

MULTI DISCIPLINARY REHABILITATION OF A PATIENT WITH ALTERED PASSIVE ERUPTION AND HYPODONTIA-- CASE REPORT

\* Ravi Kiran .V

\*Associate Professor, Department of Prosthodontics, Gannavaram, Andhra Pradesh, India

ABSTRACT

Patients who clinically display excessive gingival and short teeth require a thorough diagnosis and treatment plan to provide a predictable aesthetic outcome. This article illustrates multi-disciplinary approach in the treatment of a patient with altered passive eruption.

KEYWORDS: Altered passive eruption, Biologic width

INTRODUCTION

Frequently ‘short teeth’ are a common “chief complaint.” expressed by the patients dissatisfied with the appearance of their smile since the teeth are visually disproportionate in size. The clinical condition can be termed ‘short tooth syndrome.’ The etiology associated with each specific condition must be identified separately. Since the treatment planning, management is different for each condition. An excessive amount of gingiva can result in a ‘gummy smile’ appearance with the teeth having a proportion close to unity (width to length ratio 100 percent). Surgical periodontal treatment, specifically esthetic crown lengthening, becomes imperative in these situations in order to restore the ‘aesthetic framework’ i.e, tooth proportion and the golden proportion. Tooth eruption involves a complex series of events and has not yet been fully elucidated. Active Eruption occurs as the tooth elongates through amelogenesis, dentinogenesis, cementogenesis.osteoclastic activity removes bone in a genetically predetermined path allowing the tooth to enter the oral cavity. Passive eruption is a process by which epithelial attachment of the gingival tissue retracts from the enamel portion of the crown onto the root into adult position just apical to the CEJ. These two processes appear to be controlled by different groups of regulatory genes. Alterations in either of these processes can result in ‘short tooth syndrome’.

This case report depicts multidisciplinary approach in the treatment of patient with altered passive eruption and hypodontia.

Case report

A 21-year-old female patient presented for treatment of excessive gingival display in the anterior region and requested a restorative option that would provide improved aesthetics (Fig.1 and Fig.2). Initial clinical examination revealed a wide band of attached gingiva with associated passive eruption. Periodontal probing indicated that the depth of the sulcus on the facial of the maxillary and mandbular teeth was coronal to the cementoenamel junction (CEJ), supporting the presence of passive eruption. Next, the cervical area of each of the teeth to be treated was altered using acrylic diagnostic splint to simulate the proposed cosmetic change(Fig.3). The patient was informed that the suggested correction of the excessive gingival display would meet her aesthetic concerns.

Classification of Altered Eruption<sup>1</sup> (active and passive)

Type IA	<ul style="list-style-type: none"><li>• Osseous crest apical to the CEJ (passive)</li><li>• Adequate amount of attached gingiva</li><li>• Gingival margin incisal to the CEJ</li></ul>
Type IB	<ul style="list-style-type: none"><li>• Osseous crest at the CEJ (active)</li><li>• Adequate amount of attached gingiva</li><li>• Gingival margin incisal to the CEJ</li></ul>
Type IIA	<ul style="list-style-type: none"><li>• Osseous crest apical to the CEJ (passive)</li><li>• Inadequate amount of Keratinized tissue</li><li>• Gingival margin incisal to the CEJ</li></ul>
Type IIB	<ul style="list-style-type: none"><li>• Osseous crest apical to the CEJ (active)</li><li>• Inadequate amount of Keratinized tissue</li><li>• Gingival margin incisal to the CEJ</li></ul>

Table. I CLASSIFICATION OF CROWN LENGTHENING PROCEDURES

Classification	Characteristics	Advantages	Disadvantages
TYPE 1	gingival excision does not violate biologic width	Temporization may be done immediately	
TYPE 2	Gingival excision violates biologic width	Allows staging of gingivectomy and Osseous contouring	requires Osseous contouring
TYPE 3	Gingival excision violates biologic width	Allows staging of gingivectomy and Osseous contouring	requires Osseous contouring
TYPE 4	Gingival excision violates biologic width	Temporization may be done at the second Stage gingivectomy	requires Osseous contouring

The classic research by Gargiulo et al<sup>2</sup> in 1961 defined the “dento-gingival junction” as 3 distinct components: gingival sulcus, junctional epithelium, and connective tissue attachment. The dentogingival junction was later redescribed as the “biologic width” by Cohen as the sum of junctional epithelium and connective tissue attachment. This biologic width is on average 2.04 mm, whereas the mean sulcular depth was 0.69 mm.

#### Surgical Procedures

A line was drawn on the maxillary master model indicating the intended position of the gingival margin based on width-to-length criteria. A sheet of 0.30-inch vacuform material was thermoformed over the cast using a pressure former. Following cooling, the thermoformed material was trimmed, scalloping the facial margin to follow the line that had been placed on the master model. The edge was then colored with a red permanent marker to increase intraoral visibility during surgery.

Following administration of a local anesthetic periodontal probe was used to feel the CEJ at the mesial, distal, and midfacial aspect of each of the anterior teeth and the premolars. The vacuform surgical template was inserted, and the edge of the tray on the facial was visualized in relation to the mucogingival line. (Fig.4)

#### Bone Sounding:

The level of the alveolar crest must be determined prior to any considerations<sup>8-12</sup> regarding aesthetic crown lengthening. The degree of clinical crown elongation vis-à-vis the position of the alveolar

bone will determine the feasibility, surgical aspects, and treatment sequence( Table-I)<sup>13</sup>.

The surgical template was removed and the outline of the proposed gingival margin was evaluated. The gingivectomy was used to complete the contouring gingival cut, creating a semilunar shape and sparing the papilla. To avoid a resultant “black triangle,” the papilla was not included in the gingivoplasty cut. A periodontal scaler was used to detach the gingival tissue from the tooth surface and remove any tissue tags remaining on each site (Fig.5 and Fig.6). The patient was dismissed and instructed to avoid spicy foods and to use warm salt water rinses three to four times daily until she presented for the follow-up appointment two weeks later. At the follow-up appointment, the patient indicated that she was satisfied with the improved smile. Clinical examination noted a lack of gingival inflammation.

Clinical observation indicates that impingement of the biologic width will result in attempts by the gingival tissue to reestablish its original dimension through bone resorption or, in the presence of a thick alveolar crest, chronic gingival inflammation.

Deas<sup>14</sup> concluded that there was a significant tissue rebound after crown lengthening procedures position became stable at 3 months, and remained subsequently unchanged through the remainder of the 6- month duration of their study. Stable gingival margins should allow definitive tooth preparation and impression making to take place 3 months after that had not fully stabilized at 6 months. Their findings demonstrated that the gingival margin surgery, even in the esthetic zone.



Fig 1. preoperative-extraoral view



Fig 2. preoperative-Intraoral view



Fig 3. Smile analysis with surgical template



Fig 4. surgical template



Fig 5. Crown length after gingivectomy



Fig 6. Extra oral view after gingivectomy



Fig 7. Provisional restoration



Fig 8. Provisional restoration

Specifically applied to esthetic crown lengthening, key diagnostic factors were assessed using the following sequence:

1. Identify the desired incisal edge position.
2. Determine an adequate clinical crown length.
3. Design the post surgical gingival margin outline.

What is commonly referred to as gummy smile is actually excessive gingival display caused by a variety of factors. Excessive gingival display may be the result of a skeletal deformity such as vertical maxillary excess. This excessive display may also be due to short upper lip or hyperactive orbicularis oris.

#### **Incisal attrition with compensatory eruption**

Tooth surface loss is physiologic and occurs as a natural consequence of aging and wear. However several factors including attrition, abrasion, erosion may render tooth surface loss Pathologic. In physiological tooth structure loss, vertical dimension is maintained by alveolar bone remodeling; i.e; compensatory tooth eruption resulting in an elongation of the dento-alveolar process. Despite generalized tooth surface loss, the freeway space and the resting facial height appear to remain constant due to dento alveolar compensation. If restoration of worn teeth is being planned then the extent of dentoalveolar compensation would appear to determine the treatment strategy thereby defining the need to carry out measures such as crown lengthening to restore the esthetic clinical crown dimensions. Alternatively, restoration of a patient's dentition may be provided at an increased VDO if excessive attrition with loss of VDO is identified by an increase in phonetic FWS.

#### **Clinically Relevant Aesthetic Blueprints:**

This process is often initiated with development of a diagnostic waxup. The diagnostic waxup must be developed to reflect any contributory adjunctive procedures that may be contemplated as part of the multidisciplinary treatment plan. .

#### **Provisional Restorations:**

The completed laboratory waxup reflecting planned adjunctive procedures, is utilized as a basis for the fabrication of a provisional prosthesis.<sup>15-25</sup> Following intraoral placement, the provisional prosthesis is gradually modified until all the have objectives been

achieved. (Fig. 7 and Fig. 8) Once this is accomplished, the functional and aesthetic outcome has been defined, from which the design of the definitive restoration will be generated.

#### **Restorative Considerations:**

Measures must be taken to ensure that the definitive restoration replicated the anatomic details developed in the finalized provisional restoration. To this effect, silicone indices of the provisional prosthesis are utilized as preparation guides to verify adequate tooth reduction that provides sufficient space to accommodate the prescribed restorative materials<sup>26,27</sup>.

#### **Gingival retraction and final impressions**

Gingival retraction with retraction cord 2-0 size(ultradent) was done and final impressions were made with putty, lightbody (ivoclar vivadent)double impression technique<sup>28</sup>. (Fig. 9)

#### **Interocclusal registrations and transfer**

After the orientation relations were transferred with the ear piece face bow (hanau ) the models were articulated using cross mounting technique (Fig.10) onto the hanau H2 semi adjustable articulator. Metal-ceramic restorations were fabricated on the individual dies (Fig. 11) following the guidelines established by the cross mounting procedure(Fig.12)

#### **Occlusal concept**

Mutually protected occlusion<sup>29</sup> where posterior teeth get discluded in the anterior mandibular movements was established along with the group function occlusion in the lateral movements. Customized anterior guidance table fabricated during the provisional stage dictated the palatal, incisal contours of the definitive restorations.

After the occlusal contacts were refined in the patient's mouth , they were glazed and luted into position using resin modified glass ionomer cement(GC FUJI CEM).

#### **patient recall and follow-up.**

Patient reported no discomfort and was satisfied with the post treatment result (Fig.13 and Fig.14) and improved chewing efficiency. Patient was given instructions regarding the oral hygiene and importance of 6 monthly visit.





Fig.9. Putty light body impression



Fig.10. Bite registration



Fig.11. Mounting, Die preparation

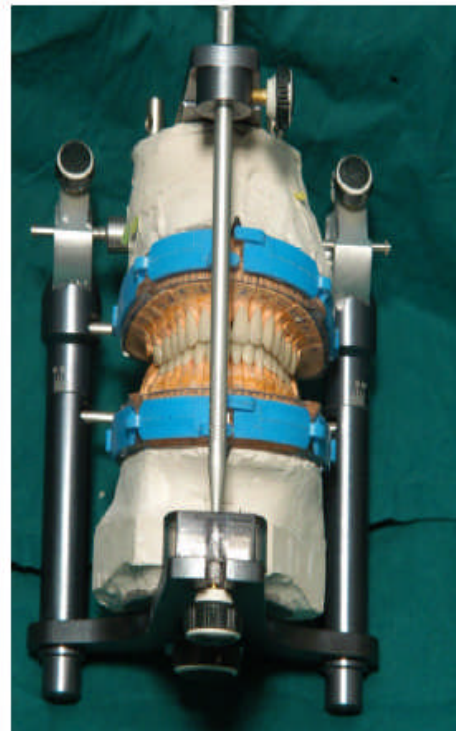


Fig.12. metal ceramic restorations



Fig.13. Pre treatment view



Fig.13. Post treatment view

**DISCUSSION AND CONCLUSION**

The preservation of aesthetic objectives in the treatment of functionally compromised dentitions that require multidisciplinary therapy represents a considerable clinical challenge. Generally accepted treatment planning concepts organize the sequence of therapy into phase I, aimed at initially addressing existing and active disease processes, followed by phase II, which includes corrective and restorative procedures. This traditional compartmentalization of treatment and thought process is not conducive to the achievement of aesthetic outcomes in multidisciplinary scenarios. Instead, the introduction of the aesthetic blueprint and its development during the diagnostic phase, as well as strict adherence to an aesthetically Oriented outcome based methodology, will result in enhanced integration of the specialities.

**References**

1. Stephen J. Chu, Susan Karabin, Saiesha Mistry .Short Tooth Syndrome: Diagnosis and Treatment Management. *cda journal*, 2004; 32(2); 143-152.
2. Garguilo, Orban B. Dimensions and relations of the dentogingival junction in humans. *j periodontal* 32, 1961; 261-7.
3. Coslet JG, Vanarsdall R, Weisgold A. Diagnosis and Classification of Delayed Passive Eruption of the Dentogingival Junction in the Adult. *Alpha Omegan* 1977; 70: 24-8.
4. Gargiulo AW, Wentz FM, Orban B. Dimension and relations of the dentogingival junction in humans. *J Periodontol* 1961; 32: 261-7.
5. Ingber JS, Rose LF, Coslet JG. The "biologic width"—a concept in periodontics and restorative dentistry. *Alpha Omegan* 1977; 10: 62-5.
6. Kois JC. Altering gingival levels: the restorative connection. I. Biologic variables. *J Esthet Dent* 1994; 6: 3-9.
7. Smukler H, Chaibi M. Periodontal and dental considerations in clinical crown extension: a rational basis for treatment. *Int J Periodontics Restorative Dent* 1997; 17: 464-77.
8. Becker W, Ochsenbein C, Tibbetts L, Becker BE. Alveolar bone anatomic profiles as measured from dry skulls. Clinical ramifications. *J Clin Periodontol* 1997; 24: 727-31.
9. Bragger U, Lauchenauer D, Lang NP. Surgical lengthening of the clinical crown. *J Clin Periodontol* 1992; 19: 58-63.
10. Herrero F, Scott JB, Maropis PS, Yukna RA. Clinical comparison of desired versus actual amount of surgical crown lengthening. *J Periodontol*
11. Rufenacht C. *Fundamentals of Esthetics*. Carol Stream, IL: Quintessence Publishing, 1990.
12. Chiche G, Pinault A. *Esthetics of Anterior Fixed Prosthodontics*. Quintessence Publishing Co Inc., U.S. (April 1994)
13. Long J, Cole J, Staffanou R. Shade selection and Aesthetic design preservation in multidisciplinary therapy; philosophy and execution; practical procedure. *aesthet dent* 2002; 14(7): 561-579.
14. Aesthetic crown lengthening classification, treatment planning considerations. 2004; 16(10): 769-779
15. Miller A. Laboratory communication. *Quint Int* 1993; 24(5): 305-309.
16. Muia P J. *Esthetic Restorations: Improved Dentist-Laboratory Communication*. Carol Stream, IL: Quintessence Publishing, 1993.
17. Garber DA, Belser UC. Restoration-driven implant placement with restoration-generated site development. *Compend Contin Educ Dent* 1995; 16(8): 796-804.
18. Daftary F, Bahat O. Prosthetically formulated natural esthetics in implant prostheses. *Pract Periodont Aesthet Dent* 1994; 6(9): 5-83.
19. Levin EI. Dental esthetics and the golden proportion. *J Prosthet Dent* 1978; 40(3): 244-252.
20. Lombardi RE. The principles of visual perception and their clinical application to denture esthetics. *J Prosthet Dent* 1973; 29(4): 358-382.
21. Kois JC, Phillips KM. Occlusal vertical dimension: Alteration concerns. *Compend Cont Educ Dent* 1997; 18(12): 1169-1174.
22. Studer S, Zellweger U, Schärer P. The aesthetic guidelines of the mucogingival complex for fixed prosthodontics. *Pract Periodont Aesthet Dent* 1996; 8(4): 333-341.
23. Kois JC. The restorative-periodontal interface: Biological parameters. *Periodontol* 2000 1996; 11: 29-38.
24. Allen EP. Use of mucogingival surgical procedures to enhance aesthetics. *Dent Clin North Am* 1988; 32(2): 307-330.
25. Lie T. Periodontal surgery for the maxillary anterior area. *Int J Periodont Rest Dent* 1992; 12(1): 73-81.
26. Yuodelis RA, Faucher R. Provisional restorations: An integrated approach to periodontics and restorative dentistry. *Dent Clin North Am* 1980; 24(2): 285-302.
27. Chiche G. Improving marginal adaptation of provisional restorations. *Quint Int* 1990; 21(4): 325-329.
28. Lee EA. Predictable elastomeric impressions in advanced fixed prosthodontics: A comprehensive review. *Pract Periodont Aesthet Dent* 1999; 11(4): 497-504.
29. Winter RR. Achieving aesthetic ceramic restorations. *J Calif Dent Assoc* 1990; 18(9): 21-24.

**Corresponding Author****Dr. Ravi Kiran**

Department of Prosthodontics,  
Siddhartha Institute of Dental Sciences,  
Chinnoutapalli, Gannavaram,  
Andhra Pradesh, India. E-mail:  
karies2010@gmail.com