

Case Report

Restoration of esthetics and function in a patient with amelogenesis imperfecta: A clinical report

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Amelogenesis Imperfecta is a dental condition that affects only the enamel, as it is an entirely ectodermal disturbance. A 16-year-old individual presented with discolored natural dentition. Composite restorations were fabricated for the maxillary and mandibular anterior teeth and metal-ceramic crowns were cemented on the posterior teeth. The final treatment result provided the patient with improved dental aesthetics that enhanced his self-image.

Key words: Aesthetics, amelogenesis imperfecta

INTRODUCTION

Amelogenesis imperfecta (AI) includes a variety of genetically determined disorders that primarily affect the enamel of all or nearly all teeth, without causing detectable alterations elsewhere in the body. This definition implies that the genetic mutations involve highly specialized genes that regulate only enamel formation and do not affect structural or enzymatic protein formation in other tissue systems, or in the regulation of general metabolic processes.^[1] AI is reported to have an incidence of one person in every 16,000 and was first described in 1890, but not until 1938 did Finn (as cited by Greenfield) classify it as a separate entity from dentinogenesis imperfecta.^[2]

Three types of amelogenesis imperfecta are described in the literature: hypoplasia, hypocalcification and hypomaturation. Enamel hypoplasia is an exclusive ectodermal disturbance related to alterations in the organic enamel matrix, which can cause white flecks, narrow horizontal bands, lines of pits, grooves and discoloration of the teeth, varying from yellow to dark brown.^[3] Enamel hypocalcification is a defect in the mineralization process, which causes the enamel to become soft and friable. The hypomaturation variance is determined by abnormality in the final stages of the mineralization process and differs from hypocalcification in that the enamel is harder with a mottled opaque white to yellow-brown or red-brown

color.^[4] According to Seow,^[5] common clinical problems of AI are poor aesthetics, teeth sensitivity and loss of occlusal vertical dimension, although distinctive clinical features may be observed in each type of AI.

The treatment plan for patients with AI is related to many factors including the age of the patient, the socioeconomic status, the type and severity of the disorder and its intraoral manifestation.^[6] This clinical report describes the treatment sequence of a 16-year-old individual with AI using composite resin restorations for the anterior teeth and metal-ceramic crowns for the posterior teeth.

Clinical report

A 16 yr old individual reported to our department with a chief complaint of unesthetic smile due to discolored teeth [Figure 1]. No family history of this condition was reported. Panoramic radiographs revealed that the patient had retained maxillary deciduous canines on the right and left sides. The maxillary right and left canines were impacted. Mandibular third molars on both right and left sides were retained [Figure 2].

The patient's generalized oral hygiene was poor and depths recorded were 3 mm or more. Mandibular right canine and maxillary right second molar were extensively damaged by caries and were completely covered with gingival tissue. The maxillary left second molar had been previously extracted due to caries. The



Figure 1: A and B, Pretreatment right and left buccal view of teeth in maximal intercuspation



Figure 2: Panoramic radiograph. Radiodensities of enamel and dentin were similar



Figure 3: Frontal view of occlusal splint in place



Figure 4: Post-treatment occlusal views. A, Maxillary; B, Mandibular.



Figure 5: Composite restorations on the maxillary and mandibular anterior teeth

enamel layer was very thin and yellowish-brown in color and the occlusal anatomy was completely absent. The molars were most severely affected and all tooth surfaces were dull and rough leading to a diagnosis of hypomaturational type of AI.

The first phase of treatment involved periodontal preparation by scaling and root planning. Crown lengthening by gingivectomy was carried out on the mandibular right canine and a healing period of 12 weeks was allowed for the soft tissues to mature adequately.^[7] After gingivectomy, endodontic treatment of the mandibular right canine was carried out and a prefabricated threaded post (SB post, Pre-sandblasted

Dental Post System; J. Morita USA) was used to support a core fabricated with composite resin (Clearfil Photocore Kuraray Co. Ltd, Osaka, Japan). The prognosis for the maxillary right second molar was deemed hopeless and therefore the tooth was extracted.

Complete arch maxillary and mandibular impressions were made with irreversible hydrocolloid (Alginoplast; Heraeus Kulzer, South Bend, Ind), and used to obtain diagnostic casts, using Type III dental stone (Labstone, Kalabhai Karson, Mumbai, Ind). Face-bow transfer was done and interocclusal records were made to mount the casts in centric relation on a semi-adjustable articulator (Hanau Series H2; Water Pik, Fort Collins, U.S.A). As the patient had less vertical dimension of occlusion, the vertical dimension had to be increased by 3 mm using an occlusal splint [Figure 3]. The patient was treated with occlusal splint for a period of 4 weeks and report back. Phonetics was used to assess that the increase of vertical height was within the physiologic limits.

In treatment planning special attention was given to improve the aesthetics and function. Fabrication of metal-ceramic crowns for maxillary and mandibular posterior teeth and composite restorations for the anterior teeth was planned. The patient was informed of the diagnosis, the treatment planned and his consent was taken before the start of the procedure. Composite restorations were chosen for the anterior teeth because they were cost effective. Porcelain laminate veneers were advised at a later date.

The maxillary premolars and first molars along with the mandibular premolars, first and second molars on both right and left sides, were prepared and rehabilitated simultaneously to receive metal-ceramic crowns. The teeth were prepared to allow for 1.5 mm of restorative material on the occlusal surfaces. The porcelain on the facial surface extended over the cusp tip and half of the way down the lingual incline of the facial cusp on maxillary premolars and molars. A shoulder of 1.5 mm on the facial side and a chamfer of 0.5 mm width was prepared on the lingual side. Tooth reduction was kept to a minimum. All tooth preparations were completed without sharp line angles.

Impressions of prepared teeth were made with vinyl polysiloxane (Reprosil; Dentsply, USA) in stock trays. Definitive maxillary and mandibular casts were formed, mounted to an articulator with trimmed dies of prepared teeth and the maxillomandibular relationship record was made with vinyl polysiloxane (EXABITE II NDS). Provisional restorations were given (TEMPRON, GC Corp, Tokyo, Japan) and the occlusal plane was established.

A trial evaluation of the metal substructure, prior to build up of the ceramic material, enabled final occlusal refinement. The crowns were cemented with glass ionomer cement (GC Fuji I, GC Corporation, Tokyo,

Japan) using the manufacturer's recommended powder/liquid ratio. The vertical dimension of occlusion was carefully maintained during the period of provisionalization and through the completion of restoration [Figure 4].

The maxillary and mandibular anterior teeth were then prepared to receive composite restorations (CHARISMA, Heraeus Kulzer, Germany). Shade matching was done according to the skin tone, because all the teeth were being restored. [Figure 5].

The patient was followed up for 1 year on a regular 3-month recall appointment schedule. Emphasis was given on the maintenance of oral hygiene and regular check-up visits.

DISCUSSION

There are a number of alternatives for the treatment of teeth affected by amelogenesis imperfecta. For many years, the most predictable and durable esthetic restoration of anterior teeth has been achieved with complete crowns. However, this approach requires the preparation of a substantial amount of tooth structure.^[4]

The popularity of porcelain laminate veneers has increased since being introduced, because tooth preparation is conservative and the restorations are aesthetic. However, an in vitro study has described some disadvantages such as marginal adaptation and bonding problems.^[4]

Composite resin restorations have been tried for the anterior teeth. Unfortunately, composite resins show polymerisation shrinkage, thermal dimensional change, staining, poor wear resistance, and its use veneers has a limited life of 4 years or less.^[8] Patients and dentists should discuss the advantages and disadvantages of various treatment options available in deciding the best treatment plan.

CONCLUSION

This clinical report describes the use of composite restorations and metal-ceramic crowns for restoration of a hypomaturation type of amelogenesis imperfecta. Composite restorations were placed on the anterior teeth and metal-ceramic crowns were placed on the posterior teeth to improve the aesthetics and function. This boosted the patient's self-confidence and also increased his responsibility to maintain adequate levels of oral hygiene.

ACKNOWLEDGMENTS

The authors would like to express their gratitude to Mr. Krishnamurthy Bhat for technical assistance rendered.

