

Smile Design: From Ape To Human

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Abstracts: Background & Objective: The domain of periodontics has changed from being strictly a health service to one, where smile enhancement has been brought to the forefront of treatment planning. In the composition of a beautiful smile, the form, balance, symmetry and relationship of the elements make it attractive or unattractive. Altered passive eruption is one of the conditions where a large portion of the anatomic crown remains covered by the gingiva which compromises dentofacial aesthetics. Periodontal plastic procedures, such as the basic gingivectomy, osseous correction or the apically positioned flap, may be used to change the silhouette form of teeth and their relative proportion. Here is a case of a 22-year-old healthy male with altered passive eruption (type 1A) with treatment that resulted in a revised silhouette form for the tooth which is more elliptical and attractive so as to resolve the unwarranted excessive display of gingiva apparent during smiling. [Barot V NJIRM 2015; 6(4):121-124]

Key Words: Altered passive eruption (APE), aesthetic crown lengthening, gingivectomy, gummy smile, tooth eruption.

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Introduction: The relationship between perioral and intraoral is fundamental to dental aesthetics. The smile triad- the lips, gingiva and teeth must have a harmonious relationship for an aesthetic appearance. During a full smile, the lips determine the amount of both the gingiva and clinical crown that is revealed, and it is the gingiva along with the incisal edge position, that influences the amount of clinical crown visible.¹ All of the tissues follow the contour of the cemento-enamel junction (CEJ) of the tooth resulting in a normal parabolic form. Altered passive eruption (APE) of teeth is a condition which may create aesthetic concerns due to the excessive gingival display (gummy smile) of upper anterior teeth while smiling.

Case report: A 22-year-old healthy male reported with the complaint of excessive display of gums and short teeth in the upper front region of jaw [Figure 1]. His medical history was non-significant and had no adverse habits.

Figure 1: "Gummy smile" in upper front region of the jaw.



Intra-oral examination revealed clinical crown of maxillary central incisors 6 mm long with no incisal wear [Figure 2].

Figure 2: Clinical crown of maxillary central incisors 6 mm in length with no incisal wear.



The periodontal examination using UNC-15 periodontal probe showed 4 mm of gingival sulcus [Figure 3] and vertical bone sounding measurement (under local anaesthesia) of 7 mm from gingival margin crest to the alveolar crest [Figure 4]. Mucogingival junction was apical to the alveolar crest [Figure 5]. Radiographically, intra-oral periapical radiographs (IOPA) showed alveolar crest 2 mm below the CEJ [Figure 6.a, 6.b and 6.c].

Figure 3: Maxillary central incisors having 4 mm of sulcus depth.



Figure 4: Bone sounding measurement, 7 mm from gingival crest to the alveolar crest.



Figure 5: Mucogingival junction (MGJ) was apical to the alveolar crest showing adequate width of attached gingiva.



Figure 6.a: IOPA i.r.t 11,12,13 showing alveolar crest 2 mm below the CEJ.



Figure 6.b: IOPA i.r.t 11,21 showing alveolar crest 2 mm below the CEJ.



Figure 6.c: IOPA i.r.t 21,22,23 showing alveolar crest 2 mm below the CEJ.



Based on clinical and radiographic examination, a diagnosis of altered passive eruption (type 1A) was given. The periodontal treatment was planned

consisting of phase I therapy followed by gingivectomy. A vacuform surgical stent was fabricated to be used as a surgical guide and as a reference for final finishing and to anticipate post-operative results [Figure 7.a and 7.b].

Figure 7 : A vacuform surgical stent fabricated to be used as a surgical guide



Under local anaesthesia (2% lignocaine HCl with adrenaline 1:80,000), bleeding points were marked [Figure 8], using B.P. blade no. 15 internal bevel incision was placed 4 mm from margin following scalloping from maxillary right canine to left canine region [Figure 9].

Figure 8: After marking the bleeding points just before gingivectomy



Figure 9: Immediately after gingivectomy from maxillary right canine to left canine region



After tissue excision periodontal dressing was placed. Post-operative instructions were given and analgesics (Tab. Ibuprofen 400mg TDS for 3 days) and antimicrobial rinse (0.2% chlorhexidine gluconate twice-a-day for 2 week) were prescribed. Follow up after 1 week showed uneventful healing. Post-operative follow up after 1 month showed more functional and aesthetic smile [Figure 10.a and 10.b]. Post treatment patient's satisfaction regarding smile was evaluated based on a

questionnaire which showed increased in subjective esthetics and improved self-confidence [Figure 11].

Figure 10.a: Post-operative 1 month follow-up showing uneventful healing



Figure 10.b: Post-operative 1 month follow-up showing "aesthetic smile"



Figure 11: Questionnaire on patient's satisfaction regarding smile and treatment

Question and response options	Time point	
	Pre-treatment	Post-treatment
How satisfied are you with your smile?		
Not at all satisfied		
Somewhat satisfied	+	
Very satisfied		+
Extremely satisfied		
How satisfied are you with the amount of gum showing when you smile?		
Not at all satisfied	+	
Somewhat satisfied		
Very satisfied		+
Extremely satisfied		
How would you rate the experience of surgical procedure?		
Poor		
Adequate		
Good		
Very good		+
Excellent		
How would you rate your confidence level when you smile?		
Not at all confident		
Somewhat confident	+	
Very confident		+
Extremely confident		

Discussion: Considering the aesthetic emphasis in dentistry today, it is important to strive for optimal gingival health and aesthetics. Some characteristics of an esthetic smile include: 1) dental midline is straight; 2) smile line follows the convexity of the lower lip; 3) central incisors are symmetric; 4)

gingival margins of the central incisors are symmetric; 5) incisal embrasures gradually deepen from central incisors to canines; 6) teeth are straight or mesially inclined; and 7) width-to-length ratio of the central incisors is 75% to 80%.²

Tooth eruption is divided into two phases: active and passive eruption. Active eruption ceases when the teeth come into contact with the opposing dentition. The additional step involved in the normal eruption pattern of teeth involves passive eruption, which is the migration of the epithelial attachment apically to expose the anatomic crown of the tooth. A delay or failure of this to occur can result in the appearance of short clinical crowns and excessive gingival display.³

Its prevalence is reported to be approximately 12% considering more than 1,000 adult patients with mean age of 24 years.⁴ It was first described by Orban and Kohler (1924).⁵

Gargiulo et al⁶ (1961) classified and divided passive eruption into four stages:

- Stage I: The sulcus and junctional epithelium (JE) are on the enamel.
- Stage II: The sulcus is on the enamel The JE is part on the enamel and part on the cementum.
- Stage III: The sulcus is at the cemento-enamel junction (CEJ) and the JE is completely on the cementum.
- Stage IV: The sulcus and the JE are apical to the CEJ.

Coslet et al⁷ (1977) classified altered passive eruption into two main types according to the relationship of the gingiva to the anatomic crown and then subdivided those classes according to the position of the osseous crest:

- Type 1: gingival margin incisal or occlusal to the CEJ, wider band of attached gingiva, mucogingival junction is apical to the alveolar crest.
- Type 2: band of attached gingiva normal, mucogingival junction is located at the level of the CEJ.
- subgroup A: alveolar crest- CEJ relationship corresponds to the 1.50- to 2.0-mm distance accepted as normal, allows for normal insertion of the gingival fiber apparatus into the cementum.

- iv. subgroup B: alveolar crest is at CEJ, observed during the transitional dentition that is undergoing active eruption.

Treatment according to the condition:

- Type 1A: gingivectomy
- Type 1B: gingivectomy + osseous resection
- Type 2A: apically repositioned flap
- Type 2B: apically repositioned flap + osseous resection

The height of contour of the gingival margin on the centrals (zenith)⁸ should also be considered. The gingival zenith is kept slightly distal to the middle of the long axis for the central incisors, cuspids and bicuspid. And for lateral incisors it is at the midline of the long axis of the tooth & 1 mm shorter than the gingival margins of the adjacent teeth (centrals and cuspids). This gives the centrals, cuspids and bicuspid the subtle distal root inclination, which is paramount for the scaffold of a beautiful smile. Moreover, excessive gingival display negatively affects a person's perceptions of attractiveness, friendliness, trustworthiness, intelligence, and self-confidence.⁹

Conclusion: APE is a genuine risk to periodontal health, making oral hygiene maintenance difficult along with unattractive smile. Hence a perfect amalgamation of form, balance and harmony of the elements of hard and soft tissues creates a healthy beautiful smile. And gummy smile can have an adverse effect on the perception of a person's attractiveness and self-confidence level too.

Thus, success of the case can be attributed to good case selection, meticulous treatment plan and patient's compliance.

References:

1. Ahmad I. Geometric considerations in anterior dental aesthetics: restorative principles. *Pract Periodontics Aesthet Dent* 1998;10:813-22
2. Chiche GJ, Pinault A. *Esthetics of Anterior Fixed Restorations*. Chicago: Quintessence Publishing; 1994:61-62.
3. Garber DA, Salama MA. The aesthetic smile: diagnosis and treatment. *Periodontol* 2000 1996;11:8-28.

4. Volchansky A, Cleaton-Jones PE. Delayed passive eruption. A predisposing factor to Vincent's infection? *J Dent Asso S Africa* 1974;29:291-94.
5. Orban B, Kohler J. The physiologic gingival sulcus. *Z Stomatol* 1924;22:353.
6. Gargiulo AW, Wentz FM, Orban B. Dimensions and Relations of the Dentogingival Junction in Humans. *J Periodontol* 1961;32:261-67.
7. Coslet GJ, Vanarsdall R, Weisgold A. Diagnosis and classification of delayed passive eruption of the dentogingival junction in the adult. *Alpha Omega* 1977;10:24-8.
8. Kokich VG, Kokich VO: Interrelationship of Orthodontics with Periodontics and restorative dentistry. In: Nanda R, ed. *Biomechanics and Esthetic Strategies in Clinical Orthodontics*, St Louis: Elsevier: 348-73, 2005.
9. Malkinson S, Waldrop TC, Gunsolley JC, Lanning SK, Sabatini R. The effect of esthetic crown lengthening on perceptions of a patient's attractiveness, friendliness, trustworthiness, intelligence, and self-confidence. *J Periodontol* 2013;84:1126-33.

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