

Case Report

Guided Tissue Regeneration and Papilla Preservation with the “Wale’s Tail” Flap

Carla A. Damante*, Adriana C. P. Sant’Ana, Maria Lucia Rubo de Rezende, Sebastião Luiz Aguiar Gregghi and Euloir Passanezi

Discipline of Periodontics, Bauru Dental School, Brazil

Corresponding author

Carla Andreotti Damante, Faculdade de Odontologia de Bauru, Al. Octavio Pinheiro Brisolla 9-75, 17012-901, Bauru- SP – Brazil, Tel: 55 14 32358278; Fax: 55 14 32234679; Email: cdamante@usp.br

Submitted: 18 August 2013

Accepted: 23 September 2013

Published: 25 September 2013

Copyright

© 2013 Damante et al.

OPEN ACCESS

Keywords

- Guided tissue regeneration, Periodontal
- Regeneration
- Wound healing

Abstract

Introduction: The “whale’s tail” flap technique is designed to preserve interdental tissue in guided tissue regeneration. This is the first report to describe the use of this flap associated to autogenous bone graft.

Case presentation: This paper describes a case where the “whale’s tail” flap was used associated to autologous osseous graft and bovine collagen membrane in an esthetic zone with a vertical defect. A 56-years old patient presented the mesial aspect of de lateral incisor with vestibular probing depth (PPD) of 7mm and palatal PPD of 8mm. After treatment there was a gain in attachment level of 4mm.

Conclusion: The technique presents good outcome when used with osseous grafts and guided tissue regeneration.

INTRODUCTION

Guided tissue regeneration (GTR) comprises procedures attempting to regenerate lost periodontal structures through differential tissue responses. It refers to regeneration of periodontal attachment through barrier techniques, using materials such as expanded polytetrafluoroethylene, polyglactin, polylactic acid, calcium sulfate and collagen, are employed in the hope of excluding epithelium and the gingival corium from the root or existing bone surface in the belief that they interfere with regeneration [1]. On the cellular level, periodontal regeneration is a complex process requiring coordinated proliferation, differentiation, and development of various cells types to form the periodontal attachment apparatus. The concept of periodontal regeneration arose from Melcher’s theory which proposed that the cell type that repopulates the exposed surface at the periodontal repair site will define the nature of attachment that takes place [2]. Cells from both periodontal ligament and alveolar bone are important to the formation of new bone, cementum and periodontal ligament [3].

The classical approach to periodontal regeneration in the last 30 years has been the use of bone grafts in repairing periodontal defects. The association of guided tissue regeneration with graft materials has been reported with success [4]. To optimize the regeneration and preserve soft tissues many techniques of papilla preservation have been described in literature [5-10].

Bianchi and Bassetti [11] described, in 2009, a surgical

technique designed to preserve interdental tissue in guided tissue regeneration called the “whale’s tail” technique. It was intended for the treatment of wide intrabony defects in the esthetic zone involving the elevation of a large flap from the buccal to the palatal side to allow access and visualization of the intrabony defect and to perform GTR while maintaining interdental tissue over grafting material. Authors described a significant improvement on clinical parameters and soft tissue healing with primary closure [11].

The aim of this study is to describe a clinical case where the “Whale’s tail” technique was employed to obtain periodontal regeneration.

CASE REPORT

A 56-years old man presenting a diastema between central and lateral right incisors was referred to the clinic of periodontics to treat periodontal defects (Figure 1). The patient didn’t have systemic problems but smoked 3 cigarettes a day for the last 20 years. There was a clinical and radiographic evidence of an intrabony defect associated with the maxillary right incisors. Lateral incisor had a mesial vestibular probing depth of 7 mm, a mesial palatal probing depth of 8 mm and attachment loss of 7 and 8 mm respectively.

Before the surgical procedure, full-mouth plaque score, full-mouth bleeding score, periodontal probing depth (PPD), clinical attachment level (CAL), and gingival recessions were recorded.

The patient received oral hygiene instructions and full mouth scaling and root planning.

Two vertical incisions were performed from the mucogingival line to the distal margin of the lateral incisor and mesial margin of the central incisor on the buccal surface (Figure 2). A horizontal incision joined the vertical incisions at the apical aspect of the flap. In the coronal aspect of the flap intrasulcular incisions were made at buccal, interproximal and palatal sides. A full-thickness flap was elevated from buccal to palatal side through the diastema (Figure 3 and 4). The defect was debrided, the root was scaled, planned and conditioned with citric acid for 3 minutes (Figure 5). Autogenous bone was removed from the palatal side with a chisel and it was used to fill the defect (Figure 6). A bioresorbable bovine collagen membrane (GenDerm®, Baumer, São Paulo) was used to cover the graft (Figure 7). The flap was repositioned from the palatal to the buccal side, and its margins were sutured without tension, far away from defect (Figure 8). Antibiotics were prescribed (Amoxicilin, three times a day) for one week. Healing was uneventful. Recall appointments were performed once per week for the first 4 weeks and once per month at the following period (Figure 9 and 10).

After 16 months the mesial vestibular and palatal probing depths were 3mm with a gain in attachment of 4 and 5 mm respectively (Figure 11 and 12).

DISCUSSION

The preservation of papillary integrity during all dental



Figure 1 Clinical aspect of the diastema associated to the osseous defect between right central and lateral incisors.



Figure 2 Vertical and horizontal incisions at buccal aspect. Intrasulcular incisions preserving the papilla.



Figure 3 Elevation of the mucoperiosteal flap resembling a "whale's tail".



Figure 4 Elevation of a mucoperiosteal flap from buccal to palatal side through the diastema preserving the papilla.



Figure 5 Aspect of the osseous defect at the mesial side of lateral incisor.



Figure 6 Autologous osseous graft collected from the palate.



Figure 7 Bovine collagen membrane.



Figure 8 Flap suture.

procedures to minimize its disappearance as much as possible is essential for maintaining esthetics especially during and after periodontal surgery [10].

The surgical technique presented in this paper allows regeneration of wide intrabony defects involving the maxillary anterior teeth with notable interdental diastemas, maintaining interproximal tissue to recreate a functional attachment with esthetic results [11]. The advantages of "Whale's tail" flap are the elevation of a large flap from buccal to palatal, allowing the preservation of a large amount of soft tissue. Thus it results in

good primary flap closure [11]. The use of incisions distant from the defects and graft margins drastically reduces the percentage of flap dehiscence mainly when membranes are used. The disadvantages of the technique are the necessity of a diastema in order to allow flap dislocation to palatal side. The flap elevation is delicate and the surgeon must be careful to preserve the papilla, which will maintain the vascularization of the flap. Bianchi and Basseti [11] reported a CAL gain (4.57 ± 0.65 mm) and PPD reduction (5.14 ± 0.95 mm) with the "Wale's tail" flap.

The first description of a surgical approach named papilla preservation was published by Takei et al. [5] and the technique was designed to obtain a primary closure in grafted sites. In 1995, Cortellini et al. [6] published a modification of the Takei et al technique naming it modified papilla preservation technique. Other techniques described in literature were designed to maintain primary closure of the flaps at the interdental space. One

of them is the simplified papilla preservation flap [8]. Additional advantages of this technique are the limitation of membrane collapse, and the applicability in narrow and/or posterior interdental spaces [8]. With this technique authors showed a mean CAL gain of 4.9 ± 1.8 mm and a PPD reduction of 5.8 ± 2.5 mm. Cortellini et al. [12] described the modified minimally invasive surgical technique that has been recently designed to further reduce the surgical invasiveness, minimize the interdental tissue tendency to collapse, enhance the wound/soft tissue stability and reduce patient morbidity. The authors described a 1-year CAL of 5.1 ± 1 mm and residual PPD of 3.1 ± 0.6 mm with an average pocket reduction of 4.6 ± 1.5 mm with this technique. These results are in accordance with ours since we had a pocket reduction of 5 mm and a CAL of 4 mm.

Checchi et al. [10] described a long term evaluation period (22 years) after the use of surgical interdental papilla preservation technique. The interproximal tissues were still stable after this period, although a partial exposure of the buccal root surface of the left central incisor, lateral incisor, and premolar had occurred.

An interesting result was showed when the gingival blood flow during healing was compared between the modified Widman flap and the simplified papilla preservation flap [13]. The later technique may be associated with faster recovery of the gingival blood flow post-operatively. A higher gingival blood flow to different parts of the periodontium might have an essentially positive effect on the speed and on the quality of the healing process. Furthermore, an improved healing process would be of paramount importance for the final outcome of various regenerative procedures [13].

A systematic review evaluating the clinical performance, in terms of tooth survival and clinical periodontal surrogate outcomes, of conservative surgical treatment of periodontal intrabony defect was published recently and included papers on papilla preservation technique [14]. Authors stated that a sub-analysis, assessing surrogate outcomes as a function of flap design, revealed that better outcomes seemed to be associated with papilla-preservation flaps. Furthermore, the use of papilla preservation flap as the standard surgical approach in randomized clinical trials is strongly encouraged [14].

CONCLUSION

In the light of these findings we may suggest that the "Whale tale" technique has a good foresee ability when used associated to osseous grafts and guided tissue regeneration.

REFERENCES

1. Glossary of Periodontal Terms, ed 4. Chicago: The American academy of periodontology, 2001.
2. Melcher AH. On the repair potential of periodontal tissues. *J Periodontol.* 1976; 47: 256-60.
3. Melcher AH, McCulloch CA, Cheong T, Nemeth E, Shiga A. Cells from bone synthesize cementum-like and bone-like tissue in vitro and may migrate into periodontal ligament in vivo. *J Periodontal Res.* 1987; 22: 246-7.
4. Schallhorn RG, McClain PK. Combined osseous composite grafting, root conditioning, and guided tissue regeneration. *Int J Periodontics Restorative Dent.* 1988; 8: 8-31.



Figure 9 Three month-post-operative period.



Figure 10 Radiographic aspect of the osseous defect at baseline and after three months of surgery.



Figure 11 Clinical control after 16 months.



Figure 12 Radiographic control after 16 months. Note the defect bone fill.

5. Takei HH, Han TJ, Carranza FA Jr, Kenney EB, Lekovic V. Flap technique for periodontal bone implants. Papilla preservation technique. *J Periodontol.* 1985; 56: 204-10.
6. 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.
7. 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.
8. Cortellini P, 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: 589-99.
9. Cairo F, Carnevale G, Billi M, Prato GP. Fiber retention and papilla preservation technique in the treatment of infrabony defects: a microsurgical approach. *Int J Periodontics Restorative Dent.* 2008; 28: 257-63.
10. Checchi L, Montevecchi M, Checchi V, Bonetti GA. A modified papilla preservation technique, 22 years later. *Quintessence Int.* 2009; 40: 303-11.
11. 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: 153-159.
12. Cortellini P, Tonetti MS. Improved wound stability with a modified minimally invasive surgical technique in the regenerative treatment of isolated interdental intrabony defects. *J Clin Periodontol.* 2009; 36: 157-63.
13. Retzeppi M, Tonetti M, Donos N. Comparison of gingival blood flow during healing of simplified papilla preservation and modified Widman flap surgery: a clinical trial using laser Doppler flowmetry. *J Clin Periodontol.* 2007; 34: 903-11.
14. 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.

Cite this article

Damante CA, Sant'Ana ACP, de Rezende MLR, Aguiar Gregghi SL, Passanezi E (2013) Guided Tissue Regeneration and Papilla Preservation with the "Wale's Tail" Flap. *JSM Dent* 1(3): 1017.