



Aesthetic Papillary Reconstruction – A Case Report of a New Technique Using Connective Tissue Graft

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Authors' contributions

This work was carried out in collaboration between all authors. Authors KJ and JT designed the study, wrote the protocol and wrote the first draft of the manuscript. Author SV managed the literature searches, analyses of the study and author NJ read and approved the final manuscript.

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Case Study

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ABSTRACT

Lost interdental papilla- commonly known as 'black triangles' are of great concern from the aesthetic as well as phonetics point of view when occurs in the anterior maxillary region. This causes an enormous effect on the self esteem of a person. The correction of lost interdental papillae is however one of the most challenging periodontal plastic surgical procedures as the interdental papilla is an end organ and does not have a blood supply of its own. Various techniques have been proposed with varied success rate for its management. We elicit a case report of papillary reconstruction in this article using connective tissue graft by undermining the gingiva-papillary unit to preserve the papillary blood supply.

Keywords: Papillary reconstruction; connective tissue graft; interdental papilla.

1. INTRODUCTION

The growing concerns of aesthetics in the present scenario make the work of a general dentist very daunting. Loss of interdental papilla is one such common cosmetic challenge faced by a clinician particularly due to the peculiarity of the blood supply in that region. Apart from aesthetics, it also causes concerns of phonetics as there needs to be a complete obstruction of the interdental space for the proper resonance of voice. Also, there leads to increased plaque accumulation and consequently periodontal problems because of the lack of self cleansing action of the black triangles. All these clubbed together can lead to lack of self esteem in the public if left untreated.

The etiological pyramid of the black space has been proposed by Sharma and Park in 2010. They proposed that the cause of loss of interdental papilla could be the initial position of the teeth (diastema), the length of gingival niche area, triangular shaped crown, divergent roots and periodontal bone loss [1]. Also tooth brush trauma and decreased keratinisation due to ageing has also been implicated as a causative factor of interdental papilla loss [2].

It therefore makes it of utmost gravity the role of re-constructing the lost interdental papilla due to any reason. Many surgical and non-surgical techniques have been proposed for papillary reconstruction [3-6]. One of the benchmark papillary reconstruction techniques was given by Han and Takei in 1996 [7]. We propose a slight modification in this technique to preserve the blood supply of the gingiva.

2. CASE AND SURGICAL TECHNIQUE

A 39 year old female who works as a teacher reported to the dental OP with a chief complaint of black triangles in the upper anteriors. On clinical examination, she had type II interdental papilla according to Norland and Tarnow's classification and had fair oral hygiene [8] (Fig. 1). The clinical attachment loss in the interdental region from 13 to 23 was found to be 4 mm. There were no periodontal pockets present. The cause of interdental papillary loss in relation to 11 and 12 was attributed to be the triangular shaped crown because of which the contact point was more coronally present. The gingival biotype of the patient was found to be 0.75 mm i.e. thin biotype according to Siebert and Lindhe [9]. Phase I therapy was done for the patient as a part of the surgical preparation. A complete blood

examination was taken for the patient as was found to be under normal range.

Local anaesthetic gel was applied on the desired area followed by 0.2% dilution of lignocaine with 1 in 1,00,000 dilution adrenaline. Three connecting semilunar incisions were made 2 mm apical to the mucogingival junction starting and ending at the midbuccal regions of 12, 11, 21 and 22 (Fig. 2). No crevicular incision was made. Instead, an Orban's knife was used to undermine through the entire attached gingiva making it a partial thickness flap which was done to preserve the blood supply of the area (Fig. 3). This made the gingivo-papillary unit mobile to be coronally displaced. A subepithelial connective tissue graft (CTG) of adequate length was harvested from the 14 to 16 region using the 'trap door' technique which is the least traumatic technique for harvesting of the CTG (Fig. 4). The harvested CTG was then placed inside the pouch, created after the coronal displacement of the gingivo-papillary unit and was stabilised by direct loop sutures at the interdental papilla (Fig. 5). The CTG was also stabilised by the help of vicryl at the mesial and distal ends and finally the flap is sutured without tension using black silk.



Fig. 1. Type 2 Interdental Papilla- The tip of the interdental papilla lies at or apical to the interproximal CEJ but coronal to the apical extent of the facial CEJ



Fig. 2. Semilunar Incision beyond the mucogingival junction

The surgical site was protected by placing a tin foil and periodontal dressing for two weeks. The patient was asked not to disturb the surgical site and to avoid tension at that area. The patient was also advised to refrain from tooth brushing at the surgical site and was asked to use chlorhexidine mouthwash for a period of two weeks to avoid plaque accumulation.



Fig. 3. Undermining the flap using Orban's knife making the gingiva-papillary unit mobile

The patient was re-called for evaluation after 2 weeks for removal of the periodontal dressing and sutures. The wound healing was found to be satisfactory. Post surgical instructions were re-enforced. The patient was advised to use ultra soft bristles for a period of 1 month. She was also instructed to gently effleurage her gums from apico-coronal direction regularly in the treated site to promote coronal migration of

interdental papilla and to promote vascularity and keratinisation.



Fig. 4. Procured connective tissue graft from the palate



Fig. 5. CTG stabilized with interrupted sutures



Fig. 6. One year post-operative view showing 80% papillary fill

The patient was periodically reviewed 2 months, 6 months, 8 months and 12 months post-operatively. 80% closure of the interdental space was observed along with an additional increased in the width of attached gingiva to 2.5 mm.

3. DISCUSSION

The surgical reconstruction of the papilla is a challenging task because the only source of blood supply of the interdental papilla originates from the base of the papilla. The arterioles arising from the crest of the alveolar bone, the periodontal ligament and the gingival tissue all anastomose and form a plexus at the interdental papillae. Hence, currently there are no predictable absolute surgical procedures advocated for the reconstruction of the papilla.

Surgical techniques can make use of pedicle grafts, free gingival grafts (FGG), connective tissue grafts or platelet rich concentrates. Pedicle grafts have been preferred over FGG as the base of the pedicle provides a good blood supply [10]. Beagle in 1992 attempted to reconstruct the lost interdental papilla by using displaced flaps [3]. Han and Takei in 1996 were the first to propose papillary reconstruction using soft tissue grafts [7]. They used two incisions to mobilize the gingivo-papillary unit, the first one being the semilunar incision apical to the mucogingival junction and the second one being the crestal incision. They then tucked in CTG and sutured the site. Pellegrine modified Takei's technique by folding the CTG to provide adequate thickness of the attached gingiva [4]. Azzi in 1988 proposed a surgical technique in which a partial thickness flap is reflected in the labial and palatal region and the graft procured from the tuberosity is placed and sutured under the labial and palatal flaps [5]. Azzi in 1999 proposed another technique for the management of recession and lost interdental papilla in which a semilunar flap was elevated followed by split thickness elevation in the buccal flap and full thickness in the papilla attached to the palatal flap [6]. Vertical incisions instead of semilunar incisions and elevation of full thickness flap were proposed in 2011 by Carranza et al. [11] to prevent blood supply damage.

All attempts of papillary reconstruction have been focussed on preserving the vascularity. In the same interest, we attempt to modify Han and Takei's [7] technique for papillary reconstruction by undermining the flap using Orban's knife and not making crevicular incisions. Also, we made 3

connecting semilunar incisions apical from the mucogingival junction rather than a single semilunar incision in the same interest. After a continuous evaluation of a period of one year, we could achieve satisfactory results in the papillary fill as well as the width and biotype of the attached gingiva.

Gingival biotype has been assessed by Siebert and Lindhe and categorised into thin when the gingival thickness is less than 1.5 mm and thick biotype when the gingival thickness is more than 2 mm [9]. In the present case, along with the papillary fill, we observe an improvement in the gingival biotype that increases the predictability and long term success of the result. The gingival biotype improved from 0.75 mm to 2 mm as measured by an endodontic file bone mapping.

The modification proposed in this case report provides satisfactory results. However, an ideal patient selection and meticulous oral hygiene procedures implemented by the patient are of utmost importance for the success of the treatment.

4. CONCLUSION

The correction of interdental papilla by modifying the classical Han and Takei technique to preserve the interdental papilla blood supply involves the undermining of the interdental papilla instead of splitting the interdental papilla and reflecting a mucoperiosteal flap. This technique provides a stable result for the growth of interdental papilla.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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