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Case Report

Longitudinal Supportive Periodontal Therapy for Severe Chronic Periodontitis with Furcation Involvement: A 12-year Follow-up Report

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Abstract

We report a case involving a 12-year follow-up after treatment for chronic periodontitis with furcation involvement. A 54-year-old woman presented with the chief complaint of hypersensitivity. Clinical examination at the first visit revealed 15% of sites with a probing depth ≥4 mm and 35% of sites with bleeding on probing. Initial periodontal therapy was implemented based on a clinical diagnosis of severe chronic periodontitis. Surgical periodontal therapy was subsequently performed at selected sites. For #44, regenerative periodontal therapy using enamel matrix derivative (Emdogain®) was selected. For #16, which exhibited a 2- to 3-wall vertical bony defect and class III (mesio-distal) furcation involvement, bone graft was scheduled. Other sites with residual periodontal pockets were treated by open flap debridement. For #37, with a gutter-shaped root, odontoplasty was performed. After reevaluation, the patient was placed on supportive periodontal therapy (SPT). During 12 years of SPT, the periodontal condition remained uneventful in most of the teeth. However, bone resorption was observed in the distal aspect of #37, making the prognosis poor. This indicates the need to continuously monitor risk factors, including inflammation and traumatic occlusion, during SPT. Although some problems still remain, severe periodontitis with furcation involvement was successfully maintained longitudinally with an adequate level of patient compliance and careful SPT.

Key words: Supportive periodontal therapy—Periodontitis—Periodontal regeneration

Introduction

Periodontitis is mainly caused by periodontal pathogens[17], but environmental and host factors can also significantly contribute to its pathogenesis and progression[5,13]. In order to treat periodontitis, initial periodontal therapy including plaque control and scaling and

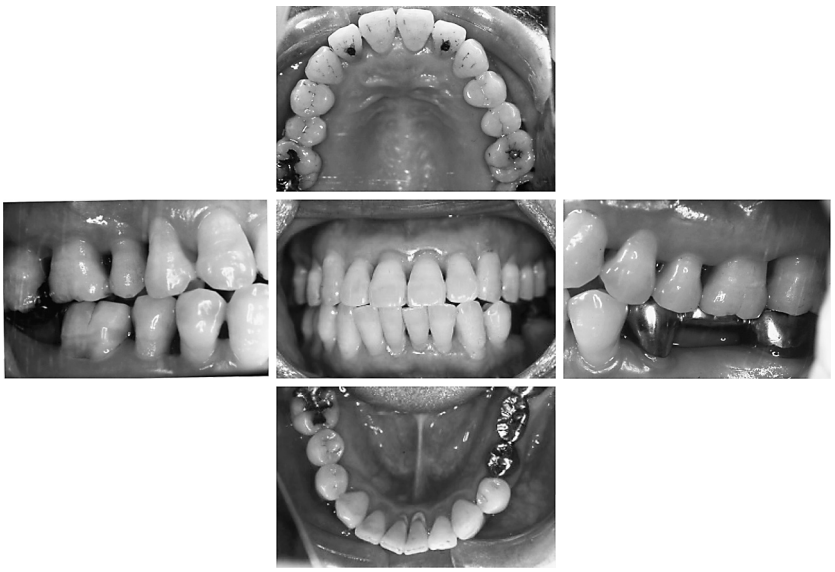


Fig. 1 Oral view at baseline

root planing (SRP) is necessary to remove or suppress bacteria and inflammatory factors. In addition to anti-inflammatory intervention, adjustment of occlusal trauma is also often necessary[6]. Following reevaluation, sites without significant improvement are subjected to periodontal surgery[8].

In recent years, the focus has been on periodontal regenerative therapy. Enamel matrix derivative (EMD) has been introduced into such therapy and is now widely used[7]. Even with such advances in surgical periodontal therapy, furcation involvement still provides a major challenge for clinicians. Therefore, it is important to determine the appropriate prognosis and therapeutic strategy, focusing particularly on access for cleaning and retention of function.

Maintenance therapy plays an important role in the longevity of teeth. In patients without maintenance, there is an increased risk of tooth loss[18]. On the other hand, regular supportive periodontal therapy with good compliance can maintain teeth for a long time[9]. It is important to note that after active periodontal treatment, patient compliance decreases as time progresses[1,18,19].

In this report, we present a case involving long-term follow-up after treatment for severe chronic periodontitis with occlusal trauma and furcation involvement.

Case Report

Written informed consent was obtained from the patient for inclusion in this case report. This report was approved by the Ethics Committee of Tokyo Dental College (No.440).

1. Baseline examination

In April 1998, a 54-year-old woman visited the Clinic of Conservative Dentistry at the Tokyo Dental College Chiba Hospital with the chief complaint of hypersensitivity in an exposed root surface due to gingival recession. The general health of the patient was good and no major illnesses were reported apart from pollinosis. She had a history of caries treatment and had received periodontal surgery in the 1980's.

As shown in Fig. 1, gingival recession was evident in all teeth. The results of a periodontal

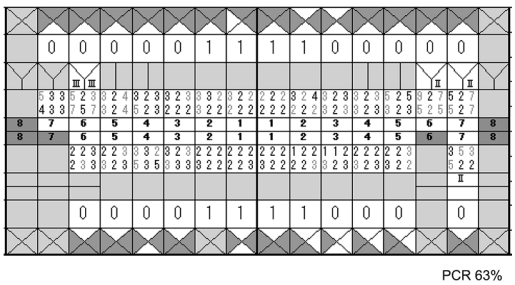


Fig. 2 Periodontal examination at baseline

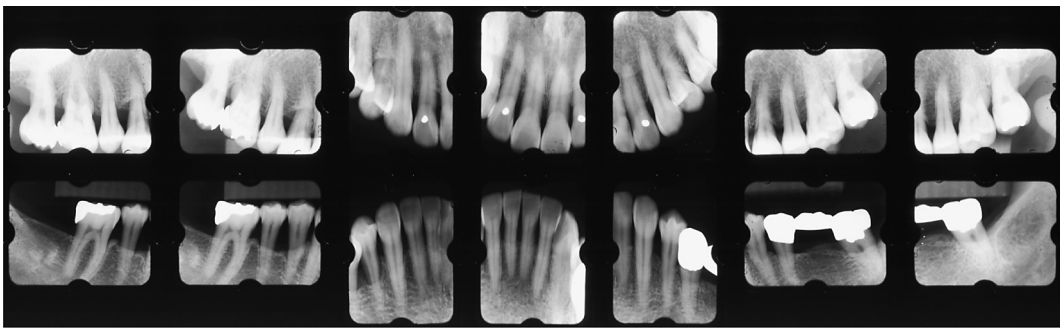


Fig. 3 Radiographic view at baseline

examination at the first visit are shown in Fig. 2. Sites with a probing depth (PD) ≥4 mm were observed mainly in the molar region. Radiographic examination revealed vertical bone defects in #16, 17, 26, 27, 37, and 44 (Fig. 3). Degree of furcation involvement was class III in #16 in the mesio-distal aspect, class II in #26 and 27, and class II in #37.

The patient's level of plaque control as assessed according to the O'Leary Plaque Control Record[12] was 63%. As for occlusal guidance, balancing-contact interference was observed in #16, 26, 37 and 46 during lateral movement.

Etiologic factors were considered to be poor plaque control, partly due to gingival recession, and occlusal trauma. This case was clinically diagnosed as severe chronic periodontitis.

2. Treatment planning

1) Initial periodontal therapy

Oral hygiene instruction, full-mouth SRP, and occlusal adjustment for #16, 26, 37, and 46.

2) Reevaluation

3) Periodontal surgery

Flap operations for #16, 17, 26, 27, 37, 44.

4) Reevaluation

5) Treatment for recovery of oral function

6) Supportive periodontal therapy (SPT)

3. Treatment process

The outline of the treatment process is shown in Table 1.

1) Initial periodontal therapy

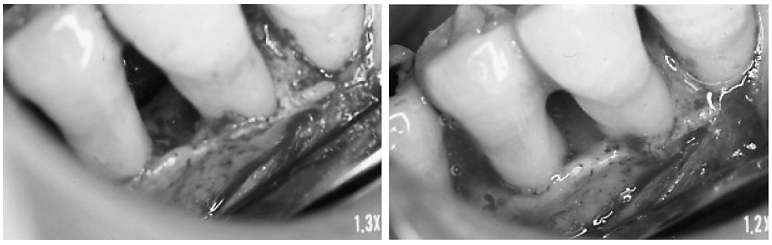
Initial periodontal therapy consisting mainly of tooth brushing instruction and full-mouth SRP was implemented. Furthermore, occlusal adjustment to reduce balancing-contact interference was also performed for #16, 26, 37, and 46.

2) Reevaluation

The status of patient plaque control improved from 63 to 8%, after initial periodontal therapy. The mean bleeding on probing (BOP)

Table 1 Treatment process

April 1998	Initial periodontal therapy
	・Plaque control
	・Full-mouth SRP
	・Occlusal adjustment (#16, 26, 37, 46)
	(Reevaluation)
August 1999	Surgical periodontal therapy
	・Regenerative therapy with Emdogain® (#44)
	・Bone grafting with Boneject® (#16)
	・Trisection (#26)
	・Odontoplasty (#37)
	(Reevaluation)
April 2000	Treatment for recovery of oral function
	・Restorative treatment (#26)
	・Bridge placement (#34–37)
	(Reevaluation)
June 2000 to present	Supportive Periodontal Therapy (SPT)
	・Plaque control
	・Occlusal adjustment



a b

Fig. 4 Periodontal regenerative therapy with EMD (#44)
a: after debridement
b: application of Emdogain®

value was reduced from 35 to 27%. A modest improvement was observed in the percentage of sites with PD ≥4 mm, from 15 to 12%. Residual deep pockets with vertical bone defects were evident at #16, 17, 26, 27, 37, and 44.

3) Periodontal surgery

In order to effectively treat the 1-wall bony defect in #44, regenerative therapy with Emdogain® was performed (Figs. 4-a, b). For #16 with class III furcation involvement, bone graft with Boneject® was selected (Figs. 5-a, b). For treatment of furcation class II at #26 and 27, trisection of the distal root was performed for #26. Trisection was not used for #27 because of the root proximity. For #37 with class II furcation involvement and a gutter-shaped root, odontoplasty was performed to reduce lingual over-contour.

4) Reevaluation and 5) Treatment for recovery of oral function

After an adequate period of time to allow healing, reevaluation was performed and restorative treatment implemented. A full

a b

Fig. 5 Bone grafting with Boneject® (#16)
a: after debridement
b: defect filling with Boneject®

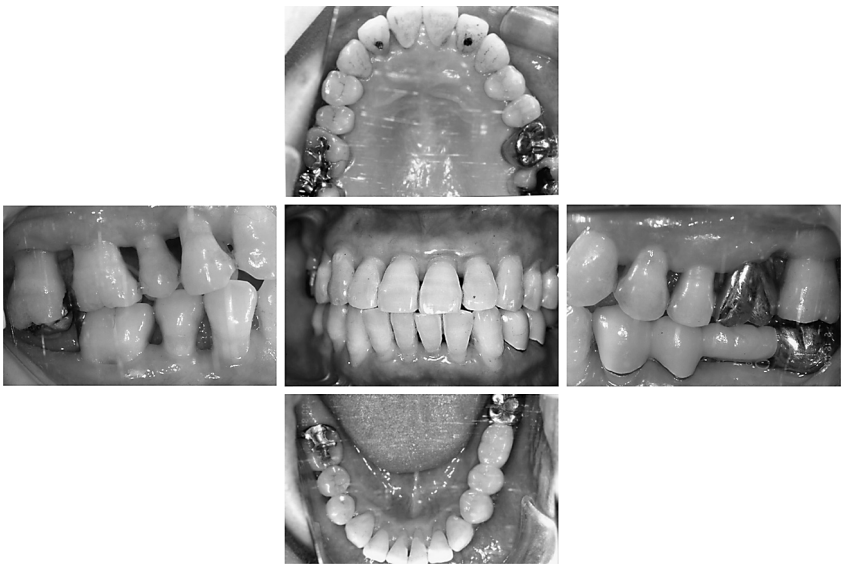


Fig. 6 Oral view at start of SPT

metal crown was placed on #26 and a 4-unit bridge set for #34–37.

6) Supportive periodontal therapy

Inflammation showed a reduction post-surgically (Fig. 6). Periodontal examination revealed an improvement in PD in most regions (Fig. 7). With meticulous effort in plaque control and application of fluoride, hypersensitivity of exposed root surface due to gingival recession was decreased.

During 12 years of SPT, the periodontal condition has remained uneventful in most

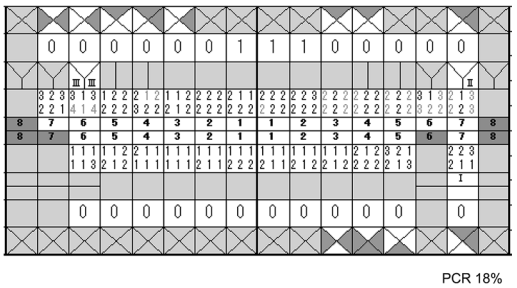


Fig. 7 Periodontal examination at start of SPT

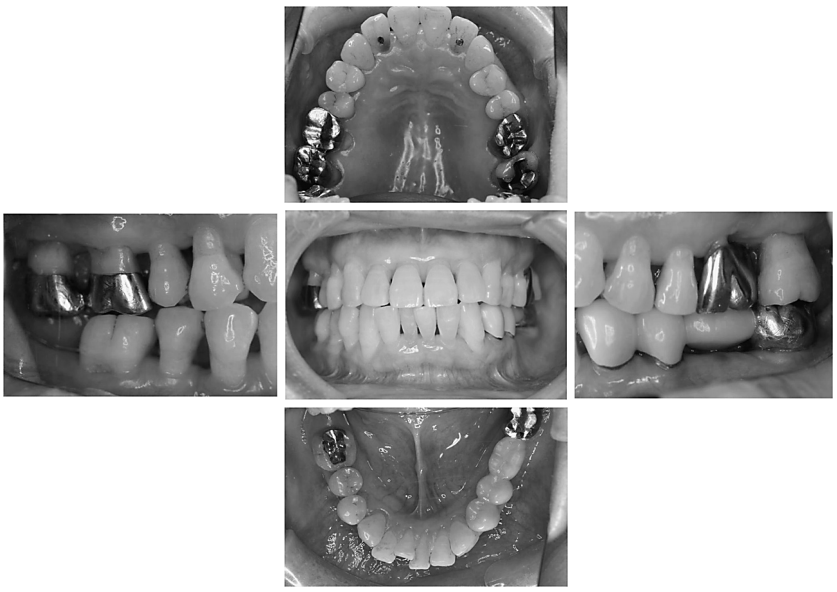


Fig. 8 12 years after start of SPT

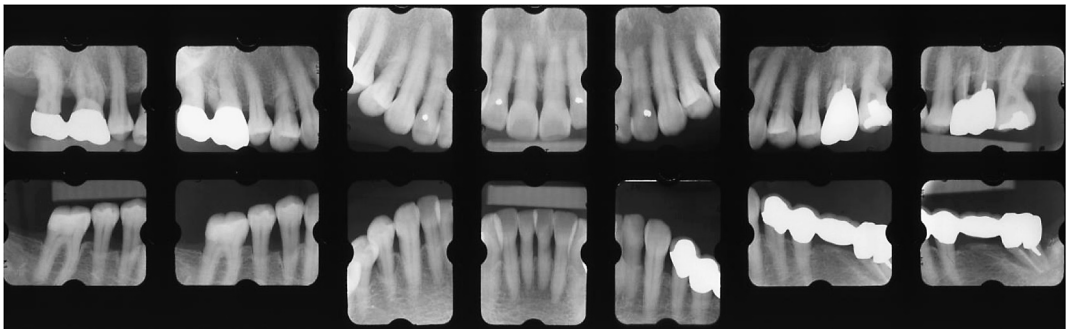


Fig. 9 Radiographic view after 12 years of SPT

of the teeth (Figs. 8, 9). As for tooth #44, which was treated with EMD, a 3-mm gain in clinical attachment was observed, although no significant change in radiopacity was identified. Longitudinal maintenance without tooth mobility was successfully obtained in tooth #16, which was treated with bone graft. Although the distal aspect of #16 showed a gain in clinical attachment, the furcation was exposed.

Frequent examination of occlusion was necessary in order to control occlusal trauma during SPT. Further occlusal adjustment was performed, when indicated.

Discussion

It is essential to establish good plaque control in order for periodontal therapy to be effective[2,10,16]. After initial therapy, periodontal surgery is often indicated in order to further reduce PD and inflammation. In the present case, tooth #44 had a vertical

1-wall bony defect, which was treated by periodontal regenerative therapy using EMD. A 3-mm attachment gain was obtained during SPT. This level of attachment gain can be considered to be significant[3].

In general, root resection or extraction is indicated in the treatment of class III furcation with poor prognosis. In this case, #16 was treated with Boneject®. Boneject® is a hydroxyapatite with bovine atelocollagen, and its use has been reported in the treatment of 1-, 2- and 3-wall bony defects. It has the ability for osteoconduction and can be absorbed slowly. However, it does not have osteoinductive capabilities or promote cell proliferation[11]. The success of periodontal surgery is influenced by the level of plaque control[15,16]. Although the clinical outcome for #16 was not optimal, it was maintained without loss of attachment. Since plaque control for #16 is rather difficult, it is important to constantly monitor the status of plaque control and implement professional care as necessary.

For #26 with class II furcation and bone loss of more than 2/3 of the root length, trisection of the distal root was performed. One of the advantages of trisection is that it facilitates cleaning. Slight mobility was observed in this tooth during SPT. It is necessary to pay attention to factors such as inflammation and occlusal trauma[4].

One study reported that compromised teeth could be maintained longitudinally by appropriate SPT[1]. During periodontal treatment, it is necessary to reinforce motivation of patients through repeated care such as professional tooth cleaning[14]. Appropriate diagnosis, prognosis, and treatment planning are all indispensable elements in every type of periodontal treatment. Learning from the treatment of this case made us realize the importance of maintenance and SPT for the long-term stability of periodontal tissue.

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