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〔CLINICAL〕

Atraumatic restoration in amelogenesis imperfecta using flowable composite resin

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(Chief : Prof. Hiroki OHNO)

Abstract

Amelogenesis imperfecta causes defects in the tooth enamel. These defects can appear as small pits or dents in the tooth or can be so widespread as to make the entire tooth small in size and/or mis-shaped. This may result in tooth sensitivity, an unsightly appearance and/or increased susceptibility to dental caries. Here, we report a case of a patient exhibiting amelogenesis imperfecta, the treatment employed to treat the defects, and the result obtained. The affected teeth (all upper teeth) appeared white and the patient requested esthetic improvement of the appearance. We applied flowable composite resin to the hypomineralized defect. The result was dramatic improvement in tooth color of the upper incisors and first premolars. We conclude that atraumatic flowable composite resin restorations are useful in the treatment of amelogenesis imperfecta defects.

Key words : Amelogenesis imperfecta, Atraumatic restoration, Flowable composite resin.

Introduction

Amelogenesis imperfecta is a disturbance in the formation of enamel¹⁻³. It can be classified as either hypoplastic, hypomineralized or hypomatured^{1,2}. It may cause tooth sensitivity, an unsightly appearance and/or increased susceptibility to dental caries. Moreover, congenital absence of teeth, the delayed eruption of teeth, and an abnormal occlusion are sometimes observed in amelogenesis imperfecta cases⁴. Thus, the inconvenience to the patient imposed by the disease can be significant. This is particularly the case for anterior teeth where esthetics may be dramatically compromised. In this case, laminate veneering, porcelain-faced

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metal crown restorations or composite resin restorations may be indicated.

Recently, flowable composite resin has become available for clinical use^{5,6)}. It is easy to use, and also exhibits improved mechanical properties. Here, we report a case of hypomineralized type-amelogenesis imperfecta, where defects were restored atraumatically using flowable composite resin restoration at the hospital of Health Sciences University of Hokkaido, School of Dentistry (Tobetsu, Hokkaido).

Case

Patient : 21 year-old female, student.

Chief complaint : Esthetic dissatisfaction with appearance of all upper teeth.

Anamnesis : There is nothing particularly.

History of the presenting complaint : Discoloration had been observed since the permanent teeth erupted. This discoloration was not observed in the deciduous dentition. The patient did not report delayed eruption of the permanent teeth.

Present condition : All upper teeth were discolored, with milky discoloration observed only labially in the incisal one-third or one-fourth part of tooth crown (Fig. 1). The shade of the sound tooth of the upper incisors and first premolars was A-3 (Fig. 1). The discolored areas did not exhibit either caries or hypersensitivity. Caries was present on the occlusal surface of 16 and 26. The patient did not have either congenital absent teeth or an abnormal occlusion. Periodontal pocket depth was 2-3 mm on all teeth.

Diagnosis : Hypomineralized-type amelogenesis imperfecta restricted to the labial incisal part of the tooth crown of the upper teeth.

Treatment : Tooth shade was selected using Shade Eye™ (Shofu Inc., Kyoto, Japan) and Vita Shade Guide (Vident™, Brea, CA, U.S.A.). FL-Bond (Shofu Inc.), self-etching priming system, was used as the adhesion system and Palfique Estelite LV (low flow) (Tokuyama Dental Inc., Tokyo, Japan) was used as the filling material (Fig. 2). The manufacturer's instructions

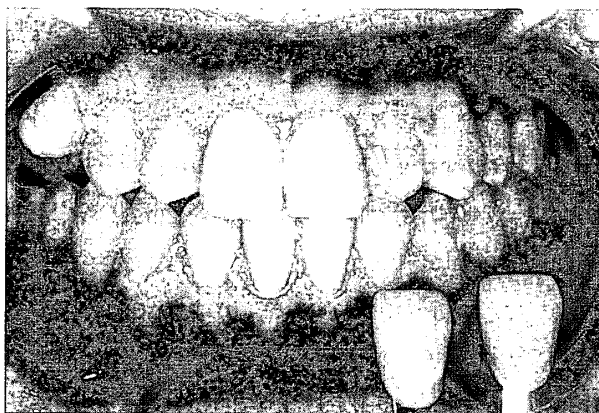


Fig. 1 Hypomineralized-type amelogenesis imperfecta restricted to the labial incisal part of tooth crown of the upper teeth

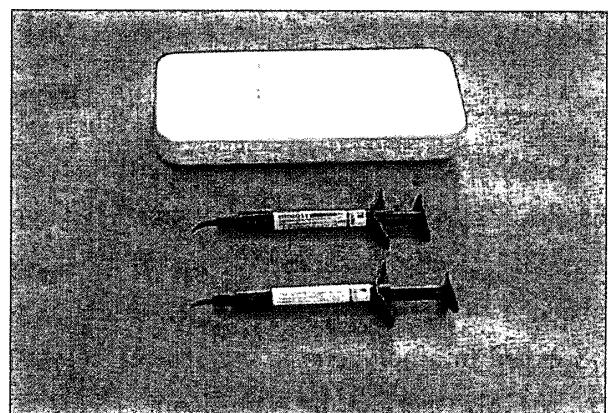


Fig. 2 Palfique Estelite LV (Tokuyama Dental Inc.)

were followed. Initially, a dry field was created around the incisors and the first premolar. Without removal of the white discoloration of the tooth, FL-Bond was applied using plastic strips and wedges. Palfique Estelite LV (low flow) shade A-3 was then used to a thickness of 0.5-1.0 mm to mask the white discoloration of the teeth (Fig. 3). An ARC Light™ II (Air Techniques Inc., Hicksville, NY, U.S.A.) was used as the visible light source. The visible light irradiation was done for ten seconds to polymerize the material. A post-treatment oral photograph is shown in Fig 4. Next, composite resin restoration was performed in the occlusal surface of 16 and 26. After treatment, professional mechanical tooth cleaning (PMTC) have been being performed at two-week intervals.

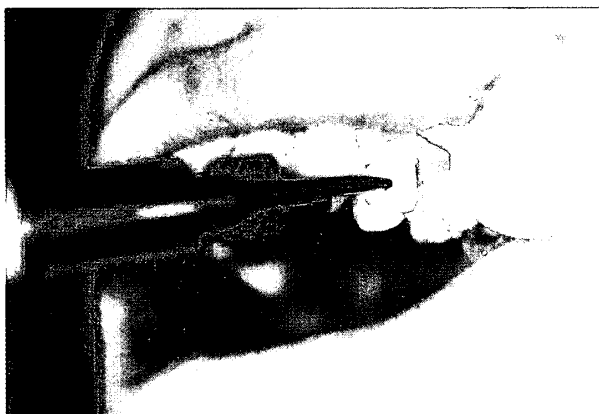


Fig. 3 Application of Palfique Estelite LV to the discolored teeth

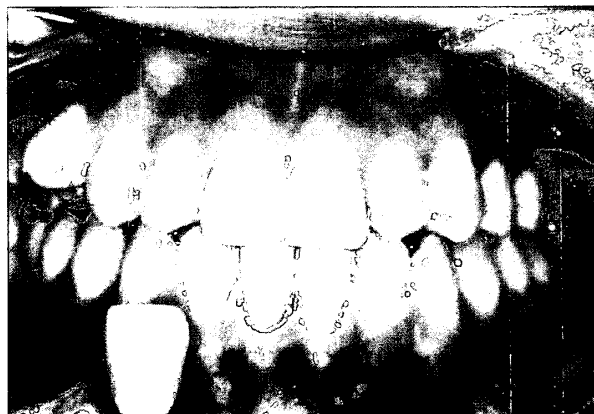


Fig. 4 Oral photograph after flowable composite resin restoration

Discussion

In the present case, enamel hypomineralization is restricted at one-third or one-fourth incisal portion of tooth crown in only upper teeth. Due to nothing particularly in the patient's anamnesis, we diagnosed this as the genetic disorder of upper teeth. Further, this might be confirmed by gene examination.

FL-Bond was used as the adhesion system. Its bonding reagent (FB-bond) contains the fluoride ion, and has a fluoride-releasing property. Therefore, it is possible that remineralization of hypomineralized layer of enamel may be promoted by fluoride ion released gradually from FB-bond over a long period. Palfique Estelite LV flowable composite resin was used as the filling material. Since it exhibits a high mobility, it is easy to use for filling wedged-shape defects, filling root cavities, lining, laminate veneering, and temporary fixation of teeth. However, it contains a little filler, so that a higher degree of polymerization shrinkage may occur than with conventional composite resins. Thus, it should be necessary to observe its prognosis for a long period.

In recent years, the concept of "Minimal Intervention (MI)" has appeared in the fields of operative dentistry and preventive dentistry^{7,8)}. This has become a reality due to the development of successful adhesion systems, the increasing understanding of dental caries and

its progression, and the spread of fluoridation. MI is less traumatic than conventional treatment, and should be performed in conjunction with caries prevention by fluoridation and caries-risk management. In the present case, we directly restored the hypomineralized defects resulting from amelogenesis imperfecta. A fluoride-releasing adhesive material was employed and its use was restricted to the labial incisal portion of the teeth. Tooth-cutting was also avoided, so contributing to the process of MI.

Conclusion

We performed atraumatic restoration of hypomineralized defects resulting from amelogenesis imperfecta, using a fluoride-releasing adhesion system and flowable composite resin. The resulting appearance was considerable improvement in tooth color of the upper incisors and first premolars. We conclude that direct restoration using this fluoride-releasing adhesion system and flowable composite resin is an excellent method for covering white discoloration caused by amelogenesis imperfecta.

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