

A combined approach to non-carious cervical lesions associated with gingival recession

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Non-carious cervical lesions (NCCLs) with gingival recession require specific consideration on both aspects of hard and soft tissue lesion. In the restorative aspect, careful finishing and polishing of the restorations prior to mucogingival surgery is the critical factor contributing to success. Regarding surgery, assessment of the configuration of the lesion and the choice of surgical technique are important factors. The precise diagnosis and the choice of the proper treatment procedure should be made on the basis of both restorative and surgical considerations to ensure the successful treatment of NCCLs. (*Restor Dent Endod* 2016;41(3):218-224)

Key words: Composite restoration; Mucogingival surgery; Non-carious cervical lesion

Introduction

A non-carious cervical lesion (NCCL) is described as the loss of hard tissue at the cemento-enamel junction (CEJ) in the absence of caries.¹ These lesions can lead to tooth hypersensitivity, plaque deposition, and further gingival irritation.² Frequently, they are associated with gingival recession, causing structural weaknesses reflected in a poor crown-root ratio and esthetic complaints. Unfortunately, the restoration of the cervical area using a resin composite or glass ionomer (GI) has shown a high failure rate due to the difficulty of isolating the area subject to restoration from the gingival tissue and the poor adhesion of these substances to sclerotic dentin and root surfaces.³

Since NCCLs often involve the simultaneous loss of tooth structure and gingival recession, the diagnostic assessment and approach should be based on a thorough understanding of the periodontal and restorative aspects of treatment. Therefore, esthetic and long-term structural success can be obtained through a multidisciplinary approach of this type. As treatment strategies may vary according to the type of gingival recession, the marginal level, and the extent of the NCCL, the clinical features of each defect site must be considered before treatment.

Zucchelli *et al.* classified NCCLs and introduced guidelines for the clinical decision-making process.⁴ If the lesion only occurs on the root surface (NCCL types I and II), a periodontal surgical approach may be sufficient for covering it. In contrast, NCCLs above the CEJ (NCCL type V) can only be restored properly with a resin composite or a GI filling. Crown-radicular NCCLs associated with gingival recession (NCCL types III and IV) are the most challenging, and the treatment of these lesions requires more delicate care. The restorative procedure on the crown part of the lesion should be performed first before mucogingival surgery and surgical gingival recovery should be applied on

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radicular part of the lesion.

The choice of restorative material is also important for long-term clinical success. The material should have mechanical properties suitable for retention, appropriate esthetic properties, and be biocompatible in order to ensure gingival reattachment. GI or resin-modified GI can be recommended for NCCLs due to the high retention rates of these materials and their favorable biocompatibility for gingival reattachment.^{5,6} However, those materials have the disadvantage of poor esthetic properties. Therefore, several studies have suggested the alternative use of microfilled resin composites and resin composites, with no significant differences observed in the gingival reattachment level between resin-modified GI and flowable resin composite.⁷⁻⁹ The purpose of the present study was to report an esthetically favorable and clinically predictable technique of treating NCCLs with concomitant severe gingival recession.

Case Report

A 43 year old female in good general medical condition complained of old resin restorations that had fallen out and increasing teeth sensitivity. She had a dental history of orthodontic treatment and extraction of all of her second premolars. The maxillary right first molar, first premolar, canine, central incisor, left central incisor, lateral incisor, and canine showed NCCLs, and multiple gingival recessions were present simultaneously. These teeth had been previously restored with resin composite on the cervical lesions, but most of those restorations had fallen out (Figure 1). For the diagnosis and treatment planning, full-mouth radiographs, a periodontal examination, and the fabrication of study casts were performed, and a full-mouth photograph was taken. The treatment procedures focused on the rehabilitation of the structural integrity of



Figure 1. Preoperative frontal view. Note the presence of a non-carious cervical lesion on the maxillary left central incisor, the lateral incisor, and the canines on both sides. Old resin restorations on right first premolar and central incisor showed ill-fitting margins and poor color matching.

the teeth, esthetic improvement through the correction of hard and soft tissue defects, and ultimately, the patient's satisfaction.

In this case, the cervical lesions were characterized by abrasion extending beyond the CEJ. The severity of gingival recession corresponded to Miller Class I, with no loss of interproximal periodontal attachment and bone level.¹⁰ In order to recover the original cervical configuration, maximum root coverage (MRC) was simulated on the study models.¹¹

Before starting the treatment, the patient underwent professional prophylaxis with oral hygiene instructions and was encouraged to avoid any further trauma of the gingival tissues and to ensure optimal plaque control. The restorative and surgical procedures were separately performed by two clinicians of the Departments of Conservative Dentistry and Periodontology. This case report was approved by the Institutional Review Board of Seoul St. Mary's Hospital, the Catholic University of Korea (KC 16ZISE0136).

Restorative procedures

The restorative procedures in the maxillary arch were carried out over the course of two separate visits. Under local anesthesia, a gingival cord was inserted to isolate the field of restoration. The MRC of each lesion was marked with an oil-based pen. The radicular part contained within the MRC was not prepared and the superficial dentin of the coronal part above the MRC was removed gently with diamond burs set at high speed under abundant cooling. Mild enameloplasty and cervical finishing line formation were also performed in order to minimize over-contouring of the restoration, which may lead to plaque entrapment, tissue inflammation, and tissue contraction during the early healing phase. After the cavity was prepared, adhesive procedures were performed (Figures 2 and 3). After selective enamel etching (Figures 2b and 3a), a two-step self-etch adhesive system (Clearfil SE Bond, Kuraray Medical Inc., Kurashiki, Japan) was used according to the manufacturer's instructions (Figure 3b). A micro-hybrid resin composite (Filtek Z-250, 3M ESPE, St. Paul, MN, USA) was used as the filling material. The composite was progressively layered with straight and curved composite applicators (Satin Steel XTS Composite Instrument TNCIGFT #3 and 4, Hu-Friedy, Chicago, IL, USA) and microbrushes were also used to increase the adaptation of these composite increments. The cervical line of the final restoration was located approximately 1 mm apical to the MRC because the original CEJ is usually located 1 - 2 mm apical to the gingival margin (Figures 2c and 3c).¹² This allows a smoother emergence profile and can prevent the exposure of the root surface, which may contribute to the persistence of hypersensitivity.⁹ All of the over-contoured

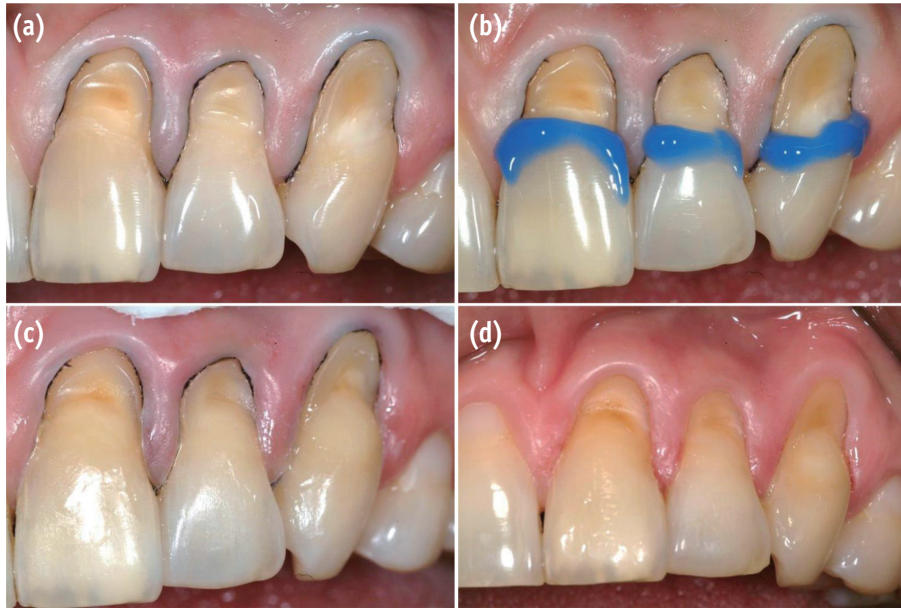


Figure 2. Restorative procedures on the maxillary left side. (a) Field isolation and cavity preparation; (b) Phosphoric acid-selective enamel etching; (c) Adhesive system application and incremental resin filling; (d) Photograph after finishing and polishing.

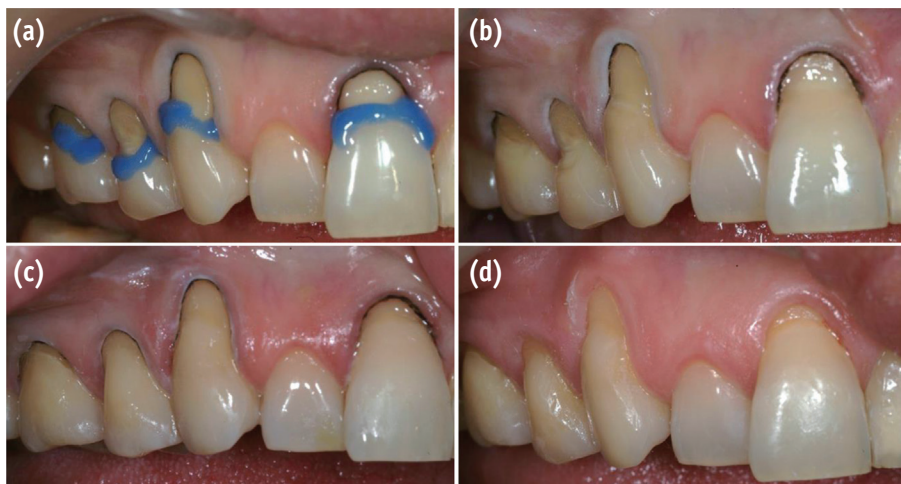


Figure 3. Restorative procedures on the maxillary right side. (a) Phosphoric acid-selective enamel etching after removal of the old restoration and cavity preparation; (b) Adhesive system application; (c) Incremental resin filling; (d) Photograph after finishing and polishing.

areas were removed using diamond fine and extra-fine burs to prevent plaque accumulation.¹³ For gingival reattachment on the restored surface, the surface of resin composite should be made of a stable, smooth, and convex substrate. Therefore, the finest finishing and polishing procedures must be completed before mucogingival therapy.¹⁴ The polishing procedures were implemented twice in order to ensure the smoothest possible surface: immediately and

after a week.

After the use of a fine silicon point (Venus Supra, Hanau, Germany), a series of Sof-lex Discs (3M ESPE) were used to improve the esthetic quality of the restoration and to achieve the highest level of smoothness possible (Figures 2d and 3d). Finally, Biscover LV (Bisco Inc., Schaumburg, IL, USA) was applied after the acid etching to seal the composite restorations.

Surgical procedures

The surgical procedure was carried out after the resin composite filling by a periodontist. The maxillary left side was treated using the envelope technique, employing a coronally advanced flap without any vertical releasing incisions. This surgical technique enables the simultaneous treatment of multiple adjacent recessions (Figures 4a and 4b).¹⁵ Beveled oblique incisions in the interproximal areas were outlined under local anesthesia and a split-thickness flap was raised to the base of the papillae, followed by a full-thickness elevation. The flap was then released above the mucogingival junction by a split-thickness elevation

again. Root surface preparation was also performed using hand and ultrasonic instrumentation. The residual interproximal papillae were carefully de-epithelized to provide a good recipient bed for flap attachment (Figure 4c). In order to allow tension-free stabilization of the flap, a double horizontal mattress suture was performed buccally across the entire flap extension with a sling suture (Figure 4d). In the maxillary right side, a modification of the coronally advanced flap was used. Since the right lateral incisor showed a normal gingival level, two independent coronally advanced flaps were performed separately on both sides of the right lateral incisor (Figure 5). Postoperative management included an anti-inflammatory

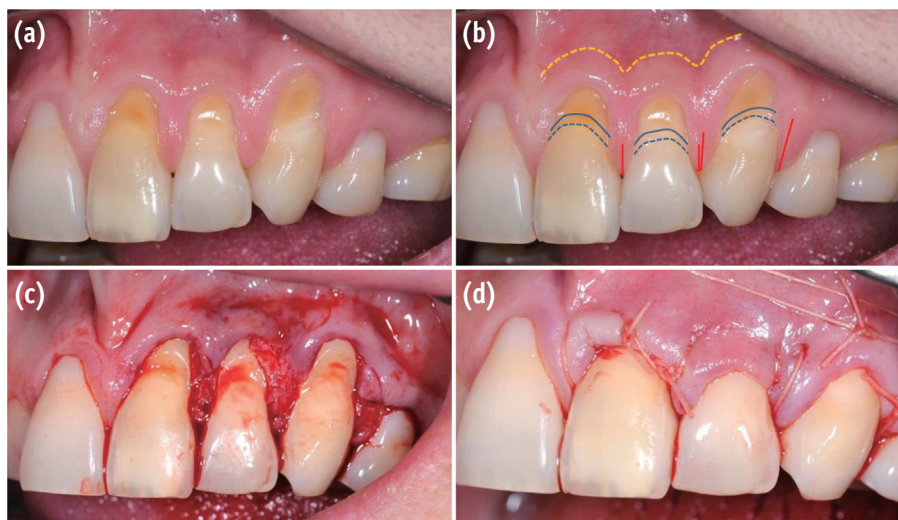


Figure 4. Surgical procedures on the maxillary left side. (a) Multiple adjacent NCCLs; (b) Schematic illustration of the surgery plan; (c) Flap reflection view; (d) Postoperative view after suturing. NCCL, non-carious cervical lesion.

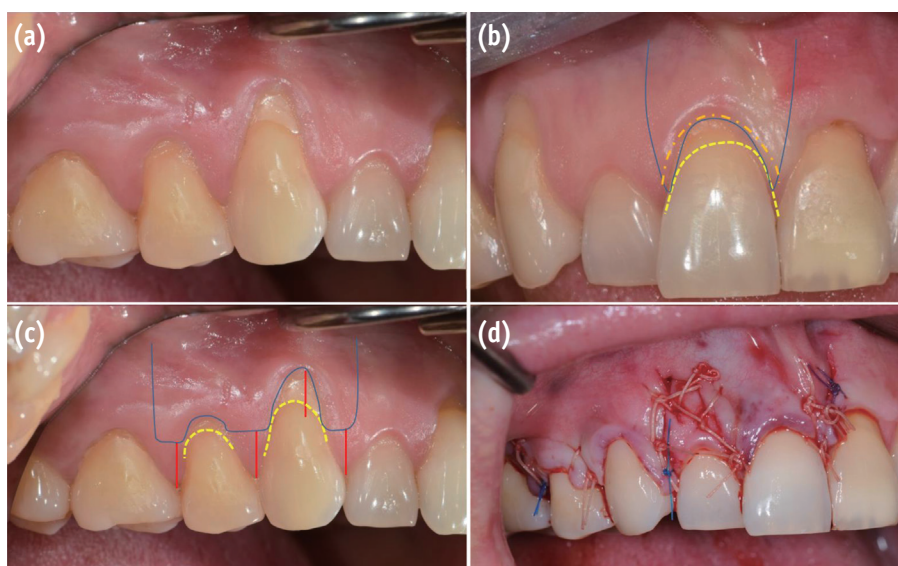


Figure 5. Surgical procedures on the maxillary right side. (a) Multiple adjacent NCCLs; (b and c) Schematic illustration of the surgery plan; (d) Postoperative view after suturing. NCCL, non-carious cervical lesion.

medication and 0.2% chlorhexidine mouthwash twice a day until the sutures were removed and brushing could be resumed. The sutures were removed approximately 10 days later. The patient was seen for follow-up four weeks, eight weeks, and six months later (Figures 6 and 7). Complete

coverage of the recession defects was achieved, and the patient complained of no hypersensitivity. At the six month follow-up, excellent esthetic results were observed, with the physiological integration of the restorative material and the new gingival architecture (Figure 8).

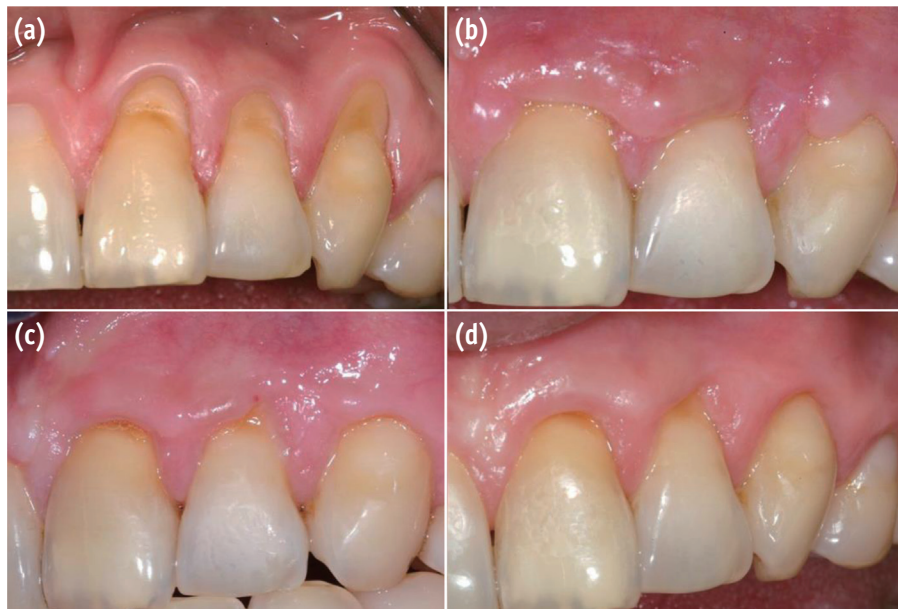


Figure 6. Postoperative view of the maxillary left side. (a) Preoperative view; (b) Four week follow-up; (c) Eight week follow-up; (d) Six month follow-up.

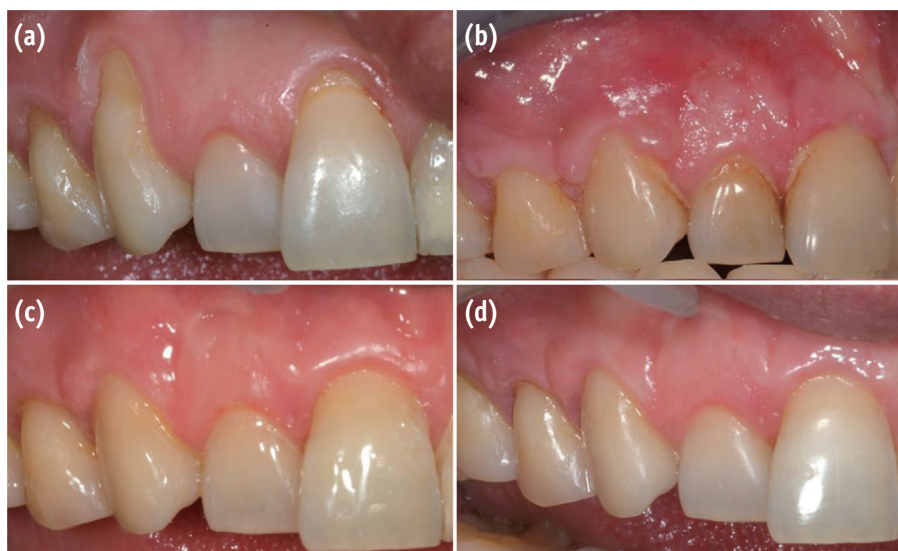


Figure 7. Postoperative view of the maxillary right side. (a) Preoperative view; (b) Four week follow-up; (c) Eight week follow-up; (d) Six month follow-up.



Figure 8. Frontal view. (a) Preoperative view; (b) Postoperative view.

Discussion

The treatment of NCCLs that include a radicular area, especially if accompanied by gingival recession, is challenging for clinicians. Parameters for predicting the possible amount of gingival recovery are needed before embarking on the treatment of gingival recession. Zucchelli *et al.* have proposed a prognostic method based on the calculation of the ideal height of the anatomic interdental papilla.^{16,17}

Gingival attachment on the restored surface can be questioned in a combined treatment strategy involving a restorative procedure on the coronal portion of the MRC followed by surgical coverage on the apical portion of the lesion. Some studies have shown that the presence of a restoration did not interfere with root coverage by flap surgery,⁹ and moreover, creeping attachment on the resin-restored surface was observed, which reflected gingival migration in the coronal direction.¹⁸ Favorable periodontal tissue responses can be observed, resulting from careful finishing and polishing of the restorations prior to flap closure and care taken with bacterial plaque control throughout the treatment procedure.^{19,20}

Although not many studies have evaluated long-term data pertaining to the combined approach described in this report, firm gingival re-attachment on the composite and the exposed root surface was observed in the present case. Although the gingival margin had not healed completely and mild gingivitis was observed in the early stage of recovery, three weeks after the surgical procedure, no abnormal periodontal pockets, redness, or bleeding on probing was observed, and the patient was satisfied with the treatment results.

The right and left surgical flap designs were different. On the right side, the flap had vertical incisions, while on the other side, only horizontal incisions were performed. Additional vertical incisions may impede blood supply to the flap and often result in scars or keloid tissue. Some clinical and esthetic advantages have been reported in cases of flap opening without any vertical incisions.^{15,21} In contrast, when vertical incisions are performed, the tissue tension may be decreased and relapse or recurrence of gingival recession is less likely to occur.²¹⁻²³ Therefore, a vertical releasing incision may be helpful in flap design for the purpose of preventing recurrence of the gingival recession and minimizing the exposure of the unrestored root surface, thereby eventually improving the esthetic appearance.

Conclusions

NCCLs combined with simultaneous gingival recession require particular consideration on both aspects of hard and soft tissue lesion. In the restorative aspect, careful finishing and polishing of the restorations prior to mucogingival surgery is a critical factor contributing to success. Regarding surgery, assessment of the configuration of the lesion and the choice of a surgical technique are important factors. The precise diagnosis and the choice of the proper treatment procedure should be made on the basis of both restorative and surgical considerations to ensure the successful treatment of NCCLs.

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Conflict of Interest: No potential conflict of interest relevant to this article was reported.

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