

“ESTHETIC SMILE” A CONCERN DUE TO ALTERED PASSIVE ERUPTION - CASE REPORTS

Savitha A.N¹* Sahar Razack² Rosh R.M³

1. Professor, Department of Periodontics, The Oxford Dental College, 10th Milestone, Bommanahalli, Hosur Road, Bangalore, Karnataka 560068.
2. Post Graduate Student, Department of Periodontics, The Oxford Dental College, 10th Milestone, Bommanahalli, Hosur Road, Bangalore, Karnataka 560068.
3. Senior Lecturer, Department of Periodontics, The Oxford Dental College, 10th Milestone, Bommanahalli, Hosur Road, Bangalore, Karnataka 560068.

* sunilc_06@hotmail.com

Abstract

A gummy smile is an esthetic alteration that is of concern in today's era of perfection and beauty. The gingival complex plays a vital role in the overall beauty of an individual's smile.

Altered passive eruption is a clinical situation that occurs due to excessive gum overlapping the enamel, thus contributing to a gummy smile. Altered passive eruption may easily be corrected provided the biologic determinants are taken into consideration to achieve a favourable esthetic outcome.

Keywords: Altered passive eruption, gummy smile, crown lengthening, gingivectomy, biologic width.

1. Introduction 1

An esthetic smile is an important aspect of a person's beauty. With the growing demand for aesthetics, the problem of excessive gingival display has garnered much importance in the field of dentistry. There has also been a steady rise in importance of the potential of plastic periodontal surgical procedures to enhance the smile line.

A smile may be considered as pleasant when the upper teeth are completely exposed, and approximately 1mm of buccal gingival tissue is visible. However, a gum exposure not exceeding 2-3mm is also considered pleasant, whereas an excessive exposure (> 3 mm) is generally considered not attractive by many patients (Allen, 1988).¹ Excessive gingival display is a condition characterized by excessive exposure of the maxillary gingiva during smiling, commonly called a “gummy smile”.^{2,12,15} Gummy smile or short tooth syndrome is a condition caused primarily by a skeletal deformity in which there is vertical excess of the maxillary tissue, a soft-tissue deformity in which there is a short upper lip or a combination of the two.⁹ Another cause of excessive gingival display is insufficient clinical crown length.^{1,9} Evaluation of clinical crown length is important because it may be the principal cause of excessive gingival display.

Common causes of short clinical crowns include coronal destruction resulting from traumatic injury, caries or incisal attrition, as well as coronally situated gingival complex resulting from tissue hypertrophy or a phenomenon known as altered passive eruption.

Short Tooth Syndrome (STS)

The following clinical scenarios may be associated with STS:⁶

Altered Eruption- that may be active or passive, excessive incisal attrition causing compensatory eruption of teeth, delayed eruption of maxillary incisors- that may cause excessive eruption of mandibular incisors.

In an individual with a healthy dentition, each tooth and its alveolus actively emerge from its crypt. The teeth continue to erupt through the gingiva until they make occlusal contact with the teeth in the opposing arch. This stage is followed by passive eruption, that is the apical migration of the dentogingival unit adjacent to the cemento-enamel junction (CEJ).

Passive eruption can be divided into 4 stages according to the relationship between the epithelial attachment and the CEJ.

In stage 1, the epithelial attachment —the junctional epithelium — rests on the enamel surface.

In stage 2, the epithelial attachment rests on the enamel surface and the cemental surface apical to the CEJ.

In stage 3, the epithelial attachment rests on the cemental surface, and

In stage 4, inflammation causes the epithelial attachment to migrate apically.

When passive eruption does not progress past stage 1 or stage 2, it is referred to as altered passive eruption. In this situation, the gingival margin does not migrate to its final position on the cemental surface. Instead, it remains positioned on or near the enamel surface. Goldman and Cohen defined altered passive eruption (APE) as the situation in which "the gingival margin in the adult is located incisal to the cervical convexity of the crown and removed from the cemento-enamel junction of the tooth".^{10,11}

APE may be classified into two types-⁷

APE TYPE 1- This type would be determined by exclusive failure of passive eruption, giving rise to excessive gingival overlap on the anatomical crown of the tooth, while in contrast the distance from the bone crest to the cemento-enamel junction would be normal.

APE TYPE 2- This type would be determined by the primary failure of the active eruption phase, as a result of which the tooth would not emerge sufficiently from the alveolar bone, thereby leaving the cemento-enamel junction very close to the bone crest. This situation would in turn prevent apical migration of the gums during the passive eruption phase.

The occurrence of altered passive eruption is unpredictable, but the frequency in the general population is about 12%.¹⁰ The gingiva of any patient with altered passive eruption is usually healthy in the absence of plaque.

Diagnosing a case as altered passive eruption involves evaluating the age of a patient, the sulcus depth of the tooth or teeth and the clinical crown lengths. The age of the patient is significant as the anterior teeth undergo passive eruption in the early teen years, whereas the posterior teeth may not reach this point until the patient is in their 20s. In normally erupted teeth, the CEJ lies just apical to the gingival margin of the anatomic crown and the sulcus depth measures 1-3mm. In cases of altered passive eruption, the CEJ may be as much as 5mm apical to the gingival margin resulting in a short- looking tooth.³

The management of altered passive eruption may include periodontal surgery, crown lengthening, and in selected cases, forced eruption. When periodontal surgical procedures are indicated, the objective is to apically position the soft tissue to the appropriate esthetic height while producing sufficient sound tooth structure so as to establish biologic width on the root.⁸

Before surgical therapy is performed to correct altered passive eruption, the patient must undergo initial scaling and root planing. This reduces the gingival inflammation if any, and allows for an accurate assessment of the amount of reduction of gingiva and bone needed.

2. Case description

2.1 Patient A

A female patient aged 18, presented with a chief complaint of excessive gum exposure and short looking teeth. There was no contributing medical or family history. On smiling the patient presented a 3-4mm of gingival display. Clinical examination revealed a wide band of attached gingiva in the maxillary anterior region associated with an isolated pseudo pocket with respect to 21.

As there was presence of gingivitis due to plaque accumulation, the patient underwent scaling and root planing, to reduce the gingival inflammation. The sulcus depth was detected and combined with bone sounding to determine the type of altered passive eruption and the case was diagnosed as type 1A of altered passive eruption.

2.1.1 Esthetic Periodontal Surgery

Since the crestal bone to gingival margin distance was observed to be greater than 3mm, a gingivectomy procedure was indicated.

Following administration of a local anesthetic, a pocket marker was used to mark the outline of the tissue that needed to be excised. A full-thickness external bevel incision was placed to recreate the normal festooned pattern of gingiva, accompanied by removal of tissue from the facial surface, to complete the gingivectomy procedure. As the patients pre operative bone levels were acceptable, bone alteration was not necessary.

At the follow up appointment the patient indicated that post operative sensitivity or pain were not experienced, and she was satisfied with the improved smile.

Pictures

Case I- GINGIVECTOMY PROCEDURE



PRE OPERATIVE VIEW (figure 1)



INCISIONS GIVEN (figure 2)



TISSUE EXCISED (figure 3)



SUTURES PLACED (figure 4)



COMPARISON BETWEEN PRE OPERATIVE VIEW and ONE WEEK POST OPERATIVE PICTURE (figure 5,6)

2.1.1.1 Patient B

A female patient aged 27, presented with a chief complaint of short looking teeth. There was no contributing medical or family history. On smiling the patient presented a 4mm of gingival display especially with respect to the lateral incisors and a flat gingival architecture. Initial clinical examination revealed a wide and thick band of attached gingiva in the maxillary and mandibular anterior region with associated altered passive eruption. Clinical analysis by periodontal probing highlighted a shorter length of the crowns of the incisors. The patient also exhibited crowding of the maxillary central incisors and the mandibular anteriors. The patient presented with a potentially competent lip seal.

Endoral examination did not reveal any bone defects. The patient underwent scaling and root planing. The sulcus depth was detected and combined with bone sounding to determine the type of altered passive eruption. The case was diagnosed as type 1B of altered passive eruption.

2.1.1.2 Esthetic Periodontal Surgery

Since the bone sounding revealed less than 2mm distance between the crestal bone and CEJ, a gingival flap with osseous surgery was indicated.

As the gingival thickness was more external bevel incisions were given to obtain a uniform thickness of the flap and allow for contouring of the gingival margins. This was followed by placement of crevicular incisions, and the flap was reflected. The position of the CEJs was verified. Ostectomy was performed to create an approximate 2-2.5mm distance between crestal bone and CEJ to establish a new biologic width. The bone was recontoured to reflect the soft tissue architecture. The gingiva was then apically repositioned to the level of the CEJ and sutured.

The procedure was repeated for the mandibular arch in the same manner.

At the follow up appointment the patient reported to be extremely satisfied with the procedure and improvement in her smile. The patient was then directed to the orthodontic department to further enhance the esthetic effects.

Case II- APICALLY DISPLACED FLAP



PRE OPERATIVE PICTURE (figure 7)



INCISIONS PLACED (figure 8)



TISSUE EXCISED (figure 9)



FULL THICKNESS FLAP REFLECTED

DEBRIDEMENT DONE (figure 10)



OSTECTOMY BEING CARRIED OUT (figure 11)



OSTECTOMY DONE



SUTURES PLACED (figure 12)



COMPARISON BETWEEN PRE OPERATIVE VIEW AND ONE WEEK POST OPERATIVE VIEW (figure 13,14)



PRE OPERATIVE VIEW OF MANDIBULAR ANTERIOR TEETH (figure 15)

INCISIONS PLACED (figure 16)



TISSUE EXCISED (figure 17)

FLAP REFLECTED DEBRIDEMENT DONE (figure 18)



OSTECTOMY DONE (figure 19)

SUTURES PLACED (figure 20)



COMPARISON BETWEEN PRE OPERATIVE AND POST OPERATIVE VIEW ONE WEEK AFTER SUTURE REMOVAL (figure 21, 22)

3. DISCUSSION

The requirements of patients requesting an aesthetic treatment is undoubtedly a challenging goal, mainly because they often take famous people as a reference. Aesthetic principles do not follow only dental parameters, but also gingival ones and, in particular, the integration of these with the individual's smile, face and body.¹³ The evaluation of the patients' expectations and their understanding of the possible therapeutic solutions are the starting point for a treatment plan. The analysis of the features, and of the degree of dynamicity of the lips in relation to the teeth is carried out by evaluating facial, dental, labial and phonetic parameters (Belser, 1982; Chicche and Pinault, 1994).^{4,5} The general aesthetic principles applying to hard and soft tissues (Belser, 1982; Rufenacht, 1990)¹⁴, allow – if respected – to obtain a balanced and harmonious smile.

This article reports cases in which the patients' altered passive eruption modifies the perception of their smile and the aesthetic effect. After a careful clinical and radiographic examination, patients underwent a periodontal surgical treatment first. It should be kept in mind that a crucial determinant of the position of the gingival tissue is the underlying bone.

Re-creating an adequate biologic width is necessary to maintain gingival health and to allow sufficient space between the crown margin and the alveolar crest to prevent an inflammatory lesion from developing with possible attachment loss (Newcomb, 1974; Dello Russo, 1984). Most authors agree that a minimum distance of 3mm is required from the osseous crest to the final margin following a crown lengthening procedure. The 3mm allows for 1mm of supra crestal connective tissue attachment, 1mm of junctional epithelium and 1mm of sulcus depth (Bragger et al 1992).

4. CONCLUSION

Aesthetics is an important part of dentistry today. Enhancing one's appearance has become an integral part of life in today's population. A gummy smile due to the altered passive eruption phenomenon poses as a challenge to the dentist, but with correct diagnosis and appropriate therapy for excessive gingival display, dental esthetics can be improved.

So far there has been little investigation as to the prevalence of various types of altered passive eruption, and little is known about the specific developmental causes of this phenomenon.

This paper provides clinical and biologic presentations on the treatment of altered passive eruption, using periodontal plastic procedures. Clinical and radiographic examinations dictate the necessary removal of soft and hard tissues to achieve the desired result. The reestablishment of a correct biologic width leads to excellent clinical, biologic, and aesthetic outcomes.

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