CLINICAL REPORT

Use of cyanoacrylate for the stabilization of tissues in root coverage procedures: A case series report with 5 years follow up.

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INTRODUCTION

Periodontal plastic surgery is defined as a surgical procedure to prevent, correct, or eliminate developmental/traumatic deformities of the gingiva and alveolar mucosa. Among its objectives are to recover the morphology, correct, or eliminate developmental/traumatic deformities of the gingiva and alveolar mucosa.

ABSTRACT

A variety of periodontal plastic surgery techniques have been proposed to correct aesthetic and functional problems caused by gingival recession, with root coverage using connective tissue grafts being the one most commonly performed. These surgeries, however, are partially dependent on tissue graft stability. In this case series, we describe the use of a tissue adhesive (cyanoacrylate) as a solution for graft stabilization. Two patients with Cairo’s type 1 gingival recession were treated with an envelope technique using connective tissue graft stabilized with cyanoacrylate alone. The results were a faster procedure and complete root coverage, even after 5 years of follow-up. Our findings suggest that cyanoacrylates can be an alternative to standard graft stabilizing procedures, leading to a stable root coverage in RT1 recessions.

KEY WORDS:

Cyanoacrylates; Gingival recession; Tissue adhesives

CASE REPORT

Case 1

A 43-year-old male, ASA I, patient sought treatment for gingival retraction and hypersensitivity in tooth 24. At clinical examination, a gingival recession type (RT) 1 (according to Cairo’s classification system), 2 mm. in length, was diagnosed (Fig. 1). Probing depth (PD) and clinical attachment level (CAL) were 1 mm. and 4 mm., respectively (Table 1). The characteristics of the gingival margin, gingival thickness and dental morphology were compatible with a thick biotype. Scaling and hygiene instructions were performed one week before surgery. The patient was informed of the risks and benefits and signed an informed consent.

The root coverage procedure was performed using an envelope technique, aiming to fully cover the exposed root area, reestablishing the natural gingival contour and treating the hypersensitivity. The procedure was performed under local anesthesia. Both donor and recipient sites were anesthetized using 2% lidocaine with epinephrine 1:100,000 (Lignospan, Septodont. France). The root scaling of the exposed surface was performed with a Gracey curette No. 5/6 (American Eagle, Missoula, USA). A partial thickness incision was done in to the sulcus of the
A connective tissue graft was harvested from the palate making a 1.5 cm. incision with a 15c scalpel blade (Swann-Morton Ltd. Sheffield, England). Next, the graft was de-epithelized. Adipose tissue remnants were removed using Le Grange scissors (Medesy, Maniago, Italy). The wound area in the palate was then covered with a dental cyanoacrylate (PeriAcryl® 90 HV, GluStitch Inc., Vancouver, Canada).

The connective tissue graft was inserted in the recipient bed, leaving 2 mm. exposed (final position); the surgical wound was washed with saline solution and dried with gauze. Finally, 2 layers of tissue adhesive (PeriAcryl® 90 HV, GluStitch Inc., Vancouver, Canada) were applied on the surface of the tissues using a rubbing technique, until a compact and stable structure was achieved (3 layers of adhesive) (Fig. 2). The whole procedure took 20 minutes.

For post-operative care, the patient was instructed to keep a soft diet for 7 days, drink plenty of liquids, and not brush the operated areas for 4 weeks. Follow-up consultations took place at 7, 14, 60, 180 days, and 5 years post-surgery. At 14 days, the tissue adhesive detached on its own. At 60 days, complete coverage of the recession was achieved. At 5 years, the gingival margins were stable. In tooth 1.3, the PD and CAL were 1 mm. and 1 mm., respectively, while in tooth 1.2 PD and CAL were both 1 mm. (Table 1), values that remained stable over 5 years (Fig. 6).

**DISCUSSION**

Covering exposed root surfaces has become an integral part of periodontal surgical practice, due to an increased demand for these treatments.(11,12) The treatment of gingival recessions can be carried out following different surgical techniques and the available scientific evidence shows that connective tissue grafting presents the best results in terms of amount of attached gingiva formed and percentage of root coverage.(13)

Subepithelial connective tissue grafts are the standard when facing a gingival recession, especially if greater root coverage is needed, as it provides a good aesthetic result. It also significantly reduces the chance of graft avascular necrosis, since the receiving area receives a double vascular

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**Table 1. Probing depth (PD) and clinical attachment (CAL) level before treatment and after 5 years.**

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**Figure 1. Baseline recession in tooth 2.4: The recession class RT1 of Cairo is 2 mm. length. The phenotype was classified as thick.**

**Figure 2. Envelope technique with an exposed connective tissue graft: The graft was inserted and left expose 2 mm. The tissue adhesive was covering the flap and graft stabilizing the area for 10 days.**

**Figure 3. Result 5 years after the surgery: The margins are stable with PD of 1 mm. and CAL of 1 mm.**

**Figure 4. Baseline recessions: The recessions class RT1 of Cairo in 1.3 and 1.2 are 2 mm. and 1 mm. length, respectively. The phenotype was classified as thin.**

**Figure 5. Surgical procedure:**

**Table 1. Probing depth (PD) and clinical attachment (CAL) level before treatment and after 5 years.**

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**Case 2**

A 51-year-old female, ASA I, patient sought treatment for receding gums in teeth 1.3 and 1.2. At clinical examination, two recessions RT1 were diagnosed: one in tooth 1.3 with 2 mm. in length, and another one in tooth 1.2 with 1 mm. (Fig. 4). In tooth 1.3, the PD and CAL were 1 mm. and 3 mm., respectively, while in tooth 1.2 PD and CAL were 1 mm. and 2 mm. (Table 1). The characteristics of the gingival margin, thickness of the gingiva and dental morphology and transparency of the probe were compatible with a thin biotype. The surgical protocol and postoperative recommendations described above for patient 1 were followed for this patient as well (Fig. 5). The aim of the surgery was to increase the gingival thickness, thus developing a thick phenotype, in order to achieve complete coverage of the recession. The patient was informed of the risks and benefits and signed an informed consent.

This time, the procedure took 23 minutes. At 14 days, the tissue adhesive detached on its own. At 60 days, complete coverage of the recession was achieved. At 5 years, the gingival margins were stable. In tooth 1.3, the PD and CAL were 1 mm. and 1 mm., respectively, while in tooth 1.2 PD and CAL were both 1 mm. (Table 1), values that remained stable over 5 years (Fig. 6).
Figure 5. Tunnel technique with an exposed connective tissue graft: The graft was inserted in 1.3/1.2 and leaved expose 2mm. and 1mm.. The tissue adhesive is covering the flap and the graft stabilizing the area for 14 days.

Figure 6. Result 5 years after the surgery: The margins are stable with PD of 1mm. and CAL of 1mm.

Wound closure is critical for a successful surgery. Suboptimal suturing or postoperative care by the patient may lead to complications, like graft loss(10). In this report, the envelope technique(11,12) was used as a basis for the surgical procedure; a coronal advancement flap was not performed, but 1 to 2mm. of connective tissue was left exposed. A systematic review with an 18-month follow-up compared connective grafts completely covered through coronal advancement flap versus partial exposure, and concluded that there was no difference in probing depth, clinical attachment level, or in the healing processes between these two techniques(13). Additionally, a systematic review indicates that it is possible to expose connective tissue up to 2.8 ± 1.1mm. Exposed connective tissue has shown a significant increase in attached gingiva, tissue thickness, and a decrease in recurrence of the gingival recession(14). Accordingly, in this case series both patient treatments presented stable results 5 years after surgery.

Regarding procedure duration, we observed a mean of 21 minutes. A study by Zuchelli et al. indicates an average chair time in root coverage surgeries of about 40 minutes(15). Given the authors are highly skilled periodontist, we speculate that a time-consuming suturing process might be why it took them considerably longer. When cyanoacrylates are used, the application time is around 30 seconds.

Reports indicate that this type of surgical technique has a high learning curve, as evidenced by a high percentage of graft loss by inexperienced clinicians. They are also time-consuming and prone to complications, such as pain, bleeding and suture dehiscence, which often leads to surgical failure(16,17). Some of these issues could be solved using tissue adhesives.

Tissue adhesives also create a strong adherence surface, stabilizing the flap without perforating the flap and thus ensuring a better blood supply. Moreover, they work as a protective layer, preventing food from entering the wound or the connective tissue graft from detaching, making surgical procedures more predictable(18).

CONCLUSION

In the presented cases, adequate stabilization of the flap and connective tissue graft was achieved using dental cyanoacrylate, reducing surgical time and showing stable results after 5 years of follow-up. In an unprecedented manner we provide preliminary evidence of the efficacy of cyanoacrylate-based tissue adhesive for root coverage. As a next step, cohort studies with a larger sample size and a control group should follow.

CLINICAL JUSTIFICATION FOR THE STUDY

Novel tissue bonding compounds like cyanoacrylates are currently available in the medical market for skin injuries with great efficacy. However, the little evidence of this agents in oral procedures have slow down their usage in the periodontal clinical practice.

MAIN RESULTS

In particular, this paper highlights a novel biocompatible bonding agent with promising results to stabilized the tissues in root coverage procedures as an alternative to conventional suture with a stable clinical result after 5 years follow up.

PRACTICAL CONSEQUENCES

The use of cyanoacrylates to stabilized tissues in combination with minimally invasive surgical techniques seems to be a reliable alternative to sutures showing a stable clinical result after 5 years follow up.

CONFLICT OF INTEREST AND FUNDING SOURCE

Javier Rojas is involved in the company GluStitch Inc. and has received financial support for congresses and workshops. The project was funded by the author. The cyanoacrylate used in this study was donated by the company GluStitch, Vancouver, Canada. The other authors have no conflicts of interest.

References