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(CASE REPORT)

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Cyanoacrylate Adhesive Agent for Coronally Advanced Flap Stability

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Abstract

Introduction*:* Gingival recession, characterized by displacement gingival margin below the cemento enamel junction. Many surgical procedures have been attempted to obtain gingival recession. Acellular dermal matrix (ADM) grafts can be used as a substitute for connective tissue graft during root coverage procedures. A carefully planned surgery needs proper immobilization of the flap can be achieved by proper wound closure technique with appropriate material such as sutures or tissue adhesives. Cyanoacrylate tissue adhesives have been proposed as a suitable alternative for surgical wound closure. The aim of this study was to evaluate the potential of cyanoacrylate tissue adhesive for coronally advanced flap surgical stability.

Case Report: A 57-year-old female came to the Periodontics Specialist Clinic in Dental Hospital Universitas Airlangga with complaint dental sensitivity resulting from exposed root surfaces in upper right molar and premolar. The recession on buccal teeth 15 and 16 (FDI notation was 3 mm (Miller class 1).

Case management: Coronally advanced flap (CAF) by tunneling procedure combined with acellular dermal matrix was applied of gingival recession. Acellular dermal matrix (SureDerm® was sutured with blue nylon 5.0 (Polyamide). Furthermore, the cyanocrylate adhesive (PeriAcryl® 90HV) was applied. Clinical examinations were performed at 7. 14. 30 days and 3 months after surgery. After a 2-week healing period, the sutures were removed. At the 3 months, the patient presented with stabilization of marginal tissue.

Conclusion: Cyanoacrylate tissue adhesive has potential for coronally advanced flap surgical stability.

Keywords: Gingival recession; Cyanocrylate adhesion; Coronally advanced flap; Acellular dermal matrix

1. Introduction

Gingival recession, characterized by displacement gingival margin below the cemento enamel junction[1]. Many surgical procedures have been attempted to obtain gingival recession. The treatment option combining a coronally advanced flap (CAF) with a connective tissue graft (CTG) harvested from the palate is considered the gold standard in managing gingival recessions[2]. The disadvantages of harvesting autogenous tissue include pain, post operative bleeding, and discomfort at the donor site, restricted tissue supply, prolonged operative times, and increased morbidity. Acellular dermal matrix (ADM) grafts can be used as a substitute for connective tissue graft during root coverage procedures[3].

Numerous mucogingival surgery techniques have been designed to treat gingival recession. Tunnel or supraperiosteal envelope technique presented by Allen (1994) is one of the common approaches to complete root coverage[4]. The less invasive vestibule access tunneling is the modification of the tunnel technique, which is designed to minimize the risk of laceration of the gingival margin. There is no vertical incision in this technique[11]. Several modified tunnel techniques use vertical incision for the tunneling procedure. Incision in the vertical direction may reduce gingival vascularization.

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Whereas the successful mucogingival surgery for gingival recession treatment is dependent on the excellent blood supply to the surgical site[5]. This article describes a modified tunneling technique with the use of an acellular dermal matrix to achieve root coverage. This procedure while maintaining the critical papillary integrity and avoiding vertical releasing incision.

A carefully planned surgery needs proper immobilization of the flap can be achieved by proper wound closure technique with appropriate material such as sutures or tissue adhesives[6]. Cyanoacrylate tissue adhesives have been proposed as a suitable alternative for surgical wound closure. The hemostatic and bacteriostatic effects should be accentuated as advantages of cyanoacrylate tissue adhesive, which can improve bleeding control and reduce postoperative wound infection[7,8]. The aim of this study was to evaluate the potential of cyanoacrylate tissue adhesive for coronally advanced flap surgical stability.

2. Case Report

A 57-year-old female came to the Periodontics Specialist Clinic in Dental Hospital Universitas Airlangga with complaint dental sensitivity resulting from exposed root surfaces in upper right molar and premolar. The recession on buccal teeth 15 and 16 (FDI notation) was 3 mm (figure 1).

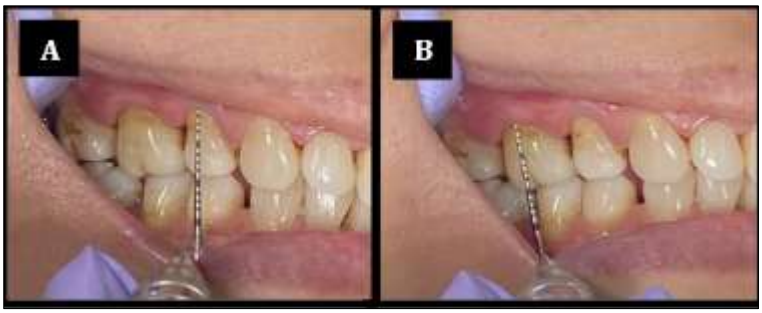

Figure 1 Preoperative view. (A) Maxillarry righ molar with 3 mm recession, (B) Premolar with 3 mm recession

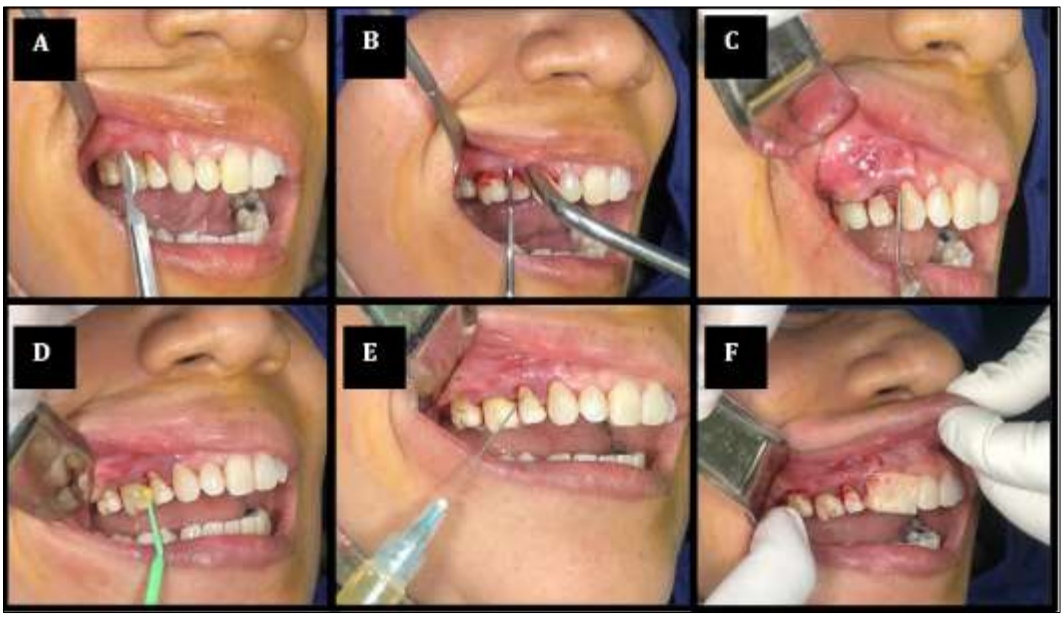

Figure 2 (A) Incision of the buccal sulcus area, (B) Tunneling access to mucogingival junction, (C) Check the tunneling access using probe, (D) Application of tetracycline, (E) Platelet poor plasma application, (F) ADM attachment

Coronally advanced flap (CAF) by tunneling procedure combined with acellular dermal matrix was applied of gingival recession. Acellular dermal matrix (SureDerm®) was sutured with blue nylon 5.0 (Polyamide) (figure 2). Furthermore, the cyanocrylate adhesive (PeriAcryl® 90HV) was applied (figure 3).

Figure 3 (A) ADM fixation with resorbable suture, (B) Sutturing with nylon 5.0, (C) Application of cyanoacrylate tissue adhessive

Clinical examinations were performed at 7. 14. 30 days and 3 month after surgery. After a 2-week healing period, the sutures were removed. At the 3 months, the patient presented with stabilization of marginal tissue (figure 4).

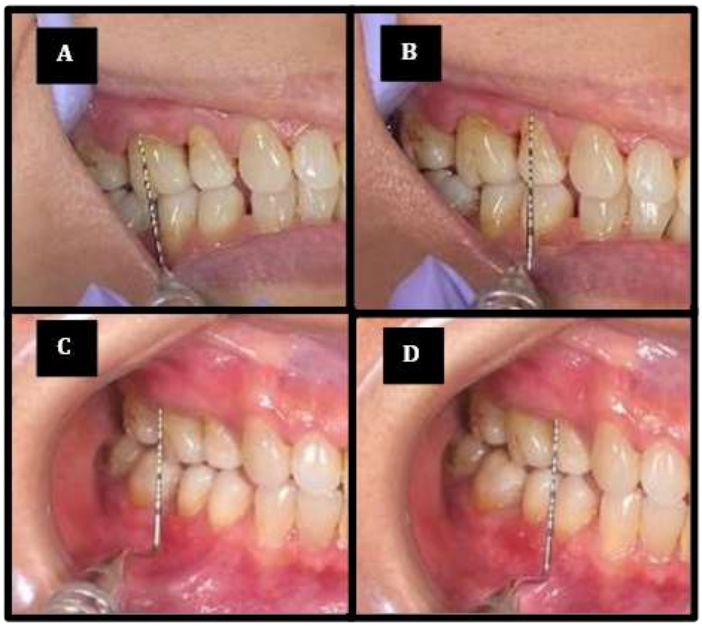

Figure 4 (A-B) Initial, (C-D) 3 month follow up after surgery

3. Discussion

Gingival recession can be defined as the exposure of root surface by an apical shift in the position of the gingival margin. A denuded root is more susceptible to tooth hypersensitivity, root caries, and poses esthetic problems[9]. One of the treatment options for gingival recession is surgical using the tunnel technique. In previous studies, the procedure to make the tunnel access is performed through gingival sulcus. Tunnel technique was performed initially by an internal beveled incision from the top of the gingival margin on the areas of recession. Afterward, partial-thickness supraperiosteal envelope by sharp dissection is extended 3–5mm laterally and apically to areas of recession, undermining interdental papilla[10].

The less invasive vestibule access tunneling is the modification of the tunnel technique, which is designed to minimize the risk of laceration of the gingival margin. In the less invasive vestibule access tunneling, the initial incision was performed from the vestibule area apically to the recession[11]. Several modified tunnel techniques use vertical incision for the tunneling procedure. Incision in the vertical direction may reduce gingival vascularization[12,13]. This article describes a modified tunneling technique with the use of an acellular dermal matrix to achieve root coverage. This procedure while maintaining the critical papillary integrity and avoiding vertical releasing incision.

Previous studies have shown the ability of cyanoacrylate tissue adhesive to improve marginal flap stability after CAF when compared to suturing alone[14]. In this case report cyanoacrylate tissue adhesive was applied as an adjunct to

suturing. The additional cyanoacrylate tissue adhesive in suturing may be expected to improve marginal flap stability compared to cyanoacrylate tissue adhesive alone and suturing alone. This may occur due to the polymerization of cyanoaacrylate tissue adhesive results in a strong bonding and stabilizing effect across the flap[15]. The ability of CTA to adhere to the tooth surface might have contributed to an additional stabilization in the marginal tissue area in this case[16].

A commercially available tissue adhesive (PeriAcryl® 90HV) was used for this case. According to the manufacturer's information, (PeriAcryl® 90HV) is a high-viscosity tissue adhesive chemically based on n-butyl- and 2-octyl-cyanoacrylate and was originally developed for intraoral application[17]. There are few contraindications to using cyanoacrylate tissue adhesive. They can't be utilised in locations where there's a lot of stress, including joints, areas where there's a lot of friction, and areas where there's an infection or exudate contamination[18]. Till date, there is no sufficient evidence showing that cyanoacrylates are carcinogenic for humans[19].

4. Conclusion

Cyanoacrylate tissue adhesive has potential for coronally advanced flap surgical stability.

Compliance with ethical standards

Disclosure of conflict of interest

All authors declared no conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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