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Delayed recurrent arterial hemorrhage after free gingival graft harvesting: a case report with retrospective vascular mapping of the palatal donor site

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Case Report

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Abstract

Background: Free gingival grafting (FGG) is a predictable mucogingival procedure commonly used to increase the width of keratinized tissue. Bleeding from the palatal donor site is a recognized postoperative complication but is usually immediate and manageable with conventional hemostatic measures. Delayed severe arterial hemorrhage after FGG remains uncommon.

Case presentation: We report a rare case of recurrent delayed arterial bleeding following palatal graft harvesting in a 29-year-old healthy male undergoing FGG surgery. The initial procedure was uneventful, with platelet-rich fibrin (PRF) used to cover the donor site. Significant arterial bleeding developed on postoperative day 2 and recurred on day 9 despite local compression, electrocoagulation, tranexamic acid therapy, and additional suturing. Low-level laser therapy administered during healing did not provide the expected clinical benefit. Definitive hemostasis was ultimately achieved using a combined approach consisting of oxidized regenerated cellulose and medical-grade cyanoacrylate tissue adhesive. Healing progressed uneventfully thereafter. Retrospective ultrasonographic and vascular transillumination assessment revealed an atypical, highly branched vessel crossing the surgical area.

Conclusions: This case highlights the importance of recognizing anatomical vascular variations and suggests that preoperative vascular mapping may reduce complications in extensive mucogingival procedures. Combined cellulose-based hemostatic material and cyanoacrylate adhesive may serve as an effective salvage strategy in refractory oral hemorrhage.

Introduction

Free gingival graft (FGG) is a widely used and predictable surgical procedure in periodontology for increasing the width of keratinized tissue and improving peri-implant or periodontal soft tissue conditions. Although postoperative bleeding from the palatal donor site is a recognized complication, it usually occurs during the immediate postoperative period and is generally manageable with conventional hemostatic measures. Reports of delayed arterial hemorrhage following FGG procedures remain rare [1]. Because of recurrent episodes of severe bleeding, the patient required assessment and management by oral and maxillofacial surgeons within a 24-hour emergency specialist care setting.

This report presents an unusual case of significant delayed arterial bleeding occurring up to 9 days postoperatively, necessitating a multi-step and unconventional hemostatic approach.

Report

A 29-year-old male with no systemic diseases or coagulation disorders presented for augmentation of keratinized gingiva. A FGG procedure was performed to harvest an epithelial-connective tissue autograft from the palate. The surgery was uneventful, and the donor site demonstrated no intraoperative bleeding. Platelet-rich fibrin (PRF) was applied to the donor site, followed by stabilization with sutures

(Fig. 1A). Postoperative medications included amoxicillin/clavulanic acid (1 g twice daily), ethamsylate (500 mg three times daily), nimesulide (as needed), and a chlorhexidine-based mouthwash.

On postoperative day 2, the patient experienced significant arterial hemorrhage from the surgical site. The displaced PRF was removed. After mechanical compression with tranexamic acid failed to achieve hemostasis, local electrocoagulation of the severed arterial vessel was performed, resulting in bleeding control. Oral tranexamic acid (1 g four times daily for 4 days) was added to the regimen. The patient was fully compliant with postoperative recommendations, and the bleeding events were spontaneous and not preceded by any traumatic insult.

To support wound healing and angiogenesis, low-level laser therapy (LLLT) was administered on days 5, 7, and 9 (diode laser, 635 nm, 100 mW, continuous wave, 20 s, 4.0 J/cm²). During the following days, the patient reported minor intermittent oozing, which was successfully managed at home with local compression using tranexamic acid solution.

On the night of day 9 (several hours after the LLLT session), a second episode of significant arterial hemorrhage occurred. Immediate compression with forceps was ineffective, necessitating repeat, deeper electrocoagulation (Fig. 1D). Oral tranexamic acid (1 g four times daily for 7 days) and ethamsylate (500 mg four times daily) were reinstated. On day 12, additional stabilizing sutures were placed to achieve mechanical compression of the donor site. Nevertheless, on day 15, the patient returned with recurrent bleeding and formation of an unstable, bleeding clot.

On postoperative day 16, definitive hemostatic management was undertaken. Following removal of the loose clot, a resorbable oxidized cellulose hemostatic sponge was applied, and the wound was covered with a medical-grade cyanoacrylate tissue adhesive (Fig. 2A).Amoxicillin/clavulanic acid was reintroduced. Following this intervention, only minor, self-limiting oozing occurred over the next three days. By day 34, sutures and residual cyanoacrylate were removed (Fig. 2B). The tissues showed complete healing with a stable graft and intact mucosa.

Two months postoperatively, retrospective intraoral ultrasonography and vascular transillumination were performed to investigate the etiology of the hemorrhages. These imaging modalities revealed a highly branched vessel coursing directly along the surgical line within the primary graft harvesting site (Fig. 3).

Discussion and Conclusion

Early bleeding from the palatal donor site following FGG procedures is relatively common and is typically manageable with standard local hemostatic measures [1]. However, arterial hemorrhage occurring on postoperative days 3 and 9, both requiring hospital-based intervention, represents an uncommon clinical event. It is hypothesized that, during the healing phase, enzymatic and mechanical degradation of the clot led to destabilization of the local environment, ultimately resulting in rupture of a structurally weakened arterial wall in an atypically positioned vessel.

The application of LLLT to enhance and accelerate wound healing following the initial electrocoagulation did not produce the expected clinical benefit [2].

This case highlights two important clinical implications. First, in cases of refractory and recurrent oral hemorrhage in which conventional measures such as electrocoagulation and suturing fail to achieve sustained hemostasis, the combined use of an oxidized regenerated cellulose hemostatic agent and medical cyanoacrylate adhesive may represent an effective salvage strategy. Cyanoacrylate provides a strong mechanical barrier that stabilizes the clot independently of the patient's coagulation cascade and limits salivary contamination and clot disruption[3].

Second, this report underscores the clinical relevance of recognizing anatomical variations of the palatal vasculature. Although the course of the greater palatine artery is well established in anatomical studies, clinically relevant inter-individual variations in its branching pattern and spatial relationship to the palatal mucosa are well documented [4]. Modern non-invasive imaging modalities, such as high-frequency intraoral ultrasonography (USG) [5–7] and transillumination techniques [8], are valuable not only for retrospective assessment of complications but also potentially for preoperative vascular mapping in patients undergoing extensive mucogingival procedures. This may contribute to improved risk stratification and reduction of iatrogenic vascular injury.

Declarations

Compliance with Ethical Standards

Funding: No external funding was received for this study.

Conflict of Interest: The authors declare no conflicts of interest.

Ethical Approval: All procedures performed in the cases were in accordance with institutional ethical standards and the Helsinki Declaration.

Informed Consent: Written informed consent for publication of anonymized clinical data and images was obtained from all patients.

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Figures

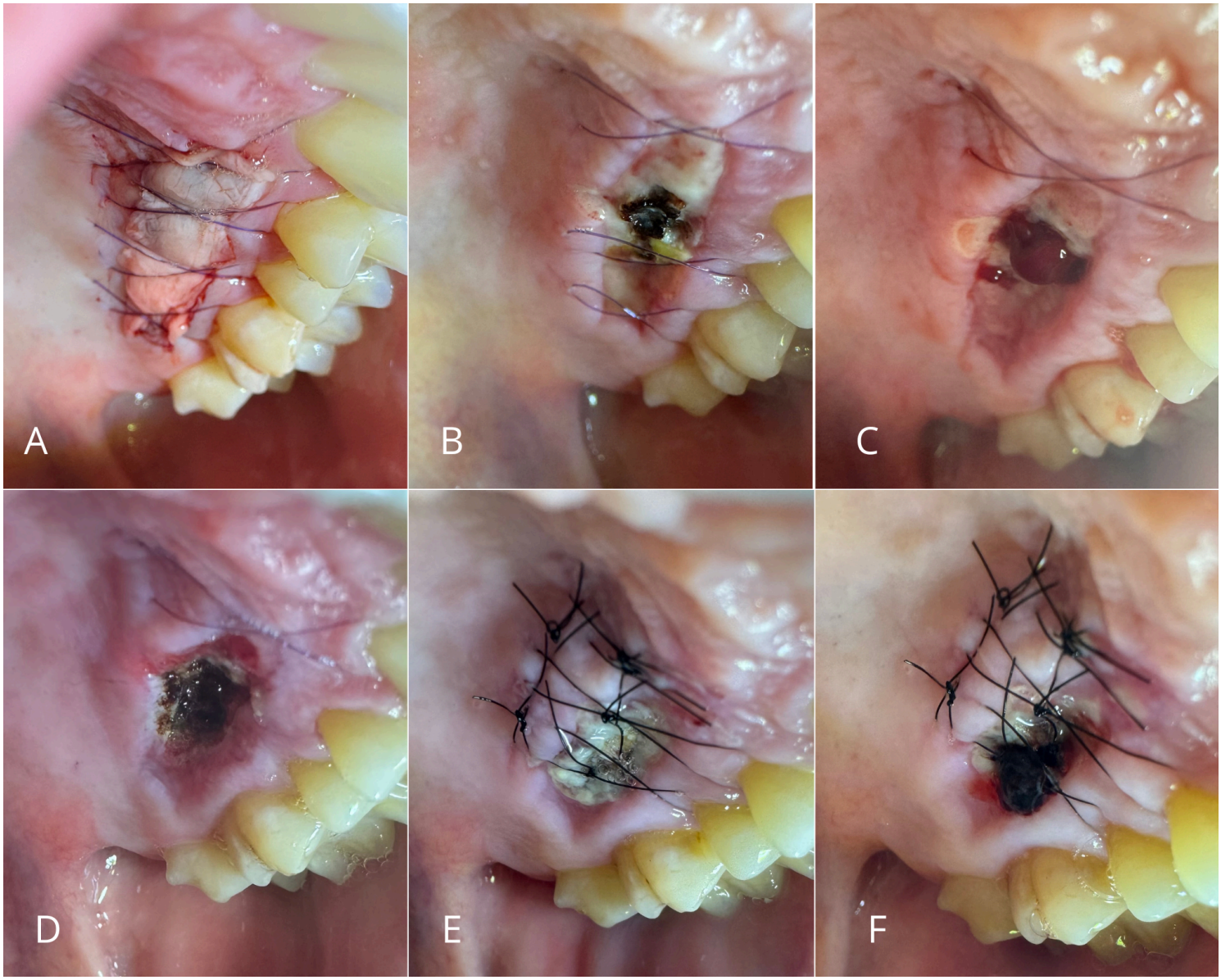


Figure 1

A. Immediate postoperative appearance of the palatal donor site covered with platelet-rich fibrin (PRF). **B.** Postoperative day 6 (4 days after hospital intervention), demonstrating fibrin deposition and localized necrosis secondary to electrocoagulation. **C.** Postoperative day 7, showing an unstable clot. **D.** Postoperative day 9 after FGG, following repeat electrocoagulation of the bleeding vessel. **E.** Postoperative day 13, with additional stabilizing sutures placed over the donor site. **F.**Postoperative day 15, demonstrating recurrent formation of an unstable clot.

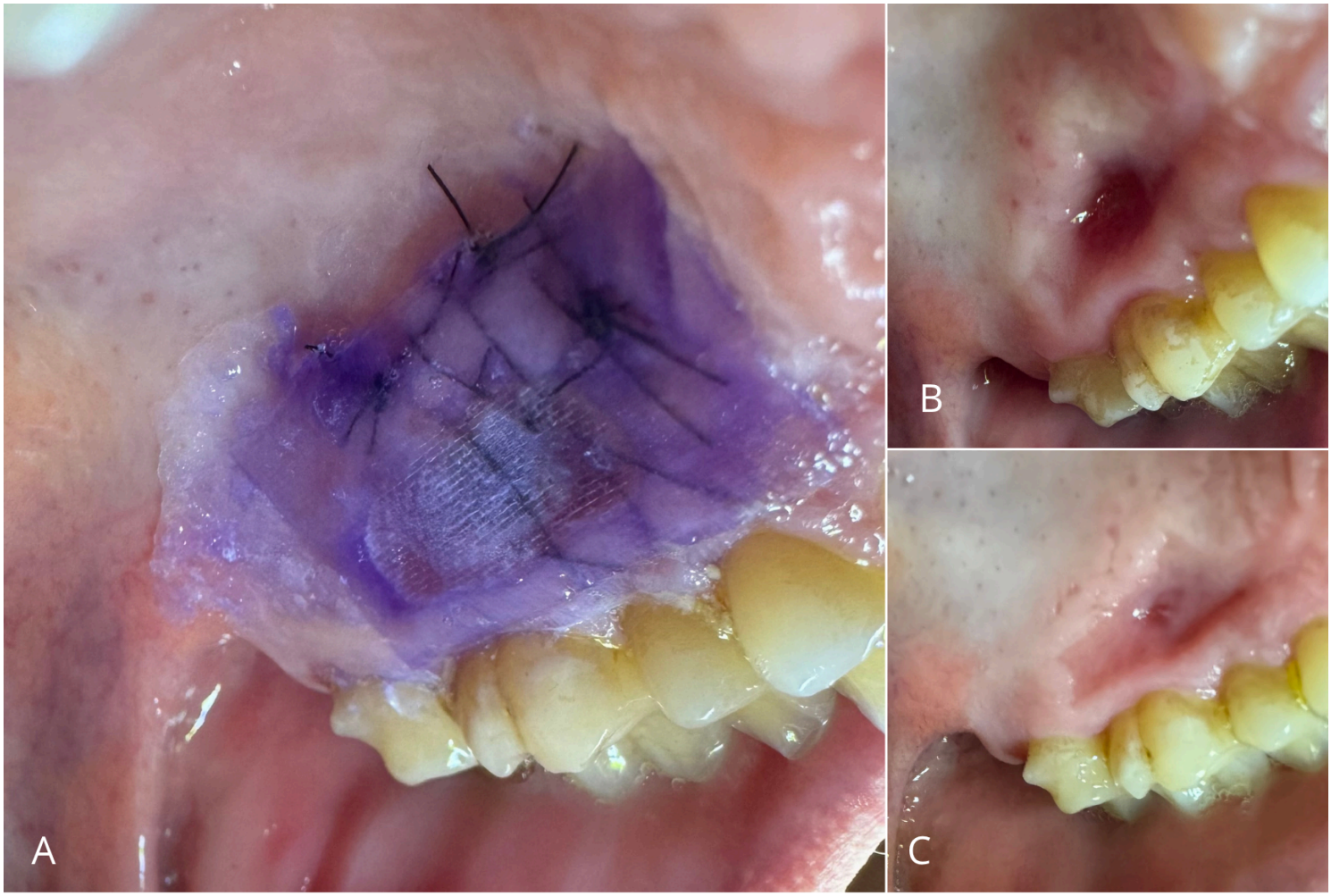


Figure 2

A. Postoperative day 16, following definitive hemostatic management with placement of a resorbable oxidized cellulose hemostatic sponge and application of a cyanoacrylate tissue adhesive (PeriAcryl®). **B.**Postoperative day 35, after removal of the stabilizing sutures and residual cyanoacrylate adhesive. **C.** Postoperative day 55 following the FGG procedure, demonstrating complete healing of the palatal mucosa.

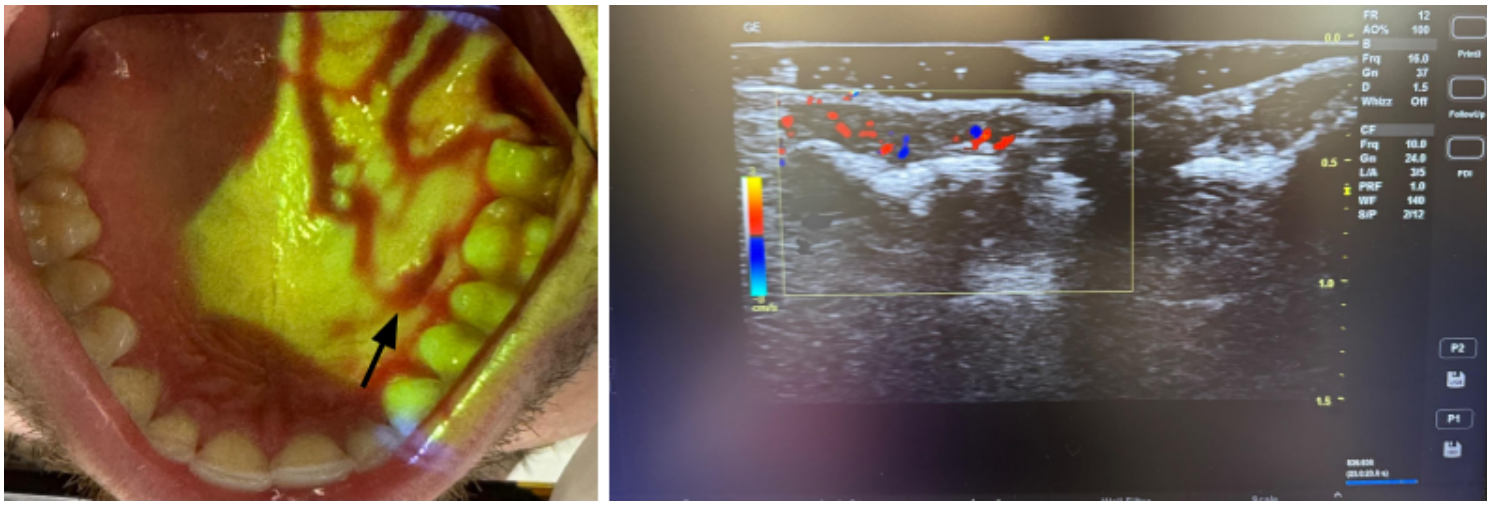


Figure 3

A. Visualization of the palatal vascular network using a near-infrared vascular imaging device. The arrow indicates the site of recurrent hemorrhage. **B.** Retrospective ultrasonographic examination of the hemorrhage site demonstrating vascular structures with high blood-flow signals (shown in red on color Doppler imaging), corresponding to branches of the greater palatine artery.