


## PERIODONTAL THERAPY FOR HOPELESS MANDIBULAR ANTERIOR TEETH: A RETROSPECTIVE CASE REPORT WITH A MULTIDISCIPLINARY APPROACH AND A 20-YEAR FOLLOW-UP

Access this article online	
Quick Response Code:	
	Website: <a href="https://periodicos.uff.br/ijosd/article/view/60226">https://periodicos.uff.br/ijosd/article/view/60226</a>
	DOI: 10.22409/ijosd.v1i66.60226

**Autores:****Gustavo Vicentis Oliveira Fernandes (Ph.D.)**

University of Michigan School of Dentistry, Periodontics and Oral Medicine Department, Ann Arbor, MI, U.S.A.

**Abdullah C. Akman (Ph.D.)**

Hacettepe University - Faculty of Dentistry, Department of Periodontology, Ankara, Turkey.

**Sema S. Hakki (Ph.D.)**

Selcuk University - Faculty of Dentistry, Department of Periodontology, Konya, Turkey.

**Running title:** Multidisciplinary treatment for periodontal hopeless teeth.**Correspondence:**

Gustavo Vicentis de Oliveira Fernandes

University of Michigan School of Dentistry

1011 North University Ave, Ann Arbor, MI 48109, U.S.A.

[gustfern@umich.edu](mailto:gustfern@umich.edu)

Tel.: +1 (734) 736-2105

**ABSTRACT**

**Introduction:** This case report presents the intentional periodontal maintenance of two periodontal hopeless lower central incisors with a multidisciplinary approach and 20-year follow-up. **Case presentation:** A 36-year-old male, in 2001, was diagnosed with aggressive periodontitis, gingival swelling, bleeding, and mandibular central incisors with mobility and poor prognosis. Following



periodontal therapy (phase I), root canal treatment, and occlusal adjustment, #31 and #41 were gently extracted to remove the granulation tissues, calculus, and infected cementum from the root surface. Then, tetracycline-HCl was applied for 5 minutes on the root surfaces. The teeth were repositioned into the sockets and splinted with a lingual bar. At 3 months, the bar was removed, and a free gingival autogenous graft was done to improve the local keratinized tissue width. Mobility scores, pocket depths, and clinical attachment levels were recorded, and radiographs were taken at 1, 5, and 20 years. The 5-year follow-up showed that the teeth were clinically and radiographically in function. There was a reduction in probing depth and a gain in clinical attachment and radiographic alveolar bone levels. After 20 years, #41 was stable, but #31 had external root resorption, leading to a new treatment plan (dental implants) and extraction. **Conclusion:** The clinical result of this case was satisfactory for 20 years. Intentional periodontal maintenance of the teeth may be an alternative treatment, even considering the high level of complexity.

**Keywords:** Case report, Periodontal attachment loss, Surgical procedure, Multidisciplinary approach, Long-term effect.

## INTRODUCTION

The primary goal of periodontal therapy is the maintenance and/or reconstruction of tissues, including periodontal attachment apparatus and bone loss due to periodontal disease. However, there are some limitations and difficulties in treating severe bone loss and tooth mobility. Although aggressive periodontitis generally affects systemically healthy individuals younger than 30, the onset may be older. Due to a rapid rate of disease progression, the prognosis of aggressive periodontitis becomes typically poor, and the involved teeth are lost (NAGY & NOVAK, 2002). When the periodontal prognosis of teeth is poor, periodontal therapy may be considered a choice to keep them as long as possible.

Periodontal maintenance is an integral part of periodontal therapy for patients with periodontal diseases. This step starts after the completion of active periodontal therapy and continues at varying intervals for the life of the dentition (AMERICAN ACADEMY OF PERIODONTOLOGY, 2000). Inadequate control of dental biofilm will result in periodontal pathogenic microorganisms' recolonization of the subgingival area, compromising the results of the periodontal treatment (JENKINS et al., 2000). Then, long-term maintenance of periodontal health depends on post-treatment care, and the outcomes depend on whether the etiologic factors are periodically controlled. Patients who attend regular periodontal maintenance programs have significantly less attachment loss and tooth loss (MIYAMOTO et al., 2006). The frequency of recall visits should be



dictated by local, behavioral, and systemic factors (AMERICAN ACADEMY OF PERIODONTOLOGY, 2000). Patients should participate actively in periodontal maintenance treatment by managing biofilm control at home and attending periodontal maintenance appointments (MIYAMOTO et al., 2006).

Intentional replantation is defined as tooth extraction and reinsertion into the extraction socket after endodontic treatment (PEER, 2004). In the literature, it was claimed that intentional replantation is contraindicated in teeth that have moderate to severe periodontal diseases (KRATCHMAN, 1997). However, some long-term follow-up studies in which periodontally involved teeth survived with healthy gingiva, reduced pocket depths, and new bone formation following intentional replantation (LU, 1986; DEMIRALP et al., 2003; YU et al., 2003; TÖZÜM et al., 2006; DEMIR et al., 2007; AL-HEZAIMI et al., 2009). Thus, this case report presented a 20-year follow-up of an intentional maintenance case in which periodontal hopeless mandibular lower central incisors had severe and aggressive periodontitis.

## CASE DESCRIPTION

The case report was based on the CARE guidelines. The patient signed the informed consent form, and the IRB approved this case report (local Ethical Committee, Konya, Turkey - 20212603). A 36-year-old male with good general health was presented in November 2001 in a private office (Turkey) with complaints of gingival swelling, bleeding, and severe mobility (class 3) (SCHULTE et al., 1992) in the lower central incisors. The intraoral examination revealed severe gingival inflammation, attachment, and papilla loss (Fig.1). The patient was diagnosed with severe and aggressive periodontitis (stage IV and grade C) (Fig.2). However, mobility at the first visit was severe. The teeth scores were above the measurable maximal limit of the Periotest (>50) (SCHULTE et al., 1992). The prognosis of those teeth was completely hopeless; however, even though treatment options and all explanations were presented, the patient strongly requested to try saving the teeth. Then, it was considered stabilization with splint, periodontal and endodontic treatments, occlusal adjustment, and periodic maintenance. The patient agreed and signed the informed consent.



Before treatment

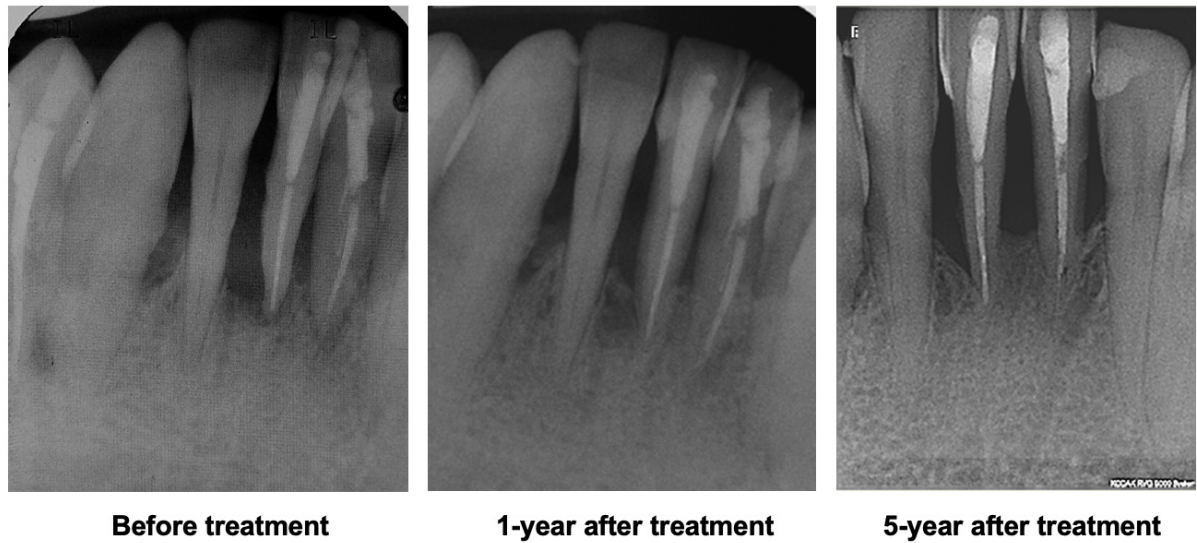


1-year after treatment



5-year after treatment

**Figure 1.** a. Clinical appearance of the patient. Severe gingival inflammation and no attached gingiva at mandibular central incisors region; b. Clinical appearance of the patient at 12 months. A quite clinically stable condition; c. Clinical appearance of the patient at 5 years.



**Figure 2.** a. Periapical radiography of mandibular anterior region before replantation. Note severe bone resorption and teeth were hopeless; b. Periapical radiography of mandibular anterior region. Note increased alveolar bone level. There was no root resorption, but ankyloses were observed in tooth #41; c. Periapical radiography of case. Tooth #31 showed no ankyloses but slight root resorption.

## Case Management

Initial periodontal therapy, including full-mouth scaling and root planning (SRP), was performed with combined stabilization of the teeth (lingual splint) and antibiotic treatment (500mg amoxicillin and 250mg metronidazole, t.i.d.) for 14 days. Afterward, endodontic treatment was conducted. After the endodontic treatment was finished, the patient was recalled to the next step. With local anesthesia, the two lower central incisors were gently removed from the sockets to remove granulation tissues, calculus, and necrotic cementum. Tetracycline-HCl (100mg/mL concentration) was applied for 5 minutes onto the root surfaces. Only the apical area of the sockets was thoroughly and gently curetted and rinsed with sterile saline solution.

Before reinserting, proximal contact areas of teeth were mildly adjusted to achieve proper arc shape. Fixed immobilization was accomplished at lingual with a temporary periodontal splint. The occlusal adjustment was performed to prevent undesirable contacts. The patient was instructed to rinse 0.12% chlorhexidine solution twice daily for 2 weeks and to use an interdental toothbrush. Teeth were polished in the third week after replantation, and monthly maintenance recalls were arranged. After the procedure, the patient was observed after 14, 30 days, 3, 9, and 12 months, and then twice a year. At 3 months, the lingual bar (splint) was removed after verifying the stability and no

mobility, and a free gingival autogenous graft was performed to increase the keratinized tissue width.

## Clinical Outcomes

Post-operative healing was uneventful. Mobility scores were obtained with Periotest (manufacturer's standard scores in Table 2), pocket depths (PD), and clinical attachment levels (CAL) were recorded (Table 1), and radiographs were taken after 1, 5, and 20 years. The 1- and 5-year follow-up examinations revealed that the teeth were clinically and radiographically stable and in function (Figs. 1,2). However, slight root resorption was observed in the root of #31 after 5 years (Fig.2). Mean value of attachment gain was 2.17mm and 3.47mm, and the mean value of PD reduction was 4mm and 5mm at the end of 5 years, respectively, for #41 and #31 (Table 1).

The initial severe immeasurable mobility of teeth (>50) was reduced to class 1 after 1 and 5 years (Table 1), and there was an improvement of the mucogingival tissue after graft surgery. In addition, alveolar bone gain and gingival recession were observed. Although the esthetic appearance was impaired after one year due to the lack of harmony between the palatal graft and recipient site and increase-sized crowns, an improved periodontal condition was found. Neither bleeding on probing nor edema was noted at 1 and 5 years (Figs. 1,2). Moreover, they were functionally acceptable without any complaint by the patient, who was highly motivated due to the treatment results.

**Table 1.** Clinical measurements of the case before and after periodontal treatment. To measure pocket depth and attachment level, the recording was performed from six different points of each tooth (mesial, mid-buccal, distal for buccal aspect, mesial, mid-lingual, and distal for lingual aspect).

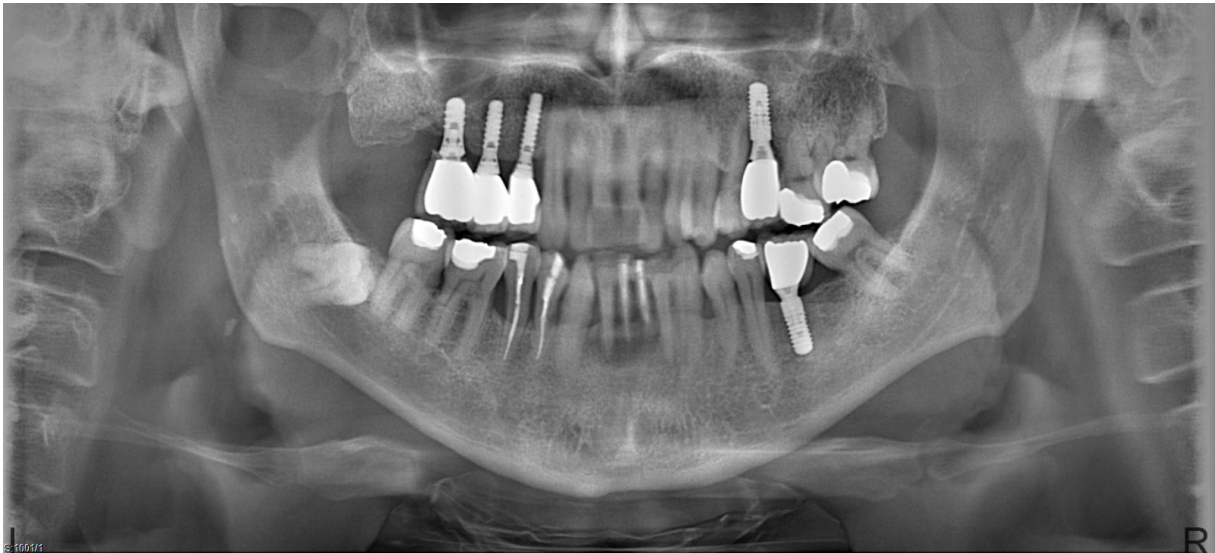
Tooth	Baseline		1-year		5 years		20 years	
	#41	#31	#41	#31	#41	#31	#41	#31
Mobility scores (*)	>50	>50	+15	+15	+14	+13	N/A	N/A
Pocket depth (mm)	V	9 7 5 10 9 7	3 2 3 3 2 3	3 1 2 3 1 2	N/A	N/A		
	L	8 5 3 4 4 7	2 2 2 2 2 2	2 1 2 2 1 2	N/A	N/A		
CAL (mm)	V	10 10 10 12 12 11	9 8 9 9 7 8	9 7 7 7 7 7	N/A	N/A		
	L	12 9 9 9 7 11	9 7 9 8 7 8	9 7 8 7 6 7	N/A	N/A		

\*Periotest (Siemens Dental Div, Bensheim, Germany). CAL = clinical attachment level; V = Vestibule; L = Lingual; N/A = not applicable.

**Table 2.** Clinical correlation of Periotest Values. The normal range of Periotest scores was between +3 and +10 for mandibular central incisors.

Evaluation of clinical mobility	Degree of loosening	Periotest values
0	No discernible movement	- 08 to +09
1	Just discernible movement	+10 to +19
2	Obvious movement	+20 to +29
3	Mobile on pressure	+30 to +50

After 20 years, in 2021, there was a recall to follow up on the patient, and the root resorption was found to be augmentation at #31, whereas #41 was stable (Figs. 3,4). Therefore, a new treatment plan was made associated with the technological and evidence-based science evolution (dental implants), which resulted in the extraction of #31 and #41 after 20 years of function.



**Figure 3.** Panoramic image after 20 years of the treatment.



**Figure 4.** Periapical image showing #41 stable and #31 with external resorption after 20 years; and Clinical images after extraction.

## DISCUSSION

Reimplantation is a non-predictable procedure, and the same results could have been achieved with a standard periodontal therapy that has demonstrated



efficiency in saving in long-term hopeless cases. Moreover, in the manuscript, supportive periodontal therapy adopted during the study period has not been described. Intentional maintenance may be an alternative approach to periodontally hopeless teeth, which was planned in 2001, a period with many limitations regarding dental implants. Moreover, to the best of our knowledge, this case report is the only study with the most prolonged follow-up period.

Demiralp et al. (2003) performed intentional maintenance and periodontal treatment of 15 hopeless-periodontally teeth and reported 17% bone gain and PD reduction without root resorption or ankylosis. Although the gingival recession increased, patients maintained their oral hygiene and reported satisfaction in preserving their teeth. In our case, attachment gain and PD reduction were obtained, and the patient was satisfied with his teeth function. Periapical radiography showed that the attempt to save the compromised teeth was feasible, and physiological mobility was observed in the teeth for 20 years.

Tözüm et al. (2006) used platelet-rich plasma (PRP) in an intentional replantation procedure for a periodontally involved #41 with an 18-month follow-up. They demonstrated 2.0-2.5mm of bone gain in the apical portion after 12 months and 3.0-3.5mm after 18 months. Demir et al. (2007) combined intentional replantation with regenerative techniques. They used PRP combined with bioactive glass graft material and a non-resorbable PTFE membrane. At the end of 12 months, the radiographically radiolucent area around the tooth disappeared utterly. Otherwise, our study did not use regenerative materials, and it was possible to detect similar bone fill.

Tetracycline has been used locally and systematically to inhibit bone resorption and collagenase activity (GOLUB et al., 1984; KELLER & CARANO, 1995). The local application removes the smear layer, causes surface demineralization, and agent adsorption to dentin. Studies demonstrated that tetracycline treating root surfaces might act as an improved substrate for connective tissue components essential for interacting with hard and soft tissues during healing. Surface demineralization enhances extracellular matrix protein binding to dentin and simulates fibroblast attachment (WIKESJO et al., 1986; BAKER et al., 1995). It may be crucial in obtaining the functional periodontal attachment of hopeless teeth. Thus, enrolling in a multidisciplinary approach (endodontic and periodontal treatments, occlusal adjust, and lingual bar/splint) (KAHN et al., 2022) can be a previous alternative to tooth extraction in cases where advanced periodontal destruction is present.

The limitations of this case report are present in the limited access to dental implant therapy in 2001, where this science had yet a low level of evidence. In addition, after achieving periodontal stabilization, aggressive periodontitis is an





extremely complex entity, which can result in a non-standard response, as observed here in this case report, harming the total replicability of the treatment. Moreover, after over 20 years, dental implant science has advanced and would be the first treatment option.

## CONCLUSION

Within the limitation of this case report, even though the consensus is that intentional replantation and maintenance are contraindicated in periodontally involved teeth, other researchers and our case report showed that it could be a feasible alternative treatment modality for hopeless-periodontally teeth as a last resort.

## PATIENT PERSPECTIVE

The expectation/prognosis to keep the teeth was low, and the possibility of placing a dental implant was extremely restricted. The approach used was extremely efficient and lasted two decades. I am satisfied with the results during this period and am now more confident about receiving rehabilitation with dental implants.

**CONFLICTS OF INTEREST:** The authors declare that this study has no conflict of interest.

## REFERENCES

1. Al-Hezaimi K, Naghshbandi J, Simon JH, Rotstein I. Successful treatment of a radicular groove by intentional replantation and Emdogain therapy: four years follow-up. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009; 107 82-5.
2. American Academy of Periodontology. Parameter on Periodontal Maintenance. *J Periodontol* 2000; 71 849-50.
3. Baker PJ, Evans RT, Coburn RA, Genco RJ. Tetracycline and its derivatives strongly bind to and are released from the tooth surface in active form. *J Periodontol* 1983; 54 580-5.
4. Demir B, Demiralp B, Güncü GN, Uyanik MO, Çağlayan F. Intentional replantation of a hopeless tooth with the combination of platelet rich plasma, bioactive glass graft material and non-resorbable membrane: a case report. *Dent Traumatol* 2007; 23 190-4.



5. Demiralp B, Nohutcu RM, Tepe DI, Eratalay K. Intentional replantation for periodontally involved hopeless teeth. *Dent Traumatol* 2003; 19 45-51.
6. Golub LM, Ramamurthy N, McNamara TF, et al. Tetracyclines inhibit tissue collagenase activity. A new mechanism in the treatment of periodontal disease. *J Periodontal Res* 1984; 19 651-5.
7. Jenkins WMM, Said SHM, Radvar M, Kinane DF. Effect of subgingival scaling during supportive therapy. *J Clin Periodontol* 2000; 27 590-6.
8. Kahn S, Dias AT, Nobre V, Oliveira LZ, Fernandes GVO. Endodontic and periodontal treatment of complete buccal root and apex exposition: A challenging case report with 17 months follow-up. *Clin Adv Periodontics* 2022; 12 152-8. doi: 10.1002/cap.10173
9. Keller DC, Carano A. Tetracycline effect on osteoclastic and osteoblastic activity. *Gen Dent* 1995; 43 60-3.
10. Kratchman S. Intentional replantation. *Dent Clin North Am* 1997; 41 603-17.
11. Lu DP. Intentional replantation of periodontally involved and endodontically mistreated tooth. *Oral Surg Oral Med Oral Pathol* 1986; 61 508-13.
12. Miyamoto T, Kumagai T, Jones JA, Van Dyke TE, Nunn ME. Compliance as a prognostic indicator: restrospective study of 505 patients treated and maintained of 15 years. *J Periodontol* 2006; 77 223-32.
13. Nagy RJ, Novak KF. Aggressive periodontitis. In: Newman MG, Takei HH, Carranza FA eds. *Carranza's Clinical Periodontology*. 9<sup>th</sup> Edition, W.B. Saunders Co.; 2002. P. 409-14.
14. Peer M. Intentional replantation – a 'last resort' treatment or a conventional treatment procedure? Nine case reports. *Dent Traumatol* 2004; 20 48-55.
15. Schulte W, d'Hoedt B, Lukas D, Maunz M, Steppeler M. Periotest for measuring periodontal characteristics-correlation with periodontal bone loss. *J Periodont Res* 1992; 27 184-90.



16. Tözüm TF, Keçeli HG, Serper A, Tuncel B. Intentional replantation for a periodontally involved hopeless incisor by using autologous platelet-rich plasma. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2006; 101 119-24.
17. Wikesjö UM, Baker PJ, Christersson LA, et al. A biochemical approach to periodontal regeneration: tetracycline treatment conditions dentin surfaces. *J Periodontal Res* 1986; 21 322-9.
18. Yu L, Xu B, Wu B. Treatment of combined endodontic-periodontic lesions by intentional replantation and application of hydroxyapatites. *Dent Traumatol* 2003; 19 60-3.