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RESEARCH ARTICLE

A GOLD STANDARD FOR RECONSTRUCTION OF LOST INERDENTAL PAPILLA – A CASE REPORT

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ABSTRACT

Surgical Reconstruction of the lost interdental papilla is the most difficult and elusive goals of periodontics in the field of reconstruction, regeneration and esthetic aspect of periodontal therapy .Loss of interdental papilla could result in patient complaints such as phonetic problems, food impaction, functional problems and esthetic concern. It is clinically represented by open embrasures and is often referred to as the "black triangle". Periodontal plastic surgery offers both surgical and non surgical approaches in the treatment of "Black triangle .Treatment of marginal tissue recession, excessive gingival display, deficient ridges, ridge collapse, and esthetic defects around teeth and implants are some of the esthetic problems associated with the interdental papilla that have to be corrected in todays scenario which has been discussed in this

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INTRODUCTION

In recent years, enhanced awareness of beauty and esthetics has lead to increase esthetic demands in dentistry. Equilibrium between "white" and "pink" esthetically is ultimate goal in modern restorative dentistry. One of the most challenging and least predictable problems is reconstruction of the lost interdental papilla. Lost interdental papilla can lead to cosmetic deformities, phonetic problems (space allows passage for the air or saliva), and lateral food impaction (Pini Prato, 2004; Tarnow, 1992). The absence or loss of interdental papillae can be due to several reasons like plaque associated lesions, traumatic oral hygiene procedures, abnormal tooth shape, improper contours of the restoration, spacing between teeth or loss of teeth. Several surgical and non-surgical techniques have been proposed to treat soft tissue deformities and to manage the inter-proximal space. The surgical techniques aim to recon tour, preserve or reconstruct the soft tissue between the teeth and the implants (Pini Prato *et al*., 2004). The most successful and predictable technique for reconstruction of lost papilla is sub epithelial connective tissue grafting .This case report highlights the importance of the inter-proximal papilla and it's clinical significance and the progress of the papilla augmentation, based on the use of a sub-epithelial connective tissue graft for the treatment of the "Black Triangle".

Case presentation: This case was undertaken in the Department of Period ontology at the D. Y PATIL SCHOOL

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OF DENTISTRY, NAVI MUMBAI India. A 50 year old patient reported to the department with a chief complaint of food lodgment in upper front region since 1 month. On clinical examination there was class I loss of the inter-dental papilla (Nordland, 1998) in the maxillary anterior region. The distance between the bone crest and the contact point was ≤ 5mm and the height of the inter-dental papilla was < 4mm (Fig 1). The patient had normal alignment of the teeth in the maxillary arch, he was a non-smoker and no proximal caries or improper restoration were present with respect to the site.

The pre-surgical protocol: The treatment protocol was explained to the patient and an informed consent was obtained. After the phase one therapy, scaling and root planning was done. The clinical parameters such as the Papilla Index Score and the Height of Interdental Papilla were measured .The height of inter-dental papilla was determined according to McGuire MK *et al* (2007). In this procedure, the inter-dental papilla was anaesthetized with 2% lignocaine hydrochloride. A William's periodontal probe was used to measure the distance between the bone crest to the apical end of the contact point (H) (Fig 2). Loss of the papilla was determined by measuring the distance between the tip of the inter-dental papilla to the apical end of the contact point (H1) (Fig 3). Then, the height of the inter-dental papilla (H2) was determined by subtracting H1 from H.

The surgical technique: The patient was recalled after 1 week after scaling and root planing. The surgical area was anaesthetized with 2% lignocaine hydro-chloride which contained 1:2,00,000 adrenaline. A semilunar incision was made 3mm apical to the muco-gingival junction facial to the inter-dental area, followed by a pouch like preparation towards the inter-dental area. Intra-sulcular incisions were made around the necks of the adjacent teeth to free the connective tissue attachment from the root surface, to allow the coronal displacement of the gingiva papillary unit (Fig 5.)

Obtaining the Graft from the Donor Site: The sub-epithelial connective tissue graft was harvested from the palate following a single incision design. A No. 15 blade was used to make a partial thickness horizontal incision, about 3mm apical to the gingival margin of the first premolar, extending towards the first molar. (Fig 6). It was reflected underlying connective tissue was exposed. Asmall periosteal elevator and was used to reflect the connective tissue which was harvested. After harvesting the graft, the wound was sutured by using 4-0 black silk sutures.

Transferring and Immobilizing the Graft: The sub-epithelial connective tissue graft which was harvested from the palate was tucked in and pushed coronally within the prepared pouch to support and provide bulk to the coronally positioned interdental papilla. (Fig 7) The gingivopapillary unit was then sutured by interrupted sutures using 4-0 black silk suture. The patient was prescribed analgesics (Ibuprofen 400mg bid for 3 days) and 0.12% chlorhexidinedi gluconatemouth rinse twice daily for 2 weeks. Post-operatively, the patient was instructed to rinse the mouth with 0.12% chlorhexidine mouthwash for 10 days and to refrain from flossing or interdental brushing for 4 weeks. The sutures were removed after 14 days .The surgical site was evaluated on follow up visits and clinical parameters were recorded at the end of 1 month and 6 months. For clinical and statistical analysis, the measurements at baseline (Fig 9, 10), 2 weeks (Fig 11,12) , 1 month (Fig 13 , 14) and 6 months (Fig 15, 16) were taken into consideration.

RESULTS

The results was based on Papilla Index Score and distance between tip of interdental papilla to apical end of contact point The Papilla Index Score was given by Nemcovsky CE 2001) PIS 0: No papilla was present and there was no curvature of the soft tissue contour.

PIS 1: Less than half the papilla height was present as compared to that in the proximal teeth; a convex curvature of the soft tissue contour was observed.

PIS2: At least half the papilla height was observed, but it was not in complete harmony with the inter-dental papilla of the proximal teeth.

PIS 3: The papilla filled the inter-proximal embrasure to the same level as in the proximal teeth and it was in complete harmony with the adjacent papilla.

So, the papilla index score of the patient on the day of surgery was PIS 2. The PIS on 1 month later was PIS 3 which remained same after 6 months. Hence there was increase in PIS score by score 1 in 6 months. The distance between tip of interdental papilla to apical end of contact was measured on the day of surgery it was < 5mm, 1 month it was < 3 mm and on 6 months was decreased by <2mm. A 100 % fill of the interdental papilla was noted after 6 months.

DISCUSSION

One third of adults have unaesthetic black triangles (Kokich, 1999). Other studies found that black triangles were found in 67% of the population over 20 years of age compared with 18% in the population under 20 years of age patient attitude towards black triangles was dissatisfactory and was found to rank quite high among aesthetic defects Tarnow's study (Tarnow *et al*., 1992) has become a standard in calculation of crestal bone to contact area distance when predicting the stable papilla height. His study, based on 288 patients, showed that when the contact point was within 5.0 mm of the crestal bone, the papilla was present in 100% of samples. However, when the distance was 7.0 mm, the papilla was present in only 27% of samples (Tarnow, 1992). Wu YJ also found that a distance of 5, 6, and 7 mm resulted in an open embrasure in 2, 44, and 73% of the cases respectively (Wu, 2003). These observations indicates that papilla was present in almost 100% of the cases if the distance from the alveolar crest to the contact point was 5 mm or less. When the distance was more than 7 mm, most patients had an open gingival embrasure. For those with periodontal diseases, it is the bone loss that increases the distance between the contact points and alveolar crest and eventually creates open gingival embrasures. Tarnow's 5.0 mm rule might be skewed in a favorable or unfavorable direction because there are many factors that determine the presence of black triangles such as the root angulations, teeth shape, occlusion and previous trauma. The chances of 'black triangles' is minimal in triangular teeth that have narrow, more incisally positioned contact point compared with that of square-shaped teeth with wide contact points. The degree of interproximal fill is also dependent on the periodontal biotype.

Fig. 1. Pre-operative view (loss of inter-dental papilla in relation to 11, 21

Fig. 2. Distance between the bone crest and the contact point (H1)

Fig. 3. Distance between tip of interdental papilla to apical end of contact point

Fig. 4. Semilunar incision placed 3mm apical to mucogingival junction Intrasulcular incisions given and tunnel prepared

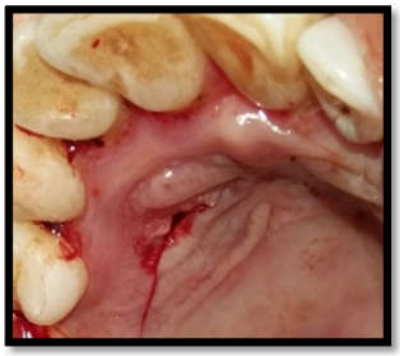

Fig. 5. Palatal donor site with single incison design

Fig. 6. Sub- epithelial connective tissue graft

Fig. 7. Connective tissue was placed in the tunnel

Fig. 8. The recipient site was sutured by 4-0 black silk sutures

Fig. 9. baseline

Fig.10. Distance between tip of interdental papilla to apical end of contact point

Fig. 11. After suture removal(14 days)

Fig. 12. Distance between tip of interdental papilla to apical end of contact point

A thin tissue type creates unaesthetic hollow gingival embrasures while a thick periodontal biotype encourages interdental fill, (Ahmad, 2005). McGuire MK *et al* (2007) suggested that the success and the predictability of any surgical procedure for treating papilla loss is based on the amount of the papilla fill (McGuire, 2007).

In this case, maintenance of good oral hygiene was the reason of complete fill of the papilla in the site due to the stability of the connective tissue graft .This procedure was employed in accordance with that of Han TJ and Takie HH (1996). Effective method of achieving predictable and stable results for treating papilla loss is semi lunar coronally repositioned papilla

Fig. 13. Post operative site after 1 month

Fig. 14. Distance between tip of interdental papilla to apical end of contact point

Fig. 15. Post operative site after 6 month

Fig. 16. Distance between tip of interdental papilla to apical end of contact point

Fig. 17. Pre - Operative

Fig. 18 Post - Operative

was combined with a sub-epithelial connective tissue graft. The advantages of this technique and success of this grafting procedure was mainly due to the dual blood supply from the underlying connective tissue base and the overlying recipient flap, an excellent color match and a donor site with a closed wound which provided less post-operative discomfort. The main advantage of using a tunnel or a pouch like design for this case was that it avoided a horizontal or vertical releasing incision, which helped in maximizing the papillary and the lateral blood supply to the submerged connective tissue graft. The atraumatic management of the tissues, respect for the blood supply and avoidance of tension and pressure are critical for the viability of the tissues and the success for the procedure. This flap design maximizes the soft tissue vascularity and the primary wound closure. The sub-epithelial connective tissue graft was procured by the single incision technique, as described by Hurzeler (Hurzeler, 1999). The advantage of single incision technique is healing with primary intension at donor site and very less postoperative morbidity to the patient. The grafted tissue receives a flow of plasma and an in growth of capillaries from the periosteum, the underlying connective tissue and the overlying flaps. Reliable solution to an aesthetic problem is achieved by use of a sub-epithelial connective tissue graft for interproximal papilla augmentation. The papilla augmentation procedure is relatively easy and it is based on the principles of plastic surgery techniques.

Conclusion

Rebuilding gingival esthetics is an important issue in modern esthetic dentistry. This clinical case report suggests that soft tissue augmentation with sub epithelial connective tissue harvested from palate, is an ideal treatment for black triangle with predictable results. However, for better evaluation of the papilla fill a longer follow up is advisable.

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