Outcomes After 25 Years of Periodontal Treatment and Maintenance of a Patient Affected by Generalized Severe Aggressive Periodontitis

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This report describes the long-term outcomes of nonsurgical periodontal therapy and supportive periodontal treatment (SPT) of a 21-year-old patient affected by generalized aggressive periodontitis at multiple teeth with a compromised prognosis. After 25 years of SPT, no teeth had been extracted and no periodontal pockets associated with bleeding on probing were present. Radiographic analysis showed an improvement in infrabony defects, demonstrating long-term improvement is possible with nonsurgical periodontal treatment provided that smoking is not present and the patient is included in a strict SPT. Int J Periodontics Restorative Dent 2018;38:347–354. doi: 10.11607/prd.3534

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Periodontitis characterized by a rapid destruction of the clinical attachment with subsequent severe alveolar bone loss is defined as *aggressive periodontitis* (AgP).[1] Such cases may be further classified as localized or generalized according to the extent of the periodontal destruction, with the generalized forms usually affecting people aged younger than 30 years and presenting with generalized severe bone loss and clinical attachment loss, recessions, and the presence of periodontal pockets. The rapid and severe interproximal attachment loss may lead to formation of angular bony defects. Aggressive forms of periodontitis are considered multifactorial in nature, developing as a result of complex interactions between a genetically susceptible patient and specific potential pathogens. The clinical manifestation of the disease may further be modified by environmental factors such as cigarette smoking. Hence, treatment of the disease should be directed toward control of behavioral factors and elimination of the subgingival microbiota. In the literature, different studies have evaluated the short-term results of treatment of generalized AgP (G-AgP)[2–4] and have demonstrated promising results in terms of clinical and microbiologic outcomes, mostly when systemic metronidazole and amoxicillin were

Fig 1 *Clinical situation at baseline of a 21-year-old man referred for the treatment of recurrent periodontal abscesses at different sites in the oral cavity.*

administered as an adjunct to nonsurgical periodontal therapy. Nevertheless, few studies have reported on the medium-term outcome of treatment of G-AgP patients.[5]

To the best of the present authors' knowledge, no data are available on the long-term (> 10 years) results of periodontal treatment in patients with G-AgP. Thus, the aim of this case report is to describe the 25-year outcomes of periodontal treatment and supportive periodontal care of a patient affected by G-AgP.

Case Report

In 1992, a 21-year-old man was referred for treatment of recurrent periodontal abscesses at different sites in the oral cavity (Fig 1). The medical history of the patient was negative, and no smoking habits were recorded. Periodontal examination revealed full-mouth plaque and bleeding scores of 100% and 90%, respectively. Periodontal probing (Table 1; see online version at www.quintpub.com) showed the presence of a high number of locations with deep periodontal pockets (> 6 mm) and thus advanced attachment loss, mainly at interproximal sites. Grade III furcation involvement was noted at the maxillary right first molar, grade II at the maxillary left second molar and right first molar and the mandibular right second molar, and grade I at the maxillary right second molar, mandibular left first molar, and mandibular right second molar. Radiographic evaluation (Fig 2) demonstrated generalized severe bone loss with several teeth (maxillary right central and lateral incisors and first molar; maxillary left lateral incisor and first and second premolars; mandibular left canine, second premolar, and first and second molars; and mandibular right lateral incisor and first and second molars) presenting angular bony defects up to the apical third of the root. Radiographic images compatible with furcation involvement were observed at the maxillary right first and second molars and left first molar and the mandibular left second molar. Root proximity was observed at the maxillary right central and lateral incisors. Periodontal ligament widening was observed at teeth the maxillary right central and lateral incisors and second premolar, the maxillary left lateral incisor and first premolar, the mandibular left second molar, and the mandibular right lateral incisor and second premolar. Unfavorable crown-to-root ratio was present at the maxillary right central and lateral incisors, second premolar, and first molar; the maxillary left central and lateral incisors and first and second premolars; the mandibular left canine and first and second premolars; and the mandibular right central and lateral incisors and second premolar. Unfavorable root morphology was noted at both maxillary second molars.

Results from the microbiologic culture demonstrated a total of 1.4^{8} colony forming units with proportions of *Actinobacillus actinomycetemcomitans* (0.03%) (today named *Aggregatibacter actinomycetemcomitans*), *Porphyromonas gingivalis* (65%), *Prevotella intermedia* (0.2%), and *Bacteroides forsythus* (today named *Tannerella forsythia*) (0.9%). Furthermore, a depressed neutrophil chemotaxis was observed from the immunologic analysis.

According to the medical, dental, and periodontal history of the patient, this was classified as a generalized early onset periodontitis patient. Since 1999, this disease has been named generalized aggressive periodontitis.[1]

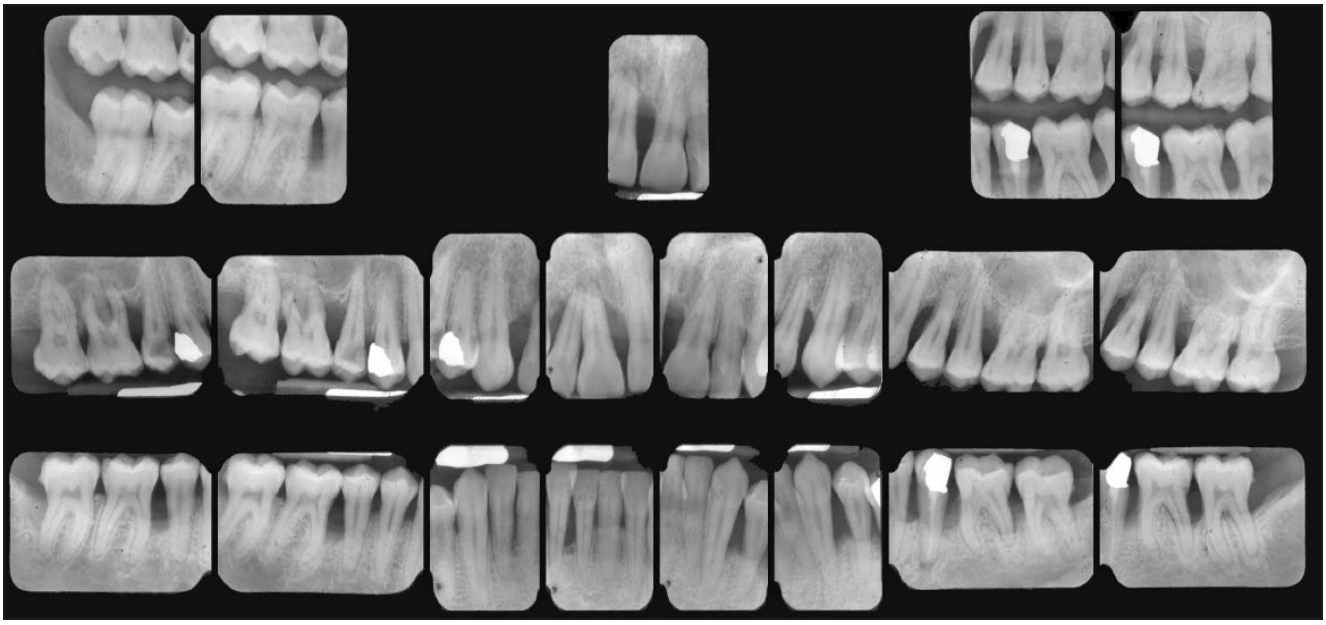

Fig 2 *Radiographic evaluation at baseline.*

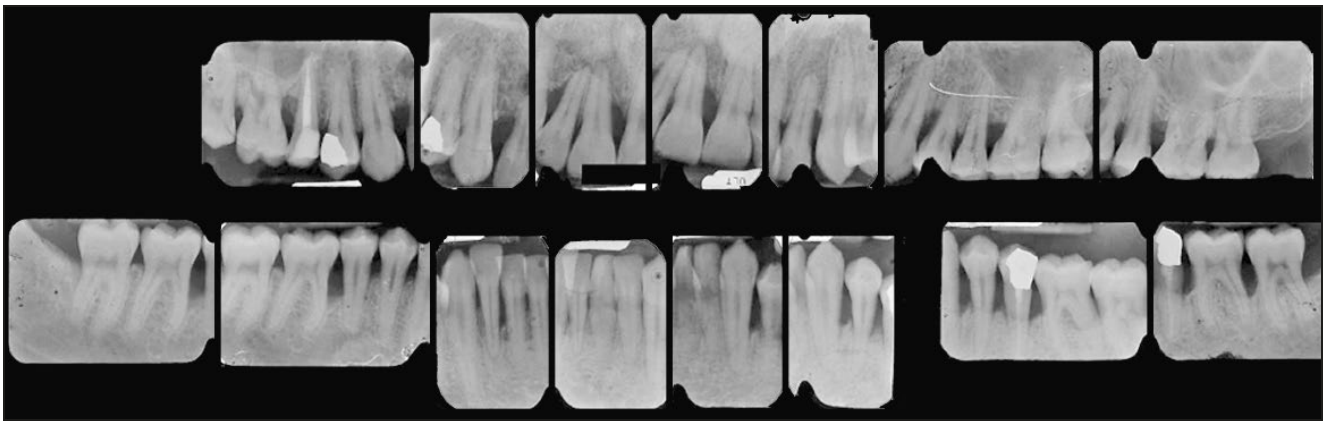

Fig 3 *Radiographic evaluation at 1 year, after nonsurgical periodontal therapy with systemic antibiotics.*

The hygienic phase of the treatment started with a session of supragingival plaque control in which the patient was instructed in the use of the modified Bass technique and interdental brushing devices. Afterward, scaling and root planning (SRP) was performed under local anesthesia using a quadrant-by-quadrant approach. Clorhexidine 0.2% mouthrinse (1 minute tid) were indicated during the entire period of SRP. In the last session of SRP, metronidazole 500 mg (tid for 7 days) combined with amoxicillin 500 mg (tid for 7 days) was prescribed. As part of the infection control, endodontic treatment and conservative reconstruction of the maxillary left second premolar were also performed.

At 3 months after SRP, the periodontal reevaluation revealed full-mouth plaque and bleeding scores of 35% and 30%, respectively. Mean probing pocket depths were reduced considerably from the first examination, although at all sextants residual pockets > 4 mm were still present. SRP was repeated in all residual pockets > 4 mm positive for bleeding, and oral hygiene procedures were reinforced. No extraction or periodontal surgery was performed.

At 1 year, full-mouth periapical radiographs (Fig 3) and a new periodontal evaluation were compiled (Table 2; see online version at www.quintpub.com). The clinical examination demonstrated an overall

Fig 4 *Clinical and radiographic situation of the maxillary* right *second premolar and first molar at baseline* (a, b) *and after endodontic treatment at 1 year* (c, d). *Clinical and radiographic situation at 25 years after crown lengthening of the maxillary right second premolar and distal root amputation of the first molar and delivery of a two-unit fixed partial denture* (e, f).

Fig 5 *Clinical situation after 25 years of follow-up.*

shrinkage of the marginal tissues. Full-mouth plaque and bleeding scores were 10% and 8%, respectively. Periodontal pockets > 4 mm were present at the maxillary right lateral incisor, second premolar, and first and second molars; the maxillary left lateral incisor, first and second premolars, and first and second molars; the mandibular left canine through second molar; and the mandibular right second premolar and first and second molars. Grade III furcation involvement remained at the distal root of the maxillary right first molar and grade I at the maxillary left first molar and mandibular left second molar. At this time point, based on the new periodontal and radiographic condition of the patient, the treatment plan consisted of crown lengthening of the maxillary right second premolar and endodontic treatment and distal root amputation of the maxillary right first molar. These teeth were then prepared for a two-unit fixed partial denture (Fig 4). The patient was enrolled in a strict recall system of SPT every 3 months. During the recall appointments, sites with bleeding on probing and a PPD of ≥ 5 mm were reinstrumented. When necessary, the patient was remotivated and reinstructed in oral hygiene procedures.

Clinical Outcomes

After 25 years of SPT, no teeth were extracted and no periodontal pocket > 5 mm associated with bleeding on probing was present (Table 3 [see online version at www.quintpub.com], Fig 5). Over

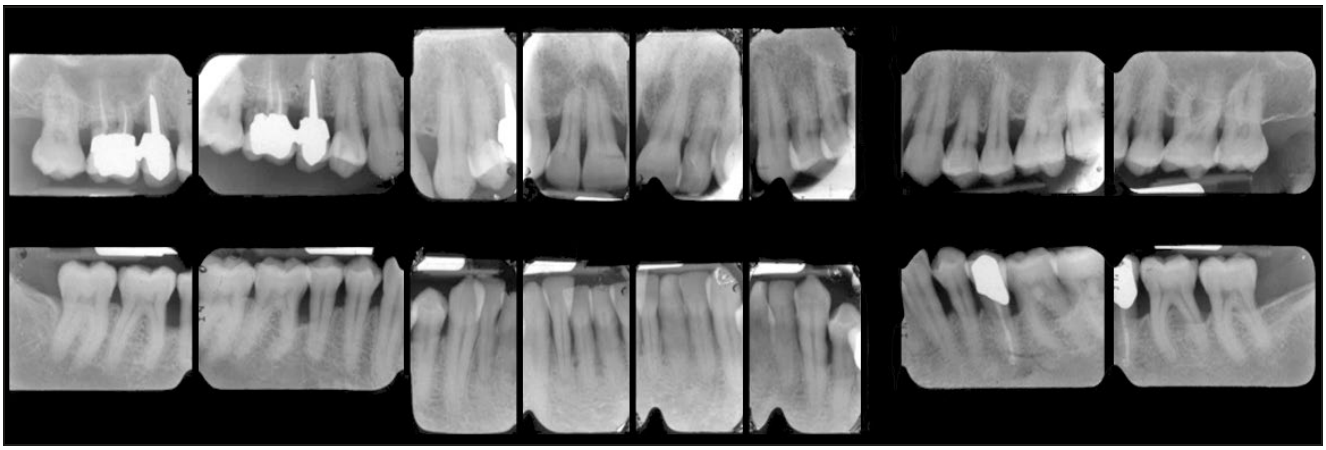

Fig 6 *Radiographic evaluation after 25 years of follow-up.*

the years, the patient maintained an optimal level of oral hygiene, with a full-mouth plaque score (FMPS) that never exceeded 10%, and absence of a high level of inflammation, with a full-mouth bleeding score (FMBS) that ranged from 5% to 10%.

Radiographic Outcomes

To evaluate the long-term outcomes of therapy and maintenance in terms of radiographic bone loss, x-rays were analyzed at baseline, 1 year, and 25 years (Fig 6) using a method described by Björn et al,[6] Nibali et al,[7] and Steffensen and Weber.[8] Measurements from baseline, 1 year, and 25 years were compared.

Baseline to 1 Year

Results from the radiographic analysis (Table 4; see online version at www.quintpub.com) demonstrated that at baseline the mean horizontal (suprabony) bone loss component was 4 ± 1.4 mm, whereas the mean vertical was 3.8 ± 1.8 mm. The overall mean bone loss was 7.9 ± 2.3 mm. The mean defect angle was 34.9 ± 7.5 degrees. At 1 year, the horizontal component of the defects was 3.6 ± 1.2 mm, remaining unchanged (mean change: 0.4 ± 0.7 mm), while the mean vertical defect decreased to 1.4 ± 1 mm, with a difference of 2.4 ± 1.3 mm. The overall mean bone loss decreased to 5 ± 1.6 mm, for a change of 2.9 ± 1.6 mm. The mean defect angle augmented to 53.3 ± 18.8 degrees, with an improvement of 18.4 ± 20.4 degrees.

1 to 25 Years

The horizontal (suprabony) component of the defects remained unchanged throughout the entire observation period (3.6 ± 1.2 mm at 1 year and 3.4 ± 1.2 mm after 20 years). The average radiographic vertical defect depth changed from 1.4 ± 1 mm at 1 year to 0.7 ± 0.7 mm after 25 years, with a difference of 0.7 ± 0.7 mm. The average defect angle changed from 53.3 ± 18.8 degrees at 1 year to 68.7 ± 22.3 after 25 years, with a change of 15.4 ± 20.9 degrees. Of these defects, 2 (the maxillary right central incisor and left first premolar) had persistent radiographic infrabony defect depth of 2.0 mm after 25 years, while 11 (85%) were < 2.0 mm (Table 5; see online version at www.quintpub.com).

Discussion

This case report demonstrated that it is possible to treat severe G-AgP by means of nonsurgical periodontal treatment, and even more important, that it the results of treatment can be improved provided the patient is included in a strict SPT system. The long-term effect of periodontal treatment has been extensively analyzed in clinical trials[9,10] and in retrospective analysis of large samples of population.[11] Hence, surgical treatment including gingivectomy and flap procedures with or without osseous surgery as well as nonsurgical treatment involving subgingival scaling and soft tissue curettage have been compared in terms of treatment outcomes. Results from these studies were heterogeneous, and the variability

depended on factors such as the low number of patients generally included, the severity of periodontal disease of the included patients, and the period of evaluation. Despite this lack of agreement, fewer periodontal breakdown sites (ie, sites with clinical attachment loss > 2 mm) were observed with the resective surgical approach compared to the other therapeutic modalities.[9] Pocket elimination thus should be considered as a goal of therapy in specific clinical scenarios to limit the risk of progression of the disease.

Although the issue of which type of treatment is most effective is still a matter of debate, all the studies clearly showed that most patients incorporated in recall programs after active periodontal therapy were able to maintain periodontal health in most of their dentition. Furthermore, no difference in inflammatory indices and in the longitudinal maintenance of clinical attachment level were observed between sites treated nonsurgically and those treated surgically.[12,13] This observation may explain the treatment results observed in this study. Although the clinical conditions of the patient after nonsurgical treatment could indicate a need for additional surgical therapy, no further treatment was delivered. Nevertheless, the patient never exceeded a FMPS of 10% and presented a FMBS that ranged between 5% and 10% throughout the 25 years of maintenance. Most likely, the ideal conditions of oral hygiene and the tailored SPT played a major (more decisive than the technique) role in the long-term treatment results.

Another factor that may in part explain the effectiveness of nonsurgical therapy in this particular patient is the adjunctive used of a systemic antibiotic. Due to the initial diagnosis of G-AgP and the presence at baseline of elevated proportions of specific periodontal pathogens, systemic antibiotics were prescribed to the patient in the last session of SRP for 1 week. It has been demonstrated that the adjunctive use of systemic antibiotics in combination with nonsurgical treatment improved the short-term clinical outcomes[3,14] in patients with aggressive periodontitis, reducing the need for additional therapy. The case reported in this study presented several teeth with questionable prognosis at baseline compromised by site-specific periodontal breakdown. After initial therapy, the prognosis changed from questionable to favorable, and after 25 years of SPT, 100% of the dentition was maintained in this patient. These results overcome those reported by Graetz et al[15] in their evaluation of the survival rate of teeth presenting an initial bone loss of > 50% in patients treated for AgP during long-term SPT of 15 years. They reported that 88.2% of questionable teeth (> 50 to > 70% bone loss at baseline) were still present after 15 years of SPT, concluding that in AgP the nonsurgical treatment of periodontally compromised teeth with advanced bone loss was a meaningful therapeutic approach to prevent tooth loss. One key factor that may explain such positive results is the nonsmoking status of the patient. Smoking has been found to be associated with higher incidence of tooth loss in patients undergoing periodontal maintenance for more than 5 years.[16]

In the present case report, several infrabony angular defects were present. These types of defects have been associated with a higher risk of periodontal progression and eventually tooth loss in the absence of systematic periodontal therapy,[17] but not in periodontally well-maintained individuals.[18] Over the years, angular bony defects have been treated by total or partial surgical elimination of the defect through osteoplasty and ostectomy[19] or by periodontal regeneration.[20] Rosling et al[21] demonstrated clinical resolution and radiographic fill of vertical defects following open flap surgery, and the same results were also observed in early-onset periodontitis cases by Lindhe and Liljenberg.[22]

Knowledge is limited regarding radiographic bone changes in infrabony defects following nonsurgical therapy. While different studies have shown that nonsurgical periodontal therapy has minimal potential for osseous repair of infrabony defects,[11] a recent retrospective study[7] analyzing the healing of periodontal infrabony defects after 12 to 18 months following nonsurgical treatment reported that bone fill may occur, with a reduction in defect depth associated with widening of the infrabony angle. Furthermore, a positive association between the reduction of bony defect depth from the initial defect depth and the use of adjunctive antibiotics was seen, whereas smoking showed a negative association. These results are extremely consistent with what was

observed in the present case report, treated by nonsurgical therapy with the use of adjunctive antibiotics, without a history of smoking. All angular bony defects showed significant bone fill after 12 months, with a reduction of the defect depth and a widening of the infrabony angle (Tables 1 to 3; see online version at www.quintpub.com).

An important consideration is the major radiographic changes in infrabony defects observed between baseline and 1 year with a bone defect fill of 2.4 ± 1.3 mm. Although the healing after nonsurgical periodontal treatment is supposed to involve formation of a long junctional epithelium, this case report demonstrates that changes in the defect depths may also be observed, irrespective of the relationship between bone and root surface. It is generally accepted by clinicians that to obtain new bone formation within an infrabony defect, granulation tissue must be removed to allow colonization of the wound by cells from the periodontal ligament and the bone, rather than cells derived from the gingiva or the epithelium. In this specific case, following several episodes of scaling and root planing, the bone continued to form and mineralize during the first postoperative year. These major radiographic changes have also been observed at the furcation of the maxillary right first molar, although it is well known that the initial furcation involvement has been associated with higher probability of tooth loss.[16] Furthermore, these data demonstrate that healing may continue for a period of 12 months following initial therapy, with an increase of bone density in periodontal defects.[23] This observation should be kept in mind when establishing an adequate period of time to allow tissue to heal after initial therapy and to potentially reduce the need for additional surgical therapy.

After initial therapy, a regular SPT was established in this case to maintain low levels of plaque and bleeding throughout the 25 years of follow-up. It has been demonstrated that the successful treatment of periodontitis is dependent not only on a proper active treatment but also on the establishment of a recall system that ensures the maintenance of a high standard of oral hygiene.[12–24] Different studies have demonstrated that good compliance and a SPT is a prerequisite for the long-term retention of teeth.[11,25–28]

Another factor that needs to be taken into consideration for long-term maintenance of patients is the influence of residual pockets on the progression of periodontitis and tooth loss. This has been largely investigated in the literature, showing the detrimental effect of residual PPD, BOP, or the association of PPD and BOP.[29] These findings have been corroborated on a long-term basis by Matuliene et al.[30] Authors evaluated the role of residual pockets with a PPD of ≥ 5 mm following active periodontal treatment in predicting further progression of periodontitis and tooth loss in a patient cohort individually maintained from 3 to 27 years. The authors concluded that residual PPD of ≥ 5 mm represented a risk for further progression of periodontitis. This concept has been described as the critical probing depth for deep pockets (> 6 mm) at which access flap surgery was more beneficial to achieve the best prognosis in the long-term maintenance phase.[31] Furthermore, fewer needs for retreatment were observed on a long-term basis when the surgical approach was used to treat patients with advanced periodontal disease.[12] Therefore, it may be speculated that a resective surgical approach of this patient could have provided fewer sites with PPD ≥ 5 mm and consequently a lower risk of disease progression. However, except for a distal root amputation with osteoresective surgery of the maxillary right first molar (showing Class III furcation involvement), no further surgical treatment was performed. Instead, an individualized SPT was provided to this patient, and sites with bleeding on probing and with a PPD of ≥ 5 mm were reinstrumented when intercepted during the recall phases of maintenance. The participation in a stringent SPT is most likely the key factor in the long-term success of this therapy.

Conclusions

If we consider that the true sequelae of periodontal disease is tooth loss and hence evaluate the success of periodontal therapy and maintenance over time by assessing tooth loss, it may be stated that this G-AgP patient was successfully treated with only periodontal nonsurgical therapy in combination with a systemic antibiotic. Furthermore, this case report demonstrated that

it is possible to maintain up to 25 years a very compromised dentition in a nonsmoking patient with G-AgP provided that a strict maintenance protocol is established and maintained. This consideration is of particular clinical importance in the decision-making process for compromised teeth: Too often dentists decide to extract teeth just by evaluating the residual bone on a radiograph and to use implants to substitute them, without taking into consideration the healing potential of periodontal lesions and the need to control the inflammatory situation of the whole mouth.

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Table 1 Periodontal Evaluation at Baseline

Tooth (FDI)	17	16	15	14	13	12	11	21	22	23	24	25	26	27
PPD														
F	10, 5, 3	7, 5, 10	10, 3, 5	3, 3, 3	3, 3, 7	10, 5, 5	5, 5, 7	5, 3, 10	5, 3, 7	5, 3, 5	7, 5, 7	7, 8, 8	7, 5, 7	5, 5, 5
P	8, 5, 8	7, 5, 7	5, 5, 5	5, 3, 5	5, 3, 7	7, 8, 7	5, 5, 8	5, 3, 3	3, 5, 5	5, 5, 5	5, 3, 5	5, 3, 5	7, 5, 7	7, 5, 7
Furcation	II d	III d, III f	–	–	–	–	–	–	–	–	–	–	II d, II m	I d, I m
Mobility	1	2	2	–	1	2	2	1	2	–	2	2	1	1
Tooth (FDI)	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**34**	**35**	**36**	**37**
PPD														
L	10, 5, 5	5, 3, 10	10, 5, 3	5, 3, 5	5, 3, 5	5, 3, 8	5, 3, 5	5, 3, 5	5, 3, 5	5, 3, 8	8, 5, 6	8, 5, 8	3, 5, 10	5, 7, 7
F	8, 5, 5	5, 3, 8	7, 5, 7	7, 5, 5	5, 3, 10	8, 8, 10	5, 3, 5	5, 3, 5	5, 5, 5	5, 3, 10	10, 3, 7	7, 3, 8	8, 3, 8	8, 3, 8
Furcation	I l I f	–	–	–	–	–	–	–	–	–	–	–	I l	II l
Mobility	1	1	2	1	1	2	2	1	1	2	2	2	2	1

PPD = probing pocket depth; F = facial; P = palatal; d = distal; f = frontal; m = mesial; L = lingual; l = lateral.

Table 2 Periodontal Reevaluation at 1 Year

Tooth (FDI)	17	16	15	14	13	12	11	21	22	23	24	25	26	27
PPD														
F	5, 3, 2	3, 3, 5	5, 3, 3	3, 2, 3	3, 2, 3	5, 2, 3	3, 2, 3	3, 3, 3	3, 2, 5	3, 2, 3	5, 2, 5	5, 3, 5	5, 3, 5	3, 3, 3
P	3, 3, 3	3, 2, 5	3, 2, 3	3, 2, 3	3, 2, 3	5, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	2, 2, 2	3, 2, 3	3, 2, 3	5, 3, 5	5, 3, 5
Furcation	–	III d III f	–	–	–	–	–	–	–	–	–	–	I d I m	–
Mobility	–	1	1	–	–	1	–	–	1	–	1	1	–	–
Tooth (FDI)	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**34**	**35**	**36**	**37**
PPD														
L	5, 3, 3	3, 3, 7	5, 3, 3	3, 2, 3	3, 3, 3	3, 3, 3	3, 3, 3	3, 3, 3	3, 3, 3	3, 3, 5	5, 3, 5	5, 3, 7	3, 3, 7	3, 5, 5
F	8, 3, 3	3, 2, 7	7, 3, 5	4, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 3, 5	5, 3, 5	5, 3, 5	5, 3, 5	5, 3, 5
Furcation	–	–	–	–	–	–	–	–	–	–	–	–	–	I l
Mobility	–	1	1	–	–	–	–	–	–	1	1	1	1	–

PPD = probing pocket depth; F = facial; P = palatal; d = distal; f = frontal; m = mesial; L = lingual; l = lateral.

Table 3 Periodontal Reevaluation at 25 Years

Tooth (FDI)	17	16	15	14	13	12	11	21	22	23	24	25	26	27
PPD														
F	4, 2, 2	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 3, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 3, 3	4, 3, 4	3, 3, 3
P	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	2, 2, 2	3, 2, 3	3, 2, 3	4, 3, 4	4, 3, 4
Furcation	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Mobility	–	–	–	–	–	1	–	–	1	–	1	–	–	–
Tooth (FDI)	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**31**	**32**	**33**	**34**	**35**	**36**	**37**
PPD														
L	4, 3, 3	3, 2, 4	3, 2, 3	3, 2, 3	2, 2, 2	2, 2, 2	2, 2, 2	2, 2, 2	2, 2, 2	2, 2, 3	3, 2, 3	3, 3, 4	3, 3, 3	3, 3, 3
F	4, 3, 3	3, 2, 4	3, 2, 3	3, 2, 3	2, 2, 2	2, 2, 2	2, 2, 2	2, 2, 2	2, 2, 2	2, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3	3, 2, 3
Furcation	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Mobility	–	–	1	–	–	–	–	–	–	1	1	–	–	–

PPD = probing pocket depth; F = facial; P = palatal; d = distal; f = frontal; m = mesial; L = lingual; l = lateral.

Table 4 Radiographic Measurements (Baseline to 1 y)

Tooth (FDI)	Total bony defect depth (mm)			Suprabony defect depth (mm)			Infrabony defect depth (mm)			Defect angle (degrees)		
	Baseline	1 y	Difference	Baseline	1 y	Difference	Baseline	1 y	Difference	Baseline	1 y	Difference
16 m	11	4	7	5	3	2	6	1	5	29	65	36
12 d	10	7	3	5	5	0	5	2	3	35	30	5
11 m	11	7	4	3	3	0	8	4	4	34	45	11
22 d	9	5	4	4	4	0	5	1	4	26	40	14
24 m	8	4	4	3	2	1	5	2	3	31	35	4
25 d	7	4	3	4	4	0	3	0	3	20	90	70
37 d	5	3	2	3	3	0	2	0	2	45	90	45
36 d	7	5	2	4	4	0	3	1	2	34	50	16
35 d	7	5	2	4	4	0	3	1	2	41	60	19
33 d	10	7	3	7	5	2	3	2	1	40	50	10
42 m	7	6	1	5	5	0	2	1	1	40	48	8
46 m	8	6	2	5	4	1	3	2	1	46	50	4
47 d	3	2	1	1	1	0	2	1	1	33	40	7
Mean (SD)	7.9 (2.3)	5 (1.6)	2.9 (1.6)	4 (1.4)	3.6 (1.2)	0.4 (0.7)	3.8 (1.8)	1.4 (1)	2.4 (1.3)	34.9 (7.5)	53.3 (18.8)	18.4 (20.4)

d = distal; m = mesial.

Table 5 Radiographic Measurements (1 y to 25 y)

Tooth (FDI)	Total bony defect depth (mm)			Suprabony defect depth (mm)			Infrabony defect depth (mm)			Defect angle (degrees)		
	1 y	25 y	Difference	1 y	25 y	Difference	1 y	25 y	Difference	1 y	25 y	Difference
16 m	4	3[a]	1	3	3[a]	0	1	0	1	65	90	25
12 d	7	6	1	5	5	0	2	1	1	30	80	50
11 m	7	5	2	3	3	0	4	2	2	45	40	5
22 d	5	5	0	4	4	0	1	1	0	40	38	2
24 m	4	4	0	2	2	0	2	2	0	35	35	0
25 d	4	4	0	4	4	0	0	0	0	90	80	10
37 d	3	3	0	3	3	0	0	0	0	90	90	0
36 d	5	5	0	4	4	0	1	1	0	50	56	6
35 d	5	3[a]	2	4	2[a]	2	1	1	0	60	65	5
33 d	7	5	2	5	5	0	2	0	2	50	90	40
42 m	6	5	1	5	5	0	1	0	1	48	90	42
46 m	6	4	2	4	4	0	2	0	2	50	90	40
47 d	2	2	0	1	1	0	1	1	0	40	50	10
Mean (SD)	5 (1.6)	4 (1.1)	1 (0.9)	3.6 (1.2)	3.4 (1.2)	0.2 (0.5)	1.4 (1)	0.7 (0.7)	0.7 (0.8)	53.3 (18.8)	68.7 (22.3)	15.4 (20.9)

[a]Reference: crown/filling apical margin.
d = distal; m = mesial.