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Zucchelli's coronally advanced flap technique for the management of multiple adjacent gingival recessions with long term follow-up

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Abstract

Aim: To treat multiple adjacent gingival recession using Zucchelli's technique of coronally advanced flap with long term follow up.

Background: Gingival recession is the exposure of root surfaces due to apical migration of the gingival tissue margins. It can lead to a variety of functional and Esthetic problems such as unacceptable esthetics, hyper sensitivity, root caries, and difficult plaque control. Selection of appropriate surgical procedure allows the clinician to gain optimal structural correction of the soft tissue deficiency with good soft tissue architecture and esthetics. Zucchelli and De Sanctis have described a modified coronally advanced flap design for the treatment of multiple gingival recessions, which allows for optimal flap adaptation and satisfactory root coverage.

Case Description: A 35-year-old healthy male had complained of sensitivity and unaesthetic appearance in the maxillary front region. Clinically multiple adjacent gingival recessions were present with respect to 11, 12,

21 and 22 with non-carious cervical lesions (NCCL) on the facial aspect and 22.

Zucchelli's technique of coronally advanced flap technique was used for the treatment of multiple gingival recessions and patient was followed for 7 years. NCCLs was restored with GIC before surgery for better retention rates, gingival margin adaptation, and enchanced Esthetic results.

Conclusion: Zucchelli's technique is a preferred treatment modality for the management of multiple adjacent recession defects. In the present case, not only complete root coverage was obtained but results were maintained for long-term using proper supportive periodontal care with excellent tissue contour and color match.

Clinical Significance: This case report shows that the root coverage treatment in multiple adjacent gingival recession using Zucchelli's technique of coronally advanced flap technique showed 100% root coverage after 1 month. Stable results were maintained even after 3 years and 7 years.

Keywords: Multiple adjacent gingival recessions, Zucchelli's technique of Coronally advanced flap, Root coverage, Aesthetics, non-carious cervical lesions (NCCL), Glass ionomer cement (GIC)

Introduction

Gingival recession is defined as the location of the marginal tissue apical to the cement-enamel junction (CEJ) with exposure of the root surface [1].

Gingival recession can be caused by various etiological factors such as inflammatory periodontal disease, plaque -induced inflammation, calculus and restorative iatrogenic factors, improper oral hygiene practices, tooth mal positions or root prominence leading to the thinning of bony plate, high frenum attachment, improper Periodontal treatment procedures, underlying alveolar dehiscence, thin gingival biotype and uncontrolled orthodontics movement [2].

Root coverage procedures have been in practice to cover the denuded root surfaces to benefit poor Esthetic appearance, to relieve teeth hypersensitivity and to prevent plaque accumulation [3].

Over the years different surgical techniques are proposed for treatment of mucogingival defects of the exposed root surface in the aesthetic zone of dentition.

Coronally advanced flap is the first-choice surgical technique used when there is adequate keratinized tissue apical to the recession defect of single tooth as well as multiple teeth. Optimum root coverage results, good color blending of the treated area with respect to adjacent soft tissues, and recuperation of the original morphology of the soft tissues margin can be predictably accomplished using this surgical approach [4].

But some local anatomic conditions may render the coronally advanced flap such as, the absence of keratinized tissue apical to recession defect, the presence of gingival cleft, the marginal insertion of frenuli, or the presence of very shallow vestibule [4].

In 2000, Zucchelli and de Sanctis modified coronally advanced flap procedure to treat multiple recession defects. Zucchelli's coronally advanced flap does not consist of vertical releasing incisions.

Another feature of Zucchelli's technique is the sub marginal oblique incisions in the interdental area connecting the Cemento enamel junction of one tooth to the marginal gingiva of the adjacent tooth (Fig: 1). The flap was raised with a split-full-split approach in the coronal-apical direction [5].

Fig 1: Schematic representation of zucchelli's technique

The exposure of the root surface by gingival recession is frequently associated non-carious cervical lesions (NCCLs), which causes dentine hypersensitivity, root caries, compromised plaque control, and unaesthetic appearance [6]. NCCL are characterized by a loss of hard dental tissue located at the cementum-enamel junction. They vary from shallow grooves to broad dished-out lesions to large wedge-shaped defects.

They are caused by a combination of processes, including erosion (chemical or electro chemical dental tissue destruction), friction, attrition (endogenous mechanical wear), abrasion (exogenous mechanical wear such as frequency of brushing, tooth brushing method, and bristle hardness), and occlusal stress [7].

The presence of NCCLs poses challenges in the treatment of gingival recession as they increase the complexity of treatment planning for root coverage and they may reduce the intimate contact and stability of the flap/graft against the concave root surface and create difficulty in positioning the gingival margin of the flap over the Cemento-enamel junction [8'9].

Therefore, NCCLs may affect the predictability of the results and lead to greater likelihood of recurrence of the recession. Further, the restoration of NCCLs before surgery can lead to a better gingival margin adaptation, increasing the Esthetic results.

In this case report, Zucchelli's coronally advanced flap with envelope technique is used in the management of multiple recession defects affecting adjacent teeth with non-carious cervical lesion in aesthetic region.

Case description

A 35-year male reported with chief complaint of sensitivity and unaesthetic appearance in the maxillary anterior region.

During clinical examination it was observed that, presence of multiple and adjacent Miller's class II gingival recessions, affecting teeth 11, 21 and class I gingival recession affecting 12 and 22 (Fig: 2). The cervical abrasion depth of 1mm (Zucchelli et al NCCL type 3) was present on 21 [10].

Medical history and periodontal parameters that is probing depth, recession depth, clinical attachment level (CAL), the height of keratinized gingiva, were recorded. The depth (from the CEJ to gingival margin) of the gingival recession was 4 mm on teeth 11, 21 and 3mm on 22 (Fig: 3, 4). Radio graphs were obtained for diagnosis and treatment planning. Procedure was explaining ned to the patient, and the written informed con sent was obtained.

Firstly, patient had undergone scaling and root planning and oral hygiene instructions were also given to patient. After a week, the cervical abrasion on 21 was restored with glass ionomer cement (GIC) (Fig: 3). After the resto rative procedure, the surgical procedure for cover age of the exposed roots was performed.

Local anesthesia (lignocaine HCL with 2% epinephrine 1:200,000) was administered to the patient. After successful local anesthesia, the oblique submarginal incisions interdentally were given and the incisions were continued as intrasulcular incisions at the recession defects.

The oblique submarginal incisions aid in the formation of new interdental papillae (Fig: 5). A 15-no. blade was used to dissect the flap in a split–full-split manner. The

flap was raised from the coronal to the apical direction. Gingival tissue apical to the root exposures was raised in a full-thickness manner to provide that portion of the flap critical for root coverage with more thickness. Then the most apical portion of the flap was elevated in a split-thickness manner to facilitate the coronal displacement of the flap. Root planing was done mechanically using curettes.

De-epithelization of the remaining interdental papillae was done to provide a surgical bed for the coronally advanced flap (Fig: 6).

The flap was then advanced coronally over the exposed root surfaces. The newly prepared interdental papillae were rotated on the de-epithelized surgical bed. The flap was secured with sling sutures (Fig: 7).

Fig 2: Preoperative showing multiple adjacent recession on 11,12,21,21

Fig 3: 4mm gingival recession depth with respect to 11 and the cervical abrasion on 21 restored with GIC.

Fig 4: 3mm gingival recession depth with respect to 22

Fig 5: Oblique submarginal incisions

Fig 6: De-epithelization of the interdental papillae

Fig 7: Suturing with coronal advancement of flap

Fig 8: 1 week follow up post operatively

Fig 9: 1 month follow up showing good healing

Fig10: 3 years follow up with results maintained.

Fig 11: 7 years follow up with results maintained

Postoperative instruction:

Patient was instructed not to brush his teeth in the treated area but to rinse his mouth with chlorhexidine solution (0.2%) twice daily for 1 minute starting 24 hours post-operatively. Patient was advised to take Tablet Duricef *(*Cefadroxil*)* (500 mg BD), Tablet Flexon (Paracetamol (325 mg) + Ibuprofen (400 mg)) (BD) for 3 days postoperatively. Fourteen days after the surgical treatment, the sutures were removed. Plaque control in the surgically treated area was maintained by chlorhexidine rinse for another 2 weeks.

Healing was satisfactory and adequate root coverage was obtained at 1week and 1 month follow up (Fig: 8, 9). A session of professional oral hygiene procedures, with oral hygiene instructions, was performed at 1, 3 and 6 months. After the recall at 6 months, professional oral hygiene procedures were performed 2–3 times a year. Complete root coverage was seen with respect to all the treated teeth even after 3 years and 7 years with excellent tissue contour, color match (Fig:10,11).

Discussion

Complete root coverage is the most desirable outcome for the patients having high Esthetic demands.

Zucchelli and De Sanctis (2000) introduced the coronally advanced flap for multiple adjacent teeth recessions, which includes an envelope flap (no vertical releasing incisions); with rotating the movement of the surgical papillae during the coronal advancement of the flap[5].Using the same technique Zucchelli did a comparative controlled randomized clinical trial in 2009 for the treatment of multiple gingival recessions with coronally advanced flap with and without vertical releasing incisions. After 1-year significant decrease in RD (Recession depth) was observed in both groups (from 2.55 – 0.92 mm to 0.22 – 0.42 mm at control sites and from 2.59 – 1.03 mm to 0.10 – 0.04 mm at test sites). This change in RD corresponded to root coverage was of 92.64% – 14.25% and 97.27% – 8.08% in the control and test groups, respectively. Conversely, the envelope coronally advanced flap showed increased

probability of complete root coverage, a greater increase in buccal keratinized tissue. Keloid formation along the vertical releasing incisions which can compromise the Esthetic outcome in CAF can also be avoided using envelop flap [11]. Thus, in the present case Zucchelli technique without the vertical incision was chosen, because of fewer postoperative complications and superior Esthetic outcome.

Several authors have reported root coverage using above said technique but most of the case reports have reported short term follow up. After achieving complete root coverage, maintenance of results for long term is another challenge and depends on many factors like presence of certain unfavourable anatomical conditions, patient's oral hygiene, patients' motivation and compliance have an impact on the long-term stability of the root coverage. Harinder Gupta et al presented a case report with multiple Class I Miller's gingival recession treated successfully with Zucchelli's modification of con ventional coronally advanced flap with 6 month follow up where the results were stable and no sensitivity was reported on recall after 1 month and 6 months[12].Isha Agrawal et al presented a case report using Zucchelli's technique of coronally advanced flap with PRF membrane for the treatment of multiple gingival recessions and after 3 months showed complete root coverage in maxillary right first and second premolars, no scar formation at operative site and the excellent the color matching[13]. Saragade et al in their case report concluded that the root coverage observed was almost 100% in after 1 month and the results were stable even after 6 months using Zucchelli's coronally advanced flap [14].

Harsha Mysore Babu et al presented a case report on bilateral multiple gingival recessions treated with Zucchelli's modified coronally advanced flap with or without the use of Platelet Rich Fibrin, result showed that at 9 month follow up, the mean root coverage achieved with Zucchelli's modified coronally advanced flap alone was 55±13.9 % and Zucchelli's modified coronally advanced flap with PRF was 75 ± 20.40, showing no statistical significance between the procedures [15].Quaid Johar Shakir et al presented a case series using this technique where adequate root coverage with stable results for over 12 months were achieved. No scar formation was observed and the color match of the tissue was excellent [16]. In this case report we are reporting long term follow up and results were stable for 7 years. This can be attributed to the factors such as maintenance protocol where patient hygiene practices are checked and re-instructed at each appointment for preventing the resumption of traumatic toothbrushing and the recurrence of gingival recessions. Further, Chanchal Bharwani et al compared the clinical effective ness of Zucchelli's technique with that of the tunnel technique with subepithelial connective tissue graft (SECTG) placement for the treatment of multiple gingival recessions affecting adjacent teeth in the Esthetic areas where the result showed statistically significant root coverage for both groups, 82.50% ± 23. 72% and 71.40% ± 20.93% of defects in the test (Zucchelli's technique) and control groups(tunnel technique with SECTG), respectively[17].

NCCLs associated with gingival recession are the most challenging, and the treatment of these lesions requires more delicate care. Where the restorative procedure should be performed first before the surgical gingival recovery. For long-term clinical success the choice of restorative material plays an important role. There are many restorative materials can be used out of those GI or resin-modified GI are highly recommended for NCCLs due to the high retention rates, appropriate Esthetic

properties, the capacity to release fluoride over a long period of time and their favourable biocompatibility for gingival reattachment [18].

Erhan Dur sun et al compared Nano filled and conventional resin-modified glass ionomer fillings combined with connective tissue grafts for treatment of gingival recessions with non-carious cervical lesions, where the percentage of root coverage at 12 months was 89.5%, 90.1%, and 96.2% in the resin-modified glass ionomer (RMGIC), nano ionomer cements (NIC), and control groups (without NCCL), respectively. Successful root coverage with connective tissue grafts was achieved on teeth restored with RMGIC or NIC cervical filling [19].

Santamaria et al reported a case series where he treated one patient with coronally positioned flap and a resin-modified glass ionomer restoration, and two patients with treated with a coronally positioned flap, resin-modified glass ionomer restoration, and connective tissue graft. After the healing period, all patients showed CAL gain and reduction in relative gingival recession and the patients were satisfied with the final esthetics and had no more dentin hypersensitivity [20].

Thus, present case report emphasized that the Zucchelli's modification of the coronally advanced flap is an effective root coverage treatment modality for the management of multiple recession defects in aesthetic regions of the mouth.

Conclusions

Zucchelli's technique is a preferred treatment modality for the management of multiple adjacent recession defects. In the present case, not only complete root coverage was obtained but results were maintained for long-term using proper supportive periodontal care with excellent tissue contour and color match.

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