Multidisciplinary treatment planning for patients with severe periodontal disease

Josselin Lethuillier,1 Sébastien Felenc,2 Philippe Bousquet3

Abstract
Periodontally compromised patients usually have a history of periodontitis (chronic or aggressive), but no active disease at the time of implant placement. In order to proceed with treatment, the treating dentist must determine whether it is possible to place implants, whether prosthetic treatment will be required, and whether it is possible to use orthodontic treatment in periodontally compromised patients. This case report describes and explains the treatment of a 58-year-old female patient suffering from severe aggressive periodontitis, and the accompanying treatment decisions. First, the initial phase and assessment are described. The surgical phase is then reviewed, in which a full thickness flap was reflected during periodontal surgery, followed by plastic surgery with a connective-tissue graft. Subsequently, the strict supportive periodontal therapy (SPT) necessary before placing the implants is discussed. The orthodontic treatment initiated after a third assessment to prevent relapse is discussed thereafter, as well as the placement of a fixed retainer during the final phase of treatment.

Key words: aggressive periodontitis, periodontal plastic surgery, dental implants, orthodontic treatment, prosthodontic treatment, supportive periodontal therapy.

Introduction
The diagnosis of aggressive periodontitis is now well known: rapid bone loss, no association with systemic disease, a family history of periodontal disease, no correlation between bone destruction and the presence of dental plaque, and the presence of Aggregatibacter actinomycetemcomitans and/or Porphyromonas gingivalis in significant numbers. Patients with aggressive periodontitis may need a variety of treatments, including orthodontic, prosthodontic, and possibly implant treatment. The challenge lies in the need to treat several facets of the disease, which raises the following questions: Can multiple treatments be administered? When should a multiple-treatment approach be adopted? What sequence should treatment follow? For a multidisciplinary approach, communication between the various practitioners involved is essential but could be complicated.

Finally, concerns about relapse exist, specifically after orthodontic or periodontal treatment. Many articles describe long-term implant survival rates in periodontally healthy patients, but few focus on periodontally compromised patients. The same applies to orthodontic and prosthodontic treatment. This article aims to address the above questions with evidence-based dentistry performed as described in the following case report.

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Case Report

The patient was a 58-year-old female whose chief complaints were malpositioned teeth and partial tooth loss (Figure 1). Her main reasons for consulting a dentist were that her teeth had become displaced with time and that her gingiva caused her discomfort (Figure 2). The patient did not smoke and showed no sign of other periodontitis risk factors, such as stress. She reported that as her mother had lost a number of teeth around the age of 35, she consequently feared losing all of her teeth as well. She was questioned on her oral hygiene.

The clinical examination found tooth displacement with major secondary migrations, and poor periodontal tissue quality. Periodontal probing was performed to determine the pocket depth of the periodontal lesions. Major periodontal degeneration was found, with the periodontal pockets in excess of 5 mm in depth for the overall dentition and with pockets that varied between 7 and 10 mm in depth around the maxillary molars (Figures 3–5).

**Figure 1:** The patient was a 58-year-old female, who came to us complaining of malpositioned teeth and partial tooth loss.

**Figure 2:** The tooth displacement can be seen clearly, with major secondary migrations. Gingival tissue that has signs of periodontal disease with a zone of blue-purple colour is also visible.

**Figure 3:** Occlusal view of the upper jaw.

**Figure 4:** Occlusal view of the lower jaw.

**Figure 5:** The lateral view shows the differences between the bone base and the orthodontic relation of the tooth displacement. Major secondary migrations are visible in this side view in occlusion.
The panoramic X-ray showed the absence of certain teeth (Figure 6). A radiograph of the preoperative status was performed to attain a better view of the bone anatomy and alveolar bone loss (Figure 7). It revealed horizontal bone loss in two-thirds of the periodontal supporting bone in the posterior region. In quadrant 1, there were major angular lesions, such as those on tooth 16 (Figures 8–10).

A PCR bacterial identification test was deemed necessary. It established the presence of *P. gingivalis*, *Prevotella intermedia*, *Tannerella forsythia* and *Treponema denticola*, but not *A. actinomycetemcomitans*.

Finally, impressions were taken and mounted on an articulator to assess the patient's dynamic and static occlusion. The assessment found a Class 2 Division 2 malocclusion and the absence of adequate posterior bone support and non-functional clasp guideline.

The radiographic examination made use of intra-oral and extra-oral photographs, a panoramic X-ray, and a radiograph.
The following findings from the examination were considered relevant to the diagnosis: the presence of several periodontal pockets greater than 10 mm in depth, the absence of systemic disease associated with periodontal disease, rapid bone destruction in the last two years, and a family history of periodontitis, including tooth loss. Based on the presence of *P. gingivalis*, the significant proportion (30%) of periodontal pockets with a depth of more than 5 mm, and the absence of a correlation between the bone destruction and dental plaque, severe aggressive periodontitis was diagnosed. (Table 1)

**Treatm ent**

The treatment plan was to extract tooth 18, followed by initial therapy, an examination eight weeks later, and surgery after three months. Subsequently, implant treatment, including prosthodontic and orthodontic management, would be pursued, and treatment would be concluded with supportive periodontal therapy. Based on the absence of *A. actinomycetemcomitans* and on the significant depth of the periodontal pockets (mainly in the posterior region), a 14-day course of metronidazole was prescribed. In addition to this antibiotic treatment, full mouth disinfection, including scaling and root planing, was performed. The necessary instruction was given to the patient regarding oral hygiene, and the scaling and root planing schedules were finalized.

The patient returned to continue treatment eight weeks later. Initial observations showed that the gingiva had improved. Periodontal probing confirmed this initial positive observation, and found pocket depths of more than 6 mm limited mainly to the posterior teeth (Table 2). Surgery was then carried out according to the Widman procedure by reflecting a periodontal flap to gain access to the angular lesions (Figure 11). At the three-month return visit, a satisfactory level of periodontal health and efficient plaque control were found.

The implant treatment was subsequently initiated. The Summers technique was used to insert an implant to replace tooth 17 (Figure 12). A period of three months was allowed for bone tissue repair, with regular return visits to check on the patient’s hygiene.

A final assessment was performed before initiating the orthodontic treatment. Periodontal probing found that none of the pockets measured more than 4 mm in depth, allowing for the orthodontic treatment to be initiated (Table 3), beginning with the mandible. The primary objective of the

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orthodontic treatment was to correct the dental malpositions, to make room in Quadrant 3 for an implant and to correct the forward incisal region of the mouth in order to restore the patient’s anterior guidance. The orthodontic treatment on the reduced periodontium was performed by using flexible arches to prevent stress that could generate uncontrolled movements of the teeth with depleted support (Figure 13). In order to improve the anchorage in the posterior region, a temporary crown was placed on the implant in position 17 to act as an anchorage point. Once the crown had been placed, the orthodontic treatment was then carried out in the maxilla.

The orthodontic treatment took slightly less than 18 months. During this period, the periodontium was examined regularly to ensure that there was no risk of further infection. During one of the visits, inflammation due to an insufficient
was the same on both the left and the right sides, and space between Teeth 34 and 35 was created in order to insert an implant to act as a third premolar (Figures 16–18).

Three months later, the dental prosthetic procedure was carried out by the orthodontist to reduce the space and to improve the areas of contact. For the maxilla, a direct dental retainer might have been problematic in terms of treatment stability and maintaining the teeth in the correct position. A cast and bonded dental retainer to be supported by Teeth 13 to 23 was therefore selected. This retainer used parallel pins to aid its passive insertion. To this end, a guide was made that would position itself easily and precisely on the six maxillary anterior teeth (Figures 19, 20). A double mixture with a silicone addition impression material was made, based on which an extra-coronal retainer in white gold with tiny pins was fabricated (Figure 21). Although preferable for the mucogingival environment around tooth 31 was observed (Figure 14). A connective-tissue graft was therefore deemed necessary (Figure 15). The stabilization of the posterior teeth was the same on both the left and the right sides, and space between Teeth 34 and 35 was created in order to insert an implant to act as a third premolar (Figures 16–18).

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Discussion
Implant placement in cases of aggressive periodontitis is now well understood and can be well managed. Karoussis et al.
Figure 27: After several months healing following the deep soft tissue graft, a creeping attachment that allows thicker covering on this position is visible on the operated tooth 32.

demonstrated that there are no statistically significant differences in pocket depth between periodontally healthy patients and periodontally compromised patients. However, clinical attachment loss in generalized aggressive periodontitis patients is greater than that in periodontally healthy patients. Therefore, periodontally compromised patients should undergo supportive periodontal therapy, as was implemented in this case, along with orthodontic treatment and be closely monitored.

Gkantidis et al. noted that patients with adequate plaque control and a reduced but healthy periodontium can undergo orthodontic treatment without aggravation of their periodontal conditions. Regarding the periodontal treatment schedule, they recommended a period of two to six months from the end of periodontal therapy until bracket placement. Implants have been suggested as anchorage for orthodontic appliances in cases in which the existing dentition cannot provide sufficient stability.

Brägger et al. noted that, in patients treated for periodontitis and provided with metal–ceramic fixed partial dentures, high survival rates - especially for fixed partial dentures with end abutments - can be expected.

Conclusion

Thanks to a multidisciplinary treatment planning approach, this patient’s periodontal disease was successfully treated. The first phase of treatment controlled the infection, and the second and third phases (orthodontic treatment, followed by implant and prosthetic treatment) addressed the effects of periodontitis. The patient’s aesthetic and functional expectations were met and, thanks to evidence-based dentistry, positive long-term results are anticipated. Owing to the diagnosis (severe aggressive periodontitis), the patient is involved in an intensive supportive periodontal therapy programme designed to prevent relapse (Figures 25–29).

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References


