

## Restoring Function and Esthetics in a Patient with Amelogenesis Imperfecta: A Case Report

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### Abstract

**Aim:** The purpose of this case report is to present the esthetic and functional rehabilitation of the teeth in a 22-year-old patient with Amelogenesis imperfecta (AI).

**Background:** AI is a group of hereditary defects of enamel, unassociated with any other generalized defects. It is a rare developmental abnormality of the enamel, with a variable occurrence of approximately 1:4000 to 1:14000 in Western populations. AI results in poor development or complete absence of the enamel of the teeth caused by improper differentiation of the ameloblasts.

**Report:** This report describes the diagnosis and treatment of a young male patient with AI and missing molar teeth using contemporary restorative strategies. Initially, the tooth surfaces were treated with a professional cleaning along with conservative restorative treatment. Later, metal-ceramic crowns for posterior teeth and full-ceramic crowns for anterior teeth were utilized for final restorations.

**Summary:** The complexity of the management of patients with AI supports the suggestion the dental profession should have appropriate methods for the rehabilitation of rare dental disorders. The treatment of patients with AI should start with early diagnosis and intervention to prevent later restorative problems.

**Keywords:** Amelogenesis imperfecta, AI, enamel abnormality, porcelain, restoration

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## Introduction

Amelogenesis imperfecta (AI) is a rare developmental abnormality of the tooth enamel, with a variable occurrence of approximately 1:4000 to 1:14000 in Western populations.<sup>1-5</sup> AI results in poor development or complete absence of the enamel of the teeth caused by improper differentiation of ameloblasts.<sup>6</sup>

Although the hypoplastic subtype of AI (hypocalcified and hypomaturation being the other two subtypes) does not directly increase the risk for the development of caries in the affected teeth, the absence of normal enamel morphology invariably results in diminished occlusal function, and often in severely compromised esthetics.<sup>7</sup>

Dental features associated with AI include:<sup>8-9</sup> quantitative and qualitative enamel deficiencies; pulpal calcification, taurodontism and root malformations; failed tooth eruption and impaction of permanent teeth; progressive root and crown resorption; congenitally missing teeth; and anterior and posterior open bite occlusions.<sup>2</sup>

It is common for AI patients to receive little or no oral healthcare during childhood. Pitted enamel surfaces may predispose AI teeth to plaque accumulation, but the spacing of the teeth may reduce interproximal caries susceptibility. Oral hygiene has to be maintained at a high level if a favorable long-term prognosis for restorative procedures is to be achieved.

Treatment objectives for the young adult patient also include the relief of pain and the improvement of facial esthetics and function. Most reports of the treatment of AI in the dental literature have involved children and young adolescents. There are just a few reports regarding the oral rehabilitation of older persons.<sup>10-11</sup>

## Case Report

### Diagnosis

A 22-year-old male patient presented with esthetic and functional inadequacy of permanent teeth along with considerable tooth sensitivity. A detailed medical, dental, and social history was obtained.

The oral examination revealed all molar teeth were missing except the maxillary left first permanent molar and the patient had a 2 mm anterior openbite. The enamel of all remaining teeth was hypoplastic and yellow-brown in color. The surfaces of the teeth were rough, and the enamel was either not visible or very thin over the crowns of all teeth. The dentin, where it was exposed, was brown and hypersensitive (Figures 1 and 2).

The left and right sides of the mouth are shown in Figures 3 and 4, respectively. The left maxillary and mandibular premolars were in a cross-bite relationship.

Radiographically the teeth showed normal pulpal morphology while the enamel appeared to be very thin or missing in the anterior region (Figure 5).

The patient was questioned about the presence of similar abnormalities in his family including parents, brothers, sisters, and grandparents. He stated his aunt who lived in a faraway city was the only one to have such an appearance to her teeth. Therefore, the patient was diagnosed with hereditary AI (Figure 6).



**Figure 1.** The occlusal view of the mandibular teeth.



**Figure 2.** The occlusal view of the maxillary teeth.



**Figure 3.** An appearance of the mouth from the left side.



**Figure 4.** An appearance of the mouth from the right side.



**Figure 5.** Panoramic radiograph of the patient at diagnosis.



**Figure 6.** Clinical appearance of Al.

Photographs and a panoramic radiograph were obtained prior to treatment. No other abnormalities were observed. The enamel of the teeth appeared to have the same radiodensity as dentin.

The patient's oral hygiene was unsatisfactory, along with many carious teeth and old restorations. The initial level of gingivitis was observed and recorded. The patient reported he was reluctant to brush because of the sensitivity of his teeth.

#### **Treatment**

Implant therapy was recommended to replace the missing teeth in order to preserve the existing alveolar bone level. However, the parents stated

they could not afford implant therapy. The patient also stated he did not want to wear a removable partial denture.

Replacement of the missing first molars was treatment planned using cantilever bridges to replace the molars in the absence of distal abutments.<sup>12</sup> The patient was informed about the disadvantages of cantilever bridges and the entire preparation process for all teeth.

Using diagnostic models, along with clinical and radiographic findings, the treatment plan was formulated. The patient was informed about the restorative procedure and all other treatment alternatives including the differences in costs, the levels of tooth structure removal, the expected clinical longevity, the time period necessary to conclude the treatment, and the possible esthetic result.

Because all molar teeth except the maxillary left first molar were missing and the vertical dimension had to be increased, fixed prosthetic restorations were selected.

During the initial phase of the treatment, the plaque accumulation was removed by providing a professional cleaning and then conservative treatment was performed.

### **Posterior Preparations**

Later, chamfer preparations of the premolar and canine teeth were done for metal-ceramic restorations. Impressions were taken using polyvinyl-siloxane impression material (Affinis, Coltene-Whaledent, Konstanz, Germany) using stock trays and interocclusal relationships were recorded. The vertical dimension was increased by 2 mm in the incisor region in order to restore the premolar teeth in a favorable occlusal relationship. All prepared teeth were restored with provisional crowns. The occlusal records were transferred to a semi-adjustable articulator with a facebow (Type ARH-2, Dentatus, Hagersten, Sweden), and the final casts were mounted. Metal-ceramic cantilever crowns were fabricated in a licensed dental laboratory.

Following the metal framework and ceramic try-in sessions, the metal-ceramic crowns were cemented temporarily using (Temp Bond NE, Kerr, Salerno, Italy). The preparation of central and lateral incisors was delayed by three weeks in order to assess the acceptability of the new vertical dimension.

### **Anterior Preparations**

Shoulder preparations for central and lateral incisors were done for full-ceramic restorations. Impressions were made with polyvinyl-siloxane impression material using stock trays, and an interocclusal record was taken. The prepared teeth were restored with provisional crowns. The same mounting procedures as was used for the posterior teeth and interocclusal records using a facebow were used for the anterior restorations.

The marginal fit and esthetic appearance of crowns were verified. In the final steps of the treatment, metal-ceramic crowns were completed for the posterior teeth whereas the anterior teeth were restored with full-ceramic crowns (Figure 7).

The occlusal views of the mandibular and maxillary teeth following the completion the restorations are also shown in Figures 8 and 9, respectively.



**Figure 7.** Anterior view of the final restorations.



**Figure 8.** The occlusal view of the mandibular teeth after restoration.



**Figure 9.** The occlusal view of the maxillary teeth after restoration.

### **Discussion**

The prosthetic rehabilitation of AI patients has been previously presented in several case reports.<sup>11,13-15</sup>

The different materials and methods for restorative procedures currently available have made it both exciting and confusing for dental practitioners. It should be pointed out limitations exist, and the application of techniques are not universal.<sup>16</sup> It has been reported adhesive restorative techniques, overdentures, porcelain-fused-to metal crowns, fixed partial dentures, full porcelain crowns, and inlay/onlay restorations are all used for the prosthodontic treatment of

AI patients.<sup>7,11,16</sup> In the present case a porcelain fused to a precious metal alloy approach was utilized for the restoration of the posterior teeth, while all ceramic crowns were fabricated for the anterior teeth. Both the marginal fit and the color acceptability of the restorations were satisfactory.

Historically, patients with AI have been treated with extractions or with the construction of complete removable dentures. These options are psychologically harsh when the problem must be addressed in adolescent patients. Several studies for AI patients have illustrated the use of composite resin restorations, sealants, and other bonded resins, polycarbonate crowns, stainless

steel crowns, and space maintainers to restore a mutilated dentition that may only be the result of severe attrition.<sup>13,15,17-18</sup>

### Summary

The complexity of the management of patients with AI supports the suggestion the dental profession should have appropriate methods for the rehabilitation of rare dental disorders. The treatment of patients with AI should start with early diagnosis and intervention to prevent later restorative problems. This case report describes the functional and esthetic rehabilitation of AI with porcelain-fused-to metal and all ceramic crowns.

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