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Periodontal--Restorative Approach for Treating Non-Carious Cervical Lesions With Multiple Gingival Recessions: A Case Report

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Abstract.

Background: Non-carious cervical lesions (NCCLs) are commonly associated with multiple gingival recessions. These cases cause aesthetic issues, dentin hypersensitivity and increased plaque accumulation. Therefore, they require multidisciplinary treatments. Zucchelli proposed the combined periodontal–restorative approach using envelope coronally advanced flap (CAF) in managing multiple gingival recessions with NCCLs.

Objective: This case report highlights the effectiveness of Zucchelli's modified envelope CAF in combination with a restorative approach for the treatment of multiple Miller class-III gingival recessions with type-3 NCCLs.

Case Report: Zucchelli's approach was used to determine maximum root coverage (MRC). Restorative treatments in covering the NCCLs were limited to 1 mm apical to the calculated MRC. Modified envelope CAF was performed with full and partial thickness flap. After root exposure, root planning was done and restorative finishing was performed to acquire the ideal restorative finish line without marginal overhanging. Root surfaces were conditioned for 2 min. Adjacent interdental papillae were de-epithelialized, and the flap was repositioned and secured using sling sutures to establish a tight seal, allowing the clot between the root concavity and the flap to mature. Periodontal dressing was applied.

Results: After 12 days, healing was uneventful with good aesthetic and functional results. Complete root coverage according to MRC predictions was obtained, and periodontal health was normal.

Conclusion: Zucchelli's modified envelope CAF with restorative approach shows good outcomes in treating multiple gingival recessions with NCCLs, given the correct determination of MRC.

Keywords: gingival recession, periodontal plastic surgery, root coverage

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1. Introduction

Non-carious cervical lesions are tooth structural loss at the cementum-enamel junction that is not related to caries (NCCLs) [1,2,3]. These types of lesions harm the teeth' structural integrity, pulpal vitality, and aesthetics [4]. NCCLs may appear clinically as a variety of defects, ranging from small depressions to massive wedge or disc-shaped lesions [3]. They are caused by a combination of processes, including erosion (chemical or electrochemical dental tissue destruction), friction, attrition (endogenous mechanical wear), abrasion (exogenous mechanical wear), and occlusal stress [1,2,4,5]. The following dental brushing factors have been linked to the development of NCCLs: frequency of brushing, tooth brushing method, and bristle hardness [5].

Given the combined effects of these possible etiological variables, the presence of NCCLs may lead to dentin exposure and biofilm build-up in the cervical area. As a result, NCCLs have been linked to various problems such as cervical dentin hypersensitivity and gingival recession [2,6].

Gingival recession is defined as an apical migration of the gingival margin beyond the cementoenamel junction (CEJ), resulting in root surface exposure to the oral cavity [7]. Thin gingival tissue, mucogingival conditions, and/or positive history of progressive gingival recession and/or inflammatory periodontal disease(s) in teeth presenting with one or both of the first two variables are related with higher vulnerability to gingival recession [7,8,9].

According to the prognosis of root coverage, gingival recessions have been categorized into four classes. Since there is no loss of interproximal periodontal attachment in Class I and II gingival recessions, full root coverage can be accomplished [7,8,9]. However, a line separating the enamel from the coronal dentin (exposed owing to the abrasion defect) emerges in many cases of gingival recessions related to cervical abrasion and is commonly mistaken

with the anatomic CEJ. This issue causes subsequent errors, making the required root coverage unachievable [10,11]. Because the most coronal section of the exposed dentin belongs to the anatomic tooth crown and is thus not coverable with soft tissues, the patient's desires for total coverage of the exposed dentin are unrealistic.

In this scenario, restorative correction of the abrasion defect cannot resolve the patient's aesthetic problem caused by the tooth's excessive length [6,9,10,12,13]. Furthermore, due to the difficulties of isolating the restoration site from gingival tissue and the poor adherence of these substances to sclerotic dentin and root surfaces, restoration of the cervical region using a resin composite or glass ionomer has demonstrated a

significant failure rate. Mucogingival treatment, on the other hand, is not indicated by itself, particularly in the event of a profound abrasion defect combined with gingival recession [10]. In fact, root covering surgical techniques that relocate soft tissues coronally inside the abrasion zone may impair the patient's plaque control and make a composite restoration with a perfect marginal fit and an appropriate emergency profile practically unachievable [10]. Predetermination of root coverage promotes conservative restorative therapy, which in turn simplifies periodontal root coverage surgery.

Type III NCCL is the most complex type of the case, clinically presented as MRC located at the deepest point of the lesion [8,9,10]. In this case, Zucchelli proposed that the correct treatment is to reduce the depth of hard tissue defect, restore the teeth until the MRC level, provide the correct emergence profile, and then perform root coverage surgery.

This case report highlights the effectiveness of Zucchelli's modified envelope CAF in combination with a restorative approach for the treatment of multiple Miller class III gingival recessions with type 3 NCCLs.

2. Case Report

A 39-year-old male in a good general medical condition complained of teeth hypersensitivity in the upper and lower teeth, especially during consumption of cold food and beverages. The patient had a bad habit of traumatic toothbrushing, causing general gingival recessions in maxillary teeth. This habit must be resolved before treatment of gingival recession.

Intraoral examination showed multiple gingival recessions (Miller class III) in teeth 11, 12, 13, 14, 15, 16, 22, 23, and 24. Non-carious cervical lesions were clinically evident in 13,

14, 22, 23, and 24. These NCCL showed coronoapical involvement. Lower posterior teeth showed gingival recession due to horizontal bone loss. The patient presented a medium gingival phenotype.

Full-mouth radiographs (Figure 1), periodontal exams, and a full-mouth image were obtained for diagnosis and treatment planning. The patient provided informed consent. Treatment aims to restore aesthetic and physiology through the correction of hard and soft tissue defects, thus reducing hypersensitivity.

Maximum root coverage was calculated using Zucchelli's method[8], considering reduced papilla height and cementoenamel junction point angle. The diagnosis of NCCL

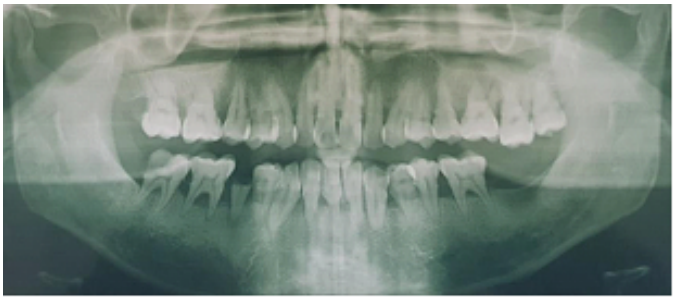

Figure 1: Full mouth radiograph. (Source: Author's own work).

was made by using a periodontal probe that allowed for the realization of the presence of the most

coronal step of the NCCL. The sharpness, depth, and flat outline of the coronal step of the NCCL distinguished it from the anatomic CEJ. The lesion showed type 3 NCCL, where the maximum root coverage (MRC) is located at the deepest point of NCCL [10]. In this case, a combined periodontal and restorative approach was needed. The treatment was done in two steps. The right maxillary region was done first, followed by the left maxillary region two weeks after. This case report particularly describes the gingival recession and NCCL management on 22, 23, and 24 (Figure 2). The prognosis depends on the determination of correct MRC, hence identifying the limit of flap advancement and dental restoration, and the stability of the gingival margin post-operatively (Figure 3).

Figure 2: Clinical photograph of the surgical site. (Source: Author's own work).

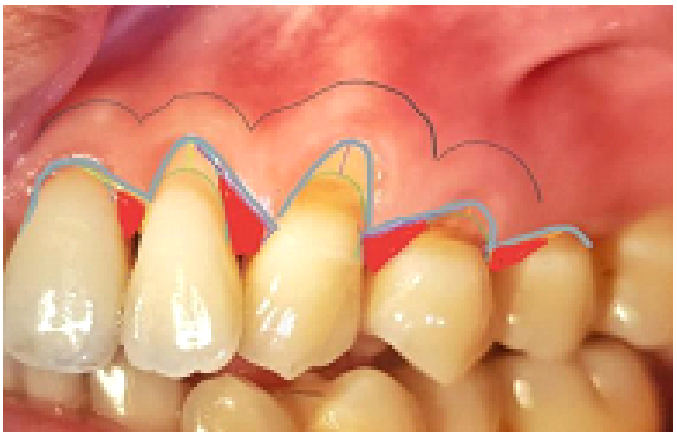

Figure 3: Treatment planning considering the calculations of maximum root coverage (MRC) and flap axis rotation according to Zucchelli et al. (Source: Author's own work).

2.1. Treatment planning

The patient underwent initial scaling and professional prophylaxis treatment. Oral hygiene instructions were given to correct toothbrushing method [11]. Apicocoronal technique using a

soft-bristle toothbrush is considered to be a nontraumatic toothbrushing method to avoid any further hard and soft tissue trauma while ensuring optimal plaque control.

2.1.1. Restoration procedures

Prior to beginning therapy, a restorative procedure was performed to 1 mm apical to the MRC. Superficial dentin of the coronal part above the MRC was removed gently with diamond burs using copious cooling. Mild odontoplasty was performed to reduce the depth and increase the height of the NCCL, to avoid the risk of over contouring the restoration. The cavity was etched and bonded, then restored using composites (Figure 4 and 5). Finishing was performed in two stages, after the restorative procedure and after flap elevation to obtain a smooth surface and an ideal finish line with no cervical overhanging. This provides a smoother emerging profile while preventing root surface exposure, avoiding the persistence of hypersensitivity and plaque buildup.

2.1.2. Surgical Procedures

The surgical area was disinfected extraoral and intraorally, then anesthetized using 2% lignocaine HCl containing 1:80,000 epinephrine. The coronally advances flap was performed using an envelope flap, approached from the lateral buccal aspect (Figure

Figure 4: Cavity etching, then bonding was performed. (Source: Author's own work).

Figure 5: Restorative composite was applied until 1 mm apical to the MRC. (Source: Author's own work).

6). This flap allows more vascularization in the surgical area. The flap was designed considering the extent and axis of rotation. The horizontal incision consists of a series of oblique paramarginal incisions in the interdental area using a no. 15 blade. Together with the intrasulcular incisions at the gingival margins mesial and distal to the recession, this incision creates the surgical papillae for the flap. The first oblique incision starts on the mesial and distal of 23, continued to 24 and

22. The submarginal oblique incisions are joined with intrasulcular incisions along the distal margin of the interincisal papilla without reaching the tip, extending through recession defects' mesial and distal gingival margin to finish designing the surgical papilla. The flap was irrigated with saline every two minutes to maintain the flap moisture. The flap is varied in thickness, with split-thickness in the surgical papilla, full-thickness in the gingival tissue apical to the recession defect, and split-thickness continuing apically.[9,10,11] Polishing of the restoration is continued, and exposed root surfaces with pre-surgical clinical attachment loss were thoroughly scaled with Gracey curettes. Root

surfaces were then conditioned for two minutes with 24% ethylene-diaminetetraacetic acid (EDTA) to eliminate smear layer and improving fibrin clot adhesion.

Figure 6: The surgical site was anesthetized, and the tissue was incised with a no.15 blade according to the previously planned flap. On the root surfaces, curettage was done. EDTA was applied for two minutes. The papillae were de-epithelized, releasing incisions were performed, the flap was coronally advanced until 1-2 mm above the MRC, then sling sutures were placed. The flap is securely fitted around the contour of the teeth, facilitating clot stability. (Source: Author's own work).

EDTA conditioning is rinsed with abundant saline. The coronal sections of the interdental papilla were epithelialized, serving as vascular beds for attachment of the coronally advanced flap's surgical papilla. Releasing incisions were made so that the coronally positioned flap is free of tension. Flap mobility is considered sufficient when the flap margin is positioned passively 1 mm coronal to the CEJ of involved teeth and the surgical papilla rest on their respective anatomical papilla. Flap stabilization was obtained using sling sutures around the palatal cingula, starting from 24, 22, then ends in the center part of the flap, 23. Clot leakage between the flap keratinized tissue margin and the anatomical crowns should be absent. This permits clot stabilization, which will transform into mature connective tissue. Double

horizontal mattress sutures were performed at the mucobuccal fold, creating a force breaker effect, consequently reducing muscle tension. Periodontal dressing was applied.

Postoperative pain was controlled with 500 mg of mefenamic acid, and 300 mg of clindamycin was given for three days. The patient was advised not to brush in the treated region, to rinse with a 0.2 percent chlorhexidine solution for one minute three times a day, and to consume a soft diet. After 7 days, the sutures were removed (Figure 7).

Figure 7: The surgical site before, after surgical procedure, and after a control period of 12 days. (Source: Author's own work).

After twelve days, healing was uneventful with good aesthetic and functional results. Hypersensitivity disappeared and there was no inflammation in gingival tissue or failures in restorations noted. Complete root coverage was obtained according to MRC predictions, and periodontal health was normal. The patient was satisfied with the outcome. However, the patient still requires an additional monitoring period to observe a stable marginal gingiva position. According to several reports, six to twelve months are sufficient to prove stable clinical gingiva margin position and keratinized tissue increase [14,15].

3. Discussion

Treating coronoradicular NCCLs accompanied by gingival recession is challenging for clinicians. Parameters for predicting the possible amount of gingival recovery are needed before starting the treatment of gingival recession. Zucchelli et al.[8] proposed a prognostic method based on the ideal height of the anatomic interdental papilla and CEJ. However, in this case, the gingival recession showed Class III Miller recession, which means there is a loss of interdental papillae height. The de-epithelized interdental papillae serve as the most coronal vascular beds to which the soft tissues surrounding the root exposure are sutured during mucogingival surgery. A reduction in papilla height reduces the potential advancement of the coronal flap as well as the capillary exchanges between the root covering soft tissues and the interdental connective tissue. Furthermore, the NCCL made it difficult to determine the anatomic CEJ in the treated teeth [10,11,16,17,18].

Because determining the anatomic CEJ is difficult, a technique to predict the line of maximum root coverage (MRC) should be developed. The height of the anatomic papilla is visibly lower than that of the ideal papilla in a tooth with the traumatic loss of interdental papilla, and the difference is equivalent to the distance between the tip of the papilla and the contact point. After calculating the ideal papilla, the dimension is provided apically, beginning at the tip of

both the mesial and distal anatomic papillae. These measurements' projections on the recession margin allow the identification of two points joined by a scalloped line, the contour of which changes depending on the patient's biotypes and the form of the anatomic CEJ of other neighbouring teeth. This line denotes the root coverage line. The composite is then used to reconstruct the lesion up to this point [8,9,11].

Zucchelli and De Sanctis [9] introduced the coronally advanced flap for several recessions, which includes an envelope flap (no vertical releasing incisions); taking into

account the rotating movement of the surgical papillae during the coronal advancement of the flap. During flap elevation, a split (at the level of the surgical papillae) – full (at the soft tissue apical to the root exposure) – split (apical to bone exposure) thickness flap is performed. A double incision (one to dissect muscle insertions from the periosteum and the other to cut muscle from the inner connective tissue lining the mucosa of the flap) is made to allow coronal flap advancement; then the anatomic papillae are de-epithelized, and several sling sutures are used as an anchorage to the palatal cingulum of the treated teeth.

Many previous cases showed successful results using this approach [10,11,13,15,20]. The recession defects were fully covered, excellent tooth emergence profile was achieved, absence of BOP and reduction of local plaque scores were obtained, dentin hypersensitivity was reduced, and pocket depth, clinical attachment levels were improved. This method also showed stable outcomes after a control period of six to twenty-four months [10,11,22,13,15,16,17,18,19,20,21].

However, this procedure has some disadvantages. It needs some degree of tooth preparation, involving crown bevel and odontoplasty to correct dental emergence profile, sacrificing healthy dental structure [13]. Furthermore, it is suggested that a connective tissue graft be placed under

the flap to augment keratinized tissue thickness, hence increasing long-term gingival margin stability, particularly in thin gingival phenotypes [15].

4. Conclusion

Zucchelli's modified envelope CAF with a restorative approach shows promising potential in treating multiple gingival recessions with NCCLs. However, the patient still requires an additional monitoring period to observe a stable marginal gingiva position.

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