



Aesthetic and Functional Rehabilitation of a Patient with Amelogenesis Imperfecta: A Case Report

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Abstract

The Amelogenesis Imperfecta (AI) is an alteration that occurs during the process of formation and maturation of the dental enamel. It may show autosomal dominant or recessive transmission pattern and is associated to the X chromosome, affecting both deciduous and permanent dentition. The objective of this study was to report a case of aesthetic and functional rehabilitation in patients with amelogenesis imperfecta. A 33-year-old male patient presented to the UESPI School of Dentistry Clinic looking for aesthetic treatment for the anterior teeth. After clinical analysis, gingival hyperplasia, excessive bleeding, poor oral hygiene, yellowing spots and small transverse grooves on the vestibular surfaces of all anterior teeth and horizontal cervical fracture in the right upper central incisor were observed (11). After CT scan of the conical bundle, we observed a radiolucent circumscribed unilocular image, external root resorption and vertical radicular fracture in the apical third of the tooth. Patient presented extrusion of the first and second maxillary molars (16, 17 and 27) due to the absence of the antagonists (37, 46 and 47), dental sensitivity, functional, aesthetic and psychological problems. The following procedures were performed: periodontal scraping, reanatomization by the direct technique with composite resin in the anterior elements, endodontic treatment, intra radicular retainer and coronary reconstruction with composite resin in tooth (11) and preparation of a partial denture removable for the teeth (37, 46, 47). Through planning and treatment, integrating different dentistry specialties, it was possible to improve aesthetics and restore occlusal function of the patient, achieving treatment success.

Keywords: Amelogenesis Imperfecta; Dental Enamel; Oral rehabilitation

Introduction

Amelogenesis Imperfecta (AI) is an alteration that occurs during the development of the enamel structure, which can affect both deciduous and permanent dentition. It may be just an isolated finding, as it can be part of a malformative syndrome. Of hereditary origin it is usually caused by mutations in the amelogenin gene (AMEX) and may show autosomal dominant or recessive transmission pattern, linked to the X chromosome [1,2].

The process of formation and maturation of dental enamel is highly complex, covering three main steps: deposition of the organic matrix, mineralization of the matrix and finally enamel maturation. If there is any change or failure in any of these steps, there

may be deficiency of its formation or defects in the mineral and protein content, and may generate some form of AI, which regardless of type, symptomatology and oral complications are similar and can be identified with based on clinical and radiographic characteristics [3,4].

These defects of enamel formation can be classified as: Hypoplastic (Type 1) characterized by translation disturbance and secretion of the extracellular matrix in which the thickness of the enamel is reduced in points or areas of the surface; Hypomaturado (Type 2) occurs due to disturbance of enamel maturation in which the dental enamel has normal thickness, but is softer; Hypocalcified (type 3) is due to the disturbance of the matrix mineraliza-

tion process, where dental enamel of normal thickness, very soft, opaque and with coloration varying from white to dark brown; Hypomaturado-Hypoplastic (Type 4) which shows an association between hypoplasia and hypomaturation of the enamel. It is important to hypomaturation of the enamel, which is colored yellowish-white and may have pits on the vestibular face [1,3,5].

Patients with AI have color changes in their teeth, which vary from tooth to tooth, from patient to patient, and may be white-opaque, yellow or brown due to complex genetic interactions. This enamel anomaly may be related to problems in eruption, dental agenesis, anterior open bite, pulp calcifications, crown and root resorption, vertical occlusion reduction (ODV), tooth sensitivity, attrition susceptibility, root malformations and taurodontism [4,6,7,8].

A negative impact on the social interaction and quality of life of the patient due to the aesthetic damages resulting from this anomaly is observed [3-5,9]. In this way the treatment requires high esthetic demands, being a challenge for the clinician. The abnormal shape of the enamel, orthodontic deficiencies, the potential for periodontal disease and the psychological effect should be considered prior to initiation of treatment [10].

According to the degree of severity in which dental enamel is affected, there are several treatment options such as: multiple dental extractions, aesthetic restorations, preformed or composite resin crowns, removable or fixed prostheses, and good motivation for oral hygiene is always necessary for treatment to be successful [4].

The present paper presented as justification a proposal of treatment for the patient with AI, integrating different dentistry specialties for aesthetic and functional restoration.

The objective of this study was to report a case of aesthetic and functional rehabilitation in patients with Amelogenesis Imperfecta.

Case Report

This work was approved by the Ethics and Research Committee of the State University of Piauí - CEP/UESPI, number 1,938,841. A 33-year-old male patient presented to the UESPI School of Dentistry (CEO) Clinic looking for aesthetic treatment for the incisors that had a diagnosis of hypoplastic type AI in both arches.

During the anamnesis, the patient did not present any systemic alterations, did not report excessive intake of fluoride in childhood and he was not able to inform if there were cases in the family with dentition presenting the same aspect.

Following the clinical examination were observed: presence of plaques and areas of gingival hyperplasia, excessive bleeding, poor oral hygiene, yellowish spots and small transverse grooves on the central, lateral and canine incisal surfaces of the central and lateral incisors and extrusion of the first and second molars (16, 17 and 27) due to absence of the antagonists, first and second lower permanent molars (46, 47 and 37). Dental sensitivity, functional problems (chewing, speech and swallowing), aesthetic (aging aspect of face). psychological difficulties, relationship difficulties and excessive shyness were also observed.

In addition to the color changes, the teeth presented exacerbated incisal/ occlusal wear suggesting altered development during the enamel formation phase (Figure 1).



Figure 1: Incisal / Occlusal wear, color change; horizontal fracture in the cervical third of the right central incisor (11).

A horizontal coronary fracture was observed at the cervical level in the right upper central incisor (11), with a negative response to sensitivity tests, absence of pain on palpation tests, vertical and horizontal percussion. After the clinical and radiographic examination, a diagnosis of pulp necrosis with asymptomatic apical periodontitis, with periapical lesion, with a circumscribed unilocular radiolucent image and external root resorption in the peri-apical region was obtained (Figure 2). Due to these findings, additional examinations were requested: a panoramic radiograph and a cone beam CT, where it was observed that besides the lesion and ex-

ternal root resorption, the tooth (11) also presented a periapical vertical fracture (Figure 3). After the CT scan, endodontic treatment (necropulpectomy II) was indicated. Panoramic radiography showed that the enamel of the anterior teeth in both arches had inferior radiopacity and contrast compared to dentin (Figure 4).



Figure 2: Periapical Rx of 11.



Figure 4: Panoramic radiograph.

After careful clinical and radiographic analysis, the treatment plan was elaborated. First, periodontal therapy was performed by scaling and corono-radicular straightening using ultrasound and guidance on oral hygiene, residual roots extraction 37 and 47. For incisors, reanatomization was performed using the direct facet technique with composite resin (Figure 5).

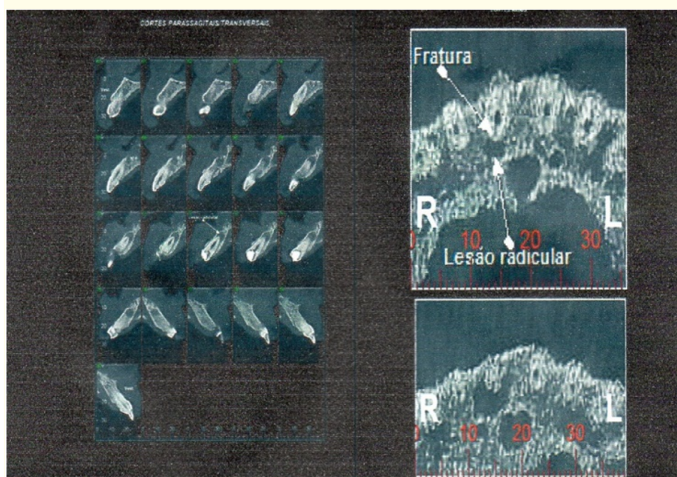


Figure 3: Sagittal and axial section of CT showing fracture and periapical lesion of 11.



Figure 5: Direct facet using lower arch composite resin.

The choice of this technique was due to the conservative preparation, with fast results and low cost. The restoration was performed with z250 micro hybrid resins and z100 (3M) resin in colors A3, A2 and EA1, to mimic the natural enamel. As the last layer, the nanohybrid composite resin Opallis (FGM) color EA2 was used.

Endodontic treatment of tooth 11 was performed in two sessions. In the first, channel decontamination and instrumentation were performed according to the Crown-Down technique, developed at the University of Oregon, by Prof. Dr. J.B. Pappin (1978) [11], with placement of intra-canal medication (calem PMCC). In the second session, after fifteen days, root canal obturation was performed by the active lateral condensation technique recommended by Callahans (1914). The choice of this technique was due to the periapical fracture and root canal fragility. Cones of gutta percha (DENTSPLY) and MTA Fillapex (Angelus) cement, have good biological compatibility (Figure 6) [12].

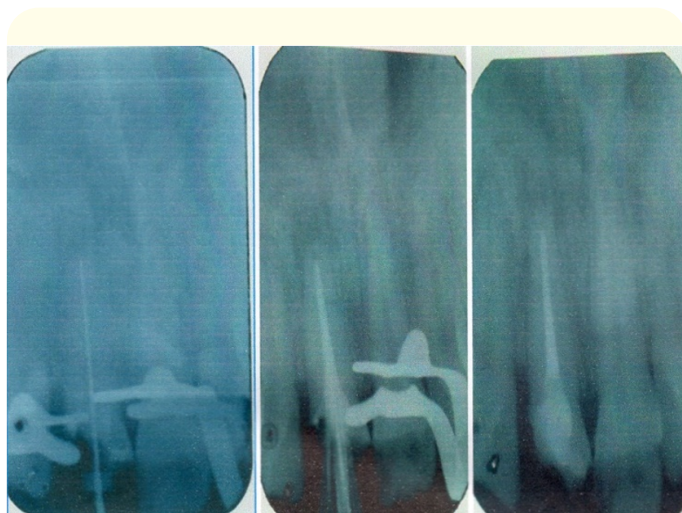


Figure 6: Periapical Rxs verifying channel obturation by lateral condensation technique.

There was clinical and radiographic monitoring during the first twelve months. To observe changes or unexpected failure, a new CT was performed fifteen months after the endodontic treatment. During the examination the repair of the vertical radicular fracture was observed, a hypodense tomographic image suggestive of periapical fibrous scar (Figure 7).

After the endodontic treatment, a reinforced intra radicular retainer was used, fiberglass pin Reforpost (Angelus) was cemented under relative insulation, due to the fact that it is a material that presents characteristics close to dentin, providing protection to the root remainder and promoting absorption of masticatory force, as well as good esthetics, fast execution and low cost [13-15].

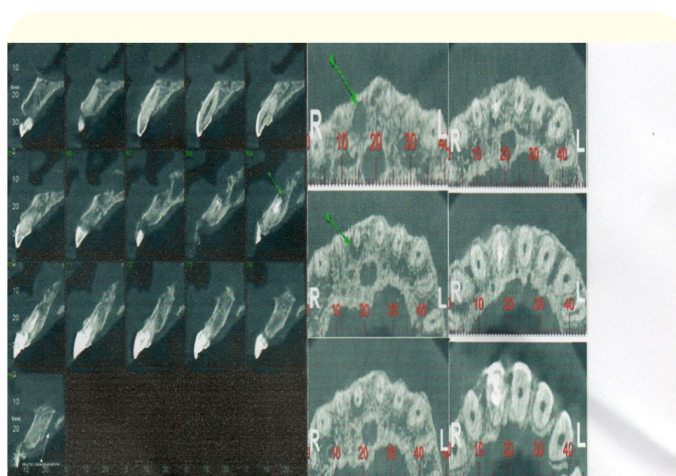


Figure 7: CT (sagittal and axial cut) fifteen months after endodontic treatment proving a decrease of the lesion.

For the coronary reconstruction, the direct technique with composite resin was used. Beginning with the crown filling covering the pin, returning the shape and structure of the tooth within the existing space. Z250 microhybrid resins and the z100 resin of (3M) in colors A3 and A2, to mimic the natural enamel was used the nanohybrid resin Opallis (FGM) color EA2 [15]. Finishing and final polishing were performed one week after coronary reconstruction, using Sof-Lex (3M / ESPE) sanding discs, from coarse to fine granulation, proximal sanding strips, abrasive tips from the Enhance system (Dentsply) and felt disks with polishing paste under absolute insulation (Figure 8).

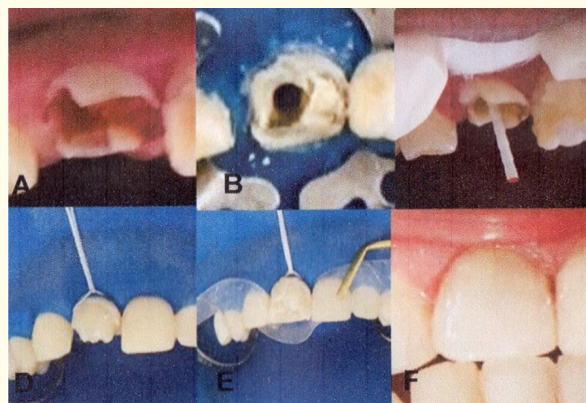


Figure 8: A) Horizontal coronary fracture; B) Coronary opening; C) Fiberglass pin insertion; D) Coronal filling with composite resin; E) Application of small increment of composite resin; F) Final clinical aspect.

In order to restore vertical dimension of occlusion (OVD) and restore occlusal stability, a lower removable partial denture (RPD) was made in clinical and laboratory sessions. At the first clinical session the molding of study and confection of niches and later molding of work with silicone of condensation were done.

In the first laboratory phase, the metal structure was cast after the model was created with type IV gypsum and the same was fitted to the semi-adjustable articulator (ASA). The arch was registered with the upper arch in relation to the base of the skull. In the second clinical session, the metallic structure was tested, its adaptation to the teeth being checked and the wax occlusion checked with the antagonist arch. In the second laboratory phase, teeth assembly and Ceroplasty were performed (Figure 9).

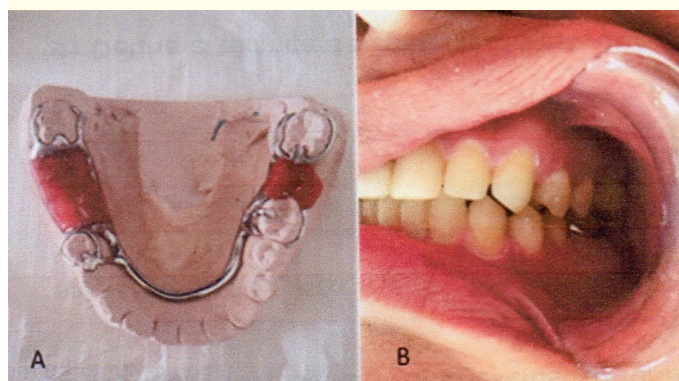


Figure 9: A) Ceroplasty and adaptation of the metallic structure to the model; B) Occlusal adjustment and positioning adjustments of the teeth.

In the third clinical session, the aesthetic and functional test of the teeth was performed, done occlusal adjustment and adjustments of the positioning of the teeth. In the last laboratory phase, the inclusion, pressing, polymerization, finishing and polishing of the RPD base was carried out. In the last clinical session, the RPD was installed, occlusal adjustment, finishing and polishing, and recommendations for use and hygiene (Figure 9). After the treatment, the patient presented a harmonic and aesthetic smile, healthy periodontium and absence of tooth sensitivity.

Functional and occlusal restoration were observed, corresponding to chewing, speech and swallowing. The same presented improvement in self-esteem (Figure 10). The treatment corresponded significantly with the level of demand and expectation of the patient.

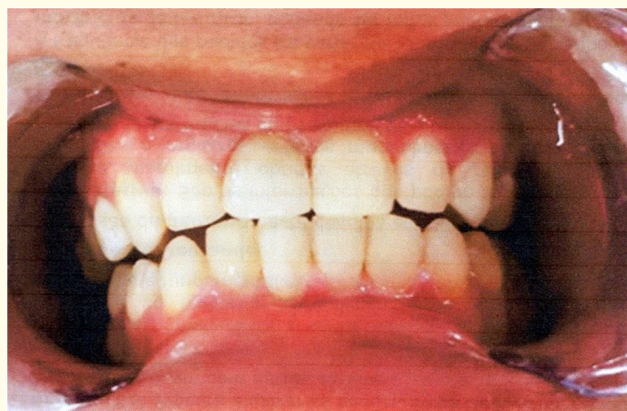


Figure 10: Final smile after direct facets with composite resin and RPD.

Discussion

The identification of AI is mainly established through intra and extraoral exams. Radiographic examinations should be performed in conjunction with clinical examination. As in any potentially hereditary condition, the presence of cases in the family should be evaluated [6]. Numerous treatment modalities have been described for the rehabilitation of AI patients, varying according to aesthetic and functional dental impairment.

Other factors should be considered when planning treatment, such as: patient's age, socioeconomic status and oral situation at the time treatment is initiated, since the patient with a compromised smile may present with psychological and behavioral disorders [7,16]. In this context, rehabilitation treatment at the level of aesthetics and facial harmony acquires extreme relevance in re-establishing the patient's self-esteem and self-confidence with AI [7,17].

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disorders [7,16]. In this context, rehabilitation treatment at the level of aesthetics and facial harmony acquires extreme relevance in reestablishing the patient's self-esteem and self-confidence with AI [7,17].

In the permanent dentition, the treatment consists of reducing the dental sensitivity and restoring the OVD, function and aesthetics. Periodontal treatment is a priority. It begins as soon as the clinical height of the crown and gingival tissue is restored. Complete oral rehabilitation requires a multidisciplinary approach, such as prosthesis, periodontics, orthodontics and endodontics, as well as orthognathic surgery [9]. Complex cases of AI may require multiple dental extractions, aesthetic restorations, plaques for restoration of vertical dimension and control of tooth sensitivity [18].

In this sense, the clinical management adopted in this case integrates aesthetic and functional rehabilitation through multidisciplinary procedures. Necropulpectomy II (two sessions) was chosen because it demonstrates success in the regression of periapical lesions [19].

Currently, several treatments may be indicated for this lesion, such as extraction of the devitalized tooth associated with the curettage of the epithelium of the apical zone, obturation of the root canal with or without apicectomy, only canal obturation, endodontic treatment associated with laser therapy as a co adjuvant in the repair of bio stimulation tissue. After appropriate treatment fibrous scars may occasionally occur instead of new bone formation, especially when both cortices are ruptured. According to some authors, concomitant CT has been of great use in the evaluation of fractures, especially horizontal ones, showing to be more effective in identifying them in comparison with periapical radiography [20,21].

Other authors have reported the use of cone beam CT in the detection of internal and external root resorptions and have concluded that it can help with accurate information both for diagnosis and for treatment of these cases [22,23]. Studies show that its application is not always necessary, however, in selected cases it becomes important, since it is able to reproduce images of areas not reached by conventional radiographs.

Aiming for greater stability and longevity was the insertion of fiberglass pin, because it has similar properties to the dentin, providing protection to the root remainder, reducing the probability of fracture, promoting absorption of masticatory force and reconstructing homogeneous functions, as well as outside recommended by other authors [13,14].

The literature reports that adhesive restorative methods, besides reinforcing the remaining dental structure, allow for minimal dental wear compared to indirect ceramic crowns, factors that position adhesive techniques as the first choice in the treatment of AI. The limitations of the composite resin technique are mainly related to cases of unsatisfactory oral hygiene, which favors the degradation of the organic matrix of the resin and consequent alteration of color and texture [7]. Some authors stated that aesthetic/restorative rehabilitation of the patient should involve a multidisciplinary approach, always taking into consideration the expectations of the patient. In addition, the aesthetic success of each specific clinical condition is closely related to the planning of a correct treatment sequence.

Another treatment options for dental absences in the lower arch were suggested, such as: installation of dental implants and fixed partial prosthesis. However due to his socioeconomic conditions to defray labor expenses, he opted for RPD, which is used to restore aesthetics and function, especially for those who make up the Brazilian low-income population, since this dental prosthesis has a low cost of preparation.

Conclusion

The aesthetics and occlusal function of a patient with Amelogenesis Imperfecta were restored by means of oral rehabilitation, satisfying him in relation to his dentofacial harmony.

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