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## Case Report

# A novel clinical protocol for the greater palatine compression suture: A case report

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### Abstract:

Bleeding from the palatal donor site is a worrisome complication of palatal soft tissue harvesting procedures and leads to considerable stress to both the patient and the surgeon. Several methods to control palatal hemorrhage have been suggested in literature, including a palatal suture, but a precise protocol has not been suggested. The present case report aims to suggest a protocol for the greater palatine compression suture (GPCS). Five patients who experienced profuse bleeding from the palatal free gingival graft donor site were treated with the GPCS. The palatal midline was used as a landmark and the location of the greater palatine foramen was estimated. The suture was placed anterior to the estimated location of the foramen and was passed deep into the palatal tissue with the aim of looping and compressing the vascular bundle. In all the patients, an immediate reduction and arrest of bleeding from the palatal wound was observed with blanching of the soft tissues around the suture. The proposed technique is a predictable method to control palatal hemorrhage and can be used if other less invasive techniques fail to stem the blood flow from an injured palatal vessel.

### Key words:

Free gingival graft, greater palatine artery, hemorrhage

## INTRODUCTION

Intra- or postsurgical bleeding is a known complication following palatal soft tissue harvesting procedures.<sup>[1]</sup> Procedures with alternative grafts such as the acellular dermal matrix are associated with a much lower incidence of bleeding,<sup>[1]</sup> but do not demonstrate results as good as autogenous palatal grafts.<sup>[2]</sup>

The greater palatine vascular bundle passes through dense connective tissue that is firmly bound to the underlying bone. Clinical identification of the greater palatine neurovascular bundle (GPB) may be complicated by factors such as the height of the palatal vault and thickness of the palatal tissue.<sup>[3]</sup> This anatomy makes it difficult to access or isolate this artery for ligation in case of a surgical injury. Most techniques for managing palatal bleeding described thus far involve the use of local hemostatic agents, ligature wires, periodontal dressings, modified Hawley's appliance, platelet-rich fibrin, and electrocoagulation among others.<sup>[4,5]</sup>

A suture to compress a bleeding palatal vessel has been suggested previously, but no protocol to place such a suture has been explicitly stated.<sup>[6,7]</sup> The present case report aims to document a greater palatine compression suture (GPCS) technique and to suggest a clinical protocol. The investigators hope that such a technique will be a handy tool for a safe and uneventful surgical experience in palatal soft tissue harvesting.

## CASE REPORT

Five patients who experienced profuse bleeding from the palatal free gingival graft (FGG) donor site were included in this case series after obtaining informed consent. The patients were in the age group of 17–36 years, referred for the treatment of gingival recession following orthodontic therapy. A free gingival graft was done to augment the gingiva and achieve recession coverage. Local infiltration with a local anesthetic solution with 1:80,000 adrenaline and pressure at the site using moist gauze failed to stem the blood flow. A decision to place a greater palatine bundle compression suture (GPCS) was made.

The protocol suggested for the greater palatine compression suture is as follows [Figure 1]:

1. The palatal midline is identified (Y)
2. An imaginary line is projected perpendicular to the palatal midline to the junction between

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- the first and second maxillary molars (X)
3. A point (Point A) is identified 20 mm from the palatal midline (Y) along the line X [Figure 1]
4. An 18 mm triangular body, half-circle needle with a 3-0 black braided silk suture is used
5. The needle is passed along its curve to the depth of the palatal vault from point A toward the palatal midline
6. The point of emergence (Point B) of the needle should be about 10 mm medial and about 5 mm anterior to Point A [Figure 2]
7. The suture is then secured with a surgeon's knot with enough tension to cause visible blanching of the palate [Figure 3].

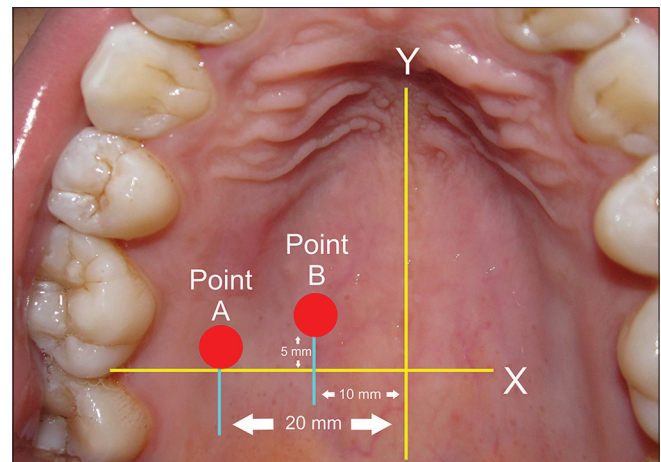
Following the placement of the suture, an immediate reduction in the bleeding was observed and hemostasis could be achieved [Figure 3]. Satisfactory healing of both the donor and the recipient sites was observed with complete palatal wound healing at the 3 week appointment.

## DISCUSSION

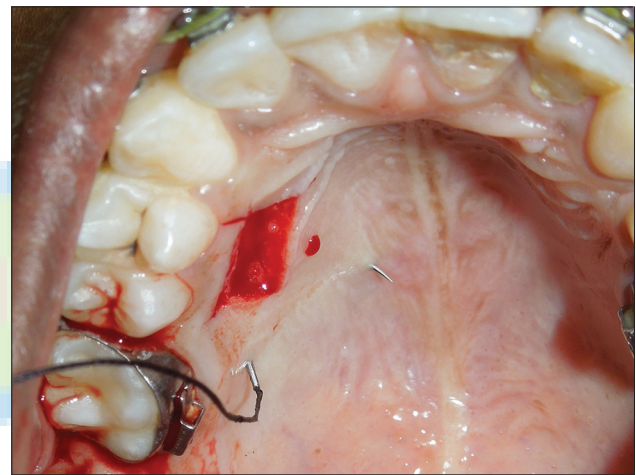
The GPB emerges onto the palate from the greater palatine foramen and courses anteriorly. In a study of 300 dry human skulls, Westmoreland and Blanton<sup>[8]</sup> reported that the greater palatine foramen was located opposite or distal to the third molars in 57% of the skulls and opposite to the second molars in 9.7% of the skulls. The authors observed that the greater palatine foramen was consistently located 1.5 cm from the palatal midline and 0.19 cm from the posterior border of the hard palate and suggested that this relationship can be used to predictably locate the greater palatine foramen.<sup>[8]</sup> Fu *et al.*<sup>[3]</sup> reported that the greater palatine foramen was located between the second and third molars in 66.6% of their cases. Klosek and Rungruang<sup>[9]</sup> reported the greater palatine foramen to be located adjacent to the second molars in 35.7% and adjacent to the junction of the second and third molars in 35.7% of their samples.

Studies using cadavers have reported the location of the GPB in relation to the cemento-enamel junction (CEJ) of the maxillary teeth. Reiser *et al.*<sup>[6]</sup> reported that the GPB was located at a distance of 7, 12 and 17 mm from the CEJ of maxillary teeth in shallow, medium and high palatal vaults respectively. In another cadaver study, Fu *et al.*<sup>[3]</sup> reported that the GPB was located 13.1 ± 2 mm from the CEJ of the first molar and 12.2 ± 2 mm from the CEJ of the premolar teeth. Yilmaz and Ayali,<sup>[10]</sup> used cone beam computerized tomography to locate the GPB and reported that the GPB was located at a distance of 14 mm from the CEJ of the first molars and 10.8 mm from the CEJ of the canine teeth. The CEJ can be used as a clinical guide to assess the location of the greater palatine foramen. This may be complicated in situations where the CEJ is not exposed clinically or has been lost due to erosion or abrasion. The present technique aims to overcome this using the palatal midline as a fixed reference for the location of the GPCS.

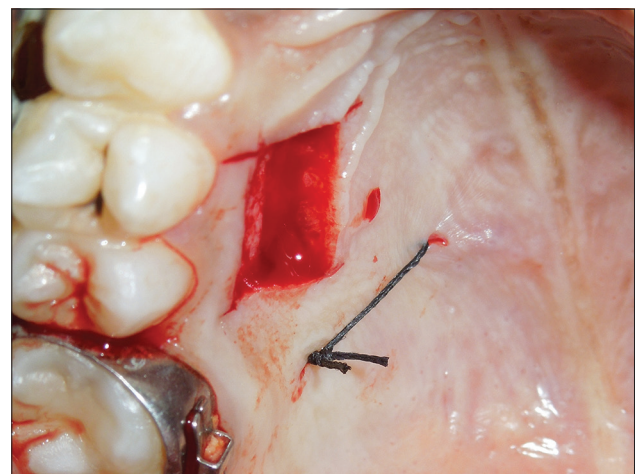
The suture is placed between the graft donor site and the greater palatine foramen. The greater palatine bundle courses anteriorly from the greater palatine foramen which is assumed to be about 15 mm away from the palatal midline.<sup>[8]</sup> Point A is identified at 20 mm from the midline so that the suture may be allowed to



**Figure 1:** Diagrammatic representation of the landmarks for the proposed suturing technique. Point A denotes the point of entry of the needle. Point B denotes the point of emergence of the needle. The palatal midline is taken as a reference for the clinical measurements



**Figure 2:** Needle passed from Point A to Point B



**Figure 3:** Greater palatine compression suture in place. Visible blanching of the palate at the area of the suture indicates a correctly placed compression suture

loop the greater palatine bundle and emerge at point B [Figure 1]. Braided silk is used as the material of choice as it can be knotted

under tension. It cannot be clinically determined whether the suture loops the greater palatine artery or merely exerts pressure on the surrounding tissue. The possibility of injuring the GPB is also present. Nevertheless, this suturing technique has demonstrated consistent benefit in controlling palatal bleeding.

Several techniques have been tried to control palatal hemorrhage due to the FGG harvesting procedure. Traditional techniques such as the use of ligature wires, periodontal dressings, and a Hawley's plate have been described by Farnoush<sup>[4]</sup> as techniques for improving patients' comfort and to support the palatal healing. While these techniques can potentially manage the routine palatal hemorrhage, their efficacy to control severe hemorrhage has not been documented. Saroff *et al.* observed that microfibrillar collagen dressing is an effective hemostatic agent.<sup>[11]</sup> Rossmann and Rees documented the use of absorbable gelatin sponge and oxidized cellulose as effective agents to control palatal hemorrhage, but noted that the sites with absorbable gelatin sponge showed delayed healing.<sup>[12]</sup> Electrocoagulation is an easy and effective technique for controlling the palatal hemorrhage but special equipment and precautions are required for its use. Human studies on the effects of electrocautery on the tissues are lacking, but the evidence from animal studies shows that the sites treated with electrosurgery show deeper inflammatory effects and delayed healing.<sup>[13,14]</sup>

The palatal suture has been employed with good success to control the hemorrhage from the FGG donor site,<sup>[6,7]</sup> but a precise protocol has not been suggested. The technique described here is an easy to learn technique and does not require any special equipment or material. An effort has been made to identify landmarks that are easily identifiable and to suggest a technique that is reproducible. The suture can be used on encountering severe bleeding, on damaging the greater palatine vessel or when other less invasive techniques fail to arrest the palatal hemorrhage. The efficacy of this technique needs to be compared to other known techniques in well-designed clinical trials.

The proposed protocol for the GPCS has shown reproducible results in consecutively treated cases and can be a valuable tool to control palatal hemorrhage. This can reduce the intra- and postoperative morbidity experienced by the patient.

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The authors would like to thank Dr. Tanya Jadhav for sharing her experiences with palatal soft tissue grafting procedures and the management of severe palatal hemorrhage. The authors also acknowledge the contribution of Dr. Vivek Patel toward the literature review.

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#### Conflicts of interest

There are no conflicts of interest.

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