

ORAL REHABILITATION OF A CASE OF AMELOGENESIS IMPERFECTA

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ABSTRACT

Amelogenesis imperfecta has been described as a group of hereditary enamel defects not associated with systemic diseases. Restoration of these defects is important not only because of aesthetic and functional concern, but also because there may be a positive psychological impact for the patient. Among various treatments described for rehabilitation of Amelogenesis imperfecta, this case report described the rehabilitation of patient with Amelogenesis imperfecta utilizing twin stage procedure with aim of improving patient's function, appearance, restoring the proper contacts and simplifying the prosthetic clinical and lab work procedures. Twin stage procedure is based on the fact that described to prevent horizontal forces acting during various mandibular excursion in full mouth rehabilitation case, to control horizontal forces concept of disocclusion was given which in turn depends upon the condylar path, incisal path, cusp angle. Among them cusp angle role is more supported whereas condylar path and incisal path role is considered unreliable.

KEY WORDS: Full mouth rehabilitation, Amelogenesis imperfecta, Occlusion, Twin stage procedure.

INTRODUCTION

Controlling of horizontal forces on teeth during various mandibular excursions in full mouth rehabilitation case are difficult to achieve and challenging for restorative dentist for many years. To prevent these horizontal forces the concept of disocclusion was introduced into dentistry. Disocclusion is defined as separation of opposing teeth during eccentric movements of the mandible [Gpt-7, 1999]. To achieve uniform disocclusion pantograph and fully adjustable articulator are developed, but these are based on belief that the condylar paths unchangeable in a living body but the anterior guidance could be changed freely by the dentist.

Influences on the amount of disocclusion:

There are three factors that determine disocclusion

- 1. Condylar path
- 2. Incisal path
- 3. Cusp angle

Concept of twin stage procedure: Earlier condylar path has been regarded as the main determinant for occlusion in prosthetic treatment. It measured and used as a clinical reference to restore occlusion. Since the condylar path has been shown to have deviation within the individual and its influence on

disocclusion is minimal [Hobo and Takayama].^{1,2} Because of above factors condylar guidance is no longer consider as immutable and individual and can't be considered as reference for occlusion. The deviation of the incisal path in each individual is less than that of the condylar path. The incisal path influences disocclusion at the second molar twice as much as that of the condylar path during protrusive movements, three times on the nonworking side and four times on the working sides during lateral movements. However the incidence of malocclusion and distributes widely in nature; the incisal guidance would not be a reliable guidance for occlusion. This infers that the cusp angle, which has not studied previously, should be considered as a new reference for occlusion. Embryologically, the cusp angle is an independent factor from both condylar and incisal paths. To obtain a good occlusion in a restorative dentistry, the critical factor may require reproducing a standard value for the cusp angle.

Standard value for cusp angle:The cusp angle was considered to be the most reliable reference for occlusion. However it is the common finding that as age advances the teeth loses its original occlusal morphology by caries, abrasion and restorative works.



Fig.1.Pretreatment Intraoral photograph.



Fig.2. Wax Set-up.



Fig.3. Biomechanical preparation of Maxillary arch



Fig.4. Biomechanical preparation of Mandibular arch



Fig.5.Full Mouth Temporization



Fig.6. Recording centric relation

Accordingly as such the existence cusp angle of the patient who visits the dental office cannot be taken as reference for occlusion. Since there are minimal variations in cusp morphology of permanent teeth immediately after eruption so if this value of cusp angle at the time of eruption known, and subsequently constructing the occlusion according to this reference is ideal for patient. The author³ however found no available data on cusp angle. To establish a new reference for occlusion, it is necessary to define a standard value for the cusp angle. To obtain it, the measured amount of disocclusion was found as the only reliable relevant data available. The amount of disocclusion is the superior-inferior distance between the maxillary and mandibular opposing cusps in the eccentric position, forming a geometric triangle between a disocclusion, cusp path and cusp angle. The cusp path can be determined from the measured values of the condylar path and incisal path based on the mathematical model of mandibular movement. When the cusp path is obtained in this manner, the value of the cusp angle is estimate using the trigonometry.

The basic concept involved in the new procedure requires a methodical approach. The cast with movable anterior segment is fabricated. First, reproduce the occlusal morphology of the posterior teeth without the anterior segment and produce the cusp angle coincidence with standard values of effective cusp angle [condition 1]. Secondly, reproduce anterior morphology with the anterior segment and provide anterior guidance which produce a standard amount of disocclusion [condition 2]. The application of the two conditions described to fabricate the cusp angle and anterior guidance are innovative clinical procedure. This is named as the "Twin stage procedure"².

Articulator adjustment values for reproduction of standard cusp angle: The standard value of sagittal protrusive effective cusp angle is 25 degrees. The combination of sagittal inclinations of the condylar path and anterior guide tables of an articulator are limitless. However, the simplest is combination is to adjust each to 25 degrees and wax the occlusal morphology to produce the balanced articulation. A cusp of 25 degrees will be formed.

Adjustment values for generating disocclusion: After waxing the cusps to the standard angle value

[25 degree], the anterior guidance should be established to reproduce the standard amount of disocclusion, for example, 1mm during protrusive movement. There are again an infinite number of possible combinations of adjustment values for condylar path and anterior guide table of an articulator.^{4,5} However, the computed results showed a standard amount of disocclusion was generated by fabricating anterior guidance using a combination of 40 degrees for condylar path and 45 degrees for the anterior guide table.

Fabrication of cusp angle

1. Adjust the articulator according to the condition 1.
2. Remove the maxillary or mandibular anterior segment of cast.
3. Wax the occlusal morphology of posterior teeth.

Fabrication of anterior teeth

1. Adjust the articulator according to condition 2.
2. Reassemble the anterior segment of the cast.
3. Wax the palatal contour of the maxillary anterior teeth

Contraindications:

1. Abnormal curve of spee
2. Abnormal curve of Wilson
3. Abnormally rotated tooth
4. Abnormally inclined tooth

Case Report

A 20-year-old male patient reported to the Department of prosthodontics, dissatisfied with the appearance of his teeth. He commented that he felt his existing teeth are unattractive and poses difficulty in chewing. These problems just couldn't let him open in front of people. He wanted to be out of his ugly appearance.

Initial evaluations of patient encompass a detailed social, dental and medical history. Past dental history revealed the involvement of deciduous teeth. The patient had a non-contributory medical history. Clinical examination of the patient revealed hypocalcified enamel, marginal gingivitis, improper intercuspation and lack of proximal contact because of tooth surfaces loss (**Fig.1**)

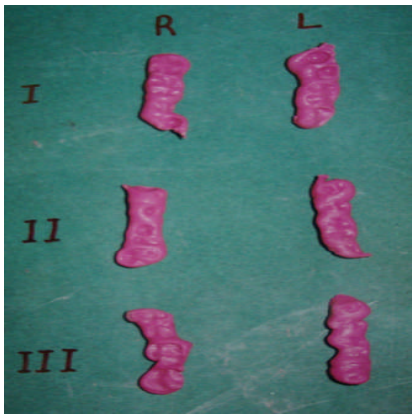


Fig.7. Polyvinylsiloxane records on left and right side



Fig.8. Full mouth- Metal Try-in



Fig.9.posttreatment -intraoral photograph

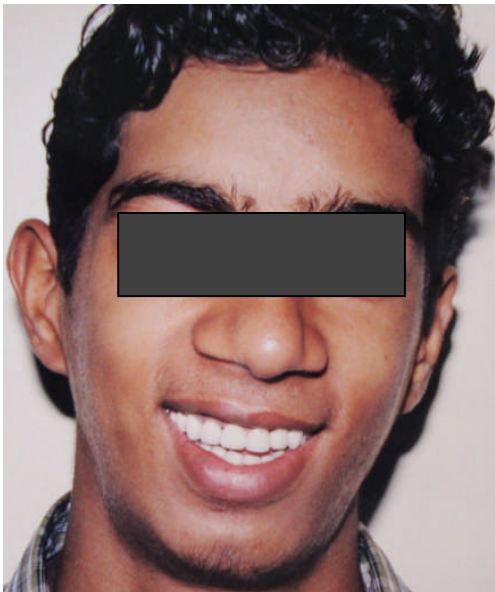


Fig.10.Posttreatment-extraoral frontal photograph

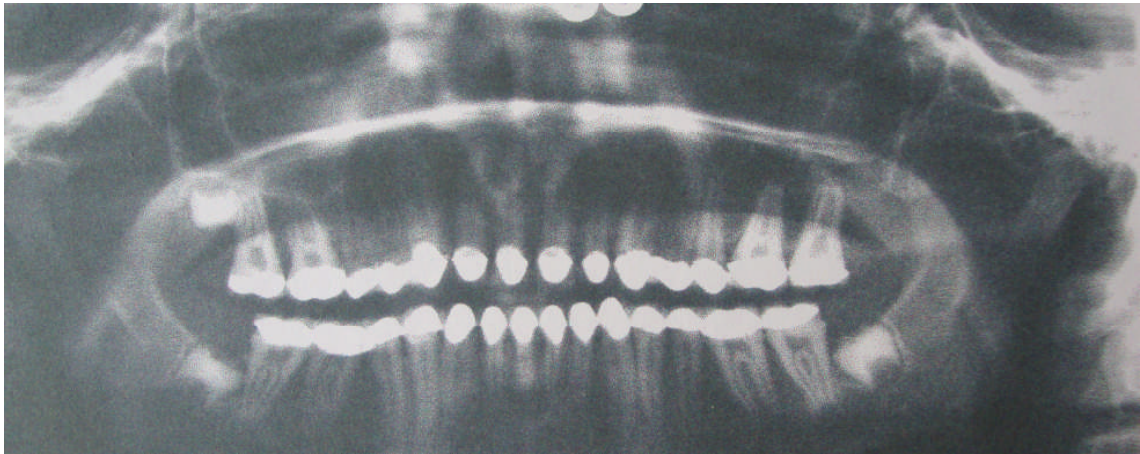


Fig.11. Post treatment OPG

Table.1. Articulator setting values for condition 1 and condition 2

Condition	Condylar path		Anterior guide table	
	Sagittal condylar path inclination	Bennett angle	Sagittal inclination	Lateral wing angle
1. without anterior teeth	25	15	25	10
2 .with anterior teeth	40	15	45	20

Initial diagnostic evaluation consisted of a series of digital images with diagnostic casts. Diagnostic cast made with irreversible hydrocolloid and poured using type 3 dental stone and mounted on semi adjustable articulator [whip mix] using face bow transfer and diagnostic wax up done in accordance with condition 1 and 2 (Fig.2)(Table-1).

When informed consent was obtained from the patient, treatment was initiated. Biomechanical preparation of maxillary and mandibular teeth was done to receive metal ceramic crowns(Fig.3 and Fig.4). Both arches polyvinyl siloxane impressions made to create cast and full mouth temporization was given (Fig.5). Centric relation was recorded with anterior jig using silicone bite registration paste, but before that posterior temporaries were removed [three polyvinyl siloxane centric relation records was taken (Fig.6 and Fig. 7). Face bow recording was done to mount the maxillary cast on a semi adjustable articulator. Cut was made distal to the canine on the cast so that maxillary anterior segment of the cast was easily removed [to achieve this two die pins were placed inside the anterior segment of cast. Working split cast with proper placement of die spacer and ditching also made. Full mouth metal coping try in (Fig. 8) and followed by bisque bake metal ceramic try in and face bow recording done at the bisque bake stage, centric relation record made using silicone bite registration paste .

Remounting procedure: Pick up impression of maxillary and mandibular arches were made using putty wash polyvinyl siloxane impression material. Later, all bisque baked crowns position were checked in pick up impressions and dowels pins were placed to retain the crown in the plaster model and remount cast were made [the metal ceramic

crowns were imbedded in the plaster model and mounted on a semi adjustable articulator using face bow transfer, mandibular cast mounted according to centric relation records.

Articulating paper was made to check the occlusal interferences and adjustment were done using round stone. In the laboratory bisque baked ceramic metal crowns retrieved from the remount cast and it glazed. Final glazed metal ceramic crown were cemented with resin luting cement. The outcome of treatment in terms of function and aesthetics satisfied the expectation of patient and dentist (Fig.9, Fig.10, Fig.11).

Discussion

There are alternative restorative procedures for amelogenesis imperfecta.⁶⁻¹² Each method has limitation and it should be critically reviewed prior to deciding a treatment plan. The treatment for patients with amelogenesis imperfecta is related to many factors including the age of patients, the socio-economic status, the type and severity of the disorder, its intra oral manifestation and aesthetic and functional demands. Treatment plan should have common goal – functional, aesthetic and longevity of restoration, yet the approaches being slightly different. Restoring full mouth with Twin stage procedure has its own advantage as the basic concept involved in the new procedure reproduce the occlusal morphology of the posterior teeth without the anterior segment and produce the cusp angle coincidence with standard values of effective cusp angle. Secondly, reproduce anterior morphology with the anterior segment and provide anterior guidance which produces a standard amount of disocclusion. The anterior guidance and the patient's condylar inclination might or might not

be in harmony. The amount of disocclusion changes (increase or decreases) in patient's mouth, as this technique followed a fixed value of 40° of condylar inclination. So the amount of disocclusion varies from the predetermined value.

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