

Diagnosis, Treatment Planning, and Full-mouth Rehabilitation in a Case of Amelogenesis Imperfecta

Abstract

Amelogenesis imperfecta is a genetic condition affecting the teeth resulting in aberrations of the structure and clinical appearance of enamel. The treatment of amelogenesis imperfecta involves a multidisciplinary treatment approach requiring a comprehensive examination, diagnosis, and effective treatment planning strategy along with satisfaction of patient-related factors. The clinical case described here involves judicious involvement of different disciplines to formulate a treatment plan best suitable to confirm with the patient's needs and expectations, at the same time maintaining the integrity and harmony of associated hard and soft tissues.

Keywords: *Diagnosis, full-mouth rehabilitation, treatment planning*

**Mayuri Naik,
Siddharth Bansal¹**

*Department of Conservative Dentistry, Goa Dental College and Hospital, Bambolim, Goa,
¹Department of Prosthodontics, ITS, Gaziabad, Uttar Pradesh, India*

Introduction

Amelogenesis imperfecta is characterized by a group of conditions, genomic in origin, which can affect the structure and clinical appearance of enamel of all or nearly all the teeth and which may be associated with morphologic or biochemical changes elsewhere in the body.^[1] The treatment of amelogenesis imperfecta requires a detailed examination, multidisciplinary treatment planning along with agreement of patient-related factors, which would allow the formulation of a comprehensive treatment plan to be in harmony with the hard and soft tissues.^[2,3]

Clinical Report

A 24-year-old female patient reported to the department of conservative dentistry with primary concerns of misaligned, discolored, aberrantly shaped, and unesthetic dentition that hindered her ability to comfortably chew along with generalized tooth sensitivity. The patient's expectations were to receive a smile makeover along with improved functionality. She also requested a treatment that avoided any orthodontic intervention.

The medical history was noncontributory, thorough extraoral and intraoral examination ruled out any abnormalities of TMJ and parafunctional habits.

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A detailed facial esthetic analysis and intraoral examination were carried out^[4,5] [Figure 1].

Facial analysis [Figure 2d]

- Interpupillary line and commissural line parallel to horizon
- Facial midline is centered, face appears to be symmetrical
- Concave facial profile
- E line: Maxillary: -4 mm, Mandibular: +1 mm
- Thick lower lip, short upper lip.

Dentolabial analysis [Figure 2e]

- Tooth exposure at rest: maxillary - 10 mm with flat incisal curve
- Gummy smile (approximately 3–4 mm of gingiva is visible)
- Smile width of 8
- Upper interincisal midline is deviated toward right side by 4 mm.

Phonetic analysis

- M sound-interocclusal rest space is 3 mm
- E sound-interlabial space occupied by maxillary teeth - >50%
- F/V sound-incisal profile 2 mm lingual to vermilion border of lower lip
- S sound-closest speaking space is 1 mm

Dental analysis [Figures 2a-c]

Teeth present 18 17 16 15 14 12 11 21 22 23 24 25 26 27 28

48 47 46 45 44 43 42 41 31 32 33 34 35 36 37 38

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Address for correspondence:

Dr. Mayuri Naik,
Department of Conservative Dentistry, Goa Dental College and Hospital, Bambolim - 403 202, Goa, India.
E-mail: naikmayurimohan@gmail.com

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Figure 1: (a-c) Preoperative labial view. (d and e) Preoperative occlusal view

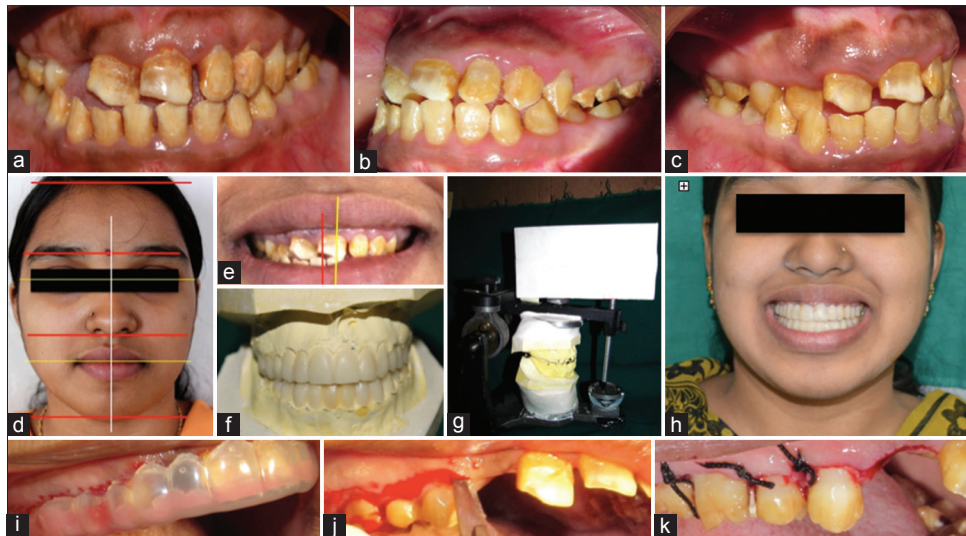


Figure 2: (a-c) Preoperative intraoral view. (d) Facial analysis. (e) Analysis of midline shift. (f) Wax mock-up on diagnostic casts. (g) Broadrick's occlusal plane analysis. (h) Intraoral mock-up with acrylic resin. (i-k) Gingival recontouring and crown lengthening procedure

Teeth absent 13

Teeth carious 17 16 15 24 26 48 47 46 35 36 37 38.

Short clinical crowns in posterior region, constricted maxillary arch, cross-bite relationship in the left posterior region and i. r. t. 21, generalized mild attrition, Angle's Class III malocclusion, generalized yellow-brownish discoloration of teeth, incisal edges are thin, and the cuspal structures are aberrant, multiple spacing between teeth.

Periodontal examination

Periodontal examination revealed asymmetric gingival margins, irregular zenith, thick gingival biotype, fair oral hygiene, no bleeding on probing, and pocket depth of <3 mm.

Final diagnosis

Final diagnosis revealed amelogenesis imperfecta, Class III malocclusion with constricted maxillary arch, gummy smile line.

The treatment plan constituted four phases.^[6,7]

Phase 1

Study models were fabricated for diagnosis and diagnostic wax-up. A face-bow transfer was made for recording craniomaxillary and maxillomandibular relationship and it was decided not to alter the vertical dimension. After mounting on a semiadjustable articulator, Broadrick's occlusal plane analysis was carried out [Figure 2g]. The wax-up of final prosthesis was sculpted on the diagnostic casts [Figure 2f]. Template was prepared using acrylic resin from the diagnostic wax-up. The template was loaded with temporary crown material and adapted on the patient's maxillary and mandibular teeth to form eggshell provisionals as direct mock-up restoration [Figure 2h]. The esthetics were examined and patient's approval was taken to continue with further treatment.

Phase 2

Root canal treatment was performed in relation to 17161514121121222324252627
474645444342413132334353637.

This was followed by full-mouth gingivectomy [Figure 2i-k] in conjunction with gingivoplasty to gain an increase in the clinical crown length and facilitate placement of the permanent crowns. Extraction of tooth 12 was carried out which was in crossbite.

Phase 3

Six weeks after crown lengthening procedure, maxillary and mandibular teeth except mandibular anteriors and maxillary and mandibular second molars were prepared for full-coverage metal ceramic crowns. Amount of reduction was guided by the silicon index of the diagnostic wax-up. Custom made metal post and core were fabricated for 11 21 26 46 [Figure 3a and b].

The template derived from the diagnostic wax-up was used to create provisional crowns using cold cure acrylic resin. Intraoral adjustments of provisionals were carried out to establish mutually protected occlusion in centric and group function occlusion in eccentric movements. Cementation of provisionals was carried out using temporary luting material.

Phase 4: Definitive restorative treatment

Bisque trial was carried out for a 7 unit metal ceramic fixed partial denture (FPD) replacing upper left maxillary canine and lateral incisor, entire FPD spanning from right first premolar to left canine [Figure 3c and d].

Individual metal ceramic crowns were fabricated for maxillary and mandibular first molars and premolars. Mandibular anterior teeth were built up with direct composite restorations after carrying out dentin deproteinization [Figure 3e and f].

Re-evaluation and maintenance

Oral hygiene instructions were given and the patient was recalled after 1 month for follow-up. On completion of the treatment, all our objectives were achieved. We could not only conserve the remaining tooth structure but could

also restore masticatory function and improve esthetics with average smile line. After a follow-up of 24 months, the patient was satisfied with both function and esthetics [Figure 4a-h].

Discussion

Rehabilitation of a patient with amelogenesis imperfecta involves a complex interplay of various factors. The restoration of esthetics and function in patients can be accomplished by an accurate diagnosis and appropriate treatment planning involving multidisciplinary approach. The primary goal of treatment should be to tackle each problem along with a comprehensive plan, which would take care of any future treatment needs. Psychological demands of these patients should also be handled with a lot of sensitivity. All inclusive and judicious approach toward rehabilitation is reassuring to the patient and will help to relieve their anxiety.

The extent, appearance, and the status of the pulp will determine the type of restorations necessary to achieve esthetic, functional, and harmonious stomatognathic system. The treatment of permanent dentition in amelogenesis usually involves a multifaceted treatment plan with intervention from multiple disciplines. Prosthodontic, periodontal, endodontic, and orthodontic consultation may be necessary, and treatment could also involve orthognathic surgery.^[8]

In the present case, the patient requested a treatment plan, which was economical, of a shorter duration without surgical and orthodontic intervention. Hence, it was decided that the rehabilitation would involve predominantly endodontic, periodontal, and prosthodontics treatment approaches.

The patient did not have any alteration of the vertical dimension of occlusion which was verified by the presence of posterior support; no history of occlusal wear, even if there is some amount of occlusal wear it would gradually be compensated by continuous tooth eruption. Phonetic evaluation revealed normal mandibular position during the pronunciation of /S/sound. Interocclusal distance was within the normal range. Facial proportions were adequate, commissural line normal along with adequate lip thickness. Since there was no need to increase the VDO, the teeth were restored by means of a periodontal surgery to gain increase in clinical crown length.^[9] The mandibular and maxillary second molars were left unaltered without any full coverage crowns, as they would serve as stops to determine the occlusion.

The patient complained of severe sensitivity due to decreased enamel thickness and dentin exposure. The patient had multiple carious teeth with considerable loss of tooth structure. Furthermore, there were high chances of pulpal exposure in teeth during crown preparation since disproportionate crown preparation was required to



Figure 3: (a and b) Crown preparation. (c) Metal try-in of prosthesis. (d-f) Final prosthesis after cementation and direct composite buildup of mandibular anterior teeth



Figure 4: Postoperative view after 1 month recall. (a-c) Facial view. (d and h) Profile view. (e and g) Occlusal view. (f) Smile view

compensate for the shift in midline and aberrant spacing between the teeth. Hence, all the teeth were root canal treated and post and core buildup was indicated in those teeth requiring reinforcement of tooth structure and minor changes in tooth alignment.

Mandibular anterior teeth with restored with direct composites only as carrying out crown preparation would further compromise the remaining minimal tooth structure and prone it to fracture. Pretreatment of teeth with 5% sodium hypochlorite was carried out before composite restorations to enhance the effect of acid etching. Deproteinization with sodium hypochlorite reduced the organic content and thus allowed better etching which ultimately enhanced the bond strength.^[10,11]

The teeth were prepared for metal-ceramic final restorations. Metal-ceramic restorations were considered as the treatment option due to financial restraints of the patient. FPD was fabricated in areas of missing teeth and in areas requiring adjustment of the misaligned teeth, whereas remaining teeth were restored with separate single crowns.

Conclusion

An interdisciplinary approach is indispensable to evaluate, diagnose, and treat patients with amelogenesis imperfecta using a combination of orthodontic, endodontic, periodontal, prosthodontics, and restorative treatment. The age and the socioeconomic status of the patient, type and the severity of the disorder should also be taken into deliberation.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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