



PROSTHODONTIC REHABILITATION OF A PATIENT WITH AMELOGENESIS IMPERFECTA: A CLINICAL REPORT

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ABSTRACT

Amelogenesis imperfecta has been described as a complex group of hereditary enamel defects that disturbs the enamel structure and exists independent of any related systemic disorder. A 24 year old male patient presented with discolored and hypersensitive teeth. The aim of the treatment was to reduce dental hypersensitivity and restore aesthetics and masticatory function. The maxillary and mandibular teeth were prepared and metal ceramic crowns were cemented on the prepared teeth. The final treatment result provided the patient with improved dental aesthetics and functional efficiency that enhanced his self image. Follow-up visits were scheduled at 3 months interval over a period of one year. No esthetic or functional problems were seen during the follow up period.

Keywords: amelogenesis imperfecta, full mouth rehabilitation, metal ceramic crowns

INTRODUCTION

Amelogenesis imperfecta has been described as a complex group of hereditary enamel defects that disturbs the enamel structure and affects both the primary and permanent dentition. By definition, AI includes only those cases where enamel defects occur in the absence of other systemic disorders.[1] As the disturbance affects only the epithelial derivatives i.e. enamel; the mesenchymal derivatives are normal. The prevalence of amelogenesis imperfecta in the general population is low reported at between 1:7000 to 1:14000; it has significant consequences for the affected patients.[2] Amelogenesis imperfecta has been classified into 4 groups based on clinical and radiographic features,

histologic appearance and mode of inheritance: hypoplastic, hypomaturational, hypocalcified, and hypomaturational-hypoplastic with taurodontism.[1,3] The clinical feature distinguishing hypoplastic form is that the enamel is usually well mineralised but does not develop to normal thickness, whereas in the hypomaturational type the enamel of a newly erupted tooth is of normal thickness but soft and friable, and prone to post eruptive breakdown and attrition. Enamel is very hypomineralised and often of a soft cheesy consistency in the hypocalcified type. The hypomaturational type differs from the hypocalcification type in that the enamel is harder with a mottled opaque white to yellow-brown or red-brown color.

The primary clinical problems associated with AI are poor esthetics, tooth sensitivity and loss of occlusal vertical dimension. The severity of dental problems experienced by the patient varies with each type of amelogenesis imperfecta.[4] Clinical presentation can be variable ranging from mild discoloration, slight pitting and minimal post eruptive breakdown of enamel to severe discoloration, pitting or significant tooth surface loss due to chipping of hypomineralised enamel.[5] AI patients may have compromised masticatory function due to tooth sensitivity, atypical crown morphology, loss of proximal contacts and rapid attrition.[5]

Prosthetic and restorative treatment in these patients aims at restoring function of the masticatory apparatus as well as enhancing the psychosocial well-being of the patient. The aim of the treatment should be to diminish tooth sensitivity and to restore vertical dimension of occlusion, function, as well as esthetics. Treatment planning for

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patients with amelogenesis imperfecta depends on many factors like the age and socioeconomic status of the patient, the type and severity of the disorder, and the intraoral situation at the time of presentation.[5] Management includes pain and infection control, provision of aesthetics and restoration of function using a combination of prosthodontic, periodontic, orthodontic and restorative treatment. This clinical report describes the multidisciplinary approach for the rehabilitation of a young patient with amelogenesis imperfecta.

reducing hypersensitivity of teeth. The treatment plan was explained to the patient and consent taken.

The patient was placed on intensive oral hygiene program because of his inadequate oral hygiene. Following dental prophylaxis and oral hygiene instructions, the patient was placed on a 0.12% chlorhexidine gluconate (Periogard Oral Rinse) oral rinse and desensitizing toothpaste (Colgate Gelkam) with a recommended use of twice daily.

The patient's upper central incisors were



Figure 1a



Figure 1b



Figure 1c

Fig. 1a Preoperative Panoramic view

Fig. 2b Preoperative intra-oral image of affected teeth

Fig. 2c Profile view showing a class III skeletal relationship

CASE REPORT

A 24-year-old male patient presented with the chief complaint of considerable sensitivity of his teeth, poor chewing efficiency, and displeasure with his present dental appearance. He also complained of sensitivity of his teeth. A detailed medical, dental and social history was obtained. Past medical history was not significant. Patient had been residing in a non-fluoridated area since his birth which helped in differential diagnosis. On extra-oral examination, the patient had no facial asymmetry and the patient's hair, skin and nails were normal. Therefore, the patient was diagnosed with hereditary AI.

Photographs and dental radiographs were made. (Fig.1a and Fig.1b) The patient had Class III skeletal profile and arch relationship. (Fig.1c) The patient's intra oral examination revealed that all his teeth were yellowish brown in color and the enamel was either not visible or very thin. The patient's right and left upper central incisors were labially placed. On evaluation of the vertical dimension of occlusion and rest using phonetics, interocclusal measurements and facial appearance as guides, it was determined that the vertical dimension of occlusion was maintained. A treatment plan was drawn with the following aims: improving the aesthetics, restoring the masticatory function and

extracted due to severe proclination and advanced periodontal involvement. Also teeth no. 16, 46 and 48 were extracted which were later replaced by metal ceramic fixed partial denture. Endodontic treatment was performed for 25,26,36,37 and 47 followed by fabrication of metal ceramic crowns for the rest of the teeth.

Complete maxillary and mandibular arch impressions were made using irreversible hydrocolloid (Tropicalgin, Zermak). Diagnostic casts were fabricated along with the facebow transfer and interocclusal records. Casts were mounted in a semi-adjustable articulator (Hanau Vide Vue). Diagnostic preparations on the cast were done to evaluate the amount of tooth reduction needed to correct contour and alignment. Diagnostic wax-up was done and a mutually protected occlusal scheme with a



Figure 2a



Figure 2b

Fig. 2a Temporization of upper and lower anterior teeth

Fig. 2b Temporization of upper and lower posterior teeth

group function on lateral excursion was developed.

Maxillary and mandibular anterior and posterior teeth were prepared to receive metal ceramic restorations. Laboratory processed provisional restorations were fabricated from the diagnostic wax up. The provisional restorations were evaluated intra-orally and occlusal adjustments were done. They were cemented using non-eugenol temporary cement (Temposil, Coltene Whaledent). (Fig. 2a and Fig.2b)



Fig. 3a Final tooth preparation of maxillary arch
Fig. 3b Final tooth preparation of mandibular arch

Definitive impressions of the prepared teeth (fig. 3a and 3b) were obtained using polyvinyl siloxane impression material (Express XT, 3M) using putty wash technique. Final casts were generated from type 4 die stone and mounted on the articulator using interocclusal records made of polyvinyl siloxane bite registration material (O-bite, DMG). The metal ceramic crowns were fabricated without altering the vertical dimension and evaluated intra-orally. Any occlusal corrections were carried out prior to glazing and the glazed crowns were cemented with GIC luting cement (Fuji 2, GC). (Fig. 4a and Fig. 4b)



Fig. 4a Metal ceramic crowns cemented in the maxillary arch
Fig. 4b Metal ceramic crowns cemented in the mandibular arch

The outcome of the treatment in terms of function and aesthetics satisfied the expectations of both the patient and the dentist. (Fig. 5a and 5b) The patient was monitored at 3 months interval for 1 year and then once a year.



Fig. 5a Final prosthesis in occlusion
Fig. 5b Profile view of after permanent cementation

DISCUSSION

Amelogenesis imperfecta is a condition that seriously compromises the oral and psychological health of the affected individuals. In a retrospective study it was found that the prosthodontic management had a positive influence on all these patients and the aesthetic rehabilitation was judged as the most important.[6] However, the treatment of patients with AI presents a clinical challenge to the dentist. The presence of deep bite, short clinical crowns and altered mesiodistal dimensions of teeth complicate treatment considerably.[7]

Periodontal health is the fundamental to the success of any restorative procedure. Thus, it is necessary to prepare periodontal tissues properly before restorative treatment to ensure good form, function, and esthetics of masticatory apparatus and patient comfort.[8] The oral hygiene of our patient was severely compromised. This condition can be attributed to the mouth breathing and reluctance to brush because of the sensitive teeth.[9,10] The oral health of our patient was maintained after conventional periodontal therapy.

There are several alternatives for treatment of amelogenesis imperfecta. Treatment options vary considerably depending on factors such as patient's age, socioeconomic status, type and severity of the disorder, and intraoral status at the time of treatment planning. For optimal results, the treatment must be determined on an individual basis and should be based on a multidisciplinary approach.[11,12]

The management of amelogenesis imperfecta using fixed prosthodontics is a highly preferred method of treatment. Though this treatment option is an invasive one involving removal of substantial tooth structure, it is still more conservative than any other considered alternatives, which involves extraction of affected teeth.[13]

With the advances in the field of esthetic dentistry full porcelain restorations have become the

preferred treatment modality for patients with AI.[14,15] Nevertheless, inadequate marginal adaptation and bonding problems may be associated with such restorations.[16] In the present case, full-mouth metal-reinforced porcelain restorations were preferred keeping the high esthetic demand of the patient in mind without compromising the strength and function. Furthermore as the patient had an edge to edge bite, composite resin bonded restorations and veneers were not recommended as a treatment option because incisal loading creates negative impact that leads to restoration failure.[4]

A group function occlusal scheme was developed to prevent the development of undue stresses during lateral excursive movements, and to uniformly distribute masticatory loads over a greater number of teeth.[17-19]

The treatment option, however, requires the patient to maintain meticulous oral hygiene. The longevity of the comprehensive treatment of this patient required strong emphasis on meticulous oral hygiene. Equally important to the success of this treatment are the periodic recall visits for monitoring of the restorations placed. The patient was monitored at 3-month intervals for one year. The restorations exhibited no signs of deterioration and the patient's oral hygiene was satisfactory.

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