

## CASE REPORT

# Papilla Reconstruction: Reclaiming the Lost!

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## ABSTRACT

Increasing esthetic demands of the modern era has converted modern dentistry to pink and white esthetic dentistry. One of the most difficult goals in the regeneration of the soft tissues is the reconstruction of interdental papilla. A number of techniques have been tried, but the results still lack predictability. Nonsurgical techniques include repeated curettage of the interdental papilla, orthodontic and restorative correction, and hyaluronic acid application, while surgical techniques include pedicle and free gingival graft, connective tissue grafts, and subepithelial connective tissue graft. This article presents a report of two cases where a combination of platelet-rich fibrin (PRF) and pedicle graft was utilized to retain maximum vascularity and minimize scar tissue formation. The atraumatic management of the tissues with a pouch-like design avoids tension and pressure and is critical for the success of the procedure. Adequate fill of the interdental papilla was observed in both the cases and the results were stable up to 6 months.

**Keywords:** Hyaluronic acid, Interdental papilla, Platelet-derived growth factor, Platelet-rich fibrin, Transforming growth factor-beta.

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## INTRODUCTION

Modern dentistry revolves around pink and white. The harmony of pink and white esthetics remains the cornerstone of meeting the increasing esthetic demands of the modern era. A black triangle, that is the loss of interdental papillae, remains one of the most common conditions creating both esthetic and phonetic impairment. They are unesthetic and lead to food impaction that adversely affects the health of the periodontium. This loss of gingival embrasure can be due to a number of factors, including periodontal disease, interproximal contact and shape of the crown, gingival biotype, and gingival embrasure

space. So, the main goal of pink esthetics is reconstruction of the lost papilla.

An array of techniques has been tried for the reconstruction of interdental papilla including both nonsurgical and surgical. Nonsurgical techniques, such as repeated curettage of the interdental papilla,<sup>1</sup> orthodontic<sup>2</sup> and restorative correction, hyaluronic acid application,<sup>3</sup> have been tried and are less predictable offering less scope for papilla gain. However, surgical techniques include pedicle and free gingival graft and connective tissue grafts and subepithelial connective tissue grafts.<sup>4-8</sup> They are invasive and more challenging.

Recently, Choukroun's platelet-rich fibrin (PRF) has been tried for papillary reconstruction. Platelet-rich fibrin, a second-generation platelet concentrate, is an autologous fibrin that promotes wound healing, hemostasis, release of growth factors, such as platelet-derived growth factor (PDGF), transforming growth factor- $\beta$  (TGF- $\beta$ ) and insulin-like growth factor-1 (IGF-1) and promotes soft tissue augmentation. Platelet-rich fibrin consists of an intimate assembly of cytokines and structural glycoproteins enmeshed within a slowly polymerized fibrin network.<sup>9</sup>

The present article describes two cases of an innovative surgical technique to achieve soft tissue reconstruction of the interdental space.

## CASE REPORTS

### Case 1

A 26-year-old female visited the Department of Periodontics, Faculty of Dental Sciences, MS Ramaiah University of Applied Sciences, with the chief complaint of space in between her gums in the upper front teeth region. Clinical examination revealed partial loss of papilla between 11 and 21. There was no gingival recession seen on the facial surfaces and the gingiva was healthy. A high labial frenum attachment was observed between 11 and 21. Papilla index score (according to Jemt 1997) was used to assess papillary contour,<sup>10</sup> and papilla index score was 2. Radiograph revealed no loss of interdental bone (Figs 1A to G).

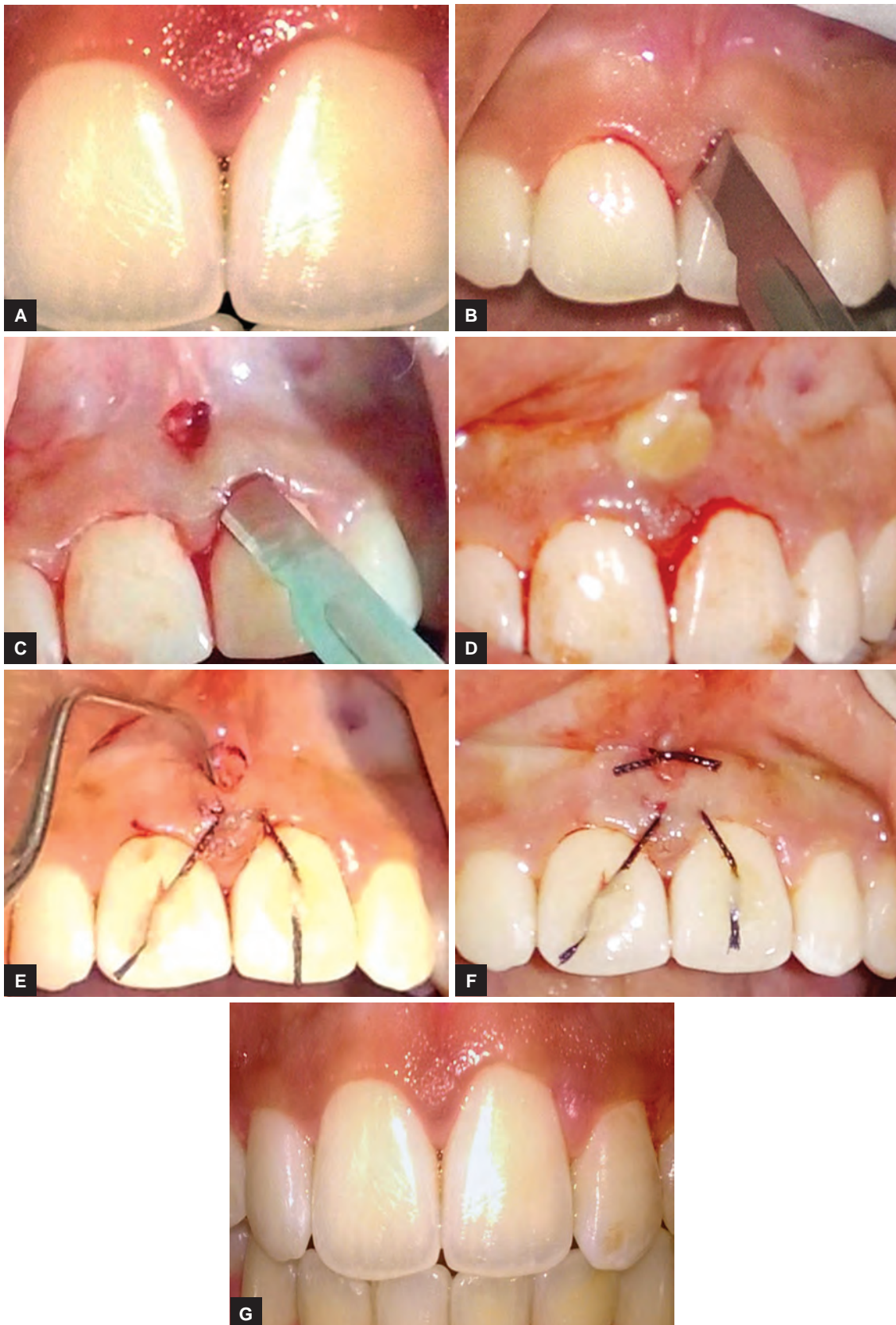
### Case 2

A 20-year-old female presented to the Department of Periodontics with the chief complaint of space in between her gums with partial loss of papilla between 11 and 21. On clinical examination, a papillary type of frenum

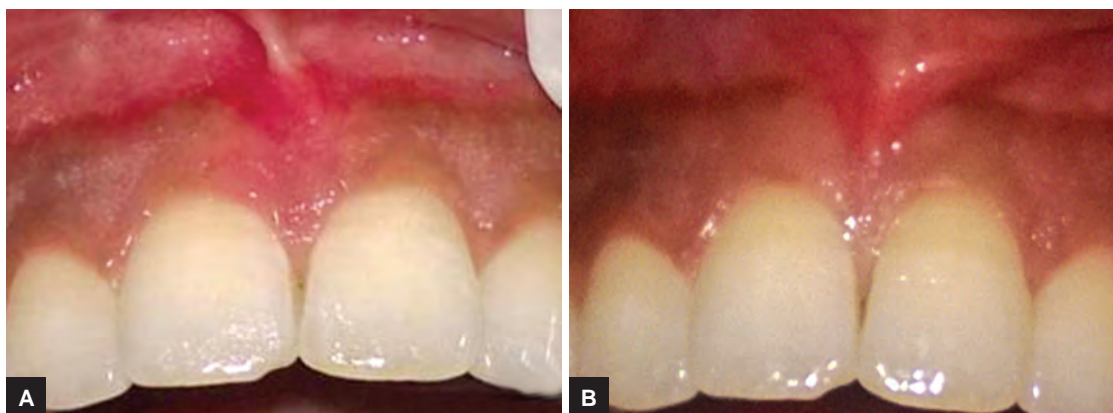
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**Figs 1A to G:** (A) Preoperative view showing black triangle irt 11, 21; (B) crevicular incisions with papilla preservation; (C) labial frenotomy done and pouch created; (D) PRF tacked in the pouch facilitating the displacement of gingivopapillary unit coronally; (E) sutures secured using composite stops; (F) 6 months postoperative; and (G) (case 1)



**Figs 2A and B:** (A) preoperative view showing black triangles irt 11, 21; and (B) 6 months postoperative (case 2)

attachment was observed between 11 and 21 (Figs 2A and B). No facial gingival recession and gingival inflammation was observed. Papillary contour measurements were done using papilla index score. There was no loss of interdental bone.

### SURGICAL PROCEDURE

The surgical procedure was explained to the patient and an informed consent was obtained. Preoperatively, patient was asked to rinse with 0.12% chlorhexidine digluconate for 30 seconds. 2% lignocaine hydrochloride was used to achieve adequate local anesthesia. Labial frenotomy was done and crevicular incisions were given around 11 to 21 and papilla was preserved. Through the incision toward the frenum, a pouch was created by its continuation in the interdental area. A curette was then used around the necks of the involved teeth to free the tissue attachment from the root surface, facilitating the displacement of gingivopapillary unit coronally. The PRF was prepared from patients' blood as per Choukroun's method and was squeezed to form a thick fibrin membrane which could be easily pushed into the pouch coronally, enabling to fill the bulk of the interdental papillae. It was secured using sutures placed on the stops created on the teeth using composite. A periodontal dressing was placed and the patient was asked to rinse with chlorhexidine digluconate (0.12%) rinse twice daily for 10 days. Analgesics and antibiotics were prescribed. Sutures were removed 10 days after the procedure and oral hygiene instructions were reinforced. After 10 days, postoperative healing was uneventful with minimal pain. Adequate fill of the interdental papilla was observed. Both the cases were followed up for 6 months.

### DISCUSSION

Treatment of black triangles is one of the most challenging and technique-sensitive procedures. A variety of

procedures have been tried for papilla reconstruction, including both nonsurgical and surgical techniques. However, the success depends on the elimination of the etiological factors before papillae can be reconstructed. In 1985, Shapiro advocated a noninvasive approach by inducing proliferation of the gingival tissue after repeated scaling and curettage.<sup>1</sup> Beagle used a combination approach of roll technique and papilla preservation technique.<sup>4</sup> Free soft tissue grafts for papillary augmentation with coronal displacement of the gingival-papillary unit and placement of subepithelial connective tissue graft was described by Han and Takei.<sup>5</sup> Interdental papilla reconstruction along with reconstruction of interdental bone to create appropriate support for gingival papilla has also been reported.<sup>6</sup> Each technique has its own advantages and disadvantages. However, no long-term results are available that could demonstrate superiority of one technique over another. One of the major factors in the success of the surgical procedure is the restoration of the vascular supply to the graft. Thus, to accomplish this, pedicle flaps were introduced. However, even with different surgical techniques and flap designs, results are not predictable and lack long-term stability.

With the introduction of Choukroun's PRF, periodontal plastic procedures are achieving better results. Use of PRF enhances neoangiogenesis, provides ideal healing properties, and allows remodeling of the soft tissue. Moreover, PRF is organized as a dense fibrin scaffold with a specific release of growth factors (TGF- $\beta$ , PDGF-AB, and VEGF) and glycoproteins during  $\geq 7$  days.<sup>11</sup> It is easy to procure and prepare and lacks biochemical handling of the blood.

The combination of PRF and the pedicle flap used in these cases retains maximum vascularity and minimizes scar tissue formation. The atraumatic management of the tissues and avoidance of tension and pressure are critical

for the success of the procedure. This pouch-like design contributes to the dual blood supply from the underlying connective tissue and the overlying flap and maintains the flap in a stable position.

The present technique eliminates the excessive trauma to the soft tissues by accessing the papillary tissue through the labial frenum. Moreover, it avoids incisions that lead to interruption of the vascular supply at the midpapillary level. Enhancement of the height of the papilla was seen with the use of this technique. Papillary index score was improved from score 3 to 4.

## CONCLUSION

This case report presents a novel surgical technique using PRF to regenerate the lost interdental papilla. Adequate increase in papillary height was observed after 6 months and the results were found to be stable. However, studies with increased number of cases and longer follow-up periods are required to determine the predictability of this procedure.

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