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International Journal of Current Research
Vol. 9, Issue, 12, pp.62790-62796, December, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

INTERDISCIPLINARY TREATMENT APPROACH FOR A YOUNG PATIENT WITH AMELOGENESIS IMPERFECTA AND ANTERIOR OPEN-BITE

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ARTICLE INFO

Article History:
Received 24th September, 2017
Received in revised form
14th October, 2017
Accepted 22nd November, 2017
Published online 27th December, 2017

Key words:
Amelogenesis Imperfecta,
Occlusal schemes, Open-bite.

ABSTRACT

Variation of teeth has been an enduring interest to the clinical practitioner and scientist. One such variation includes amelogenesis imperfecta which is heterogenous inherited disorder that disturbs the developing enamel of both primary and permanent dentition. The result is a dentition which lacks function and esthetics. As Prosthodontists, we aim to change the self-esteem, confidence and possibly the course of life of the patients by functional and esthetic rehabilitation of their dentition. This case report describes a interdisciplinary approach for full mouth rehabilitation of a patient having amelogenesis imperfecta with severe anterior open-bite. This treatment resulted in improved function, esthetics and self-confidence of the patient.

Citation: Dr. Girish Sadashiv Nazirkar, Dr. Shilpa Shankarlal Gori, Dr. Aishwarya Shyam Tendolkar and Dr. Vidhi Sandeep Shah, 2017. "Interdisciplinary treatment approach for a young patient with amelogenesis imperfecta and anterior open-bite", *International Journal of Current Research*, 9, (12), 62790-62796.

INTRODUCTION

Amelogenesis imperfecta (AI) is defined as a hereditary disorder expressing a group of conditions that cause developmental alterations in the structure of enamel (Neville *et al*., 2004). The enamel defects are highly variable and can be classified as hypoplastic, hypocalcified and hypomatured (Millet *et al*., 2015). Diagnosis and treatment of AI patients with open-bite requires an interdisciplinary approach which should aim to successfully address all dental, occlusal and soft tissue problems associated with clinical conditions (Alachioti *et al*., 2014). Here, we report a case describing an interdisciplinary approach for full mouth rehabilitation of a patient having AI with severe anterior open-bite.

Clinical report

A 15-year old female patient reported to the Department of Prosthodontics, with a chief complaint of sensitivity to hot and cold food and discolored teeth with anterior open- bite. She gave a positive history of discoloration in the primary dentition as well. The patient reported with difficulty in mastication and poor self-image.

Extra-oral findings

The patient showed a convex facial profile with increased lower facial height. Lips were incompetent during rest and function. She presented with an anterior open- bite and tongue thrusting habit (Figure 1).

Intra-oral findings

A complete dentition was present with spacing, severe anterior open- bite (10mm), only second molars contacting in cross bite, yellowish discoloration of teeth, chipping of enamel from incisal and occlusal surfaces with heavy deposits of calculus (Figure 2) Pre-operative orthopantomogram showed thin layer of enamel that was as radiodense as dentin, and lack of interdental contacts between the teeth (Figure 3) Based on the findings, AI with severe anterior open-bite was diagnosed. An interdisciplinary approach including an orthodontist, periodontist, endodontist and prosthodontist was planned. Orthodontic treatment involved correction of anterior open-bite. Crown lengthening procedure was carried out after

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completion of orthodontic treatment. Prosthodontic treatment involved occlusal and esthetic rehabilitation. The best treatment modality for occlusal rehabilitation and esthetic was full coverage restorations with maximum intercuspation in centric relation, mutually protected occlusal scheme on protrusion and canine guided occlusal scheme on lateral excursions. Initially, a conservative tooth preparation was done on anterior teeth followed by temporization. The orthodontic treatment began after the temporization of anterior teeth (Figure 4). At first, posterior crossbite was corrected using HYRAX appliance. This was followed by incorporation of TT-spikes in the appliance for breaking tongue-thrusting habit and intrusion of posterior teeth by deriving anchorage using zygomatic implants over a period of one year (Figure 5). To achieve adequate retention and resistance form, crown lengthening procedure was done for posterior teeth after completion of orthodontic treatment. The prosthodontic phase began after the correction of anterior open-bite i.e. when an anterior vertical overlap was obtained (Figure 6). Diagnostic impressions were recorded and inter-occlusal records were taken.

protrusion and lateral excursions. The posterior temporary crowns were fabricated and transferred to the second set of casts along with the anterior temporary crowns. The anterior guidance was set in the anterior crowns and occlusal corrections were done for the posterior temporary crowns to create disclusion of posterior teeth on protrusion and lateral excursions. The temporary crowns were cemented using zinc phosphate cement (Super cement, Shofu Inc., Japan). (Figure 9) After a period of three months, a new set of temporary crowns was fabricated in heat cured tooth colored acrylic resin incorporating the same occlusal scheme. The patient continued using them for six months, which provided sufficient time for adjustments to validate esthetics and function.

After six months, anterior tooth preparation (Figure 10) was completed for metal-ceramic restorations. Final impressions were made with Poly Vinyl Siloxane impression material (Aquasil Soft putty/Regular set, Dentsply, Konstanz, Germany) for fabrication of metal-ceramic crowns. Inter-occlusal records were made with Alu wax (Maarc bite registration wax, Shiva

Figure 1. Preoperative Extraoral View

Figure 2. Preoperative Intraoral View

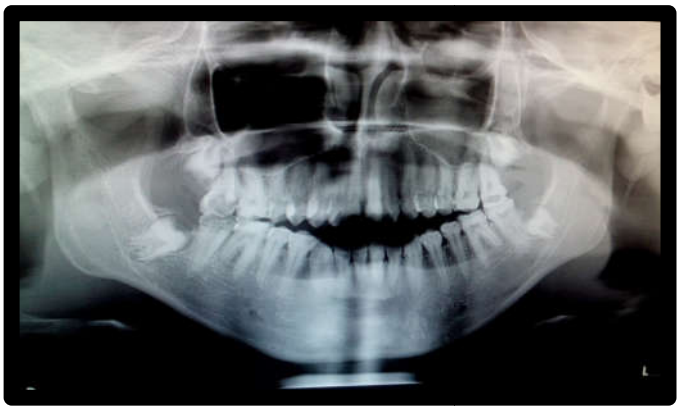


Figure 3. Preoperative OPG

Figure 4. Temporization of Anteriors

Orientation jaw relation was recorded (Figure 7) and transferred to Wide-Vue articulator. This was followed by programming of the articulator and setting of condylar guidance. Later, posterior teeth were prepared (Figure 8). Two sets of impressions were recorded and working casts were obtained. The first set of casts was used for wax mock-up of the posterior teeth in such a way that maximum intercuspation occurred at centric relation and posterior disclusion occurred on

products, India). Orientation jaw relation was recorded and transferred to Wide Vue articulator (Waterpik Technologies, USA). The framework for each tooth was waxed and the metal copings were tried in patient's mouth for marginal fit and clearance (Figure 11). The metal copings were veneered with ceramic and subjected to two firings for dentin and one final firing. Anterior guidance was first adjusted on Wide Vue articulator and then intra-orally during bisque trial.

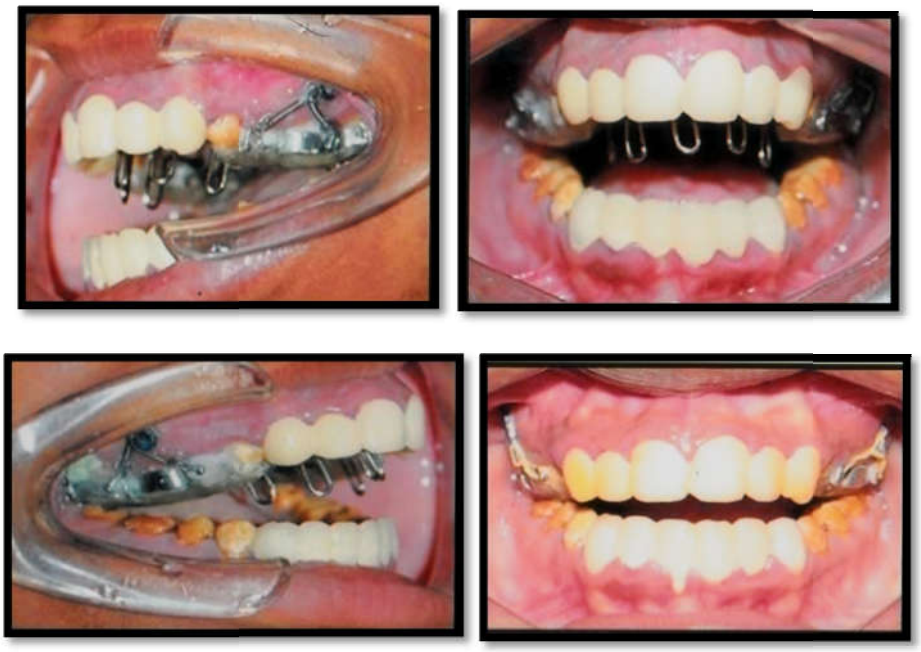


Figure 5. Orthodontic treatment

Figure 6. Correction of anterior open bite

Figure 7. Orientation jaw relation

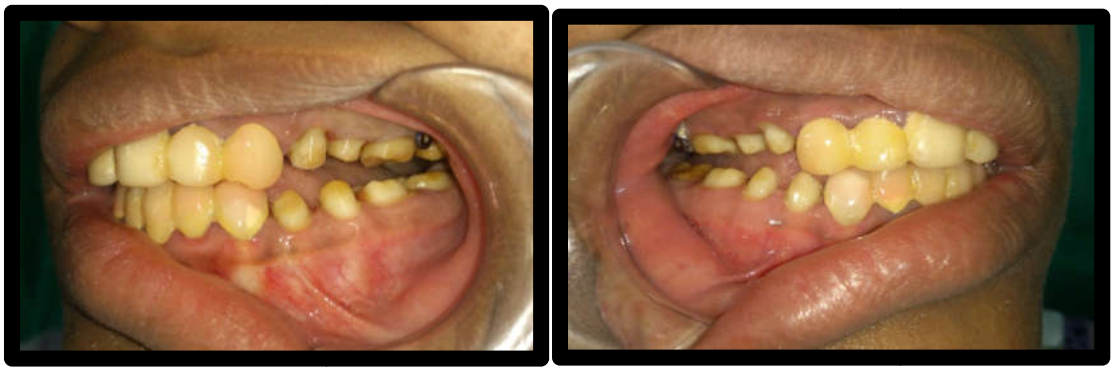


Figure 8. Posterior tooth preparation

Centric Occlusion

Protrusion

Lateralexcursions

Figure 9. Temporary crown cementation

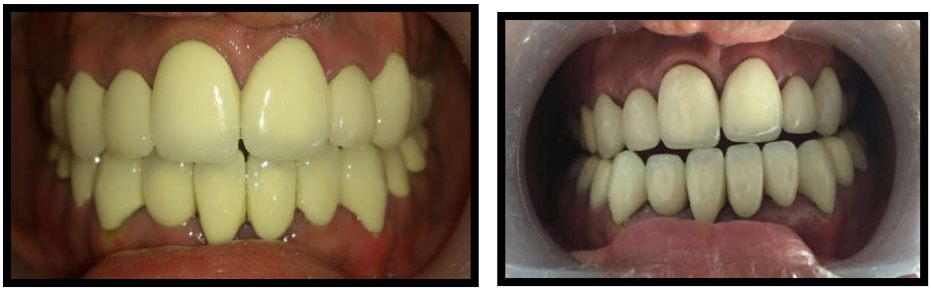
Figure 10. Anterior tooth preparation for pfm crowns and gingival retraction

Figure 11. Trial foranterior metal copings

Figure 12. Cementation of anterior pfm crowns

Figure 13. Posterior teeth preparation and gingival retraction

Figure 14. Posterior coping trial



Centric Occlusion **Protrusion**

Lateral excursions

Figure 15. Cementation of posterior pfm crowns with occlusal schemes

Figure 16. Postoperative view

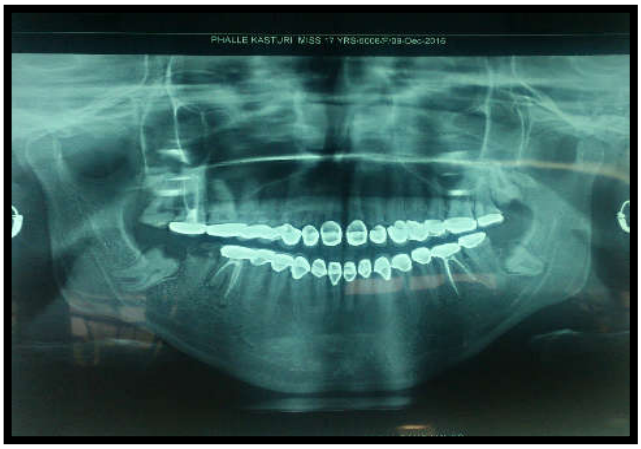


FIgure 17. Postoperative opg

Finally, metal ceramic crowns were glazed and cemented with type I Glass Ionomer cement (Hybond Glass Ionomer CX, Shofu Inc., Japan) (Figure 12). After two weeks, final impressions were made with PVS impression material for fabricating PFM crowns on posterior teeth. The same procedures were followed and intraoral metal coping and bisque trial was done (Figure 14). The PFM crowns were glazed and cemented with Glass Ionomer Cement. With the prosthodontic rehabilitation, maximum intercuspation at centric relation and mutually protected and canine guided occlusal schemes on protrusion and lateral excursions respectively were achieved (Figure 15).

DISCUSSION

This clinical report highlights the timing of the treatment judicious intervention and treatment by different dental specialities to rehabilitate patients with severe AI and openbite. The interdisciplinary approach was essential for successful management of esthetics and functional issues (Millet *et al*., 2015; Malik *et al*., 2012; Patil and Patil, 2014). It also gave a positive influence on the psychological well-being and self-confidence of the patient. Treatment modality includes patient's age, severity of AI, orthodontic needs, periodontal condition, financial implications and long term prognosis (Millet *et al*., 2015; Kinzer, 2010; Millet and Duprez, 2013). The management by direct interim bonding resin composite was not used due to poorly mineralized and friable enamel. Complete crown coverage is commonly recommended for the definitive restorative procedure in most severe hypocalcified AI cases. Even though significant reduction of tooth structure is required, such restorations protect the dental tissues from destruction due to brittle enamel structures. Adequate tooth preparation and appropriate choice of restorative material are choice for successful treatment (Millet *et al*., 2015; Chen *et al*., 2013; Urzua *et al*., 2012).

Conclusion

Management of AI patients is an extensive and complex process requiring a long term and interdisciplinary approach. Patient's functional and esthetic expectations were successfully achieved with long-list procedures including orthodontic treatment, periodontal treatment and full mouth crown coverage with metal ceramic restorations.

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