

Whale's Tail Technique- An approach for regeneration of periodontal intrabony defect

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Abstract:

Background: Periodontal regeneration is the restoration of tooth-supporting tissue that was lost due to periodontal injury or inflammation. Bone graft with Guided tissue regeneration (GTR) is a common biomaterial used for the regeneration of periodontal apparatus. Bovine bone graft (BIO-OSS), a xenograft material, has provided better results than other bone graft materials for bone fill-in intrabony defects. Whale's tail technique is performed in midline diastema of ≥ 4 mm with intrabony defect for proper defect visualization and maintaining the vascular supply of the buccal flap.

Conclusion: Whale's technique with BIO-OSS bone graft and healiguide GTR membrane has resulted in the regeneration of alveolar bone within three months of follow-up.

Keywords: bovine bone, GTR, intrabony defect, papilla preservation, whale's tail.

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INTRODUCTION

Periodontal regeneration is a challenge, and various surgical procedures are evolving for the same¹. New attachment for periodontal regeneration is possible by the use of GTR². It has been proven that GTR is more effective than open flap debridement in gaining clinical attachment level³. Various types of materials are in use for the regeneration of bony defects; among them are bone grafts. BIO-OSS is a bovine bone graft (Xenograft). The graft has been beneficial for alveolar bone regeneration⁴. Grafting with membrane has various complications in surgical procedures such as improper flap closure or post-operative recession may lead to exposure of grafting material. Membrane exposure may result in bacterial contamination. They are further complicating the surgical site. Based on these observations Takei et al. Introduced, the papilla preservation flap in 1985. Modifications in papilla preservation were made

with the understanding of defect morphology. The modifications are modified papilla preservation by Cortellini et al. 1995⁶, simplified papilla preservation by Cortellini et al. in 1997, and whale's tail technique⁸. Whale's tail technique was proposed by Bianchi et al. in 2009 for wide intrabony defects in the esthetic zone and to allow proper access and visualization of intrabony defects. This procedure is mainly performed with GTR while maintaining interdental tissue over the grafting material⁸.

MATERIALS AND METHODS

Pre-Operative: The patient age 30 years, reported to the Department of Periodontology and Implantology, MIDSR dental college Latur with a chief complaint of swollen and bleeding gums for one month. He has a midline diastema of 4mm with papillary frenum attachment. Laboratory investigation reported that all blood counts were within normal limits. On OPG examination there was a vertical defect with #11. For

further evaluation, RVG was taken with #11. On RVG, vertical defect extending from coronal 1/3 rd with #21 to middle 1/3rd with #11 was recorded. (Fig 1) Pocket depth on mesio-buccal aspect and mesio-palatal wrt #11 was 6mm and 7mm. (Fig 2 & 3))

Initially, non-surgical therapy with Ultrasonic scaling and subgingival root planing was done. After initial therapy, it was decided to surgically access the area for the management of osseous defects. The patient was recalled after four weeks for follow-up. Oral hygiene status was good. With a midline diastema of 4mm and vertical defect wrt #11, a surgical procedure with the whale's technique was chosen. Before the intra-oral surgical procedure, one day prior to surgery, the procedure was tried on a study model with a wax sheet adapted to the cast.

Operative:- Initially, the surgical area was infiltrated buccally and palatal with 2% local anesthesia with 1:80,000 epinephrine wrt #11 and #21. Two vertically releasing incisions extending up to the mucogingival junction were given on the distal side of #11 and #21 on the buccal aspect with #15 no. Blade followed by intracrevicular incision on the buccal and palatal side with #12 no. Blade. (Fig 4) While placing the blade in an increvicular incision, there was an accidental slip of the blade, and a slit-shaped cut in the center of the gingival margin wrt #11. (Fig 4) Two semilunar incisions contacting the vertical incision were placed then the flap was slowly reflected on the palatal side with a periosteal elevator. Granulation tissue was removed for defect visualization. The defect was exposed, and the depth of the defect was 8mm. (fig 5) Healiguide membrane of size 15*20 was trimmed to cover the defect and was adapted on the palatal side with a suture, then the membrane was passed buccally. With a slight reflection of the membrane, the BIO-OSS bone graft was packed into the defect, and the membrane was covered over the graft. (Fig 6 & 7). The flap was pushed back buccally and sutured with an interrupted suturing technique (fig8). Frenotomy was done to relocate the frenum. Post-operative instructions and antibiotics and analgesics were given.

Post-operative: Pt was recalled after 14 days for suture removal. (fig9) Recall appointments were

performed at 1-month intervals to assess postoperative healing and plaque control by the patient. RVG was taken after 3 months post-surgery. (Fig 10) Amount of complete bone fill was recorded.



Fig 1: Pre-operative IOPA with vertical defect wrt #11



Fig 2: Mesio-buccal pocket depth of 6mm



Fig 3: Mesio-palatal pocket depth = 7mm



Fig 4: Two vertical releasing incisions with accidental slit



Fig5: Defect of 8mm wrt 11



Fig 6: Bio-OSS bone graft filled in defect



Fig 7: Healiguide GTR membrane adapted and placed over the bone graft



Fig 8: Interrupted suture with 3-0 Mersilk suture



Fig 9: 14 days after suture removal



Fig 10: 3month RVG

DISCUSSION

Hagi et al. suggested four conditions for the successful regeneration of periodontal infrabony defect. These criteria are (1) toxins removal from the root surface, (2) by use of GTR membrane and bone graft, space provision should be established for coronal migration of pluripotent cells from intact periodontal ligament from root surface, (3) Optimal flap design and adequate suturing technique should be selected for stabilization of the wound to protect the blood coagulum (4) passive adaptation of flap, and complete wound healing is achieved for primary wound healing.⁹ Whale's tail technique has achieved almost all the above-given criteria. Mrunal et al. in a case series with a similar technique with six months post-operative result showed that there was a regeneration of wide intrabony defect involving maxillary anterior teeth and a reduction of probing depth.¹⁰ Bianchi and Bassetti used this technique to evaluate a mean probing attachment level gain of 4.9 ± 1.8 mm and a probing pocket depth reduction of 5.8 ± 2.5 mm.⁸

This case report utilized successful regeneration of intra-bony defect using the whale's tail procedure. The radiographic representation of intra-bony defect with three months follow-ups were documented. Whale's tail procedure is performed where interdental diastema is ≥ 4 mm for proper reflection of flap palatally and vertical intrabony defect wrt maxillary anterior. Soft tissue healing depends on incision technique, flap design, tissue manipulation, postsurgical follow-up, and patient cooperation¹¹. The flap is reflected only around the content defect; this prevents overexposure as in open flap debridement. Proper visualization of the defect will allow for complete defect fill. The incision is away

from osseous defects and this will reduce the flap dehiscence.¹ Placement of suture away from defect minimizes the chance of bacterial contamination of healing osseous defect. The flap design will not only preserve the papillae but also maintain the vascularization of the buccal flap.¹ Once the flap is repositioned over the treated bone defect, only perimeter sutures of the margins are required to stabilize the flap, and no sutures are needed at the papilla level.⁸ Patients maintaining proper oral hygiene after the surgical procedure also play an essential role in defect fill.

Limitation of the case: (1) IOPA of pre-operative and post-operative angulation should be the same for better evaluation of bony fill. (2) Pre-operative measurement of defect should have been carried out to get the amount of bone fill (3) for evaluation of regeneration of periodontal tissue reentry of the surgical site should be performed (4) a randomized-clinical trial needs to be done to confirm the importance of these techniques

CONCLUSION

Whale's tail technique in the present case with midline diastema of ≥ 4 mm and intrabony defect has resulted in bone fill within three months follow up. Bio-oss bone graft with healiguide was used as periodontal regenerative material. After 14 days, follow-up healing occurred by primary intentional healing. The disadvantage of this procedure is that its technique sensitive.

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