Progressive Root Resorption Associated with the Treatment of Deep Gingival Recession. A Clinical Case

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This case report presents an unusual complication, cervical root resorption, after a conventional connective tissue grafting procedure and tetracycline root conditioning. The recession was 7 mm high, with 0.5 mm of keratinized tissue present, a 2-mm probing depth, and was classified as Miller Class III. The clinical result was satisfactory and 5 mm of root coverage was achieved. However, after 20 months, cervical resorption was diagnosed. It is suggested that tetracycline root conditioning may cause root resorption in long-term evaluations. There is also a possibility of root resorption occurring in 1-year postoperative controls. Other factors will be discussed in relation to this negative clinical result. (Int J Periodontics Restorative Dent 2010;30:619–625.)

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Gingival recession is a common pathology. It causes esthetic problems, sensitivity, root caries in the cementum, and must be treated with mucogingival surgical procedures to improve esthetics, reduce recession progress, and avoid hypersensitivity.

The subepithelial connective tissue technique is well documented and extremely predictive for solving esthetic problems and reestablishing the gingival tissues around a recession via long junctional epithelium formation or periodontal tissue regeneration.[1–8] Restored root surfaces should also be included in the surface to be covered by the connective tissue graft, since eliminating the restoration allows adjunct periodontum to rebuild after the restoration's removal.[9] Root surface conditioning with chemical agents, citric acid, and tetracycline is used to improve biologic compatibility of the root with periodontal cells and enhance connective tissue grafting, although the results are controversial.[10]

The aim of this report is to present a patient with a buccal recession treated by scaling and root planing, tetracycline root conditioning, and

Fig 1 *Preoperative* (left) *clinical and* (right) *radiographic images showing a buccal recession and an overcontoured Class V restoration.*

connective tissue grafting. Results were satisfactory, though root resorption appeared as a late complication 20 months postoperatative.

Case report

The patient was a 52-year-old woman who was a healthy nonsmoker and attended the authors' dental office because of gingival recession at the maxillary left canine and an overhanging restoration. Preoperative clinical and radiographic images were taken (Fig 1).

After periodontal examination, generalized chronic adult periodontitis was diagnosed. Oral hygiene instructions were given to the patient, the restoration at the canine site was polished, and scaling and root planing were performed. One month after the initial therapy, a clinical reevaluation was carried out. Considering the mesial and distal gingival tissue lost and the recession depth, the recession was classified as Miller Class III, which predicts partial root coverage (Fig 2). The proposed treatment consisted of subepithelial connective tissue grafting and root conditioning with a tetracycline solution.

Before surgery, baseline data were registered. The buccal aspect of the recession height at the canine was 7 mm, the width of the keratinized tissue was 0.5 mm, and the probing depth was 2 mm (Fig 3). The Class V restoration was removed under local anesthesia up to the cementoenamel junction by scaling and root planing. This procedure was performed before flap raising, both

Fig 2 (left) *Clinical reevaluation 1 month after the initial therapy. A Miller Class III recession was determined.*

Fig 3 (right) *Baseline data were obtained before the surgical procedure.*

Fig 4 (left) *Double-pedicle graft and subepithelial connective tissue grafting.*

Fig 5 (right) *Flap repositioning and suturing was completed without stress over the connective tissue graft. The exposed epithelium graft and sutured mesial and distal papillae can be seen.*

smooth and supragingival, to preserve any existing connective tissue attachment.[11] The recession area was treated topically with a 100 mg tetracycline/mL saline solution for 3 minutes, rinsed, and then dried.

A trapezoidal partial-thickness double-pedicle flap was raised, passing through the mucogingival junction. Pedicles were joined with 4.0 sutures (Ethicon) (Fig 4).[7] A 2.5-mm-wide subepithelial connective tissue graft was harvested from the palate without epithelium removal and was sutured over the recession defect. The flap was sutured without stress over the graft, leaving the epithelium collar uncovered. Gingivoplasty at the mesial and distal papillae related to the defect was performed to prepare a recipient bed (Fig 5).

Postoperative care consisted of 0.12% chlorhexidine rinses twice a day for 3 weeks; amoxicillin was also prescribed (1.5 g a day for 5 days). Sutures were removed 10 days later. Healing was uneventful.

Fig 6 *After 6 months, new parameters showed 5 mm of recession coverage and 3.5 mm of keratinized tissue. A Miller Class III was achieved.*

Fig 7 *Twelve-month follow-up showed a 1.5-mm increase in recession height at the canine as well as at the other teeth, most likely a result of aggressive brushing.*

Table 1 Clinical parameters

	Baseline	6 mo	12 mo
Recession height (mm)	7	2	3.5
Keratinized tissue (mm)	0.5	4	4
Probing depth (mm)	2	2	2

After 6 months, new parameters showed 2 mm of recession measured at the level of the cementoenamel junction, 3.5 mm of keratinized tissue, and a probing depth of 2 mm. A Miller Class III recession was achieved with 5 mm of recession coverage (Fig 6).

Twelve months later, an additional 1.5-mm recession was observed, most likely a result of aggressive brushing at the affected site. New oral hygiene instructions were given and all other parameters remained stable (Fig 7 and Table 1).

Twenty months postsurgery, external root resorption was noted without any symptoms. Tooth extraction and implant placement were proposed to the patient, but she decided to wait (Fig 8). Four months later (2 years postsurgery), resorption evolution was appreciated both clinically and through radiography (Fig 9).

Before extraction and guided bone regeneration, a flap was raised to observe the resorption (Fig 10).

Fig 8 *Root resorption seen via transparent gingiva at 20 months.*

Fig 9 (above) *Clinical photograph and* (right) *radiograph showing the posttreatment recession at 22 and 24 months, respectively.*

Fig 10 *Exploratory flap raised prior to tooth extraction and guided bone regeneration. Root resorption is evident at the buccal, mesial, and distal aspects of the affected tooth.*

Discussion

After a satisfactory result in a Miller Class III patient treated with a connective tissue graft and tetracycline solution, external root resorption occured 20 months posttreatment. Resorption after regeneration treatment is an uncommon complication that can occur in spite of having achieved the desired goal of treating the recession and creating good health conditions for the periodontal tissues. It is difficult to predict, diagnose, and treat; there must be enough dentin resorption to diagnose the recession radiographically.[12,13]

An explanation for this unusual outcome is that the epithelial cells could have migrated in an apical direction. Therefore, the epithelium acts as a protective barrier against resorption.[14]

Resorption occurs in an environment where different periodontal tissues compete for marginal healing. Cell mechanisms for identifying dental tissues as foreign structures are unknown, and they induce resorptive cell activation.[15]

In a wide variety of selected cases, different surgical techniques and modifications make the comparison of the results difficult when trying to understand why resorption occurs after regeneration procedures. Hokett et al[16] reported on a patient treated with a connective tissue graft in which resorption was noted more than 1 year posttreatment. This was the only resorption-related case with a connective tissue graft found in the literature.

There is enough published information claiming connective tissue grafts as a reliable and predictable technique to obtain healthy compatible gingival tissues. This is why it is believed that the graft material is not related to root resorption. Several publications have reported that root conditioning is not beneficial since results do not improve the clinical outcome.[5,17] Cervical resorption can be produced by epithelial cervical attachment damage from a chemical agent.[18] There are few reports available on resorption cases related to regeneration techniques for periodontal defects and gingival recessions resulting from root conditioning with tetracycline solution or citric acid. A periodontal defect treated only with tetracycline showed resorption after 3 years, as reported by Ben-Yehouda.[10] Cury et al[19] recently reported on a clinical case of root resorption 2 years after periodontal defect treatment with a bioabsorbable membrane and tetracycline.

In studies with animal models[17] and humans[6] treated with a connective tissue graft and tetracycline or citric acid, resorption was not found in 6-month posttreatment controls.

Carnio et al[15] published a report on a patient treated with a connective tissue graft and citric acid that presented resorption 2 years later.

Conclusion

The buccal recession reported here was treated with a connective tissue graft and tetracycline solution. The resorption appeared 20 months after treatment. Analysis of the published studies in the literature demonstrate that resorption is a late complication, generally 1 year posttreatment, and therefore time is an important factor to be considered. It is not possible to predict future evolution when early assessments for resorption are performed.

It is suggested that tetracycline root conditioning probably causes root resorption in long-term evaluations. Therefore, this must be considered by the practitioner when developing the treatment plan.

References

1. Langer B, Langer L. Subepithelial connective tissue graft technique for root coverage. J Periodontol 1985;60:715–720.
2. Majzoub Z, Landi L, Grusovin MG, Cordioli GJ. Histology of connective tissue graft. A case report. J Periodontol 2001;72: 1607–1615.
3. Harris RJ. Successful root coverage: A human histologic evaluation of a case. Int J Periodontics Restorative Dent 1999; 19:439–447.
4. Pasquinelli KL. The histology of new attachment utilizing a thick autogenous soft tissue graft in an area of deep recession: A case report. Int J Periodontics Restorative Dent 1995;15:248–257.
5. Caffesse RG, De LaRosa M, Garza M, Munne-Travers A, Mondragon JC, Weltman R. Citric acid demineralization and subepithelial connective tissue grafts. J Periodontol 2000;71:568–572.
6. Bruno JF, Bowers GM. Histology of a human biopsy section following the placement of a subepithelial connective tissue graft. Int J Periodontics Restorative Dent 2000;20:225–231.
7. Harris RJ. The connective tissue with partial thickness double pedicle graft: The results of 100 consecutively-treated defects. J Periodontol 1994;65:448–461.
8. Bruno JF. Connective tissue graft technique assuring wide root coverage. Int J Periodontics Restorative Dent 1994;14: 126–137.
9. McGuire MK. Soft tissue augmentation on previously restored root surfaces. Int J Periodontics Restorative Dent 1996;16: 570–581.
10. Ben-Yehouda A. Progressive cervical root resorption related to tetracycline root conditioning. J Periodontol 1997;68:432–435 [erratum 1997;68:808].
11. Pini Prato GP, Baldi C, Pagliaro U, et al. Coronally advanced flap procedure for root coverage. Treatment of root surface: Root planning versus polishing. J Periodontol 1999;70:1064–1076.
12. Blomlöf L, Lindskog S. Cervical root resorption associated with guided tissue regeneration: A case report. J Periodontol 1998; 69:392–395.
13. Heithersay GS. Clinical, radiologic, and histopathologic features of invasive cervical resorption. Quintessence Int 1999;30: 27–37.
14. Karring T, Nyman S, Lindhe J, Sirirat M. Potentials for root resorption during periodontal wound healing. J Clin Periodontol 1984;11:41–52.
15. Carnio J, Camargo PM, Kenney EB. Root resorption associated with a subepithelial connective tissue graft for root coverage: Clinical and histologic report of a case. Int J Periodontics Restorative Dent 2003;23: 391–398.
16. Hokett SD, Peacock ME, Burns WT, Swiec GD, Cuenin MF. External root resorption following partial-thickness connective tissue graft placement: A case report. J Periodontol 2002;73:334–339.
17. Nagata MJH, Bosco AF, Leite CM, Melo LGN, Sundefeld ML. Healing of dehiscence defects following root surface demineralization with tetracycline: A histologic study in monkeys. J Periodontol 2005;76: 908–914.
18. Ne R, Witherspoon DE, Gutmann JL. Tooth resorption. Quintessence Int 1999;30:9–25.
19. Cury PR, Furuse C, Martins MT, Sallum EA, de Araújo NS. Root resorption and ankylosis associated with guided tissue regeneration. J Am Dent Assoc 2005;136:337–341.