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TREATMENT OF ADJACENT MULTIPLE GINGIVAL RECESSIONS USING A NOVEL ENVELOPE-TUNNEL TECHNIQUE: A REPORT OF TWO CASES WITH & WITHOUT THE USE OF CGF

Dental Science

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ABSTRACT

Over the past few decades, several surgical techniques have been proposed to treat various recession defects. Patients with multiple recessions require the treatment to be done in a single stage. Compiling all the techniques, one of the most minimally invasive approaches to achieve predictable results is by using a combination of the tunnel-envelope technique along with composite stops to secure the flap better. In addition, the use of platelet concentrates aid in better tissue healing and repair. One such platelet concentrate discovered recently is the concentrated growth factor (CGF). This report of two cases demonstrates the use of a novel tunnel-envelope technique that achieved optimal results in treating adjacent multiple recession defects with the use of CGF as an adjunctive agent in one of the cases.

KEYWORDS

Multiple recession, root coverage, envelope-tunnel, concentrated growth factor

Introduction

One of the greatest challenges in treating adjacent multiple gingival recessions is to complete the treatment in a single stage. Numerous surgical techniques that include pedicle and free soft tissue grafting procedures, have been applied to correct gingival recession defects with varying degrees of success. Over the years, techniques to treat multiple gingival recessions have undergone major evolution, from the envelope technique reported by Raetzke in 1985,[1] the subperiosteal envelope technique demonstrated by Allen,[2] the tunnel technique created by Zabalegui et al[3] and its modification by Azzi and coworkers,[4] to the relatively recent modification of the tunnel technique called the VISTA (Vestibular Incision Subperiosteal Tunnel Access) technique as proposed by Zadeh HH in 2011.[5] Correspondingly, the use of orthodontic buttons by Ozcelik et al in 2011 to secure the flap in the coronal most position, showed promising results.[6] In order to simplify these approaches, the present technique in the following cases describes a modification using the combination of a envelope-tunnel along with the use of composite stops.

The recent advancement in root coverage procedures is the use of platelet concentrates like platelet-rich plasma (PRP) or platelet-rich fibrin (PRF) as an adjunctive agent to accelerate wound healing and repair. One such platelet concentrate is the concentrated growth factor (CGF), that was first developed by Sohn et al in 2009.[7] CGF is known to contain a larger, denser and richer fibrin matrix of growth factors (GFs) and may have a better regenerative capacity than the other platelet concentrates. Therefore, due to its high versatility, one case demonstrates the use of CGF as an adjunct to the novel technique.

Case Reports

Case 1

A twenty-two year old systemically healthy female patient reported to the department of periodontology with a chief complaint of sensitivity in the upper front tooth region. A thorough case history was taken and an informed consent was obtained from the patient. Clinical examination revealed Miller's Class I recession in the maxillary anterior teeth [Figure 1]. The pre-operative clinical parameters such as recession depth (RD), probing depth (PD) and clinical attachment level (CAL) were recorded [Table 1].

Figure 1: Case 1 – Pre-operative clinical view

Treatment plan: Based on the patient's clinical periodontal evaluation and history, thorough scaling and root planing was done one-week prior to the surgical procedure. It was decided that the envelope-tunnel technique was the appropriate choice of treatment as the aim was to keep it as minimally invasive as possible and also prevented the drawbacks of raising the flap.

Table 1: Pre-operative clinical parameters for Case 1

PARAMETERS	13	12	11	21	22	23
Recession Depth (RD) (in mm)	3	3	4	5	4	2
Probing depth (PD) (in mm)	3	2	2	2	2	2
Clinical attachment level (CAL) (in mm)	6	5	6	7	6	4

Surgical procedure

The maxillary anterior teeth were anaesthetized using buccal infiltration containing 2% Lidocaine and 1:80,000 adrenaline. Using a 15-blade, sulcular incisions were made 2-3 mm short of the tip of the papillae following the curvature of the receded gingival margin. The incisions were made with an undermining motion such that a tunnel was created with the papillae intact.

A periodontal probe was used to confirm that the tunnel was free of any attachment, to facilitate passive coronal displacement of the flap to the desired position. Once the incisions were completed for all teeth, the mid-coronal point of the buccal aspect of the crowns were etched using 37% Phosphoric acid and bonded using dentin bonding agent. With the help of 5-0 Vicryl absorbable sutures, a buccal bite was taken about 3 mm apical to the gingival margin of each tooth and suspended upto the point were the tooth was etched and bonded, advancing the flap as coronally as possible, thereby covering the recession defects. At this point, the suture ends were cured using light cure (LC)-composite, by creating composite stops [Figure 2]. Periodontal dressing was then placed over the surgical site. The patient was instructed not to brush on the surgical site until sutures were removed. An analgesic (Aceclofenac 100mg + Paracetamol 500mg) was prescribed twice a day for three days. The patient was recalled fourteen days after the surgical procedure and the sutures were removed [Figure 3].

Figure 2: Case 1 – Flap coronally advanced and secured using sutures with composites

Figure 3: Case 1 – One-week post-operative view

Case 2

A forty-five year old systemically healthy male patient reported to the department of periodontology with a chief complaint of sensitivity in his teeth and receding gums in the upper front tooth region. Clinical examination revealed Miller's Class I recession in the maxillary anterior teeth [Figure 4]. The pre-operative clinical parameters were recorded [Table 2].

Figure 4: Case 2 – Pre-operative clinical view

Treatment plan: Following thorough scaling and root planing one-week prior to the surgical procedure, the envelope-tunnel technique was used as in case 1 with the incorporation of CGF along with it.

Concentrated Growth Factor (CGF) preparation

Before commencing the surgery, CGF was prepared. Intravenous blood was collected in two 10-ml glass-coated plastic tubes without anticoagulant solutions that were then immediately centrifuged using a CGF centrifuge machine with a one-step centrifugation protocol 30sec -acceleration, 2min - 2700 rpm, 4min - 2400 rpm, 4min - 2700 rpm, 3min - 3000 rpm, 36sec – deceleration and stop.[8]

Table 2: Pre-operative clinical parameters for Case 2

PARAMETERS	13	12	11	21	22	23
Recession Depth (RD) (in mm)	1	4	4	2	2	1
Probing depth (PD) (in mm)	3	2	2	3	3	3
Clinical attachment level (CAL) (in mm)	4	6	6	6	5	4

At the end of the centrifugation, there were four phases or layers namely 1) the upper serum layer 2) the second fibrin buffy coat layer 3) the third layer with growth factors and 4) the lower layer with red blood cells (RBCs).

Surgical procedure

Once coronal advancement of the gingival margin was established using the technique as previously mentioned, the CGF clot was removed from the tube and separated from the RBC layer using surgical scissors. The CGF was then compressed using a gauze piece and a 1 mm thick membrane was obtained which was immediately tucked into the tunnel flap using a periodontal probe such that the membrane extended from the 13 to 11 [Figure 5-7]. Thus, the CGF membrane obtained from one tube was used for 3 teeth each. Similarly, for the adjacent quadrant, the CGF was placed from 23 to 21. The flap was then coronally advanced using 5-0 Vicryl absorbable sutures and composite stops [Figure 8]. Periodontal dressing was then placed over the surgical site. Post-operative instructions were given as mentioned in the previous case. The patient was recalled fourteen days post-operatively for suture removal and followed-up for a period of three months. [Figure 9 and 10].

Figure 5: Case 2 – Tunnel created

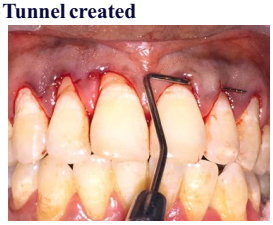

Figure 6: Case 2 – Procurement of concentrated growth factor

Figure 7: Case 2 – Concentrated growth factor inserted into the tunnel flap

Figure 8: Case 2 - Flap coronally advanced and secured using sutures with composites

Results

On evaluating both cases, similar results were noted. Successful root coverage was obtained, the probing depth remained the same and there was a gain in the clinical attachment level in relation to the maxillary anterior teeth [Case 1- Table 3 and Case 2- Table 4]. The patients were satisfied with the esthetics and reported with less sensitivity after the procedure.

Figure 9: Case 2 – One-week post-operative view

Figure 10: Case 2 – Three months post-operative view

Discussion

Despite the varied gingival augmentation approaches that have been demonstrated, choosing the appropriate technique may be challenging. The most common setbacks that clinicians encounter while treating

multiple recession defects are predictability, maintaining blood supply, the need for two surgical sites, limited quantity of graft available and post-operative complications, with the need to provide care to patients in terms of satisfactory esthetics, less post-operative discomfort and a cost-effective treatment.

Table 3: Post-operative clinical parameters for Case 1

PARAMETERS	13	12	11	21	22	23
Recession Depth (RD) (in mm)	1	0	0	0	0	0
Probing depth (PD) (in mm)	3	2	2	2	2	2
Clinical attachment level (CAL) (in mm)	4	2	2	2	2	2

Table 4: Post-operative clinical parameters for Case 2

PARAMETERS	13	12	11	21	22	23
Recession Depth (RD) (in mm)	0	1	0	0	0	0
Probing depth (PD) (in mm)	3	2	2	3	3	3
Clinical attachment level (CAL) (in mm)	3	3	2	3	3	3

The present technique surpasses most of the difficulties especially concerning blood supply, as the papillae remain intact. This technique can also be performed in teeth with isolated recession defects and on mandibular teeth as the flap remains secure with the help of sutures being cured and adherent to the composite stops. Allen et al using the envelope technique along with connective tissue graft reported less surgical trauma.[2] Similarly, Zabalegui et al also showed successful root coverage and adequate healing with the tunnel technique.[3] Our case series combined the use of both the techniques along with and without CGF and reported similar optimal results. However in cases with thin gingival biotype, care should be taken not to perforate the soft tissue while undermining or creating the tunnel.

Furthermore, growth factors play a pivotal role in achieving optimal results in terms of tissue repair. Like other platelet concentrates, CGF increases tissue vascularization and promotes proliferation of fibroblasts, thereby enhancing healing of the soft tissue.[8] The use of CGF showed no significant differences in the second case. However, in future histological examination of CGF would be required to prove its long-term predictability.

Conclusion

The envelope-tunnel technique may be regarded as a minimally invasive approach in treating adjacent multiple recession defects with optimal results. In addition, the use of CGF can also be considered to aid in better healing of the soft tissue. Nevertheless, further studies adopting this technique with a large sample size and longer follow ups are required to prove the efficacy and long-term stability of both, the technique and the use of CGF in future.

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