



# Multi-disciplinary treatment of female patient afflicted with generalized aggressive periodontitis and type 1 diabetes mellitus

## *Tratamiento multidisciplinario en una paciente con periodontitis agresiva generalizada y diabetes mellitus tipo 1*

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### ABSTRACT

The impact of systemic diseases on oral health has been well documented. Certain systemic disorders can modify the host's immune response to periodontal pathogens, thus exacerbating the severity of the periodontal disease. Among systemic diseases, uncontrolled diabetes mellitus is associated to periodontal disease. Aggressive periodontitis can appear in young adults and elicit rapid destruction of the periodontal insertion apparatus. Severe loss of periodontal support present in these cases hinders prognosis of affected teeth, and thus, the clinician faces complications when designing treatment plans and deciding upon extraction or non extraction of compromised teeth. Accomplishment of comprehensive treatment requires participation of other fields of dentistry. The aim of the present study was to present the multi-disciplinary treatment of a 17-year-old female patient afflicted with type 1 diabetes mellitus and generalized aggressive periodontitis, and present results obtained one year after completion of treatment.

**Key words:** Aggressive periodontitis, type 1 diabetes mellitus, periodontal disease, multi-disciplinary treatment.

**Palabras clave:** Periodontitis agresiva, diabetes mellitus tipo 1, enfermedad periodontal, tratamiento multidisciplinario.

### RESUMEN

El impacto de las enfermedades sistémicas sobre la salud bucal se encuentra bien documentado. Algunos desórdenes sistémicos pueden modificar la respuesta inmune del huésped a los patógenos periodontales, exacerbando la severidad de la enfermedad periodontal. Dentro de las enfermedades sistémicas, la diabetes mellitus no controlada se encuentra asociada con la severidad de la enfermedad periodontal. La periodontitis agresiva se presenta en adultos jóvenes, causando una rápida destrucción del aparato de inserción periodontal. La pérdida severa del soporte periodontal presente en estos casos, dificulta el pronóstico de los dientes y, por lo tanto, para el clínico se complica la planificación del tratamiento y existe la posibilidad de extraer los dientes comprometidos. Para realizar un tratamiento integral es necesaria la participación de otras áreas odontológicas. El objetivo de este trabajo es presentar el tratamiento multidisciplinario en una paciente femenina de 17 años de edad, con Diabetes mellitus tipo 1 y periodontitis agresiva generalizada, y los resultados de su tratamiento a un año.

### INTRODUCTION

Diabetes mellitus (DM) is caused by an insulin-dependent glucose metabolism alteration, as well as by lipid metabolism. Classical symptoms are: polydipsia, polyuria and polyphagia; frequently accompanied by chronic fatigue and weight loss. Diabetes mellitus complications include retinopathy, nephropathy neuropathy and cardiovascular diseases. Association between DM and periodontal disease has been extensively discussed in scientific literature.<sup>1</sup> Some authors<sup>2,3</sup> have diagnosed cases of aggressive periodontitis in patients with systemic diseases such as congenital neutropenia, Chediak-Higashi syndrome or diabetes mellitus. An analysis conducted by the National Health and Nutrition Examination Survey confirmed the fact that prevalence of periodontitis

was significantly higher in diabetic patients when compared to non-diabetic ones (17.3 *versus* 9 %).<sup>1</sup> Many studies on epidemiology have reported the fact that severity and extension of periodontal disease is greater in uncontrolled diabetes mellitus patients when compared to healthy patients. These studies also report that periodontitis manifestations vary within the diabetic population. This is due to differences in

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studied populations.<sup>4,5</sup> The main oral manifestations exhibited by non-controlled diabetes mellitus patients are the following: increase in periodontal disease severity and edentulism in most patients over 40 years of age.<sup>6</sup>

Other authors suggest that type 1 and 2 diabetes mellitus are associated to increase in susceptibility to periodontal disease. Nevertheless, the response of healthy and diabetic patients to surgical and non-surgical periodontal therapy has been shown to be similar.<sup>7,8</sup>

By definition, aggressive periodontitis affects young subjects and is characterized by presenting constant rapid-progression episodes; the amount of microbial deposits is inconsistent with the periodontal destruction severity. It can appear as a localized or generalized condition. It exhibits familial tendency and is associated to the presence of *Actinobacillus actinomycetemcomitans* and *Porphyromonas gingivalis*, as well as abnormal neutrophil function.<sup>9,10</sup> In young adults aggressive periodontitis cases, ethnic and genetic factors play an important role.<sup>11</sup> Prevalence of localized aggressive periodontitis in European populations varies from 0.1 to 0.2% among adolescents and young adults; prevalence in African-American populations is 10%. Hispanic populations exhibit 5%, and Caucasian population in the USA shows a 1.3% prevalence.<sup>11</sup> Severe loss of periodontal support observed in aggressive periodontitis cases hinders the process of deciding upon extraction or non extraction of compromised teeth.<sup>12</sup> Some authors emphasize upon infection and inflammation control to improve results of the condition.<sup>13,14</sup> Nevertheless when treating patients with generalized aggressive periodontitis, conventional mechanical therapy along with oral hygiene are frequently not sufficient to control the disease.<sup>15</sup>

Use of systemic antibiotics as part of aggressive periodontitis treatment has been supported in systematic reviews. Among broad spectrum antibiotics, we found that the combination of amoxicillin with metronidazole is effective to suppress *Actinobacillus actinomycetemcomitans*. This is probably due to the synergic effect which has been demonstrated *in vitro* when using a combination of both.<sup>16</sup> Other antibiotics recommended for aggressive periodontitis treatment are: clindamycin, clavulanic acid, ciprofloxacin, tetracycline, azithromycin and tetracycline fibers.<sup>12,15-19</sup>

Within the realm of surgical therapy methods, there are different types of materials to correct bone defects. In the case of aggressive periodontitis treatment, some authors<sup>13</sup> suggest use of different

regeneration materials. One of them is the use of guided tissue regeneration technique (GTR). Several clinical studies have shown the success of guided tissue regeneration treatment in reconstructive periodontal surgery. After the systematic review<sup>20</sup> of GTR use in bone defects, it can be concluded that this technique is more effective than the clinical gain of insertion levels and decrease of pocket depth when compared with conventional flap debridement surgery.

Bone grafts are another material used for the regeneration of periodontal bone defects. There is a great variety of grafts. In general terms, and according to aim analysis,<sup>21</sup> it was concluded that defects treated with bone grafts exhibited increase of the bone level, decrease (reduction) of alveolar crest loss, increase of insertion levels and decrease of probing depth when compared to the conventional technique of flap debridement. No clinical differences have been observed among different types of grafts (particulated allograft, calcium phosphate and ceramic grafts). When combined with membranes, the gain of clinical insertion levels was increased, and the probing depth was decreased when compared with results achieved with the use of solely grafts. Within the great variety of existing materials used for periodontal regeneration, we find plasma rich in growth factors (PRGF)<sup>22</sup> which has shown beneficial effects. According to clinical results PRGF increases and accelerates bone regeneration, and soft tissue healing is more rapid and predictable.

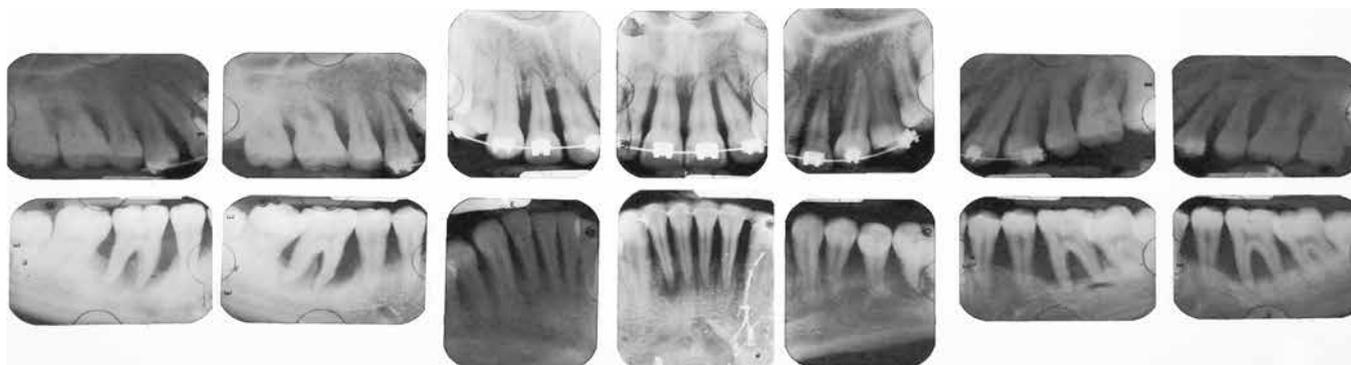
The aim of the present study was to present the multi-disciplinary treatment of a 17 year old female patient, afflicted with type 1 diabetes mellitus and generalized aggressive periodontitis, as well as to record results one year after completion of treatment.

## CLINICAL CASE

17 year old female patient, with insulin-controlled type 1 diabetes mellitus history, since the age of 12, who attended the Periodontics Department of the Research and Graduate School of the National School of Dentistry (UNAM). The patient's complaint was pain upon mastication (*Figure 1*).

Clinical exploration revealed deficient oral hygiene, grade II and III dental mobility (teeth were splinted with orthodontic devices), plaque accumulation, multiple periodontal abscesses, suppuration, spontaneous bleeding, intensely swollen and edematous gums, presence of calculi and periodontal pockets with 8 mm minimum depth (*Table I*).





**Figure 2.** Comprehensive initial x-ray series revealing generalized severe bone loss.



**Figure 3.** Alveoli after extraction; free graft donor site.



**Figure 4.** Application of PRGF to lower teeth.

Upon completion of surgery, upper and lower provisional removable prostheses were put into place. During the next surgery, flap debridement was achieved in lower teeth (35, 34, 33, 32, 31, 41, 42, 43, 44, 45). PRGF and auto-graft were applied, suture was performed with isolated 4-0 vicryl stitches (*Figure 4*).

Later on, surgery was performed with GTR and auto-graft in teeth 23, 24, 25 as well as flap debridement in teeth 13, 14, 15 (*Figure 5*).

Work was undertaken with collaboration from Oral Prosthesis and Endodontics Departments. Teeth number 13 and 23 were subjected to root canal treatment before surgery. Acrylic provisional prostheses were placed on teeth 15, 14, 13, 23, 24 and 25 in order to build splinted abutments. The patient was instructed on antibiotic and analgesic use according to the type of surgery performed.

After 8 months had elapsed from the last surgery, the prosthesis department built final restorations.

Upon completion of treatment the patient was subjected to a maintenance phase (*Figure 6*).

## RESULTS

Final laboratory tests revealed 140 mg/dL glycemia control (compared to 220 mg/dL initial figures). Periodontal treatment elicited no complications and metabolic diabetes control brought about significant improvement in periodontal circumstances. Clinical change was significant. Assessment after one year revealed absence of inflammation clinical signs, reduction in periodontal pocket depth as well as 13% dental-bacterial plaque percentage. Tooth mobility decreased in all remaining teeth where grade 1 mobility was observed. A multi-disciplinary treatment was achieved with the participation of the endocrinologist, oral prosthesis department and the



**Figure 5.** Placement of membrane and auto-graft in teeth 23, 24 and 25.

endodontics department, in order to attain successful and comprehensive oral rehabilitation.

### DISCUSSION

There is ample discussion with respect to the presence of aggressive periodontitis associated to diabetes mellitus. Parameters of the American Periodontics Academy<sup>9</sup> indicate that most patients with aggressive periodontitis are healthy; nevertheless, some publications point out an association of aggressive periodontitis with systemic conditions such as diabetes mellitus.<sup>2,23</sup>

There equally is controversy with respect to the manner in which to treat aggressive periodontitis. In 2001, Kai P. Worch, in a case report, stabilized aggressive periodontitis by means of combining root planning and scraping with systemic antibiotic coverage. Soete & et al, when using full mouth disinfection protocol established by Quirynen & et al, significantly decreased pocket depth and achieved clinical insertion gain in aggressive periodontitis patients. Other clinical operators such as Dodson & et al, stressed the use of regenerative materials combined with antibiotics for aggressive periodontitis treatment. There is a great variety of antibiotics suitable for aggressive periodontitis treatment. Selection criteria remain unclear. Antibiotic selection must be based upon patient-related factors as well as disease-related factors. In the present clinical case antibiotic coverage was deemed convenient, since it was observed that conventional periodontal treatment by itself did not elicit a favorable response.



**Figure 6.** Photograph taken six months after completion of treatment. Prosthetic rehabilitation device is in place.

Some authors like Debora C Rodriguez and Mario Taba Jr expressed in their publication the fact that non-surgical periodontal therapy allows the decrease of glycated hemoglobin levels, especially in patients afflicted with severe diabetes mellitus and periodontal disease. Nevertheless, up to the present date, in these cases, it has not been possible to determine clinical stability.

Regardless of all existing fashions to treat aggressive periodontitis, prognosis depends upon the following factors: whether the disease is localized or generalized, degree of destruction present at diagnosis time as well as the operator's skill to control future progression.<sup>12</sup>

### CONCLUSIONS

One of the most important aspects of periodontal treatment success is educating the patient with respect to the disease, including cause, risk factors and the patient's role in the course of treatment.

In this patient afflicted with generalized aggressive periodontitis, the combination of mechanical, antimicrobial and surgical therapies as well as a suitable maintenance phase achieved stabilization of periodontal health. Appropriate glycemia control was also contributive to treatment results. Participation of medical areas and other dental areas was necessary for achievement of comprehensive and successful patient treatment.

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