Interdisciplinary Approach to Treating a Patient with Amelogenesis Imperfecta: A Clinical Report

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ABSTRACT

Treatment of a patient with amelogenesis imperfecta (AI) presents a real problem from both functional and esthetic points of view. An esthetic result also will result in an improvement in the patient's quality of life. This clinical report illustrates the oral rehabilitation of a 24-year-old man diagnosed with hypomature type of AI. The aim of treatment was to both restore esthetics and improve masticatory function. Esthetic expectations of the patient were successfully attained by placing all-porcelain crowns from canine to canine in each arch, 12 crowns total. Moreover, metal-ceramic three-unit fixed partial dentures for the missing mandibular right first molars were fabricated for the patient's masticatory function. Resin composite restorations were applied to the maxillary premolars, the maxillary right first molar, the mandibular left premolars, and the right first premolar to modify the occlusion. No deterioration in the restorations and no pathology associated with the rehabilitation were found at the 1-year recall, and the patient's esthetic and functional expectations were satisfied.

CLINICAL SIGNIFICANCE

This article provides an overview of an interdisciplinary approach to treating the difficult condition of AI using a combination of treatments to achieve optimal esthetics and function.

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INTRODUCTION

Amelogenesis imperfecta (AI) is a heterogeneous inherited disorder that disturbs the developing enamel structure and exists independent of any related systemic disorder.[1–3] This enamel anomaly affects both the primary and permanent dentitions.[2–5] The prevalence of this rare ectodermal defect has been reported to vary between approximately 1:700 and 1:16,000, depending on the population studied and the diagnostic criteria used.[6]

Transmission of the gene takes place by either autosomal or X-linked dominant or recessive modes.[7,8] The most common type of AI is the autosomal dominant form.[1] Various classification systems have been proposed for the different AI types. These anomalies can be classified as hypocalcified, hypoplastic, or hypomature based on radiographic findings and clinical and hereditary criteria.[9–12]

In the hypoplastic type, there is a deficiency in the quantity of enamel that is mineralized properly. The enamel appears to be hard and

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shiny but it is malformed. In the hypocalcified type, enamel is formed in relatively normal amounts, but the enamel has a very low degree of mineralization. The enamel is soft, friable, and can easily be removed from the dentin. In the hypomaturation type, abnormalities in the maturation stage of enamel formation result in a mottled appearance, opaque white to yellow-brown or red-brown coloration, and enamel that is softer than normal that tends to chip from the underlying dentin.[1,5,13,14]

According to the literature, AI patients, regardless of subtype, have similar oral complications. Apart from enamel defects, AI also has been associated with inclusions and abnormalities in dental eruption, teeth sensitivity, poor dental esthetics, and decreased occlusal vertical dimension.[15] Other dental anomalies associated with AI include, but are not limited to, congenitally missing teeth, open occlusal relationship, pulpal calcifications, dentin dysplasias, hypercementosis, root and crown resorption, root malformations, and taurodontism.[9,12,16–19]

Although the AI subtype and severity may limit potential treatment options, a recently published survey reported the importance of treating the AI patient not only from a functional standpoint, but also from a psychosocial health standpoint.[15,20] Numerous treatments have been described for the restoration of the esthetics and function of teeth in patients suffering from AI.[12,18,19,21,22] This clinical report describes the sequenced treatment for a patient with hypomature-type AI.

CLINICAL REPORT

The patient, a 24-year-old man, was referred to the Department of Prosthodontics, Faculty of Dentistry, Cumhuriyet University for treatment. He was unable to chew his food properly, and also suffered from esthetic inadequacy and sensitivity of his teeth. He expressed extreme dissatisfaction with his appearance. A detailed medical and dental examination was performed, including photographs and dental radiographs (Figure 1).

Tissue loss affected all teeth. The enamel layer was abraded in the occlusal portion. Enamel pit defects were present in the teeth and the exposed dentin was hypersensitive. The enamel had horizontal hypoplastic bands. The mottled enamel had the same radiodensity as dentin. It was concluded that the patient likely suffered from a hypomature type of AI. The patient's mandibular right first molar had been extracted. With evidence of gingivitis, oral hygiene was not judged satisfactory at the first visit, although the patient demonstrated a good knowledge of correct oral hygiene (Figure 2). The patient reported that his 29-year-old brother had suffered from the same condition.

The interdisciplinary approach was followed because of the complex needs of the patient. A treatment plan was developed that would include treatments to reduce the reported sensitivity, improve esthetics, and restore masticatory function. Gingivectomy and

Figure 1. Panoramic radiograph (pretreatment).

Figure 2. Pretreatment view of the patient (frontal view).

gingivoplasty were performed in the area of the maxillary right central incisor to adjust the height of the cervical line. The sites were allowed to heal for 2 weeks. Although periodontal surgery had been done, maxillary and mandibular anterior teeth were prepared for all-porcelain restorations by using medium and coarse diamond burs (KG Sorensen, Barueri, Sao Paulo, Brazil), and the mandibular right second premolar and second molar were prepared for a three-unit fixed partial denture (FPD). After initial crown preparations, margins were finished with a knife-edge finish line with a fine diamond bur (KG Sorensen). Complete-arch impressions were made with a silicone impression material (Durosil L, PD President, Munich, Germany) for both the fabrication of Bis-acrylic composite provisional crowns (Optitemp Handmix, Spofa Dental, Prag, Czech Republic) in the laboratory (Ayan Dis Laboratory, Sivas, Turkey) and obtainment of the diagnostic cast models. The craniomaxillary and maxillomandibular relationships in the centric relation position were recorded. The provisional crowns were fabricated on a semiadjustable articulator (Hanau Articulator, Teledyne Hanau, Buffalo, NY, USA) and subsequently were cemented with zinc oxide eugenol cement (TempBond, Kerr Corp., Orange, CA, USA).

After 3 days, the provisional restorations of maxillary and mandibular anterior teeth were removed and final impressions were made with a silicone impression material (Durosil L). From canine to canine in each arch, restorations were fabricated with IPS Empress 2 materials (Ivoclar Vivadent AG, Schaan, Liechtenstein) in a licensed dental labaratory. Following the normal clinical sequence, the accuracy of the marginal fitting and esthetic appearance of the crowns were verified. The occlusion was assessed. After occlusal and proximal contacts had been adjusted, the restorations were cemented with a dual-cure dental adhesive cement (Panavia, Kuraray Co. Ltd., Tokyo, Japan).

A metal-ceramic three-unit FPD for the missing mandibular right first molar was fabricated (Ivoclar Vivadent AG). It was evaluated intraorally, adjusted, and cemented with a resin-modified glass ionomer cement (Fuji-Plus, GC Tokyo, Japan).

The maxillary premolars and maxillary right first molar were restored with a resin composite material (Charisma A1, Heraeus Kulzer, Hanau, Germany) to improve their appearance.

After the restorative procedures, dental sensitivity of the patient disappeared completely, and satisfactory function and esthetics were established (Figure 3). The patient was monitored at 3-month intervals for 9 months. The restorations exhibited no signs of deterioration. The patient's oral hygiene was satisfactory. The restorations remained intact, with no discoloration, crazing, or carious lesions.

DISCUSSION

The restoration of esthetics and function in patients with AI may be achieved with a dedicated team approach. In this case, meticulous

Figure 3. Frontal view of final restorations.

attention to detail, from diagnosis to postdelivery monitoring, allowed a controlled and logical treatment sequence.[23]

There are a number of alternatives for the prosthetic rehabilitation of defective enamel in amelogenesis patients. The treatment plan is related to many factors in cases of AI: age and socioeconomic status of the patient, type and severity of the disorder, and intraoral situation at the time the treatment was planned.[24]

Management of AI in the young adult using fixed prosthodontics is not a novel approach; however, it is possibly an underutilized one. All-ceramic techniques can reduce the need for conventional means of retention and allow the restoration of lost tooth structure with minimal tooth preparation. New bonding systems have improved the bond strength of dental ceramics to dentin, with initial strengths that approximate the bond to enamel.[25]

Other approaches to the prosthodontic management of patients with AI, for example, bonded porcelain inlays, stainless steel crowns, and metal-ceramic crowns, were not considered in the treatment of this patient because of his high expectations regarding esthetics and his young age, which created the need for a predictable long-term prognosis.[23]

CONCLUSION

The complexity of the management of patients with AI supports the supposition that the prosthodontic discipline should have a key position in the rehabilitation of rare disorders.[26] With careful considerations of patient expectations and requests, an interdisciplinary approach was critical for a successful outcome and patient satisfaction.

DISCLOSURE

The authors do not have any financial interest in the companies whose materials are included in this article.

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