International Journal of Drug Research and Dental Science
Volume 3 Issue 2 (Page: 97-105), 2021 ISSN: 2582-0826

Interdental Papilla Reconstruction using Modified Nordland's Microsurgical Technique: A Case Study

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Case Study
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Crossref doi: https://doi.org/10.36437/ijdrd.2021.3.2.K

ABSTRACT

Introduction: Interdental papillary loss due to trauma or as sequelae of inflammatory periodontal disease creates an unaesthetic appearance and it is also a challenge to treat. Management of these cases by conventional techniques is unpredictable owing to the availability of limited working spaces and also the delicate vascular supply of the interdental region.

Case presentation: In this case study, we describe a modified version of Nordland's technique using ophthalmic blades for the reconstruction of lost interdental papilla. The avoidance of placing a releasing incision preserves the vascular channels and may not cause unaesthetic scarring. The augmented papillary site was stable after 2 years of follow-up.

Conclusion: The Nordland's microsurgical technique offers a predictable method of papilla augmentation. The present technique relies on the placement of microsurgical dissection, atraumatic handling of the split-thickness flap, and the precise tailoring of suspensory sutures.

Keywords: Periodontal Regeneration, Periodontal Surgery, Wound Healing, Evidence Based Dentistry, Cosmetic Periodontal Plastic Surgery, Connective Tissue Grafts.

Background

Surgical reconstruction of the interdental papillae is a challenging task. The smaller dimension of the interproximal area and the vascularity of the interdental papilla, hinder attaining predictable results. Numerous surgical techniques for the reconstruction of soft tissue around the dental implants and teeth[1–12] have been described. In 1996, Han and Takei[11] introduced the use of a buccal approach with a semilunar incision to gain access to the interdental area for reconstruction of the papilla. Cortellini et al[8,9] described a simplified papilla preservation flap by the placement of a releasing incision and insertion of a barrier membrane under the surgical site. Azzi et al[2–6] have described the usage of connective tissue and bone for

augmentation of the deficient papilla. However, these techniques involve the placement of multiple incisions that may disrupt the vascular supply to the deficient papilla.

Nordland[13] et al described a microsurgical technique to position the connective tissue graft under a deficient papilla without the use of releasing incisions. This will increase the likelihood of graft survival and also minimizes tissue trauma, excessive bleeding, scarring, and pain. Nordland introduced a micro scalpel with a blade width of 0.9 mm (Nordland Papillae N-6900 Micro Scalpel, Sable Industries) which he modified to form a J-hook, for the placement of circumferential intrasulcular incision. He used this blade to undermine the papillary tissue and to prevent flap perforation owing to the delicate anatomy of the interdental papilla.

In this case study, we performed a modified approach of the original Nordland's technique with the use of microsurgical ophthalmic blades instead of a Nordland Papillae N-6900 Micro Scalpel. The patient demonstrated success using this technique along with restorative widening of the mesiodistal dimension with the help of direct composite veneering.

Clinical presentation

The classification of the initial preoperative interdental papilla was determined using the Nordland and Tarnow classification scheme.[14] After obtaining verbal consent, a patient with Class 1 loss of papilla in relation to #8 and #9 was selected for surgical correction **(Figure 1)**. The desired gingival incisal height difference was measured using a periodontal probe; the distance from the top of the preoperative papilla tip to the desired postoperative papilla tip location was measured. This will represent the donor tissue thickness that is required to achieve an optimal result.

Figure 1: Preoperative view (Class I loss of papilla in #8 & #9 was selected for surgical correction)

Case management

Following the restoration of the incisal wearing **(Figure 2)** the interdental papilla was anesthetized, along with the facial and the palatal gingiva, with lignocaine with epinephrine (1:200,000). Root surface biomodification was done with root planing and the application of tetracycline paste for 60 seconds. Bone sounding was performed (surface to palatal bone) to locate the donor tissue and to determine the adequacy of its dimensions.

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Figure 2: The incisal edge wear of the central incisor and the restorative buildup was done by direct composite veneering.

Under a surgical dissecting microscope, a circumferential sulcular incision was made to the crest of the bone using a straight ophthalmic blade (IW 7001), severing the marginal gingiva. This incision was also extended around the neighboring teeth **(figure 3)**. Using a curved ophthalmic blade (IW 7004) that can adapt to the facial contours, the intrasulcular incision was further extended past the mucogingival junction. Using papilla elevator (PH26M) and Allen periosteal elevator (PPAEL), a split-thickness flap was prepared and the interdental papillary region was completely undermined and mobilized without perforating the delicate interdental tissue **(figure 4)**. The mobility of the undermined interdental tissue allows for easier placement of the connective tissue graft. Then with a curette, the papilla was manipulated to the desired location without any tension in the gingiva papillary unit. If any undesired pulling effect is felt, then the tunneling procedure can be repeated and then checked for the passive mobilization of the interdental papilla. The connective tissue graft was shaped to the desired papillary shape and height with a pyramidal contour. The donor tissue was also extended laterally to create root coverage for the neighboring teeth. A "lasso" suture using resorbable suture (5-0 vicryl) was done to pull and position the connective tissue graft in place. The sutures were passed through the tunnel to pull the graft tissue and to hold in position **(figure 5)**.

Figure 3: Circumferential sulcular incision was given.

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Figure 4: Tunneling done using Allen periosteal elevator (PPAEL)

Figure 5: Placement of connective tissue graft under the papilla using lasso suture

Wound tension during healing may produce pulling forces to the graft. Lip Perioral musculature also may produce tension on the overlying tissues and has the tendency to pull back the interdental papilla back to the previous denuded position. And hence to maintain the papillary tissue and the donor tissue in position, a "suspensory suture" was placed. It begins at the base of the facial interdental papilla and pierces through the donor tissue and exits through the base of the palatal papilla and is anchored around the interproximal contact point. Then composite bonding material was placed at the interproximal contacts to prevent slipping of the suspensory suture through the interproximal contact **(figure 6)**. The periodontal dressing was placed, and the patient was instructed to use a chlorhexidine mouth rinse during one week of the postoperative period.

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Figure 6: Suspensory sutures placed and stabilized using composite stops

Clinical outcomes

After one week of healing, there was an improvement in the papillary height **(figure 7)**. The site demonstrated stability after 2 years of follow-up **(figure 8, 9).**

Figure 7: One week postoperative view showing improvement in papillary height.

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Figure 8: Postoperative view (Two years postoperative follow up).

Figure 9: Before & After Papilla reconstruction

Discussion: The present technique relies on the placement of microsurgical dissection, atraumatic handling of the split-thickness flap, and the precise tailoring of suspensory sutures. Gingival papillary unit with a thin periodontal biotype is very delicate to handle, and careful manipulation is needed. The ophthalmic blades can prevent inadvertent severing and offers a cost-effective advantage.

Burkhardt and Lang[15] have demonstrated superior vascularity and predictable treatment outcomes with microsurgery. The use of an ophthalmic blade and magnification are critical to the success of this technique. Using an ophthalmic blade and the papilla elevator **(figure 10)** makes tunneling under the interdental papilla easier without splitting the buccal and lingual halves, allowing the gentle lifting of the flaps from the underlying tissues while avoiding vertical incisions, helps to preserve vascularity to the papillary unit. A conventional scalpel may not allow this precision.

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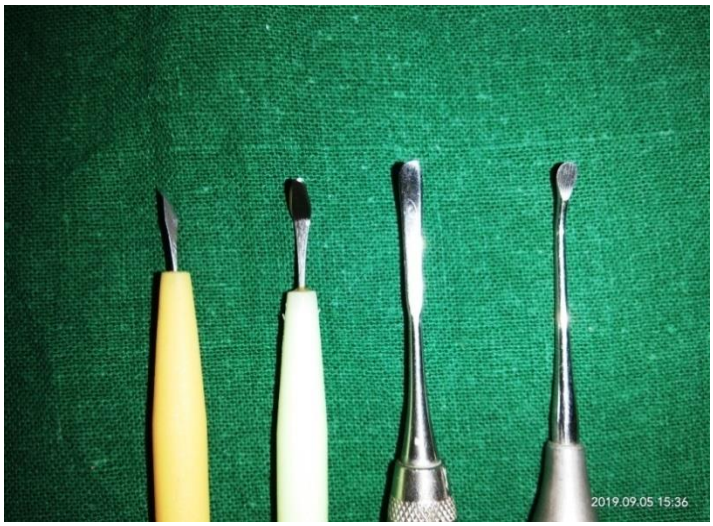

Figure 10: Straight ophthalmic blade (IW 7001), Curved ophthalmic blade (IW 7004), Papilla elevator (PH26M) and Allen periosteal elevator (PPAEL). (ordered from left to right)

Other treatment modalities for embrasure space closure can include orthodontic tooth movement, restorative reshaping of the adjacent teeth as well as surgical addition as described. The dentist should list out all of the causative parameters and choose the appropriate treatment modality. Well-controlled studies must be done for the extrapolation to the clinical settings, and to determine whether surgical magnification does enhance outcomes.

Acknowledgement: The authors have no commercial relationships or had any financial support to declare related to this case study.

One sentence summary: Microsurgical instruments are critical to the success of this technique, using an opthalmic blade and the papilla elevator allows gentle handling of flap and also helps in preserving the vascularity of the papilla.

Summary

Why is this case new information?	When performed carefully, the modified Nordland's technique can result in predictable reconstruction of the interproximal papilla.
What are the keys to successful management of this case?	Atraumatic handling of split thickness flap.
	Precise tailoring of suspensory suture.
What are the primary limitation to success in this case?	Requires technical precision.
	Sensitive to any surgical trauma and tension.
	Gingival papillary unit with a thin periodontal biotype is very delicate to handle.

References

1. Allen AL. Use of the gingival unit transfer in soft tissue grafting: Report of three cases. Int J Periodontics Restorative Dent 2004; 24: 165–175. https://pubmed.ncbi.nlm.nih.gov/15119887/
2. Azzi R, Etienne D, Carranza F. Surgical reconstruction of the interdental papilla. Int J Periodontics Restorative Dent 1998; 18: 466–473. https://pubmed.ncbi.nlm.nih.gov/10093523/
3. Azzi R, Etienne D, Sauvan JL, Miller PD. Root coverage and papilla reconstruction in Class IV recession: A case report. Int J Periodontics Restorative Dent 1999; 19: 449–455. https://pubmed.ncbi.nlm.nih.gov/10709510/
4. Azzi R, Takei HH, Etienne D, Carranza FA. Root coverage and papilla reconstruction using autogenous osseous and connective tissue grafts. Int J Periodontics Restorative Dent 2001; 21:141–147. https://pubmed.ncbi.nlm.nih.gov/11829388/
5. Beagle JR. Surgical reconstruction of the interdental papilla: Case report. Int J Periodontics Restorative Dent 1992; 12:145–151. https://pubmed.ncbi.nlm.nih.gov/1521996/
6. Blatz MB, Hürzeler MB, Strub JR. Reconstruction of the lost interproximal papilla—Presentation of surgical and nonsurgical approaches. Int J Periodontics Restorative Dent 1999; 19:395–406. https://pubmed.ncbi.nlm.nih.gov/10709507/
7. Carnio J. Surgical reconstruction of interdental papilla using an interposed subepithelial connective tissue graft: A case report. Int J Periodontics Restorative Dent 2004; 24:31–37. https://pubmed.ncbi.nlm.nih.gov/14984143/

8. Cortellini P, Pini Prato GP, Tonetti MS. The modified papilla preservation technique. A new surgical approach for interproximal regenerative procedures. J Periodontol 1995; 66:261–266. https://doi.org/10.1902/jop.1995.66.4.261
9. Cortellini P, Pini Prato GP, Tonetti MS. The simplified papilla preservation flap. A novel surgical approach for the management of soft tissues in regenerative procedures. Int J Periodontics Restorative Dent 1999; 19: 589–599. https://pubmed.ncbi.nlm.nih.gov/10815597/
10. Francetti L, Del Fabbro M, Testori T, Weinstein RL. Periodontal microsurgery: Report of 16 cases consecutively treated by the free rotated papilla autograft technique combined with the coronally advanced flap. Int J Periodontics Restorative Dent 2004; 24: 272–279. https://pubmed.ncbi.nlm.nih.gov/15227775/
11. Han TJ, Takei HH. Progress in gingival papilla reconstruction. Periodontol 2000 1996; 11:65–68. https://doi.org/10.1111/j.1600-0757.1996.tb00184.x
12. Nemcovsky CE. Interproximal papilla augmentation procedure: A novel surgical approach and clinical evaluation of 10 consecutive procedures. Int J Periodontics Restorative Dent 2001; 21:553–559. https://pubmed.ncbi.nlm.nih.gov/11794566/
13. Nordland WP, Sandhu HS. Microsurgical technique for augmentation of the interdental papilla: three case reports. International Journal of Periodontics & Restorative Dentistry. 2008 Dec 1; 28(6). https://pubmed.ncbi.nlm.nih.gov/19146049/
14. Nordland WP, Tarnow DP. A classification system for loss of papillary height. J Periodontol 1998; 69:1124–1126. https://doi.org/10.1902/jop.1998.69.10.1124
15. Burkhardt R, Lang NP. Coverage of localized gingival recessions: Comparison of microand macrosurgical techniques. J Clin Periodontol 2005; 32:287–293. https://doi.org/10.1111/j.1600-051x.2005.00660.x

How to cite this Article: **Anand Induchoodan, Remya RM, Babu Salam C;** *Interdental Papilla Reconstruction using Modified Nordland's Microsurgical Technique: A Case Study;* Int. J. Drug Res. Dental Sci., 2021; 3(2): 97-105, **doi:** https://doi.org/10.36437/ijdrd.2021.3.2.K
Source of Support: Nil, **Conflict of Interest:** Nil.
Received: 19-4-2021 **Revised:** 23-6-2021 **Accepted:** 26-6-2021