The percentage of root surface coverage was 98 and 99% for previously carious and intact roots, respectively. Root coverage in excess of 90% was achieved in 90 and 100% of the cases for previously carious and intact root, respectively. There was no significant difference between treatments in percentage of recession coverage, attachment gain, or probing depth. During the 6-year follow-up period, no further recession or recurrent caries was observed.

Conclusions: This study shows that coverage of previously carious cervical dentin with subepithelial connective tissue graft is highly effective and predictable.

COMMENTARY

This study describes a valuable alternative for treatment of carious cervical lesions. Restoring carious cervical lesions appear to be the most common treatment modality when gingival recession is present. However, restorations often are not the ideal treatment and a more biological treatment option should be considered. Thus, clinicians must be aware of the tissue graft treatment approach and apply it when indicated.

Coverage of exposed cervical areas with tissue grafts is a well-known and predictable treatment. Grafting of gingival recessions is indicated when there is no attached gingiva, no loss of interdental bone or soft tissue, and when esthetics is important. In the present study, in addition to gingival recession, there were cervical caries or restorations with secondary caries at the site. However, the presence of caries did not compromise the treatment outcome.

This treatment is not indicated when the lesion is more than 2-mm deep (horizontally) and there is a Miller Class III recession (loss of interdental bone). In these cases, restoration of the defect is still the recommended treatment.

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THE EFFECT OF DIFFERENT DESENSITIZING AGENTS ON INITIAL DEMINERALIZATION OF HUMAN ROOT DENTIN

C.R. Gernhardt, K. Aschenbach, K. Bekes, H.G. Schaller

Quintessence International 2005 (36:679–85)

ABSTRACT

Objective: This *in vitro* study analyzed the protective effect of three different desensitizing agents against demineralization of human dentin.

Material and Methods: Sixty extracted mandibular human molars were used in the study. After removal of soft tissues and cementum, the root surfaces were coated with an acid-resistant varnish, except for two windows 1 mm below the CEJ. One window per tooth was left untreated to serve as control, and the other was treated using one of the following treatments:

1. Seal & Protect 2.0 (Dentsply Professional, York, PA, USA): Two layers of this resin desensitizing agent were applied, air-thinned, and light-cured.

2. D/Sense 2 (Centrix, Shelton, CT, USA): Step 1 liquid was applied to the dry root dentin. After 10 seconds, Step 2 liquid was applied over it.

3. Gluma Desensitizer (Heraeus Kulzer, Hanau, Germany): The solution was applied to the root dentin and dried with compressed air after 60 seconds.

After treatment, specimens were submersed in a demineralization solution containing sodium hydroxide, lactic acid, and hydroxyethylcellulose at pH 4.6. After 2 weeks, the roots were sectioned perpendicular to the root axis and the samples were analyzed under polarized light microscopy.

Results: Statistical analysis revealed a significant reduction in lesion depth for all treatment groups when compared with their respective controls. Comparisons between treatment groups showed a significantly better result (less demineralization) for the specimens treated with Seal & Protect 2.0. No significant difference was found between the D/Sense 2 and Gluma Desensitizer treatments.

Conclusions: Within the limitations of this *in vitro* study, desensitizing agents might be an important aid in root caries prevention.

COMMENTARY

This *in vitro* study highlights another potential indication for desensitizing agents. Some of these materials have been used for years as a palliative treatment for dentin sensitivity and might be useful in caries prevention as well. Seal & Protect 2.0 works as an adhesive resin, sealing the dentin surface and obliterating the exposed dentinal tubules. It also contains an antimicrobial component, triclosan, and releases fluoride. In contrast, D/Sense 2 and Gluma Desensitizer are not polymerized. While the former contains potassium salts that act by depolarizing the nerve of the pulp, the latter contains glutaraldehyde that coagulates the proteins in the dentinal tubules.

Even though these materials have been used commonly for desensitization of exposed root surfaces, no strong clinical evidence exists to support their use in root caries prevention. Only recently has laboratory research suggested a possible benefit of these materials for root caries prevention. However, the mechanism involved in caries prevention with these desensitizing agents cannot be determined from this study. Seal & Protect 2.0 forms a protective layer that is resistant to acids. However, this resistance is unlikely to last long-term as this layer wears away. Gluma Desensitizer has glutaraldehyde, which is a fixative known to cross-link collagen, which might help reduce demineralization.

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Swift EJ, Hammel SA, Perdigão J, Wefel JS. Prevention of root surface caries using a dental adhesive. J Am Dent Assoc 1994;125:571–6.

THE BOTTOM LINE

Selection of a restorative material for treatment of carious cervical lesions should be based on the caries risk of the individual patient. Although it is questionable how much clinical benefit is obtained from the fluoride release of glass ionomer restorations, they seem to be the material of choice for restorations of carious cervical lesions in patients with a moderate to high risk of caries. Conventional glass ionomers are more susceptible to degradation than resin-modified glass ionomers, so their use as definitive restorations should be limited. In low caries-risk cases, resin composites seem to be an appropriate restorative material. However, a good understanding of the composite's limitations is important. Patients with low esthetic concerns in posterior areas can be treated with amalgam restorations. Amalgam has a long history of success and is a safe long-term option for direct restorations.

In moderate- and high-risk caries patients, adjunctive treatments should be performed along with restorations of the carious lesions. Topical fluoride, xylitol, and chlorhexidine are some of the available options to help with caries prevention. The combination of preventive and restorative treatment, when needed, is the key to a successful result. Desensitizing agents, although not yet clinically proven, might be considered as a caries prevention method in noncarious cervical lesions.

Lastly, if shallow lesions are present and there is no proximal bone loss, as described in the manuscript by Goldstein and colleagues, soft tissue root coverage appears to be a reasonable treatment option.

Editor's Note: We welcome readers' suggestions for topics and contributors to Critical Appraisal. Please address your suggestions to the section editor:

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