ABSTRACT

Amelogenesis imperfecta (AI) is a group of hereditary enamel defects, the diagnosis of which is based on the family history and meticulous clinical observation. Nowadays, the use of adhesive restorations has great popularity owing to many improvements in the area, such as excellent esthetics, conservative approach and improved wear, and mechanical properties etc. This clinical report illustrates the oral rehabilitation of an 18-year-old girl diagnosed with hyperplastic type of AI with direct composite restorations and a 5-year follow-up.

In low severity of AI cases, conservative approaches and their long-term follow-up have insufficient evidence to support their use so the case to be presented in this article is considered to be worthy of reporting. Thus, this article presents the conservative treatment and long-term follow-up of a patient with AI disorder.

Key words: Amelogenesis Imperfecta, Conservative Treatment, Direct Composite Veneer Restoration

Submitted for Publication: 03.22.2012
Accepted for Publication: 07.10.2012
INTRODUCTION

Amelogenesis imperfecta (AI) has been defined as a complex group of hereditary enamel defects, existing independent of any related systemic disorder.1-3 This enamel anomaly affects both the primary and permanent dentitions.3-5 It is a rare enamel mineralisation defect, described by Spokes in 1980 as "hereditary brown teeth" with a reported incidence of 1:7000 and 1:16000, depending on the population studied and the diagnostic criteria used.1,6

Three basic types of AI exist: hypoplastic, hypocalcified and hypomaturation, based on radiographic findings and clinical hereditary criteria.4,7 In the hypoplastic forms, the enamel does not develop to its normal thickness, because of the deficient formation of the matrix. In the hypocalcified forms, the cause of deficient mineralization of the formed matrix, the enamel is soft, friable and can easily be removed from the dentin after the eruption. In the hypomaturation forms, the enamel crystals remain immature so the enamel is harder, with a mottled opaque white to yellow-brown or red-brown color, and tends to chip from the underlying dentin rather than wear away.2,10 Although AI has been categorized into three broad groups, at least 15 subtypes of AI exist when phenotype and inheritance are considered.1 The most common form of AI is the autosomal dominant hypocalcified type, followed by hypomaturation, and the hypoplastic type.11,12 According to the literature AI patients, regardless of subtype, have similar oral complications.4 Dental features associated with AI includes enamel deficiencies, pulpal calcifications, taurodontism and root malformations, failed root eruption on impaction of permanent teeth, progressive root and crown resorption, congenitally missing teeth and anterior and posterior open-bite occlusions.13,14

As AI is a genetic disorder, a preventive treatment is not possible; therefore, the treatment is focused on esthetic and functional rehabilitation.1,2,14 Treatment depends on the severity of the problem and the need for esthetic enhancement, ranging from simple composite resin restorations to complete crown restorations in cases involving greater loss of tooth structure or loss of vertical dimension.3 Using conservative techniques desirable esthetics can be achieved, the teeth and supporting structures preserved and a harmonious relationship created between the occlusion and temporomandibular articulation in appropriate cases.11

The aim of this paper was to present the treatment of a young female patient diagnosed with hypoplastic type AI by using direct composite resin restorations and a five-year follow-up.

CASE REPORT

Diagnosis

An 18-year-old female patient was referred to the Department of Restorative Dentistry and Endodontics, Faculty of Dentistry, Ondokuz Mayis University with a complaint of severe pain and swelling in her left mandibular first molar tooth. In her clinical examination almost all the teeth were yellow-brown in color accompanied with high surface roughness on all enamel surfaces. Except the mandibular anterior area, there were wide approximal caries, where interproximal contacts were disappeared. The cusps of all molar teeth were abraded and the exposed dentin was hypersensitive. Although high caries activity was detected, the oral hygiene and gingival health of the patient was satisfactory (Figures 1 and 2). As she was displeased with the appearance of her teeth, her psychological health was adversely affected.

The radiographic examination revealed that the occlusal aspects of all posterior teeth were worn, and there appeared approximal caries. However, deep carious lesions were seen in both right and left second mandibular teeth. Both maxillary central incisors were decayed and left maxillary central incisor had periapical radiolucency, additionally, left mandibular first molar teeth had an enlarged periodontal space. The morphology of the roots was normal, the pulp chambers had no calcifications, and the cementum and bony trabeculations were within normal limits (Figure 3). The family medical history revealed that the patient’s brother had similar clinical appearance so it was thought that the patient could have been suffering from hereditary hypoplastic type of AI.

Treatment

The treatment started with endodontic therapy of the left mandibular first molar, which was diagnosed as acute apical abscess and mandibular second molars were extracted. Subsequently after the root canal treatment of the left maxillary central incisor, devital bleaching procedure was performed 100 % carbamid peroxide, Endoperox poudre, Septodont, Cedex, France for eliminating the discoloration. To restore the tooth structures 37% phosphoric acid was applied for 15 s, rinsed and conventional adhesive
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system (Adper Single Bond 2, 3M ESPE, Germany) was applied according to the manufacturer’s instructions. The restorations of the teeth were performed with an A2 shade universal composite resin (Filtek Z250, 3M ESPE, St Paul, USA). Afterwards, to improve the esthetical appearance, maxillary anterior and premolar teeth were prepared for direct composite resin laminate veneer restorations. For this purpose 0.5 mm facial and proximal reduction was performed. All teeth preparations were completed without sharp line angles. The restoration of left maxillary central incisor was delayed for two weeks due to residual hydrogen peroxide after devital bleaching procedure. The teeth
were etched with the phosphoric acid for 15 s and rinsed. After applying the adhesive system (Adper Single Bond 2, 3M ESPE, Germany) it was cured for 20 s with a quartz tungsten halogen light source (Smart Lite, Benlioglu; Ankara, Turkey) with an intensity of 500mW/cm². The direct veneer restorations were performed with the same A2 shade hybrid composite resin (Filtek Z250, 3M ESPE, St Paul, USA). The finishing and polishing procedures were performed with 16-fluted tungsten carbide finishing burs and Sof-Lex (3M ESPE, St. Paul, MN, USA) aluminum oxide discs for 15 s for each discs (coarse, medium, fine and superfine). After the restorative procedures were completed, satisfactory functional and esthetical appearance was established (Figure 4).

The patient was recalled at 6-month intervals. During the control in the first year, clinical and radiographic examination revealed a new approximal carious lesion in left maxillary first premolar and a fracture at left maxillary second premolar’s veneer restoration (Figure 5). The treatment of the carious affected teeth and fractured restoration was performed by using the same adhesive and composite resin materials.

Five years after the treatment significant discoloration was observed on buccal and facial surfaces due to the consumption of staining nutrients and drinks. Also, in left maxillary incisor a crack was detected at the incisal third of the veneer restoration (Figure 6). The fracture was restored with the same trade adhesive and composite resin materials; finally, the discolarization was eliminated with polishing procedures. Except these failures the restorations remained intact and there was no new carious lesion.

DISCUSSION

In the present case the results of clinical and radiographical evaluations and family history indicated that the patient had hypoplastic form of Al.

There are a number of alternatives for esthetic and functional rehabilitation of defective enamel in amelogenesis patients. The treatment plan is related to many factors such as age, socio-economic status, type and severity of the disorder, and intraoral situation at the time the treatment was planned. Sundell et al. reported that prosthetic restorations would be essential for hypocalcified forms of AI while satisfactory results could be obtained by adhesive resin restorations of hypoplastic forms.

With the technologic development of adhesive systems and composite resins, especially with respect to their
AI-affected enamel can be problematic, especially in areas of poorly mineralized, friable enamel. Thus, case selection must be carefully considered when using direct-bonded restorations.

Lygidakis et al. stated that complex composite restorations in permanent hypomineralized molars with defective enamel offer good, long term performance. They also stated the fact that great attention should be given to the removal of all clinically defective, soft enamel in order to ensure stronger bonds with the underlying, possibly normal enamel. Venezie et al. reported that bonding resin composites to mechanical and optical properties, direct veneers have been increasingly used in clinical dentistry to restore anterior teeth that have alterations in color or anatomical shape.

Al-affected enamel can be problematic, especially in areas of poorly mineralized, friable enamel. Thus, case selection must be carefully considered when using direct-bonded restorations.

Figure 5a. The arrow shows the fracture at left maxillary second premolar's veneer restoration during the control in the first year.
Figure 5b. The arrow shows the new approximal carious lesion in left maxillary first premolar restoration during the control in the first year.

Figure 6a. The crack at the incisal third of the veneer restoration 5-years after the treatment.
Figure 6b-c. Intraoral appearances 5-years after the treatment.
restorations, as insufficient evidence is available to support their use in these situations.\textsuperscript{19}

In the present case the treatment was performed with direct composite resin veneers because of low severity of the case and serious advantages, such as preserving tooth structure, no laboratory stages, less working time and lower cost. Gökçe et al.\textsuperscript{13} reported the treatment of patients with AI should start with early diagnosis and intervention to prevent later restorative problems. In this case the patient was 18 years old; it was seen that with the completion of the restorations, progressive loss of the tooth structures can have been prevented. Also the patient’s esthetic complaints disappeared, and the functional results needed by the patient were obtained.

CONCLUSION

The present report underlines the advantages of using direct resin composite restorations for conservative treatment of hypoplastic type of AI. The rehabilitation included multiple anterior and posterior composite resin restorations to improve esthetics and restore function. The long-term follow-up of the restorations indicated that composite veneer restorations would be preferable for appropriate forms of AI disorder.

REFERENCES


