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Research Article

RESTORATION OF FUNCTION AND ESTHETICS OF HYPOPLASTIC AMELOGENESIS IMPERFECTA WITH MULTIPLE IMPACTED TEETH – A CLINICAL REPORT

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ABSTRACT

Amelogenesis imperfecta is an inherited disorder affecting the development of enamel and may exist independent of any related systemic disorder. People with AI have been six times more prone to have impacted permanent teeth than the unaffected people. Treatment planning for patients with amelogenesis imperfecta depends on factors like the age, patient motivation, periodontal condition, loss of tooth structure, endodontic status, the type and severity of the disorder, socioeconomic status and most importantly the patient's cooperation. The patient presented with hypoplastic amelogenesis imperfecta with multiple impacted teeth. Multidisciplinary approach was followed to restore the function and esthetics of the patient. The follow-up was done for four years and the patient was satisfied with the treatment outcome.

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INTRODUCTION

Amelogenesis imperfecta (AI) is an inherited disorder affecting the development of enamel and may exist independent of any other related systemic disorder. AI results in poor development or complete absence of enamel due to improper differentiation of ameloblasts. Both the primary and permanent dentition may be affected. AI may be differentiated into three main groups: hypoplastic, hypocalcified, and hypomaturation depending on the clinical presentation of the defects and the likely stage of enamel formation that is primarily affected (Weinmann *et al*, 1945). There are fifteen subtypes of AI when phenotype and mode of inheritance are considered. Based on literature regardless of subtype, AI patients have similar oral complications like teeth sensitivity, poor dental esthetics, multiple impacted teeth, congenitally missing teeth, open occlusal relationship and decreased occlusal vertical dimension (Witkop and Rao, 1971; Sundell and Valentin, 1986; Aldred and Crawford, 1988). People with AI have been six times more prone to have impacted permanent teeth than the unaffected people and is often associated with anomalies such as follicular cysts (Collins *et al*, 1999). Impaction can be attributed to the concurrent follicular enlargement, abnormality in molecular control of eruption process, space deficiency and dental alignment problems (Reddy *et al*, 2010).

This clinical report discusses the elaborative step-wise management of the hypoplastic type of AI accompanied with multiple impacted teeth.

Case report

A 17 year old female reported to the Department of Conservative Dentistry and Endodontics at Government Dental College and Hospital, Hyderabad with the chief complaint of inefficiency in chewing and unpleasant appearance when smiling and conversing. The medical history revealed that the patient was under medication for hypothyroidism and her family history revealed that her maternal uncle also had the same type of dental problem. Patient also complained of missing teeth and sensitivity. On clinical examination, short clinical crowns were seen due to partial eruption and yellowish discoloration seen as a sequel to the loss of enamel and exposed dentin (Fig 1). On probing the tooth surfaces, they were soft and sensitive. In centric occlusion, the anterior teeth showed edge to edge bite and only the first molars were in occlusion whereas the rest were not occluding at all. The patient's vertical dimension in occlusion and vertical dimension at rest were assessed. The interocclusal rest space had increased because of loss of tooth structure on the molars. Teeth clinically missing were 17, 18, 23, 25, 27, 28, 37, 38, 43, 47 and 48. The condition was diagnosed as hypoplastic

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Amelogenesis Imperfecta. Panoramic radiograph revealed 18, 38 and 48 in the stage of development and 17, 23, 25, 27, 37, 43, 47 were impacted.



Fig 1 Pre-operative view

Teeth 11 and 12 were endodontically treated and the rest of the teeth showed large pulp chambers and rotated 33 and 46. The treatment plan was developed to restore the function and improve the esthetics of the dentition. It included endodontic therapy in all the erupted teeth as the patient was having large pulp chambers and possible pulpal exposure during tooth preparation for crowns followed by crown lengthening and metal ceramic restorations on all the teeth. The impacted teeth were left untreated as there was no pathological changes like follicular cyst formation or any other defects and as they were not interfering with the restorative rehabilitation.

Endodontic therapy was performed in a phased manner one quadrant at a time. All the teeth were prepared with ProTaper files (Dentsply-Maillefer, Ballaigues, Switzerland) and were



Fig 2 Post endodontic treatment OPG



Fig 3 Post - Crown lengthening

irrigated with 5.25% sodium hypochlorite, 17% EDTA and 2% chlorhexidine. Teeth were obturated with lateral condensation using AH plus sealer (Dentsply International Inc, York, PA) and gutta-percha points (Dentsply-Maillefer, Ballaigues, Switzerland) (Fig 2). 3mm crown lengthening was performed first on the maxillary arch and then on the mandibular arch (Fig 3). The patient was kept on intensive oral hygiene program with 0.12% chlorhexidine gluconate twice daily. Complete maxillary and mandibular impression were made with alginate (Neocolloid; Zermack, Rovigo, Italy) and diagnostic casts were poured with type III gypsum product (Kalstone; Kalabhai Karson, Mumbai, India). The casts were mounted on semi-adjustable articulator (Whip Mix; Model 8500, Whip Mix Corp, Louisville, USA) with face bow transfer (Quick mount face bow; Model 8645, Whip Mix Corp, Louisville, USA) (Fig 4A, B).

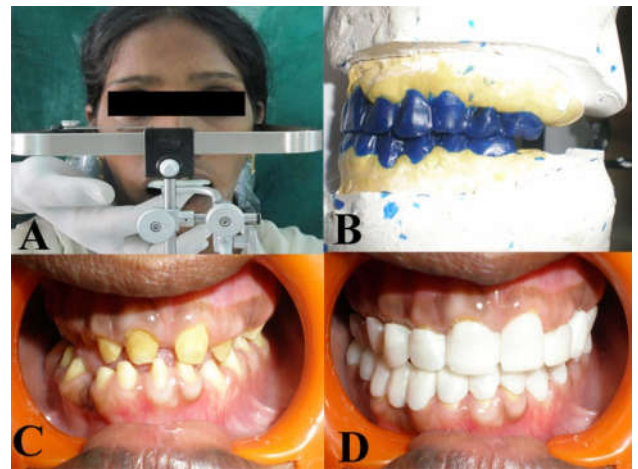


Fig 4 A Interocclusal record with semi-adjustable articulator

Fig 4 B Diagnostic wax-Up

Fig 4 C Tooth preparation

Fig 4 D Temporization

The centric relation was recorded using polyvinylsiloxane - occlusal registration material (Exabite II; GC Corp., Tokyo, Japan). The articulator was programmed using protrusive and lateral records. The diagnostic preparations and wax-up revealed insufficient interocclusal space for fixed prostheses. Vertical dimensions of occlusion was increased by 4 mm using occlusal splint device for a period of 4 months. Diagnostic preparations and waxing on the casts were done to evaluate the amount of tooth reduction for planned metal-ceramic restorations after 4 months (Fig 4B).

Tooth preparation with chamfer finish line was prepared on all teeth (Fig 4C). Provisional restoration (Protemp III; 3M ESPE, St Paul, USA) were fabricated from diagnostic wax-up and were cemented with zinc oxide eugenol temporary cement (Temp NE; 3M ESPE, St Paul, USA) (Fig 4D). A custom incisal guide table was fabricated from the acrylic resin (Rapid Repair; Dentsply India, Gurgaon, India) to preserve the anterior guidance of provisional restorations for the fabrications of definitive restorations. The patient was reviewed after 3 months. The temporaries were removed and the tooth were finished for making the final impressions for metal ceramic restorations. Shade selection and gingival retraction was done prior to impression making. Definitive impressions were made using addition silicone impression material (Exaflex and

Examix; GC America Inc, Alisip, Illinois, USA) by putty wash technique. The casts were prepared and mounted on the semi-adjustable articulator using interocclusal records. A metal try-in was performed to check the accuracy of the marginal fit and the path of insertion and withdrawal. Fabricated metal-ceramic crowns were evaluated intra-orally, adjusted, and cemented with glass-ionomer cement (GC Fuji I, GC Corporation, Tokyo, Japan) (Fig 5A,B,C). The patient was satisfied with treatment outcome. The patient was monitored at 4 months interval for 1 year and then once in a year for recall and was happy with both the function and esthetic of the restorations for past 4 years.



Fig 5 A Maxillary arch metal ceramic restorations
Fig 5 B Mandibular arch metal ceramic restorations
Fig 5 C Post-operative view

DISCUSSION

AI is a group of inherited disorder that poses challenges to the dentist during the restorative procedures. The primary clinical concern with AI patients are tooth sensitivity, dysfunction, loss of occlusal vertical dimension and esthetics. Restoring these defects is important not only for esthetic and functional reasons, but also it enhances the self-esteem and positive psychology of the patient towards the treatment. Treatment of AI included multiple extractions and fabrication of complete dentures by few authors (Sengun and Ozer, 2002). But this treatment option is in vogue due to apparent advancements in restorative procedures like resin bonded restorations, partial coverage restoration and full coverage restorations. In the present case metal ceramic full coverage restorations were used because of its good long term review (Rada and Hasiakos, 1990; Robinson and Haubenreich, 2006). Adopting a stepwise approach is essential to help preserve and retain the patient's own teeth for as long as possible.

Meticulous care was taken while addressing the decreased vertical dimension of occlusion so that the patient gets accustomed to the new dimensions and pose no problem in getting the sound stomatognathic function.

CONCLUSION

Treatment planning for patients with AI depends on many factors like the age, patient motivation, periodontal condition, loss of tooth structure, endodontic status, the type and severity of the disorder, socioeconomic status and most importantly the patient's cooperation. An interdisciplinary approach is necessary to evaluate, diagnose, and resolve esthetic problems using a combination of endodontic, periodontal, and restorative treatment for long term results.

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