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A Transitional Overlay Partial Denture for a Young Patient: A Clinical Report

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Abstract

This clinical report describes a noninvasive approach for the treatment of a patient diagnosed with amelogenesis imperfecta (AI) and severe anterior open bite. The patient's functional and esthetic expectations were successfully met with a transitional overlay removable partial denture.

Amelogenesis imperfecta (AI) is an inherited disease that disturbs the formation of enamel.[1,2] There are three types of AI: hypoplasia, hypocalcification, and hypomaturation.[1-3] Enamel hypoplasia is an exclusive ectodermal disturbance, related to alterations in the organic enamel matrix, which can cause white flecks, narrow horizontal bands, lines of pits and grooves, and discoloration of the teeth varying from yellow to dark brown.[1,2] Enamel hypo-calcification is a defect in the mineralization process. In this form, enamel is soft and friable. Hypomaturation is an abnormal occurrence in the final stages of the mineralization process. Hypomaturation differs from hypocalcification in that the enamel is harder, with a mottled opaque white to yellow-brown or red-brown color.[4-6] Several reports have described an unusual malocclusion occurring in some patients with AI, characterized by failure of the maxillary and mandibular anterior teeth to meet in occlusion.[7,8]

Restoration of these defects is important not only due to esthetic and functional concerns, but also because there may be a positive psychological impact for the patient.[9-13] Treatment planning for patients with AI is related to many factors: the age and socioeconomic status of the patient, the type and severity of the disorder, and the intraoral situation at the time treatment is planned.[4] In such cases, an interdisciplinary approach is necessary to evaluate, diagnose, and resolve esthetic problems using a combination of orthodontic, surgical, prosthodontic, and restorative treatments.

This clinical report describes a noninvasive approach for a teenage patient with AI and an anterior open bite complicated by 3D growth.

Clinical report

A 14-year-old girl self-conscious about her dental appearance and suffering from considerable open bite presented for treatment. The patient was referred to the Department of Prosthodontic Dentistry at Tehran University for evaluation and treatment. Prior to treatment, a detailed dental, medical, and social history was obtained from the patient. Clinical examination of the patient revealed functional Angle's class III dental relationships and multiple diastemata. A severe anterior open bite extended from second premolar to second premolar. The maxillary right first molar was previously restored with a stainless steel crown. The enamel of the other teeth was nearly absent, but the exposed dentin was not sensitive. All teeth had a short clinical crown height. After a thorough examination, the patient was diagnosed as hypoplastic-type AI (Figs 1 and 2).

Due to the patient's complex condition, which included AI and severe anterior open bite, and considering her age, definitive treatment (orthognathic surgery) was contraindicated. Therefore, a treatment plan was developed with the aims of improving masticatory function, malocclusion, and patient appearance in a reversible manner. A transitional overlay removable partial

Figure 1 Pretreatment view of teeth in maximum intercuspation.

Figure 2 Pretreatment view of smile.

Figure 3 Completed wax-up.

denture (RPD) was a possible treatment choice, and surgical and orthodontic treatment and fixed prostheses were delayed until her growth spurt.

Impressions of both maxillary and mandibular arches were made using irreversible hydrocolloid impression material (CA 37, Cavex, Haarlem, The Netherlands) and poured with a type III dental stone (Elite Model, Zhermack, Badia Polesine, Rovigo, Italy). The casts were mounted in centric relation on a semi-adjustable articulator (Dentatus Type ARH, Dentatus AB, Hägersten, Sweden) using a facebow and a centric relation record.

A wax-up of the proposed artificial teeth arrangement was prepared on the mounted casts without any alteration of the

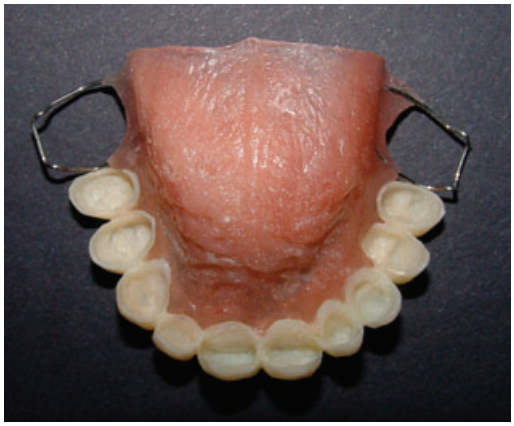

Figure 4 Intaglio surface of maxillary interim RPD.

Figure 5 Polished surface of mandibular interim RPD.

Figure 6 Post-treatment view of teeth in maximum intercuspation.

Figure 7 Post-treatment view of smile.

occlusal vertical dimension (OVD). The waxing was completed in the anterior open area of occlusion, as sufficient room existed to develop ideal anatomical tooth shapes (Fig 3). In this case the molars were left uncovered, and the canine relationship was very steep. Therefore, a canine protected occlusal scheme was developed. But the posterior disclusion decreased as much as possible in lateral disclusions. Then, wax patterns were processed with heat-polymerized acrylic resin (Shade A1, Duralay, Reliance Dental Mfg Co, Worth, IL). The restorations were polished with pumice (Steribim pumice, Metrodent Ltd., Paddock, UK), and finished with a rag wheel (Calico mop, Stoddard Manufacturing Co Ltd., Letchworth, UK).

Transitional acrylic crown restorations were inserted and adjusted intraorally for optimal margins, contours, esthetics, and occlusion. Phonetics and smile line were evaluated in this step. After an intraoral evaluation by the clinician and the patient, a new maxillomandibular relationship record was made again with vinylpolysiloxane (BISCO, Bielefelder Dentalsilicone GmbH & Co, KG, Postfach, Germany) in the maximum intercuspal position, which coincided with centric relation. Then, restorations were returned to the mouth, and the complete arch pick-up impressions were made with vinylpolysiloxane (Elite H-D, Zhermack). Restorations were left in the impressions, and new casts were fabricated. The casts were mounted in an articulator (Whip Mix Series 3000, Elite Dental Services, Inc., Orlando, FL) again.

The casts were then painted with a separating liquid (Vertex Divosep, Vertex Dental BV, Zeist, The Netherlands), then autopolymerizing repair resin (Tokuso Rebase Normal Set, Tokuyama Corp, Tokyo, Japan) was sprinkled on their lingual and palatal sides. The lingual/palatal flanges of the RPD were developed in this manner (Figs 4 and 5). A labial flange was omitted, because lip support was adequate and the presence of a flange could have an adverse effect on the patient's appearance. For the retention of the RPD, two wrought wire clasps (Remanium Spring hard 0.8-mm wire, Dentaurum, Ispringen, Germany) were incorporated in the maxillary RPD. Deep distolingual undercuts in the mandible provided adequate retention of the RPD.

During the next visit, the polished RPD was inserted, and the final evaluation and adjustment of the phonetics, esthetics, and occlusion were carried out (Figs 6 and 7). After postoperative instructions on how to properly insert the prostheses, the patient was provided with instructions on adequate oral hygiene and caries and erosion prevention. These included the application of a sodium fluoride-neutral mineral (PreviDent 5000 Plus, Colgate Oral Pharmaceuticals, Canton, MA) in the intaglio of the RPD every night and dietary counseling.

The patient was also instructed to remove the RPD at night. After three postinsertion visits, which included minor adjustments, the patient was placed on a 6-month recall.

At recall appointments, the patient is checked for soft tissue irritation, calculus, caries, and decalcification. Her prosthesis is checked for proper occlusion, retention, and stability. Additionally, we have examined the prosthesis, looking for the presence of cracks, discoloration, and calculus. If needed, the prosthesis is cleaned ultrasonically. At each recall appointment the importance of maintaining proper oral hygiene is reiterated.

Tissue irritation was noted in early recalls, but has not continued. Calculus has been noted in more recent recalls. This necessitated further motivation for maintaining proper oral hygiene, something also stressed with the patient's mother.

This patient is planned to wear the prosthesis for 4 years. At the end of that time, after consultation with a surgeon, a new treatment plan will be selected for her.

Discussion

There are a number of alternatives for the treatment of teeth affected by AI. Treatment planning in such cases depends on various factors: the age and socioeconomic status of the patient, the type and severity of the disorder, and the intraoral situation at the time treatment is planned.[4] Patients and dentists should discuss the advantages and disadvantages of treatment options, deciding the best treatment plan. The restorative dentist must clearly understand the esthetic expectations of a patient, and the patient must understand the inherent limitations of any type of restorative therapy.

For AI, possible treatment ranges from fixed to removable prostheses, and surgical and orthodontic treatments are suitable for correction of an open bite problem; however, all are permanent and irreversible approaches and are suitable only for adult patients. In this case, definitive treatment had to be delayed until the adolescent growth spurt. With a severe long face problem, surgery in the middle to late teen years (after adolescent growth spurt) is quite feasible.[14] This patient had not experienced menses, and ongoing growth in sagittal and vertical planes was expected. Therefore, a noninvasive and reversible method without removing tooth structure was mandatory. The overlay RPD secured these factors, and the esthetic result was enhanced by the fabrication of the customized acrylic teeth.

As this approach requires no tooth structural removal, it could be a transitional treatment plan. This prosthesis is also applicable in any case that requires an overlay RPD with adequate lip support. In such cases, the RPD could reinforced with metal substructures. This prosthesis could be used during the maturation period and changed as needed.

Summary

This clinical report described a noninvasive and reversible approach with the use of a transitional overlay RPD for correction of AI and severe open bite. Careful consideration of patient expectations and requests along with detailed hygiene instructions were critical for a successful outcome and patient satisfaction. This transitional prosthesis can be used as a temporary measure until the patient has fully matured.

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