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Case Report

Cyanoacrylate-Based Glue Used as Surgical Cement After Gingivectomy: Case Report

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Abstract:

The gingivectomy is widely used in dental practice. In addition to the conventional technique, an electric scalpel or laser can be used. The repair and healing generally occurs by second intention, and surgical cement is used to cover the surgical wound when using the conventional technique. In addition to tissue repair, there is also the need for apical maintenance of the gingival level after the clinical crown augmentation achieved by surgery. However, the materials used as surgical cement remain for a maximum of 7 to 15 days. In this perspective, the use of cyanoacrylate glue as a surgical cement may be indicated to assist in hemostasis, tissue repair and healing, and apical maintenance of the gingival level after gingivectomy. In addition to hemostatic properties, cyanoacrylate-based tissue adhesives are biodegradable and antibacterial. The purpose of this article is to present the case of a patient in whom, after gingivectomy with an electric scalpel, she received the application of cyanoacrylate glue as surgical cement that remained for 40 days until the making of the final unitary prosthesis. No intercurrences were reported and the repair occurred satisfactorily.

***Keywords:** Gingivectomy; Crown Lengthening; Cyanoacrylate; Wound Healing; Periodontics.*

Introduction

The gingivectomy technique for the purpose of clinical crown augmentation is widely used in dental practice. It can be performed by the conventional technique, electric scalpel or laser. The repair and healing generally occurs by second intention. Usually, in the conventional technique, surgical cement must be used to contain the bleeding and favor tissue repair and healing. Additionally to tissue repair, there is the need for apical maintenance of the gingival level after the clinical crown augmentation achieved by surgery. However, the materials used as surgical cement remain for a maximum of 7 to 15 days[1,2].

In this perspective, the use of cyanoacrylate glue as a surgical cement may be indicated to assist in hemostasis, tissue repair and healing, and apical maintenance of the gingival level after gingivectomy[3,4].

Cryanoacrylates were synthesized in 1949. However, its use as a surgical adhesive only occurred after 1959. Cryanoacrylates are polymers whose monomer is formed by reversible condensation of a formaldehyde with a cyanoacrylate ester.

Their general formula is CNCH 2 = COO-R, where R is the side chain. They come in various forms, depending on the length and complexity of the chain. The number of alkyl groups on the side chain of cyanoacrylate can be increased from one (methyl cyanoacrylate) to two (ethyl), four (butyl), five (isoamyl), and eight (octyl cyanoacrylate). Polymerization occurs in the presence of hydroxyl ions in contact with water or moisture in the tissue, forming a strong bond and an exothermic reaction. The cytotoxicity of cyanocrylate adhesives is related to their speed of degradation, and the size of the chain. The larger the side chain, the lower the speed of degradation, and subsequently, the lower histotoxicity[3-6].

The purpose of this article is to present the case of a patient in whom, after gingivectomy with an electric scalpel, she received the application of cyanoacrylate glue as surgical cement that remained for 40 days until the making of the final unitary prosthesis.

Case Report

A Caucasian female patient, 85-years-old, came to the clinic for rehabilitation on a fractured tooth.

Clinically, the patient had a radicular remaining of tooth 16 without dental crown. The tooth margins were at subgingival level on the mesial, distal and palatal surfaces (Figure 1). No painful symptoms were reported. The endodontic canals presented complete atresia.

Regarding general health, no systemic diseases or conditions were reported.

Gingivectomy was indicated for gingiva removal for clinical crown augmentation, and the use of the electric scalpel was proposed. Under local infiltrative anesthesia, gingival tissue was removed, exposing the entire remaining radicular. Little hemostatic control was achieved, even with carbonization and cauterization by the electric scalpel (Figure 2). Thus, a domestic cyanocrylate glue (SuperBonder™, Henkel, São Paulo, Brazil) was applied over the region, and immediately dried by applying the air jet (Figure 3). The patient was given analgesic and anti-inflammatory medications, as well as oral hygiene care in the region.

Figure 1: *Radicular remaining of tooth 16 without dental crown.*

Figure 2: *Gingivectomy performed with electric scalpel.*

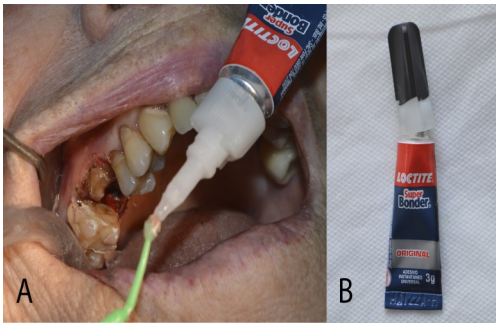

Figure 3: *Application of domestic cyanocrylate glue (A). SuperBonder™ (Henkel, São Paulo, Brazil) (B).*

After 15 days, the patient was evaluated and no complaints or complications were reported. The maintenance of the domestic cyanocrylate glue was observed, which besides the hemostatic control, also had the function of maintaining the gingival level in directed towards the apical region, functioning as a surgical cement. However, very poor oral hygiene was observed in the region (Figure 4). It was decided to maintain the cyanoacrylate glue as surgical cement.

After 40 days of the surgical procedure, the patient was evaluated again. Persistent poor oral hygiene was observed (Figure 5). Local anesthesia was performed, followed by removal of the surgical cement, as well as removal of dental calculus and prophylaxis of the region (Figure 6). The cervical end remained at supragingival level.

Figure 4: *Permanence of cyanocrylate glue as surgical cement.*

Figure 5: *Persistency of the poor oral hygiene.*

Figure 6: *Removal of the surgical cement and dental calculus, followed by the prophylaxis of the region.*

After 15 days, the tooth was prepared and molded (Figure 7). A resin prosthetic crown was made, adapted and cemented (Figure 8).

Figure 7: *Tooth prepared and molded.*

Figure 8: *Rehabilitation completed by cementation of the prosthetic crown.*

Discussion

Cyanoacrylate adhesives, particularly those with longer chains (butyl and octyl cyanoacrylates), are frequently applied in Plastic Surgery, Dermatology, Gynecology, Urology, Gastroenterology, Orthopedics, Neurosurgery, and in Cardiac and Vascular Surgery. In Medicine, indications include myocardial surgery; esophageal fistula closure; bilateral mammoplasty; corneal surgery; bone grafts; embolization of arteriovenous malformations; variceal occlusion; and in skin wound closure[3,6-8].

In Dentistry, besides butyl and octyl cyanoacrylates, the use of isoamyl cyanoacrylates, considered the best adhesive indicated for intraoral application, has been reported. This is due to better adhesion in humid areas, such as the oral cavity. In intraoral procedures, these adhesives have been reported to be used as a hemostatic in patients submitted to oral surgery; as an alternative to sutures in mucoperiosteal incisions; in the synthesis of lacerations in children to avoid anesthetic procedures; closure of cleft lip and cleft palate; periapical and bone surgeries; as a protector in recurrent aphthous ulcerations; in the reimplantation of avulsed teeth; in the support of the treatment of comminuted fractures of the maxillofacial bones; in the covering of areas submitted to grafts or resective surgical procedures, as surgical cement[3,8-12], as presented by us.

The ethyl cyanoacrylate, popularly known as domestic glue (SuperBonder™, Henkel, São Paulo, Brazil), used in the present case, has been widely used. It shows similar biocompatibility to the octyl cyanoacrylate-based adhesives, which are indicated for use in medicine. No inflammatory or allergic reactions, and no tissue necrosis were reported. The wound healing occurs aesthetically favorable. Additionally, hemostatic properties; asymptomatic treatment; no need for local anesthesia; ease of execution of the technique; reduced surgical time; and reduced costs were also reported[8]. The bacteriostatic properties occur due to the ability to form a mechanical barrier to prevent the entry of materials or microorganisms[6]. This barrier also promotes the coagulation process and allows the control of bleeding[4,6].

Cell viability studies with fibroblasts and osteoblasts were satisfactory. Antimicrobial activity and tissue biocompatibility of ethyl cyanoacrylates were similar to octyl cyanoacrylates (Dermabond™, Johnson & Johnson, São Paulo, Brazil)[5,6].

Despite the off-label indication of ethyl cyanoacrylate in health specialties, the low cost of this adhesive justifies it as a therapeutic option in more humble populations. Low tensile strength and high cost of octyl and isoamyl compounds have been reported as disadvantages. Cyanocrylate adhesives are contraindicated in infected wounds and lesions[3-6].

In the oral cavity, susceptibility to greater accumulation of dental biofilm occurs in syntheses used with suture threads[3,4,6]. Cyanocrylate adhesives are an excellent alternative to conventional sutures. However, the accumulation of dental biofilm was also observed in the present case.

Conclusions

The synthesis procedures after gingivectomy can be difficult to perform. In this perspective, the use of cyanoacrylate adhesives may favor immediate hemostasis, tissue repair, reducing healing time and promoting patient comfort. The medical and dental literature has presented satisfactory results on the efficacy, safety, ease of use, and feasibility of cyanoacrylate adhesives.

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