Successful management of extensive root caries with gingival recession using a multidisciplinary team approach - A case report of a 1-year follow-up

Vrushali Abhyankar¹, Paul S. Bland¹, Jordan Hansen²

¹Department of Periodontology, UTHSC, College of Dentistry, Memphis, Tennessee, ²Department of Root Canal and Microsurgery, White Pine Endodontics, Providence, Utah

Abstract
This case describes a combination treatment for extensive root caries and gingival recession with a resin-modified glass ionomer restoration and subepithelial connective tissue graft, with a successful 1-year follow-up. Treatment of root caries and recession treated with a restoration as a single treatment modality may produce less than ideal results due to increase tooth length and unesthetic appearance. A 35-year-old healthy male patient presented with severe sensitivity in #21. Clinical and radiographic examination showed extensive root caries extending up to the middle third of the root, 2 mm recession, and previous history of tobacco quid placement in the area. A partial thickness flap was elevated from #19 to #22 with vertical releasing incisions at both ends. The decay was removed with high-speed burs. The coronal part of the tooth was restored with composite and root portion with resin-modified glass ionomer restoration. A subepithelial connective tissue graft was harvested from the palate and secured in place with chromic sutures. Flap was approximated and closed with polypropylene sutures. 1-year evaluation showed complete root coverage and gingival health with no sensitivity. Connective tissue grafts can successfully be placed over biocompatible restorative materials like resin-modified glass ionomer to treat recession and root caries simultaneously. Dentists should be aware of not so commonplace combinations of surgical and restorative treatment modalities to achieve optimum clinical results.

Keywords: Caries, connective tissue graft, gingival recession, multidisciplinary, resin modified, restoration

Introduction
Gingival recession, the pathologic exposure of root surface, can be caused by a variety of etiological factors such as faulty tooth brushing, periodontal disease, high frenal attachments, malposed teeth, iatrogenic factors, or deleterious patient habits, in turn, leading to root caries, severe thermal and tactile sensitivity, cervical abrasion, or unsatisfactory esthetics. Cervical abrasion, non-caries cervical lesions, and root caries are frequently observed with teeth showing gingival recession. These areas of cervical recession and abrasion are more often treated with conventional restorations alone, which may further complicate the problem of exposed roots and esthetics relating to the increased length of the root in relation to tooth.¹

Treatment of gingival recession with subepithelial connective tissue graft, though a technically challenging procedure, is the gold standard for root coverage procedures. It not only covers the exposed root surface but also increases the width of the keratinized gingiva giving a highly predictable result with long-term stability.² Recently, it was demonstrated that the combined treatment of recession with a restoration and coronally advanced flap showed excellent esthetic results and reduction in sensitivity as part of the restoration was covered with soft tissue.³ In severe situations, a combination treatment with a biocompatible restoration and an addition of connective tissue graft with the coronally advanced flap instead, provided better clinical outcomes than any single treatment modality alone.⁴

Case Report
A systemically healthy 35-year-old healthy Caucasian male patient reported to the University of Tennessee Health Science Center, College of Dentistry, with the chief complaint of visible root exposure of mandibular premolars and severe sensitivity
to cold. Social history revealed a tobacco chewing habit. The patient placed a tobacco quid in mandibular right premolar area for several years but had quit for 2 years. Thorough clinical and radiographic examination was performed to assess the oral health. The examination presented a Class V composite restoration on ‘22 and ‘21 which were placed about 5 years ago. There were 2 mm recession and 3 mm of keratinized tissue associated with ‘21 [Figure 1]. All probing depths were within normal limits. Radiographic examination showed a large radiolucency extending up to the middle of the root, suggesting root caries or external root resorption [Figure 1]. All teeth in the mandibular quadrant were vital to pulp testing with electric pulp tester and endo ice.

Due to the extent of the radiographic root surface decay and recession, a combined surgical-restorative approach was planned at the same appointment. A split thickness flap was raised by placing papilla sparing parallel incisions from ‘19M to ‘22M and a vertical incision made at ‘19M and ‘22M, extending beyond the mucogingival junction to gain access. After flap reflection and defect exposure, the existing composite restoration was removed with high-speed diamond burs. There was significant secondary decay present extending up to the middle third of the root which was also carefully removed with high-speed burs [Figure 2]. It was decided to use resin-modified glass ionomer (Geristore) for the entire cavity preparation. It is a dual cured and extremely biocompatible material, due to its hydrophilic BIS-GMA...
formulation. It has numerous applications including restorations for non-caries cervical lesions, subgingival restorations, and its ability to be a successful material for root restorations. Attempts to place the same in the entire cavity preparation, however, failed; hence, it was decided to use resin-modified glass ionomer only on the root surface and composite resin on the coronal tooth structure. The restorative approach of using different materials on the crown and root surface was successful. The coronal composite restoration on ’22 was also replaced at the same time. Composite and resin-modified glass ionomer cement were smoothened with carbide burs and examined under a microscope to assess the thoroughness of caries removal and integrity of the restoration [Figure 3].

The subepithelial connective graft was then harvested from the palate with a double incision technique such that a 1 mm band of epithelium remained attached to the connective tissue portion of the graft. This band helps to increase the width of the keratinized tissue after healing and also reduces the post-operative morbidity. The 15 × 10 mm graft was positioned on the restoration over ’21 and 20 such the epithelium was at the level of the CEJ [Figure 4]. Graft was secured in place with multiple interrupted chromic sutures through the interdental papilla and a periosteal suture toward the apical end. The flap was approximated over the graft and sutured with polypropylene sutures [Figure 5].

The patient was recalled for a post-operative visit at 2 and 4 weeks after the surgery. The healing was uneventful during which time the patient was asked to avoid chewing and brushing on the affected side and use a chlorhexidine mouthwash. The patient was seen for regular periodontal recalls at 6 months and 1 year during which period his primary complaint of increased sensitivity had disappeared. The probing depths were within normal limits, and complete recession coverage with increased keratinized tissue was noted. The patient is presently on biannual dental recalls [Figure 6].

**Discussion**

A large number of studies have shown subepithelial connective tissue graft to achieve predictable root coverage showing stable results from 12 months to as long as 60 months.[6] A recent article reports that the short-term results of recession depth coverage and increased keratinized tissue have been maintained for 20 years.[6] Histological studies have shown various healing patterns of SCTG to root surface. Two healing patterns were predominately observed, a long junctional epithelium or a short junctional epithelium with long connective tissue attachment. The connective tissue fibers were noted parallel to the root surface without actually inserting into the root surface. Regeneration of periodontal ligament is usually not found and if present is restricted to the apical areas of the tooth.[7]

The cosmetic component of a combined problem of root caries and recession will not be solved by either one modality alone. SCTG with coronally positioned flap has been demonstrated as a sole procedure to successfully treat carious roots and recession.[3] However, to successfully treat apically extensive lesions, a biocompatible restorative material along with a predictable recession coverage procedure is deemed necessary to solve the problem of esthetics and sensitivity simultaneously.

Increased gingival inflammation and probing depths have been a concern of some studies that have evaluated subgingival restorations,[8] but others[9] have shown contradictory results. Gingival health in the presence of restorations is, however, shown when the restorative material is biocompatible, and the restorations are maintained on facial surfaces where oral hygiene procedures are usually optimal.

Resin-modified glass ionomer cements are biocompatible showing chemical adherence to the tooth structure. Their lower curing shrinkage and insolubility in oral fluids make them amenable to subgingival and furcation restorations. The histomorphometric response of periodontal tissues of various restorative materials such as composite and resin-modified glass ionomer cement studied on animals shows no difference in the inflammatory tissue response between restorations and control areas. This lack of inflammatory response to the biocompatible materials was attributed to careful finishing and polishing before the flap closure and plaque control during the healing phase which is also critical for successful outcome of clinical cases.[9] The greatest challenge of preventing the relapse of a periodontal pocket due to non-adaptation of the graft and the flap to the tooth is prevented in the above case with successful long-term outcome.

**Conclusion**

Although resin ionomer restorations and soft tissue grafts both have their specific clinical indications, combining the two can lead to highly predictable results. It is important to explore all possible options when treating clinically challenging cases successfully. Periodontal plastic surgical procedures along with innovative materials and restorative techniques have allowed practitioners to treat challenging clinical cases successfully.

**References**

2. Chambrone L, Tatakis DN. Periodontal soft tissue root coverage
Abhyankar, et al. Soft tissue root coverage with resin-bonded glass ionomer


This work is licensed under a Creative Commons Attribution 4.0 International License. The images or other third party material in this article are included in the article’s Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit http://creativecommons.org/licenses/by/4.0/ © Abhyankar V, Bland PS, Hansen J. 2018.