

## Generalized Aggressive Periodontitis Associated with Amelogenesis imperfecta and its Multidisciplinary Managements Options: Case Report and Review of the Literature

Fouad Hussain AL-Bayaty<sup>1\*</sup>, Tong Wah LIM<sup>2</sup>

1. Center for Periodontology Studies, Faculty of Dentistry, Universiti Teknologi MARA (UiTM), Jalan Hospital Sungai Buloh, 47000, Selangor DarulEhsan, Malaysia.
2. Center for Restorative Dentistry Studies, Faculty of Dentistry, Universiti Teknologi MARA (UiTM), Jalan Hospital Sungai Buloh, 47000, Selangor DarulEhsan, Malaysia

### Abstract

Generalized aggressive periodontitis (GAgP) is characterized by “generalized rapid destruction of periodontal ligament and alveolar bone which occurs in otherwise systemically healthy individuals generally of a younger age group but patients may be older. Amelogenesis Imperfecta (AI) is a diverse collection of inherited diseases that exhibit quantitative or qualitative tooth enamel defects in the absence of systemic manifestations. Few case reports documented the association of aggressive periodontitis with Amelogenesis Imperfecta. This clinical case report describes multidisciplinary management for oral rehabilitation of a young female patient diagnosed as generalized aggressive periodontitis associated with Amelogenesis Imperfecta. Non-surgical and surgical periodontal therapy accompanying systemic antibiotics administration, GAgP patients showed decreased probing pocket depth, absence of bleeding on probing. In the six years follow-up radiographic examination after periodontal therapy, resolutions of the bony defects were observed. Full mouth rehabilitation were provided for this patient included constructions of crowns and bridge to preserve as much tooth tissue as possible while preventing further tooth loss, and to enhance esthetics and masticatory function. Recall examination revealed patient’s esthetic and functional expectations were satisfied and no pathology was associated with the rehabilitation.

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### Introduction

Aggressive periodontitis, as the name implies is a type of periodontitis where there is rapid destruction of periodontal ligament and alveolar bone which occurs in otherwise systemically healthy individuals generally of a younger age group but patients may be older.<sup>1,2</sup> Aggressive periodontitis is a progressive periodontal disease characterized by loss of bone and periodontal support for special teeth in adolescents and young adults.<sup>3</sup> It is classified into localized and generalized forms.<sup>4</sup>

Clinical picture of aggressive periodontitis characterized by an insidious onset during the circumpubertal period. The most striking feature is that during the early stage, there is lack of clinical signs of inflammation. Moreover, the severity of periodontal destruction, which is evidenced by deep periodontal pocket formation, tooth mobility and migration, is out of proportion to the magnitude of local initiating factors. In advanced cases diastema are formed as well as rotation, drifting and elongation of the affected teeth.<sup>5</sup> Generalized aggressive periodontitis (GAgP) is characterized by “generalized interproximal attachment loss affecting at least 3 permanent teeth other than first molars and incisors”.<sup>6,7</sup> It is a multifactorial disease where interplay of microbiologic, genetic, immunologic, and environmental/ behavioral risk factors decides the onset, course, and severity.

#### \*Corresponding author:

Fouad Hussain Al-Bayaty  
Center for Periodontology Studies,  
Faculty of Dentistry, University Teknologi Mara (UiTM),  
Selangor DarulEhsan, Malaysia  
E-mail: [fouad@salam.uitm.edu.my](mailto:fouad@salam.uitm.edu.my)

Pathogenic bacteria in the dental plaque especially *Aggregati bacter actinomycetemcomitans* and *Porphyromonas gingivalis* have an indispensable role which elicits an aggravated host response which in turn is determined by the genetic and immunologic profile of the patient modified by environmental risk factors like smoking.<sup>8,9,10</sup> GAgP affects a minority of patients, but it is highly significant because it is characterized by severe destruction of the supporting apparatus of teeth in a relatively young subjects. Amelogenesis imperfect (AI) is a hereditary condition that affects the formation of the enamel matrix or the enamel mineralisation process of both the primary and secondary dentition. It is a clinically and genetically heterogeneous group of conditions that affects both the quantity and quality of the enamel structure and the overall appearance of all or nearly all the teeth in more or less an equal manner, without reference to chronology.<sup>11,12</sup> More recently it has been suggested that AI may have a syndromic association due to changes noted in other parts of the body.<sup>12</sup> AI has either autosomal dominant, autosomal recessive, sex-linked or sporadic inheritance patterns and its prevalence varies from 1:700 to 1:16,000 depending on the population studied.<sup>13</sup> Clinical presentation can range from mild discolouration, slight pitting and minimal post eruptive breakdown of enamel to severe discolouration, pitting or significant tooth surface loss due to rapid post eruptive breakdown of hypomineralised enamel.<sup>14</sup> The defect can be a small pit or dent in the tooth or can be so widespread that the entire tooth is small and/or malformed. This type of defect may cause tooth sensitivity, may be unsightly or may be more susceptible to dental caries. These can occur on a single tooth or on multiple teeth. It can appear white, yellow or brownish in color with a rough or pitted surface. In some cases, the quality of the enamel is affected as well as the quantity.<sup>15,16</sup> Amelogenesis Imperfecta with localized aggressive periodontitis is a rare clinical entity. A linkage study on Adentinogenesis Imperfecta-III kindred with juvenile periodontitis (JP) has also suggested that this disease may be linked to the long arm (q) of human chromosome 4.<sup>17,18</sup> There is no widely accepted treatment protocol for GAgP.<sup>19</sup> Treatment alternatives include scaling and root planning (SRP) alone or in conjunction with systemic antibiotics<sup>20-25</sup> as well as

surgical<sup>26,27</sup> and interdisciplinary approaches,<sup>28,29</sup> with adequate outcomes. Therapy is usually aimed at reducing the pathogenic microflora through scaling and root planing and the administration of systemic antibiotics.<sup>30,31</sup> However, conservative periodontal therapy may result in reparative wound healing with limited regeneration of the lost tissues.<sup>19,22</sup> This clinical case report describes an interdisciplinary approach to rehabilitate aggressive periodontitis patient associated with Amelogenesis Imperfecta.

### Materials and methods

A 21 year old female referred to the specialist Periodontology clinic, faculty of dentistry Universiti Teknologi MARA (27.01. 2011) with a chief complaint of unaesthetic appearance due to yellowish discoloration of her teeth and mobility of several teeth with gingival bleeding. (Fig 1). History revealed that her deciduous teeth had similar discoloration and some of her family members have the similar clinical findings. On intraoral examination, it was found that she had several missing teeth (13,11,23,33,34 and 43). The thickness of enamel was reduced on the teeth and was completely chipped off from some teeth exposing the dentin. The surfaces of the teeth were rough. The teeth, in general, exhibited a yellowish brown discoloration, with diffuse pitting present on the exposed tooth surfaces, more prominent on the labial and buccal aspects. Examination of the periodontium revealed generally poor oral hygiene. The gingiva was erythematous in all marginal and papillary areas with a soft and edematous consistency, with bleeding on probing in all maxillary and mandibular arches. Deep periodontal pockets about 8-9 mm were present in the upper and lower central incisor region, lower molars and premolars. An Orthopantomogram and Cone beam computed tomography (CBCT) radiographs were taken. The Orthopantomogram revealed that the enamel was very thin generally and even absent in relation to the molars of both upper and lower jaw. The dentine appeared normal and distinct from the enamel. CBCT demonstrated clear alveolar bone loss around all the teeth with retained left lateral deciduous tooth and impacted (13,11,23,33,34 and 43). A diagnosis of Amelogenesis Imperfect was made after a detailed examination of the teeth and

periodontium. The diagnosis of Amelogenesis Imperfecta was further supported by the family history. Based on the history, examination findings, and the radiographic findings, a diagnosis of generalized aggressive periodontitis was made according to the criteria by AAP 1999 classification and generalized aggressive periodontitis.

## Results

A 21 year old female referred to the specialist Periodontology clinic, faculty of dentistry Universiti Teknologi MARA (27.01. 2011) with a chief complaint of unaesthetic appearance due to yellowish discoloration of her teeth and mobility of several teeth with gingival bleeding (Figure 1). History revealed that her deciduous teeth had similar discoloration and some of her family members have the similar clinical findings. On intraoral examination, it was found that she had several missing teeth (13,11,23,33,34 and 43).

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**Figure 1.** View of the labial surfaces of teeth, Maxillary occlusal view and Mandibular occlusal view before treatment.

## Management of generalized aggressive periodontitis

Initial periodontal therapy consisted of motivation and oral hygiene instructions. A sulcus brushing technique (modified Bass technique)<sup>34</sup> was demonstrated, and the patient was educated on the use of interdental cleansing aids including dental floss and interdental brushes. Chlorhexidine mouthwash was prescribed to further aid in plaque control. Systemic antibiotics (Amoxycillin and Metronidazole, 250 mg of each thrice daily) were prescribed for 8 days, and the patient was recalled after 2 weeks for evaluation of the response to treatment.<sup>35</sup>

Full mouth scaling and root debridement were performed after which the patient was advised to continue the chlorhexidine mouth wash. A reevaluation eight weeks after Initial periodontal therapy revealed a reduction in probing depths and absence of bleeding on probing. The upper left and right molars and premolars treated non-surgically by root debridement under local infiltration anesthesia with sit specific gracey curettes followed by subgingival irrigation with chlorhexidine mouth wash. A modified Widman flap surgery<sup>36</sup> in conjunction with bone replacement graft and membrane (GBR) was performed in the lower molar regions whereas a sulcular incision flap was performed in the maxillary and mandibular anterior region to minimize the recession after healing for esthetic purposes. A pre-procedural rinse with chlorhexidine mouth wash was done to minimize the bacterial count in the mouth. After adequately

anesthetizing the surgical site with infiltration anesthesia and nerve blocks for the lower the first incision (internal bevel incision) 0.5mm from the gingival margin directing to the crest of the alveolar bone was made. The flap was reflected following which sulcular incision and interdental incision were made to remove the wedge of tissue. Root debridement was done with sit specific gracey curettes following granulation tissue removal. The defect was irrigated with normal saline, the graft was (Bovine graft), which was mixed with the blood from the surgical site, placed in to the defect and covered with resorbable periodontal membrane after pre-suturing the site with silk sutures. Suturing was done after adapting the buccal and lingual flaps well. A periodontal pack was placed, antibiotics (Amoxicillin and Metronidazole, 250 mg of each thrice daily) and analgesics were prescribed for the patient for 5 days. Chlorhexidine mouth wash was prescribed to further aid in plaque control post-surgically to the patient. Periodontal pack, sutures were removed and instructions were given. Postoperative evaluation 3,6,9 months after surgery showed absence of bleeding on probing and probing depths within normal limits. The patient was put on regular recall appointments for evaluation of the gingival and periodontal status and supportive periodontal therapy. A postoperative radiograph 6 years later showed a significant bone fill in the molar regions where grafting was done with an increase in bone density of the alveolar crest with corticated bone formations in the crest at the other areas (Figure 2 and 3) The oral hygiene maintenance and compliance of the patient was excellent, and there were no signs of recurrence of the disease throughout the maintenance period.



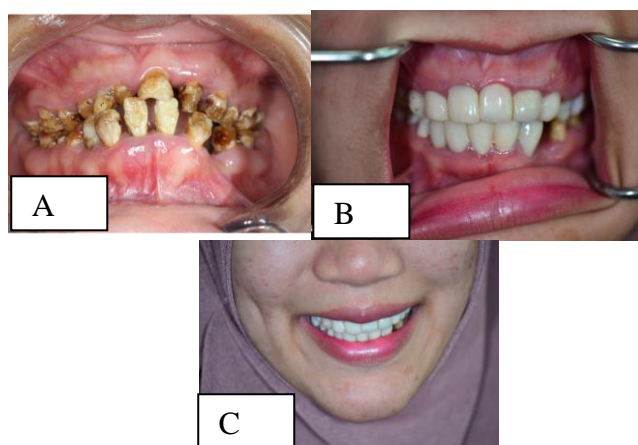
**Figure 2.** A. Orthopantomogram (OPG) before treatment 27/1/2011, B. after treatment 1/9/2017



**Figure 3.** A. Cone beam computed tomography(CBCT) before treatment 27/1/2011, B. after treatment 1/9/2017

### Restorative treatment

Since the patient was concerned about the esthetic appearance. The metal ceramic crowns proposed for her in the anterior region and posterior, where aesthetics and function are a concern. Crowns and bridge were performed for the right side of the jaw and teeth prepared in the right side for crowns and bridge. Clinical and radiographic findings are reported for up to 6 year after initial therapy, indicating good efficacy of the therapeutic strategy and stability of the treatment outcome (Figure 4).



**Figure 4.** A and B intraoral view before and after treatment. C, Extra-oral view after treatment.

### Discussion

This clinical features Amelogenesis imperfect present special challenges to the treatment. All patients have previously been treated with multiple extractions followed by the construction of an overdenture or complete dentures.<sup>37</sup> Such aggressive treatment courses have become unacceptable by modern dental professionals in light of advances made in the field of esthetic dentistry.<sup>38,39</sup> However, adopting a stepwise approach is essential to help preserve and retain

the patient's own teeth for as long as possible and avoid or delay the need for prosthetic replacement. Esthetics along with functional limitations were the reason brought the patient to the faculty of dentistry for treatment.<sup>40</sup> Treatment planning for patients with Amelogenesis Imperfecta is related to many factors such as age and socioeconomic status of the patient, the type and severity of the disorder and the intraoral situation and most importantly the patient's availability for treatment and cooperation.<sup>41-44</sup> Interdisciplinary approach is necessary to evaluate, diagnose and resolve esthetic problems using a combination of, periodontal, prosthodontic, and restorative treatment. Management of GagP patients essentially consists of a nonsurgical phase, surgical therapy an interdisciplinary therapy and a lifelong supportive periodontal therapy.<sup>45-48</sup> The combination of initial therapy with adjunctive amoxicillin/clavulanate/metronidazole followed by non-surgical periodontal therapy provided a good clinical, radiographic, and esthetic result in the present patients with severe and progressing GAgP. Beyond the limits of the case reports, the follow up for 6 years clinical and the x-t-ray findings demonstrated the significance management of this case by non-surgical and surgical approach with guided bone regeneration therapy. Stabilization of the periodontal status approach is essential to help preserve and retain the patient's own teeth for as long as possible to designed and construct fused metal porcelain crowns and bridges to provide the patient excellent and beautiful aesthetic appearance.

## Conclusions

Generalized aggressive periodontitis associated Amelogenesis Imperfecta is a rare case, treatment planning required multi disciplinary approach to evaluate, diagnose, control the disease progression and resolve the esthetic problem. This case the patient underwent advanced periodontal therapy, full mouth prosthetic rehabilitation for esthetic and functional purpose. Follow up for 6 years showed stability of the periodontal condition and improvements of the esthetic and functional aspects. Early treatment of patient with AI disorder can prevent progressive damage of dentition and the psychological impact of this condition.

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