

# MANAGEMENT OF PERIODONTAL INTRABONY DEFECTS WITH THREE DIFFERENT TECHNIQUES – A CASE SERIES

<sup>[1]</sup> Paarvathi Thenappan, <sup>[2]</sup> Vijayalakshmi R, MDS, <sup>[3]</sup> Burnice Nalina Kumari, MDS, <sup>[4]</sup> Nikitha Ravi, MDS, <sup>[5]</sup> Surthi Senthil, <sup>[6]</sup> Jaideep Mahendra, MDS, PhD, Post Doc (USA), <sup>[7]</sup> Ambalavanan Namasivayam, MDS

<sup>[1]</sup>

1Ex-postgraduate student, Department of Periodontics, Meenakshi Ammal Dental College and Hospital, Faculty of Dentistry, Meenakshi Academy of Higher Studies and Research, Chennai, Tamil Nadu, India.

2,3Associate Professor, Department of Periodontics, Meenakshi Ammal Dental College and Hospital, Faculty of Dentistry, Meenakshi Academy of Higher Studies and Research, Chennai, Tamil Nadu, India.

4Assistant Professor, Department of Periodontics, Meenakshi Ammal Dental College and Hospital, Faculty of Dentistry, Meenakshi Academy of Higher Studies and Research, Chennai, Tamil Nadu, India.

5Postgraduate student, Department of Periodontics, Meenakshi Ammal Dental College and Hospital, Faculty of Dentistry, Meenakshi Academy of Higher Studies and Research, Chennai, Tamil Nadu, India.

6Dean of Research and Postgraduate studies, Professor, Department of Periodontics, Meenakshi Ammal Dental College and Hospital, Faculty of Dentistry, Meenakshi Academy of Higher Studies and Research, Chennai, Tamil Nadu, India.

7Professor and Head, Department of Periodontics, Meenakshi Ammal Dental College and Hospital, Faculty of Dentistry, Meenakshi Academy of Higher Studies and Research, Chennai, Tamil Nadu, India..

## To access & cite this article

Website: [tmjpd.com](http://tmjpd.com)



## ABSTRACT

Periodontal regenerative procedure are aimed to reconstruct the lost periodontal structures but it is quite challenging. Because the traditional techniques possess problems in providing primary closure and early wound stability. So, this case series compares the treatment of periodontal intrabony defects using the traditional Kirkland flap, with the treatment with Entire Papilla Preservation Technique (EPP) and Modified Vestibular Incision Subperiosteal Tunnel Access Technique (M-VISTA). Using the same composite bone graft material which is a combination of A-PRF gel along with Bioglass bone graft.

**KEYWORDS:** Kirkland flap, Entire papilla preservation, Modified Vestibular Incision Subperiosteal Tunnel Access Technique, composite bone graft.

## INTRODUCTION

Management of periodontal intrabony defect is found to be challenging, this could be attributed to the need for primary closure and early wound stability which is necessary to stabilize the bone graft placed. The conventional flap techniques by Kirkland et al involved the incision of the interdental papillae, which increased the risk for post-operative membrane exposure, gingival recession during secondary healing, delayed wound healing but it provided clear vision and accessibility for the defect site.

Outcome of any regenerative therapy depends on patient associated factors and surgical factors. Patient associated factors include oral hygiene, smoking, systemic diseases and bleeding on probing. Surgical factors include wound stabilization and maintaining bone graft and membranes in place. Many techniques were then developed to overcome the shortcomings of traditional technique by Kirkland et al including the minimally invasive surgical technique, papilla preservation technique, papilla preservation flap and modified minimally invasive surgical technique, pouch and tunnel technique and modified subperiosteal tunnel access technique. These techniques reduced the post-operative trauma to a minimal level, as they involved the incision of the defect associated interdental papillae. So, there still existed a need to formulate a novel approach for periodontal intrabony defect management.

This case series will discuss the management of periodontal intrabony defects using Entire Papilla Preservation Technique (EPP), Modified Subperiosteal Tunnel Access

Technique (M-VISTA) and the conventional Kirkland flap. Entire papilla preservation (EPP) technique for management of isolated deep intrabony defect was proposed by Aslan et al 2017, involves single buccal vertical incision thus completely preserving the interdental papilla which in turn aids in blood clot stabilization and thus promoting the wound healing. M-VISTA technique was initially used for ridge augmentation in the esthetic region, later Zadeh employed this procedure to achieve anterior soft tissue coverage. Later this technique was employed for management of periodontal defects in the esthetic zone by Najafi et al.

So, this case series will describe the management of periodontal intrabony defects using composite bone grafts using conventional Kirkland flap, EPP and M-VISTA with their own advantages and disadvantages.

## PREPARATORY PHASE:

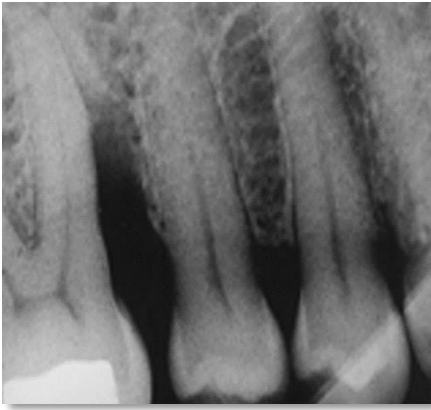
It was similar before all these flap procedures. Non-surgical periodontal therapy was performed initially to reduce the amount of inflammation; then restorative therapy was performed based on the patient's need. The patient was recalled 2-weeks after this therapy and during this recall visit patient was scheduled for the surgical appointment on sites that still had deep probing pocket depth and bone loss.

The procedure was started following the administration of local anaesthesia composed of lignocaine I.P with 2% of Bocacaine (Skymap). Transpapillary infiltration was given for both the sites. Following anesthesia bone sounding was performed

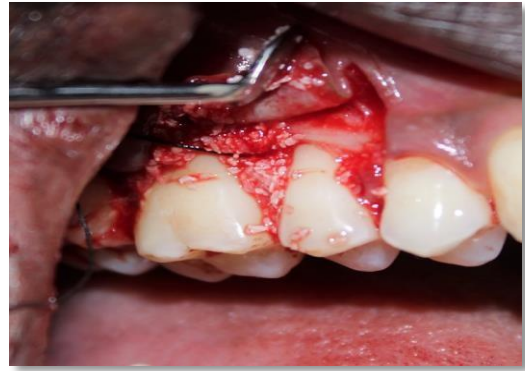
## CONVENTIONAL KIRKLAND FLAP PROCEDURE:

This technique was initially stated by Kirkland in the year 1931, to increase the access for better scaling and root planning procedure. This involves gingival crevicular incision followed by two vertical releasing incision on either side of the defect. Flap was elevated using Molt's 2 periosteal elevator. The defect was then visualised, subsequently removal of granulation tissue followed by scaling and root planning was accomplished with the use of universal curettes and ultrasonic instruments. Then the composite bone graft material was placed following pre-suturing and then the GTR membrane was placed. Flap was coronally positioned and sutured using 4-0 silk suture material with continuous sling sutures.





PRE-OPERATIVE CLINICAL PHOTOGRAPH AND RADIOGRAPH IRT 15,16



PRE-SUTURING DONE AND COMPOSITE BONE GRAFT MATERIAL PLACED IRT 15,16

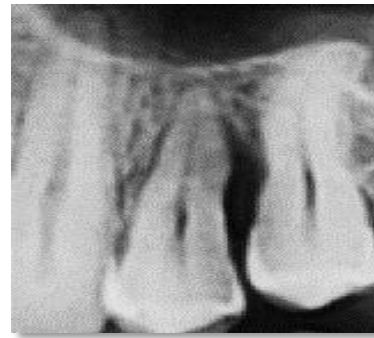
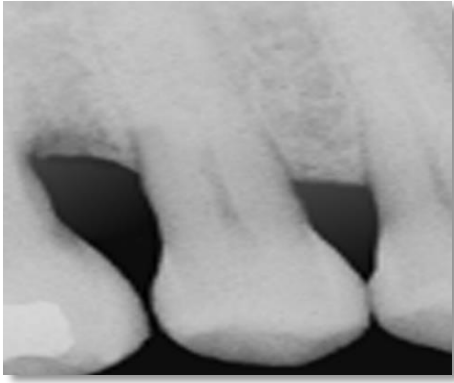


SUTURING DONE USING 4-0 SILK SUTURES IRT 15,16



SULCULAR FOLLOWED BY VERTICAL RELEASING INCISION INVOLVING THE INTERDENTAL PAPILLA PLACED AND DEFECT VISUALISED IRT 15,16





PRE-OPERATIVE CLINICAL PHOTOGRAPH AND RADIOGRAPH IRT 24,25

6 MONTHS POST-OPERATIVE CLINICAL PHOTOGRAPH AND RADIOGRAPH IRT 15,16

### ENTIRE PAPILLA PRESERVATION TECHNIQUE:

This technique was proposed to increase the blood clot stability by complete preservation of the defect associated papilla, thus increasing the wound healing capacity. This technique involved a sulcular incision followed by a vertical releasing incision on the distal aspect of the neighbouring teeth extending beyond the mucogingival junction. A 3x microscopic loupe was used to increase the visualization of the defect. Then a tunnel was created using an angled tunneling instrument following the elevation of flap with microsurgical elevator beyond the defect site. The debridement was carried out using microsurgical curettes to remove any remaining granulation tissue present. The composite graft was placed along with the GTR membrane. The flaps were approximated using 4-0 silk sutures using simple interrupted sutures.



VERTICAL RELEASING INCISION ON ADJACENT PAPILLA IRT 24,25



FULL THICKNESS FLPA ELEVATED USING MICROPERIOSTEAL ELEVATOR AND THE DEFECT VISUALISED IRT 24,25



## MODIFIED SUBPERIOSTEAL TUNNEL ACCESS TECHNIQUE:

COMPOSITE BONE GRAFT PLACED INTO THE DEFECT IRT 24,25



SIMPLE INTERRUPTED SUTURES PLACED USING 4-0 SILK SUTURES IRT 24,25



6 MONTHS POST-OPERATIVE CLINICAL PHOTOGRAPH AND RADIOGRAPH IRT 24,25

This technique is usually employed for the management of intrabony defects in the aesthetic zone while providing adequate blood clot stability thus enhancing the wound healing. This involves two vertical incisions not involving the interdental papillae on either side of the intra bony defect, followed by full thickness subperiosteal tunnel elevation unlike partial thickness flap elevation done for root coverage using tunnelling instruments. Full thickness elevation is carried to facilitate bone graft placement in this procedure. Then the granulation tissues were removed followed by scaling and root planning using Gracey currets and scaling and root planning instruments. The composite bone graft material was then placed, followed by simple interrupted suturing for the vertical releasing incisions and coronally advanced composite stop suturing to push the mucogingival complex coronally was carried out.



PRE-OPERATIVE CLINICAL PHOTOGRAPH AND RADIOGRAPH IRT 11,12

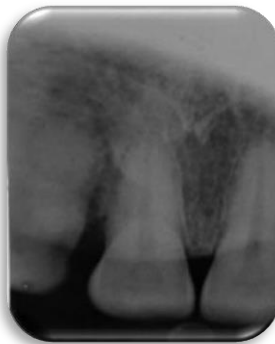


TWO VERTICAL RELEASING INCISIONS PLACED ON ADJACENT TOOTH ON EITHER SIDE IRT 11,12

SUTURING DONE BY ADVANCING 2MM CORONAL TO CEJ USING COMPOSITE STOP SUTURES IRT 11,12



FULL THICKNESS SUBPERIOSTEAL TUNNEL PREPARED IRT 11,12



POST-OPERATOIVE 6 MONTHS CLINICAL PHOTOGRAPH AND RADIOGRAPH IRT 11,12



COMPOSITE BONE GRAFT PLACED IRT 11,12

### POSTOPERATIVE INSTRUCTIONS;

The postoperative care was similar in all the sites. The patient was advised to use Aceclofenac 100mg + Paracetamol 325mg (Zerodol P) for 5 days twice daily to control pain. Amoxicillin 500mg was also prescribed to reduce or prevent any bacterial contamination. Besides the patient was advised to use 0.2% chlorhexidine digluconate mouthrinse twice daily and refrain from oral hygiene measures in that area. Then the suture removal was carried out 14 days later.



**TABLE 1: COMPARISON OF CONVENTIONAL KIRKLAND FLAP, ENTIRE PAPILLA PRESERVATION TECHNIQUE AND MODIFIED SUBPERIOSTEAL TUNNEL ACCESS**



## TECHNIQUE

	CONVENTIONA LKIRKLAND FLAP	ENTIRE PAPILLA PRESERVATION TECHNIQUE	MODIFIED SUBPERIOSTEAL TUNNEL ACCESS TECHNIQUE
PIONEERS	Kirkland 1931	Aslan et al 2017	Najafi et al 2018
INCISION	Crevicular incision followed by two vertical releasing incisions involving the interdental papillae	Vertical releasing incision on adjacent papillae	Vertical releasing incisions on adjacent teeth
FLAP PATTERN	Open flap- Full thickness mucoperiosteal flap elevation upto the mucogingival junction	Open flap- Tunneling of the defect associated papilla followed by the elevation of the marginal gingiva	Tunneling through the vertical releasing incisions with the marginal gingiva intact
RELATION TO PERIOSTEUM	Full thickness flap	Full thickness flap	Full thickness flap
INDICATIONS	Multiple intrabony defects involving lingual or buccal	Isolated intrabony defects only on the buccal surface	Intrabony defects in anterior region with the keratinized tissue height of $\geq 2\text{mm}$

	surfaces. In difficult to locate regions.		
SUTURES	Continuous sling sutures	Simple interrupted	Composite stop suturing with coronal repositioning on 2mm above the CEJ

OUTCOMES	PD reduction: $6.8 \pm 3.55$ mm CAL gain: $5.0 \pm 3.5$ mm GR increase: $3.5 \pm 0.25$ Unpredictable early wound closure	PD reduction: $6.5 \pm 2.65$ mm CAL gain: $6.3 \pm 2.5$ mm GR increase: $0.2 \pm 0.25$ 100% early wound closure	PD reduction: $5.4 \pm 2.5$ mm CAL gain: $5.4 \pm 1.5$ mm GR increase: nil 100% early wound closure
LIMITATIONS	<ul style="list-style-type: none"> <li>• Unpredictable early wound stability</li> <li>• Postoperative gingival recession causing tooth sensitivity.</li> </ul>	<ul style="list-style-type: none"> <li>• Scar at the vertical releasing incision was common</li> <li>• High risk of tearing away of the interdental papilla in areas of narrow interdental space</li> </ul>	<ul style="list-style-type: none"> <li>• Can be employed in areas with the minimal keratinised tissue width of <math>\geq 2</math>mm.</li> </ul>

## DISCUSSION:

All the above 3 techniques were shown to produce almost same PD and CAL gain (Table 1). But there was pronounced post-operative gingival recession and poor wound closure

in conventional Kirkland flap technique. But at the same time Kirkland flap produced excellent access to the defect region, which was not accomplished in EPP and M-VISTA technique. Our study results were in accordance with the study done by Nibali et al in 2019 who stated CAL gain of  $1.27 \pm 0.26$ mm using periodontal

access flap technique with deproteinized bovine bone mineral graft material. There are no randomised controlled trials available indicating the efficacy of EPP and M-VISTA in the treatment of periodontal intrabony defects.

To contrast the above techniques:

1. Conventional Kirkland flap technique provided excellent access to the intrabony defect but at the same time led to the post-operative gingival recession and poor wound closure, which could be attributed to the incision of the interdental papillae with the



---

vertical releasing incisions.

2. EPP technique was shown to decrease the post-operative gingival recession and increase the primary wound stability as it maintains the integrity whole papillae but at the same time it provides least access to the defect region and they require the use of microscopic magnifying lens to visualize the defect region. Besides this technique produces scarring in the vertical incision region, this halts its usage in anterior teeth region

3. M-VISTA technique is usually employed to treat intra bony defect accompanied by gingival recession in esthetic zones. Though it produces no gingival recession this technique can only be employed in areas with the keratinized tissue height of  $\geq 2\text{mm}$  (anterior zone) and also it provides minimal or no access to the intrabony defect region.

In this study, we employed the composite bone graft to fill the defect site. It is prepared by mixing A-PRF gel with Bioglass Bone Graft particles, this graft is said to contain osteoconductive and osteoinductive property so they are said to have properties similar to autografts.

Thus the technique to be employed to treat intrabony defect is to be selected based on the situation. In future more randomised controlled trials testing the efficacy of this three novel techniques to treat efficacy of the intrabony defect are to be employed.

## CONCLUSION:

This case series has clearly explained the advantages and disadvantages of the Kirkland, EPP and M-VISTA technique in the treatment of the intrabony defects. Each

technique has its own advantages and disadvantages, so the technique to be employed

is to be selected based on the clinical scenario. Furthermore, future research is to be directed towards testing the efficacy of EPP and M-VISTA for intrabony defect management through randomised controlled clinical trials.