Modified whale's tail technique using amnion membrane for periodontal regeneration in the anterior teeth with diastema: A case report

Agraja Ganpat Patil[1], Vaibhavi Hitesh Bhatt[2]

From [1]Lecturer, Department of Periodontics, Mahatma Gandhi Mission Dental College and Hospital, [2]Lecturer, Department of Periodontics, Yerla Medical Trust Dental College and Hospital, Navi Mumbai, Maharashtra, India.

Correspondence to: Dr. Agraja Patil, Department of Periodontics, MGM Dental College and Hospital, Junction of NH4 and Sion-panvel Expressway, Sector 18, Navi Mumbai - 410209, Maharashtra, India. E-mail: patil.agraja@gmail.com

Received - 04 June 2019 Initial Review - 19 June 2019 Accepted - 24 September 2019

ABSTRACT

The biggest challenge during periodontal regeneration in the anterior region lies in the maintenance of esthetics. Whale's tail technique has a novel flap design that achieves both these goals while maintaining the functional integrity of the periodontal tissues. A 46-year-old male reported with the chief complaint of bleeding from the gums. Periodontal examination of 11 shows probing pocket depth of 7 mm mesially with clinical attachment loss of 8 mm. Whale's tail technique using demineralized freeze-dried bone allograft (DFDBA) and Amnion membrane was used in this case to achieve 4mm gain in clinical attachment level at the end of 11 months. This technique successfully demonstrates stable clinical outcomes in terms of management of anterior periodontal regeneration in diastema cases. Long term clinical trials are required to validate these results.

Keywords: *Amnion membrane, Diastema, Esthetics, Intra-bony defects, Regeneration.*

The ultimate goal of periodontal treatment is to restore the supporting tissues lost as a sequale of periodontal disease [1]. A deep intra-osseous defect presents a major challenge in achieving this goal as it increases the risk for disease progression and recurrence after traditional therapy. When anterior teeth are present with such defects, an improvement of the prognosis of the teeth as well as maintaining the esthetics becomes a challenge.

Design of the periodontal flap in treating intrabony defects in the anterior region should be such as to preserve the gingival integrity and achieve primary closure of the flap for optimal results of the therapy. Periodontal regeneration can be done by specific surgical approaches to obtain primary flap closure and to preserve interdental tissue. They include papilla-preservation technique [2], modified papillae preservation [3], and simplified papillae preservation flap [4]. Several biomaterials like bone grafts, guided tissue regeneration, bioactive agents or combined approaches have been suggested for regenerative periodontal therapy.

Whale's tail surgical procedure involved elevation of a large flap from the buccal to the palatal side to allow access and visualization of the intrabony defect and was created, especially to perform guided tissue regeneration while maintaining interdental tissues over grafting material and thus achieving primary closure [5]. The case report aims to demonstrate the efficacy of the whale's tail technique for the treatment of intrabony defects in cases with anterior diastema.

CASE REPORT

A 46-year-old male reported to the out-patient department (OPD) section of the Department of Periodontology of a Dental college and Hospital of Navi Mumbai with the chief complaint of bleeding from the gums and 'loosening' of the teeth since past one year. The patient was apparently alright one year back when he noticed bleeding from his gums during brushing and early in the morning after waking up. Gradually, the frequency of bleeding increased in the upper front teeth since past one month, for which he visited the department OPD. The oral hygiene status of the patient was fair, with supragingival and subgingival calculus in full mouth.

On clinical examination of the patient, a deep probing pocket depth of 7 mm measured with UNC-15 probe was seen with respect to the mesial aspect of the upper right central incisor 11 with clinical attachment loss of 8 mm. Diastema was seen with respect to the upper central incisors. Upper left central incisor showed distal proximal caries without involving the incisal angle. An intraoral periapical (IOPA) radiograph was advised which showed a vertical pattern of bone loss with respect to the upper right central incisor.

Written informed consent was obtained from the patient. In initial therapy, full mouth supragingival and subgingival scaling and root planing were conducted. Excavation of caries with the upper left central incisor and temporisation of the same was done with glass ionomer cement. The patient was re-evaluated after 4 weeks following phase one therapy in the same region and

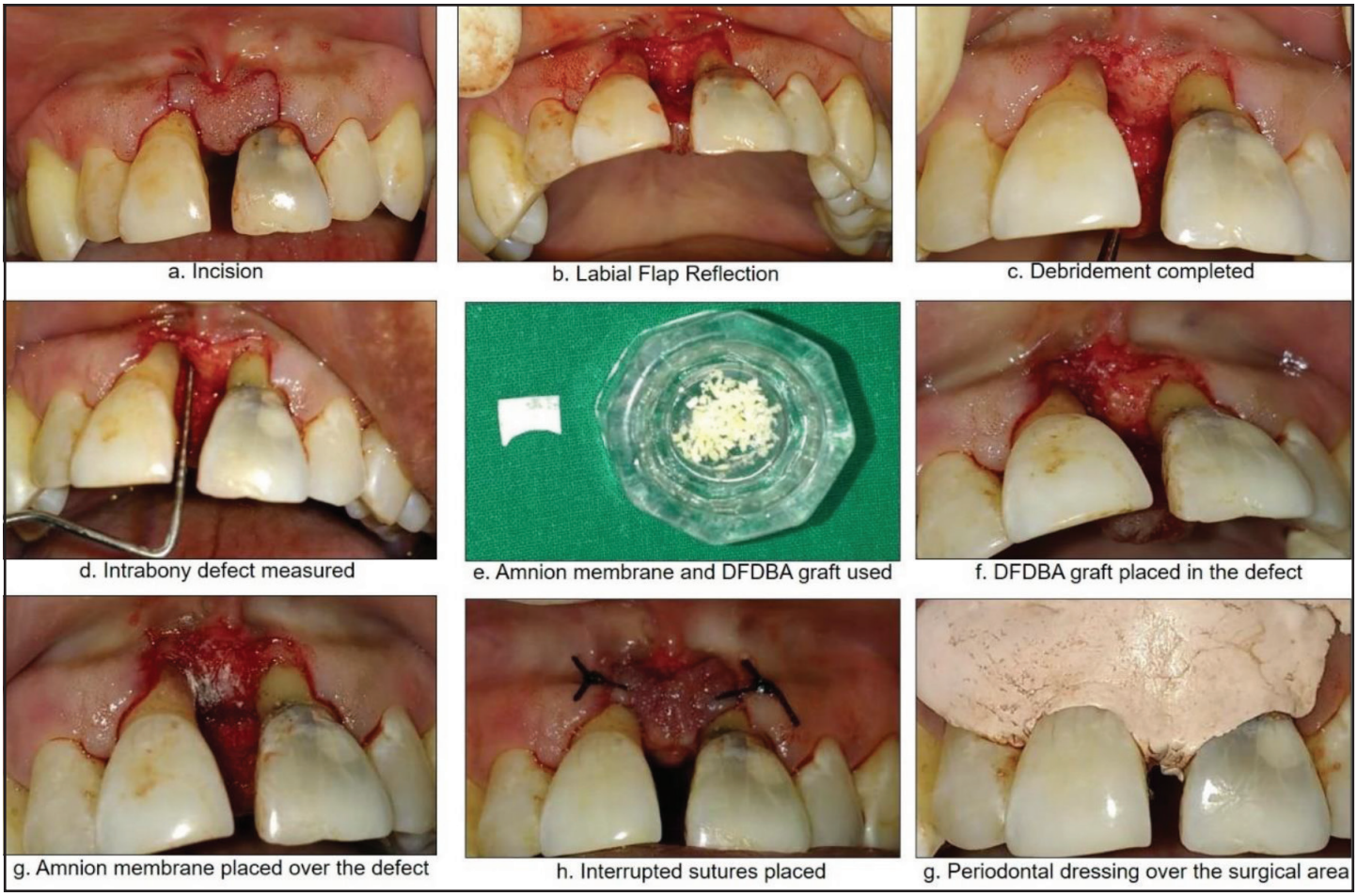

Figure 1: (a) Semilunar incision mimicking a Whale's Tail; (b) Full thickness periosteal flap reflected while preserving the papilla; (c) Intra-bony defect visualised after thorough debridement of granulation tissue; (d)Intra-bony defect; (e)DFDBA bone graft and Amnion membrane (C shape); (f) Graft placement within the intra-bony defect; (g)Amnion membrane placed to cover the graft atleast 3 mm away from the margins of the defect; (h)Interrupted Sutures with 4-0 silk; (i)Periodontal dressing over the surgical area.

presented with 6 mm pocket depth after 4 weeks. Hence, surgical management was planned.

Local anesthesia was administered in the buccal vestibule by infiltration technique using 2% Lignocaine HCL with adrenaline (1:80,000). Semilunar incisions were made extending medially till the base of the frenal attachment in order to preserve the continuity of the flap. The distal extensions of the incision were continued as intrasulcular incisions on the buccal, interdental and palatal aspect of the central incisors, separating the flap from the buccal attached gingiva and allowing the separation of a thick, broad papilla-preserving flap. The flap was elevated from the buccal to the palatal aspect visualizing the intra-osseous defect.

After thorough debridement of the defect, bone grafting was done using demineralised freeze-dried bone allograft (DFDBA) (500-1000µm, Tata Memorial Hospital-Tissue Bank, Mumbai, India) and amnion membrane (3 cm × 3 cm, C shaped, Tata Memorial Hospital-Tissue Bank, Mumbai, India) covered the bone graft. Two interrupted sutures were placed to achieve a primary approximation of the flap. Non-eugenol periodontal dressing (Coe Pack GC America Inc. USA) was used to cover the surgical wound (Fig. 1). Post-operative instructions were given and suitable antimicrobials and analgesics were prescribed.

Sutures were removed after 10 days. One month follow-up of the patient showed reduced visible clinical signs of inflammation. Follow-up of the patient was done at 1 month, 3 months, 6 months and 11 months. On Clinical examination at the end of 11 months, reduction in probing pocket depth was seen upto 3 mm on the distal aspect and 4 mm on the mesial aspect of 11 (Fig. 2). The patient was referred to the department of conservative dentistry for the final restoration of the upper left central incisor after a 6 week follow-up period.

DISCUSSION

Aesthetic considerations always pose therapeutic dilemmas in the selection of the appropriate surgical technique in the maxillary anterior region to prevent or minimize aesthetic problems such as loss of interdental papilla or increased tooth length without compromising the primary goal of periodontal surgery [5]. The preservation of papillary integrity is essential for maintaining aesthetics, especially during and after periodontal

Figure 2: Follow-up at 11 months

surgery [6]. The first description of a surgical approach named papilla preservation was published by Takei et al. in 1985 that was designed to obtain a primary closure in grafted sites [7]. In 1995, Cortellini et al. published a modification of the Takei et al. technique, naming it "modified papilla preservation technique" [8]. The simplified papilla preservation flap was proposed to provide surgical access to interproximal bony defects while preserving interdental soft tissues, even in narrow interdental spaces and posterior teeth.

Whale's tail technique was first practiced by Bianchi and Basetti [9] wherein both the objectives of regeneration and maintaining esthetics were met. Two vertical full-thickness incisions were given from the mucogingival junction to the distal margin of the tooth neighboring the defect on the buccal surface. A horizontal incision joined the apical margins of the first two incisions and the coronal margins of the vertical incisions were continued intrasulcularly on thebuccal, proximal and palatal aspects of the defect-associated tooth. In the modified Whale's tail technique proposed by Kuriakose et al., two semilunar incisions below the mucogingival junction on the buccal surface were used rather than using distinct horizontal and vertical incisions, which helped in a better approximation of the flap margins [10]. This case report depicts a stable result of a similar technique upto 11 months. The periodontal pocket probing depth (PPD) reduction and clinical attachment level (CAL) gain of 4 mm were accomplished that were almost similar to the findings of Bianchi and Bassetti who reported a CAL gain (4.57 ± 0.65 mm) and PPD reduction (5.14 ± 0.95 mm) and Damante et al. who reported a gain in attachment level of 4 mm with the "whale's tail" flap [11].

Studies by Kiany and Moloudi (2015) [12], Holtzclaw and Tuscano (2013) [13] who used Amnion Membrane (Tissue Bank, Tata Memorial Hospital, Mumbai) as a barrier for treatment of intrabony defects showed a reduction of PD within the range of the findings of this result. Kothiwale SV (2009) [14] evaluated and compared the efficacy of DFDBA and bovine-derived xenogenic bone graft (BDX) [Bio-Oss] with an amniotic membrane (AM) as guided tissue regeneration (GTR) in the treatment of human periodontal Grade II buccal furcation defects clinically and radiographically. They concluded that both the entities showed clinically significant results. Hence, DFDBA was used along with AM for the above case.

The limitation of the Whale's tail technique is that it is highly technique sensitive. The success of the procedure depends on various controllable factors like an incision technique, flap design, tissue manipulation, post-surgical follow-up and patient cooperation. At the same time, uncontrollable factors such as gingival biotype and morphotype, position of the maxillary labial frenum and width of attached gingiva, absence of midline diastema need to be assessed. Hence, a careful case selection is a key to the successful outcome of this procedure. By elevation of a large buccal flap, which allowed the preservation of a significant amount of soft tissue as well as facilitating access and visualization of the defect, the limitations of the technique were contained.

In the above case, as midline diastema was present, the patient was referred to the Department of Orthodontics for further evaluation and treatment. A systematic review evaluating the clinical performance, in terms of tooth survival and clinical periodontal surrogate outcomes of conservative surgical treatment of periodontal intrabony defects, states that whale's tail technique can be successfully used for stable regenerative and esthetically pleasing results [15].

CONCLUSION

Whale's tail technique combines the advantages of papilla preservation in esthetic cases as well as facilitates access to the underlying alveolar bone for regenerative purposes. As esthetics in the anterior region is of utmost priority in patients, practice of this technique can be encouraged. However, long term clinical comparative trials are required to determine the predictability of results.

REFERENCES

1. Becker W, Becker BE. Clinical applications of guided tissue regeneration: surgical considerations. Periodontol 2000. 1993;1:46-54.
2. Deshpande MM, Jarde SJ, Rohan SW, Chatterjee A. Whale's tail technique: A case series. J Indian Soc Periodontol. 2016; 20(4): 460–463.
3. Graziani F, Gennai S, Cei S, Cairo F, Baggiani A, Miccoli M, Gabriele M, Tonetti M. Clinical performance of access flap surgery in the treatment of the intrabony defect. A systematic review and meta-analysis of randomized clinical trials. J Clin Periodontol. 2012; 39: 145-56.
4. Murphy KG. Interproximal tissue maintenance in GTR procedures: Description of a surgical technique and 1-year reentry results. Int J Periodontics Restorative Dent. 1996;16:463-77.
5. Checchi L, Montevecchi M, Checchi V, Bonetti GA. Amodified papilla preservation technique. Quintessence Int. 2009;40:303-311.
6. Jampani ND, Songa VM, Buggapati L, Mittapally S. Bone grafting with novel flap design and management of midline diastema: an interdisciplinary perio-ortho approach, J. NTR Univ. Health Sci. 2016;5:70-4
7. Takei HH, Han TJ, Carranza FA Jr, Kenney EB, Lekovic V. J Periodontol. 1985; 56(4):204-10

8. Cortellini P, Prato GP, Tonetti MS. The modified papilla preservation technique. A new surgical approach for interproximal regenerative procedures. J Periodontol. 1995; 66:261-266.
9. Bianchi AE, Bassetti A. Flap design for guided tissue regeneration surgery in the esthetic zone: The "Whale's tail" technique. Int J Periodontics Restorative Dent. 2009;29:153-9.
10. Kuriakose A, Ambooken M, Jacob J, John P. Modified Whale's tail technique for the management of bone-defect in anterior teeth. J Indian Soc Periodontol. 2015;19:103-6
11. Damante CA, Sant'Ana ACP, de Rezende MLR, Aguiar Greghi SL, Passanezi. Guided Tissue Regeneration and Papilla Preservation with the "Wale's Tail" Flap. JSM Dent 2005;1(3):1017.
12. Kiany F, Moloudi F. Amnion membrane as a novel barrier in the treatment of intrabony defects: a controlled clinical trial. Int J Oral Maxillofac Implants 2015;30:639-47.
13. Holtzclaw DJ, Toscano NJ. Amnion- Chorion Allograft Barrier Used for Guided Tissue Regeneration Treatment of periodontal Intrabony Defects. Clin Adv Periodontics. 2013;3:131-7.
14. Kothiwale SV, Anuroopa P, Gajiwala AL. A clinical and radiological evaluation of DFDBA with amniotic membrane versus bovine derived xenograft with amniotic membrane in human periodontal grade II furcation defects.Cell tissue bank 2009;10:317-26.
15. Graziani F, Gennai S, Cei S, Cairo F, Baggiani A, Miccoli M, *et al*. Clinical performance of access flap surgery in the treatment of the intrabony defect. A systematic review and meta-analysis of randomized clinical trials. J Clin Periodontol. 2012;39:145-56.

Funding: None; Conflict of Interest: None Stated.

How to cite this article: Patil AG, Bhatt VH. Modified whale's tail technique using amnion membrane for periodontal regeneration in the anterior teeth with diastema: a case report. Indian J Case Reports. 2019;5(5):457-460.

Doi: 10.32677/IJCR.2019.v05.i05.019