Single Miller Class III recession treatment in the anterior maxilla

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Summary

Introduction: Miller's Class III gingival recession represents a challenging condition with a low predictability in order to obtain successful outcomes. The purpose of this case report is to document the management of an isolated Class III gingival recession (Rec) with Coronally Advanced Flap in combination with Subepithelial Connective Tissue Graft.

Presentation of the case: A 45 years-old female with a 2 mm Rec associated with interproximal attachment loss at the upper left canine requested a dental cosmetic treatment for this area. A bilaminar technique was performed in order to solve the aesthetic impairment. Results at short (1 year) and long term (10 years) are reported.

Discussion: At 1-year follow up a complete root coverage with no interproximal attachment loss was observed, with an increased amount of keratinized tissue width and thickness. Optimal aesthetic outcome was accomplished with complete patient satisfaction. However, at 10-year follow-up 1mm Rec on mesio-buccal and buccal sites associated to a non-carious cervical lesion (NCCL) were noticed, associated with a bruxism pattern in combination with a relapse of traumatic brushing technique and vigorous use of interdental brushes. At this time, reinstruction to the appropriate domiciliary oral hygiene procedures and a composite restoration were performed in order to solve the clinical condition.

Conclusion: At 1-year follow-up Rec associated to attachment loss and NCCL can be successfully managed by means of bilaminar technique and conservative restorations. However, a careful assessment of prognostic factors must be considered in order to achieve successful treatment outcomes in the long-term.

Key words: gingival recession, gingiva, connective tissue graft, coronally advanced flap, esthetics.

Introduction

Treatment modalities and long-term stability of outcomes following root coverage periodontal plastic surgery (RCPPS) procedures in single maxillary gingival recession (Rec) associated with interdental attachment loss (Miller Class III) is still a matter of debate. The treatment of Rec is aimed at attaining gingival health, complete root coverage (CRC) and aesthetic integration (Zuhr & Hurzeler, 2012). Nevertheless, RCPPS are complex, technique-sensitive interventions that require advanced skills and expertise (Tonetti and Jepsen, 2014).

According to Miller, in Class III Rec, a CRC is not achievable (Miller 1985). Criticisms to the Miller's classification for its lack of diagnostic/prognostic accuracy have led to the development of alternative methods in order to adequately diagnose Rec and improve the prediction of treatment outcomes (Pini Prato 2011). Cairo and co-workers attempted to overcome Miller classification's limitations considering other factors such as clinical attachment level (Cairo et al. 2011). A more comprehensive classification was also published by Rotundo et al. (2011), which considered not only periodontal but also dental factors [i.e. presence/absence of: i)Keratinised tissue (KT) ≥2 mm; ii)Non-carious cervical lesions (NCCL); iii) Interproximal bone loss]. Lastly, the most recent classification for Rec held in 2017 during the world workshop on classification of periodontal diseases, incorporates two classification systems (for the gingival and tooth sites separately) (Jepsen et al. 2018, Cortellini & Bissada 2018).

In terms of treatment efficacy, as per treatment options, the results of the latest Cochrane systematic review on RCPPS on Class I and Class II Miller Rec, with up to 12 months follow-up, suggest a greater reduction in Rec with subepithelial connective tissue grafts (SCTG) + coronally advanced flap (CAF) compared to alternative procedures such as CAF with guided tissue regeneration with resorbable membranes/acellular dermal matrix grafts or enamel matrix protein (Chambrone et al 2018).

The purpose of this case report is to document the management of an isolated Class III Rec (RT2 or ABB) with CAF in combination with SCTG.

Presentation of the case

The patient's problem

A 45 years-old female was referred for consultation regarding aesthetic impairment of the smile due to "long-tooth" appearance of the upper left canine. She had sought previous opinion regarding treatment options for this tooth, nevertheless, the only modality of treatment offered was a composite restoration to cover the Rec. The patient declined this approach, as it would not address her concerns in terms of improving the "long tooth" appearance, which in fact might be worsened.

Diagnosis

The patient was a light smoker (5 cigarettes per day) with an otherwise unremarkable medical history. Considering the area affected by the reported aesthetic problem, a 2 mm Rec associated with interproximal attachment loss was noticed at the upper left canine (23) (Fig. 1). In addition, tooth surface loss was present at the root level of the mentioned tooth and at the enamel level of the adjacent teeth (22 and 24). No previous orthodontic treatment had been provided. Based on the most recent classification for mucogingival deformities and conditions (Jepsen et al. 2018, Cortellini & Bissada 2018), the following classification applies:

Gingival site				**Tooth site**	
RT3	2	-	3	A	+

Adopting a different classification system (Rotundo et al. 2011), where the periodontal and tooth condition are assessed at the same time, the considered defect is classified as ABB (A= KT>2mm; B= presence of NCCL; B= presence of interproximal attachment loss)

Local clinical parameters are reported in the following table:

	MB	B	DB	MP	P	DP
PD	3	1	2	2	2	2
BoP	+	-	-	-	-	-
PI	-	-	-	-	-	-
Rec	1	2	0	0	0	0
KT	-	3	-	-	-	-
Mob	0					
NCCL	+					

PD= Pocket Depth; BoP= Bleeding on Probing; PI= Plaque Index; Rec= Gingival recession depth; KT=keratinized tissue width on mid-buccal site; Mob=Mobility; NCCL=Non-carious cervical lesion

Aim of the treatment.

The aim was to address the patient's wishes and improve the aesthetic of the smile. Accomplishing CRC and harmony of soft tissues was desirable.

Modifying factors

Before proceeding with surgical intervention, modifying factors were reviewed and controlled. The initial phase of therapy consisted of supra and sub-marginal debridement of the dentition and oral hygiene instructions, stressing the importance of an atraumatic toothbrushing technique (roll technique) using a soft-bristles toothbrush. Interproximal brushing with

interdental brushes was discouraged in order to avoid papilla tip collapse, instead, interproximal flossing was recommended. Moreover, composite restorations were provided for the 22 and 24 teeth in order to improve aesthetics and plaque control. The patient was informed that at least 3 months were necessary in order to assess gingival health and evaluate her ability to maintain low plaque levels with atraumatic brushing technique.

Treatment plan & Description of the Technique.

Based on the characteristics of the defect, a bilaminar technique was the preferred approach to treat such condition. Local anaesthesia using Articaine hydrochloride 4% with adrenaline 1:100.000 was provided prior to thorough root surface debridement with Gracey curettes. Afterwards, using a 15c blade, a trapezoidal flap was designed and a full thickness flap elevated till the mucogingival line. At this stage, the root debridement was finalized carefully to avoid damaging the supracrestal connective fibres with the debridement. No chemical root conditioning was performed, according to the current scientific evidence (Roccuzzo et al. 2002). Both mesial and distal papillae were de-epithelialized using microscissors. A periosteal incision and detachment of the muscle fibres released the tension of the flap, which was then fully mobilised (partial thickness flap). It should be noted that the blade was positioned superficially in order to release only the flap without containing any muscle insertion. The recipient bed was therefore prepared and ready to host the SCTG. After local anaesthesia was provided in the palatal donor area, a L-shape technique was designed to harvest the SCTG. A first horizontal 10 mm linear incision was placed 2-3 mm from the gingival margin in the first premolar and first molar area. Subsequently, a 5 mm vertical incision was placed perpendicularly and mesially to the first incision. A third incision parallel to first horizontal incision achieved an elevated partial thickness flap of approximately 1 mm thick, exposing the connective tissue underneath. The following incision, parallel to the previous one but 1 to 2 mm deeper, was performed to lift the graft. Lastly, apical and mesial incisions perpendicular to the bone were performed to detach the SCTG. The graft was then trimmed and adapted to the recipient site, aligning it more to the mesial to make it coincide with the area of most interproximal attachment loss (Fig. 2). The purpose was to thicken/reinforce the flap in this particularly weak area. The graft was also placed 2 mm apical to the cemento-enamel junction due to a 3 mm band of KT were available in the buccal flap. The graft was secured using 6-0 Vicryl sutures: the first was a periosteal crossed compressive suture, followed by mesial and distal single-interrupted sutures, anchored to the adjacent attached gingiva. Subsequently, the flap was coronally advanced and sutured using a sling suture (Fig. 3). The vertical releasing incisions were closed with additional single-interrupted sutures. Lastly, the palatal donor area was sutured by means of single-interrupted sutures.

Post-op care

These sutures were removed at 14 days. During this period, the patient was instructed to refrain from mechanical plaque control in the surgical area and was recommended to use a 0.12% chlorhexidine mouthrinse twice a day. Analgesic therapy (i.e. ibuprofen) was advised for the day of surgery. No antibiotic therapy was prescribed.

Results

At 1-year follow up the site showed a CRC on the buccal site, with less than half millimetre of residual recession on the mesial site(Fig. 4). An increased amount of KT width and thickness was noticeable upon examination. Further, optimal aesthetic outcome was accomplished, with even gingival margins, colour blending, no visible scars and complete patient satisfaction.
Local clinical parameters are reported in the following table:

	MB	B	DB	MP	P	DP
PD	2	1	2	2	2	2
BoP	-	-	-	-	-	-
PI	-	-	-	-	-	-
Rec	0.5	0	0	0	0	0
KT	-	4	-	-	-	-
Mob	0					
NCCL	-					

At the 10-year follow-up visit, a 1mm Rec on mesio-buccal and buccal sites associated to a NCCL were noticed (Fig. 5). In addition, it was recorded a bruxism pattern (as reported by the patient) in combination with a relapse of traumatic brushing technique and vigorous use of interdental brushes. After a comprehensive discussion, the patient opted for a composite restoration as the preferred modality of treatment (Fig. 6a-b). Therefore, the patient was again reinstructed to the appropriate domiciliary oral hygiene procedures and it was suggested to use a night-guard in order to control the nocturne grinding activity.

Discussion

This case report illustrates that CRC and pleasant aesthetic outcomes can be attained with a bilaminar technique for RT3/ABB single Rec defects. Nevertheless, some deterioration is expected in the long term. These results are in agreement with current literature. Pini Prato et al. (2018a) have recently published long-term retrospective data (20 years) on 24 Class III Miller Rec treated with CAF alone reporting a Mean Recession Coverage (MRC) and CRC decrease from 64% to 29% (MRC) and from 12% to 0% (CRC) between the 1-year and 20-years follow-up exams. In a regression model evaluating treatment outcomes related to CRC at different time-points, age, KT <2mm, and presence of interdental tissue loss were associated with recurrence of the Rec. In a similar long-term retrospective study (20 years), on a comparable study group (24 Class III Miller Rec), treated by means of

CAF+SCTG, MRC decreased from 66.5% to 58% (MRC), while CRC was maintained stable at 20% between the 1-year and 20-years follow-up exams. In this study, logistic regression analyses identified the KT <2mm, the presence of root steps, and smoking habit as determinant factors for recurrence of the Rec (Pini Prato et al. 2018b).

In addition to the modality of surgical treatment provided for the management of Rec, patient factors may impact in the long-term stability of outcomes following RCPPS such as poor oral hygiene, toothbrushing trauma, smoking and systemic disease that impair wound healing (Caffesse 1987, Trombelli and Scabbia 1997; Zuchelli et al. 1998; Rajapakse 2007).

Other local factors such as the amount of KT and thickness of the gingiva play a role in the long-term stability of the Rec. Thin phenotype has been associated with a higher risk of developing Rec and chances of further deterioration within time (Agudio et al. 2016; Jepsen 2018). At single Rec, classical CAF procedures are usually performed to treat defects of less than 3 mm if there is at least 2 mm of KT apical to the lesion (Allen & Miller, 1985; Zuhr & Hurzeler, 2012). The addition of autologous CTG under CAF improves CRC and may be preferred at maxillary anterior and premolar teeth (Tonetti & Jepsen, 2014). Nevertheless, the assessment of other factors such as the level of interdental tissue support and presence of NCCL are of greatest significance for the outcome of CRC procedures (Pini-Prato, 2010; Zucchelli et al. 2011; Cairo et al. 2012; Santamaria et al. 2010).

Another aspect that should be taken into consideration is the time of assessment. It has been reported that soft tissue healing following surgical root coverage with CTG was mainly accomplished after 6 months, with around two-thirds of the augmented volume being maintained after 12 months (Rebele et al. 2014). On the other hand, different observations reported a "post-operative migration of the gingival margin tissue in a coronal direction over portions of a previously denuded root" (Matter 1980). The so-called "creeping attachment" takes place mainly between 1 month and 1 year after surgery, even other studies (Agudio et al. 2008, 2009) reported a continuous coronal shift of the gingival margin (mean creeping 0.6 mm) during a longer (10 to 25 years) follow-up period. All these available data seem to indicate 12 months as the most appropriate time point at which is suitable to assess the clinical outcome of a bilaminar technique. As a consequence, other factors after this period of time, such as toothbrushing quality/modification, diet, occlusal stability, etc., could be able to influence the long-term gingival margin stability and the related achieved root coverage.

Thus, in order to achieve successful treatment outcomes in the long-term, the selection of a modality of treatment versus another needs careful assessment of prognostic factors and, must consider patient aesthetical concerns, expectations and preferences.

Conclusion

As demonstrated in this case report, Rec associated to attachment loss and NCCL can be successfully managed. The increased Rec defect observed at the 10-years follow up visit could be explained in relation to the factors herein discussed.

Clinical relevance

Coronally Advanced Flap with Subepithelial Connective Tissue Graft represents the most indicated surgical technique for gingival recession associated with interdental attachment loss (previous Miller Class III) at short follow-up period (1 year). However, several prognostic factors should take into consideration and managed in order to maintain the successful clinical outcome for a longer follow-up period.

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FIGURE LEGENDS

Fig. 1. Clinical image at baseline of upper left canine (23) with 2mm gingival recession.

Fig. 2. A trapezoidal flap was designed and a full thickness flap elevated till the mucogingival line. A connective tissue graft was located under the flap and blocked with 6-0 vicryl interrupted sutures.

Fig. 3. The flap was coronally advanced and sutured using a sling suture, with additional single-interrupted sutures in correspondence of the two vertical releasing incisions.

Fig. 4. Clinical image at 1-year follow-up. Notice the complete root coverage, the increased amount of keratinized tissue, and the optimal adaptation with the adjacent tissues.

Fig. 5. The same treated site 10 years after surgery. Notice the presence of a non-carious cervical lesion associated with a slight relapse of the gingival recession.

Fig. 6. Frontal (**a**) and lateral (**b**) views of the upper left canine after the composite restoration 10 years later.