

# Altered Passive Eruption: Periodontal Surgical Management of Two Cases

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## ABSTRACT

**Introduction :** Altered passive eruption is a condition in prominence rather than at the cemento-enamel junction. It's a developmental anomaly clinically associated with a gingival smile with short, square teeth. Difficult to detect, most of these cases are often overlooked or misdiagnosed

**Case report:** This work highlights the clinical presentation of altered passive eruption of two cases along with sequential approach for management of each condition. The follow-up was 12 months.

**Conclusion:** Altered passive eruption presents a great challenge for the practitioner with regards to both diagnosis and therapeutic management. The practitioner must make the right diagnosis, establish an appropriate treatment plan, and discuss the various therapeutic possibilities with the patient in order to satisfy their esthetic request.

**Keywords:** Altered Passive Eruption, Esthetic, Gingival, Periodontal Surgery

## INTRODUCTION

Esthetic requests have become an increasingly common reason for consultation at the dentist. A smile must have a certain number of parameters to be considered esthetic. Altering one of these parameters can be a source of disharmony, making the smile unsightly; such is the case in certain situations with the gingival smile. A smile is considered gingival if a wide gum line (> 3 mm) is exposed during a restrained smile.<sup>1</sup> Gingival smile has many etiologies, including short lip, significant vertical maxillary growth, and/or significant gingival growth.<sup>1</sup> One cause that is often overlooked is incomplete or altered passive eruption. Altered passive eruption (APE) is attributable to a developmental anomaly during the passive phase of eruption and alters several smile parameters, making the smile unsightly.<sup>2,3</sup> Goldman and Cohen (1968) defined altered passive eruption as a 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" instead of being located 1 or 2 mm from the cemento-enamel junction, as it would be normally. The result is a short clinical crown with a square appearance.<sup>2,3</sup>

In 1977, Coslet et al. classified APE into two types based on the location of the mucogingival line with respect to the crestal bone in other words, related to the height of the keratinized tissue.<sup>2,4</sup>

**Type 1:** High height of keratinized tissue; in this case, the mucogingival line is positioned very apically with respect to the crestal bone.

**Type 2:** Normal height of keratinized tissue, but all the gum is on the dental crown and the mucogingival line is on the same level as the cemento-enamel junction.

In 1996, Garber and Salama<sup>2,5</sup> established a nuance in this classification, based on the distance between the top of the crestal bone and the cemento-enamel junction, by subdividing it into two types:

**Subcategory A:** Distance between crestal bone and cemento-enamel junction is greater than 1 mm.

**Subcategory B:** Distance between crestal bone and cemento-enamel junction is less than 1 mm.

This classification is essential when selecting a therapeutic procedure (Table 1). The practitioner must make the right diagnosis, establish an appropriate treatment plan, and discuss the various therapeutic possibilities with the patient in order to satisfy their esthetic request. Periodontic plastic procedures offers the best solution by eliminating the excess of gingiva and enhancing the gingival esthetics.<sup>6</sup> The aim of this article is to expose, through two clinical cases, the periodontal management of altered passive eruption using two different techniques.

## CASES REPORT

### Case 1:

A 28-year-old patient in good general health was attended the Department of Periodontology complaining of an unsightly smile. Examination of the smile revealed a high smile line (Fig. 1). Intraoral physical examination showed the presence of a high height of keratinized tissue (> 3 mm) as well as short, square teeth (Fig. 2). Radiographic examination showed a normal distance between the cemento-enamel junction and the top of the crestal bone (Fig. 3). A type 1A altered passive

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eruption was diagnosed. Treatment involved an internal bevel gingivectomy to remove the surplus keratinized tissue. After local anesthesia, an internal bevel incision was made following the line of gingival festoons, and intrasulcular and horizontal incisions were made to detach the coronary gingival band and increase coronal height. At one week after the procedure, the patient had a harmonious and esthetic smile (Fig. 4 and 5). The patient is seen regularly for control sessions.

#### Case 2:

A 24-year-old patient in good general health was referred by the Department of Dentofacial Orthopedics for a gummy smile (Fig. 6). Clinical examination showed the presence of increased gingival height, short and square teeth (Fig. 7).

Diagnosis	Treatment
Altered Passive Eruption 1A	Gingivectomy
Altered Passive Eruption 1B	Gingivectomy + Bone Resection
Altered Passive Eruption 2A	apically displaced flap
Altered Passive Eruption 2B	apically displaced flap + Bone Resection

**Table-1:** The Treatment of APE according to its classification

Radiographic examination showed a proximity between the top of the crestal bone and the cemento-enamel junction (Fig. 8). Clinical and radiological signs confirmed the etiology of APE type 1B. Treatment first involved removing excess keratinized tissue by external bevel gingivectomy (Fig. 9). After healing and removal of the multi-bracket appliance, an apically displaced flap procedure was performed, followed by a bone resection, due to the persistent short and square appearance of the teeth in addition to a slight gingival smile (Fig. 10, Fig. 11, Fig. 12). The patient was satisfied with the end result. Periodontal maintenance sessions were set up with the patient (Fig. 13).

#### DISCUSSION

Passive eruption is a normal phase of dental eruption in which the gingival margin migrates apically to its normal position; otherwise, the tooth remains partially covered by the gum. It is in this scenario that we speak of APE, but from what age can we start talking about it? Morrow et al. (2000) conducted a study on 1,018 individuals aged 11-12 years at baseline, who were monitored up until 18-19 years of age. They noted that the height of the clinical crown continued to



**Figure-1:** Initial smile of the patient; **Figure-2:** Preoperative view; **Figure-3:** Retro-alveolar X-ray showing a normal distance between the cemento-enamel junction and the vertex of the bony; **Figure-4:** Gingivectomy and repositioning of the flap; **Figure-5:** Final result (1 year)



**Figure-6:** Initial smile of the patient: sourire gingival; **Figure-7:** Preoperative view; **Figure-8:** Preoperative retro-alveolar X-ray; **Figure-9:** External bevel gingivectomy; **Figure-10:** Persistence of the short and square appearance of the teeth after; **Figure-11:** Flap elevation and bone resection; **Figure-12:** Repositioning of the flap and sutures; **Figure-13:** Final result (1 year)

increase until patients reached 18-19 years of age, at which time it stabilized.<sup>7</sup> Therefore, it is only from 18-19 years of age that an APE diagnosis can be made. Before this age, the passive phase of the dental eruption is considered not yet complete and the gingival margin situation is not stable.

In order to diagnose an APE, we start with an extra-oral examination, which includes an assessment of the symmetry and height of the face, smile line, and lip height and mobility. The average height of the maxillary lip at rest is 20 to 22 mm in women and 22 to 24 mm in men.<sup>2</sup> The shorter the upper lip, the more the maxillary teeth will be exposed when

smiling.

The next step is to measure the clinical crowns in order to assess their dimensions while looking for short and square teeth. Several articles have studied the dimensions of clinical crowns in permanent dentition.<sup>8,9</sup> In their studies of facial esthetics, Ward concluded that the width-to-length ratio is the most reliable measure for indicating the ideal size of a clinical crown. The ideal length-to-width ratio is 0.75 to 0.8.<sup>8,9</sup>

Subsequently, a more in-depth examination of the periodontium is performed (height of the keratinized gingiva, probing depth, irregular gingival festoons, etc.).<sup>15</sup>

The cemento-enamel junction (CEJ) is normally apical to the gingival margin of the crown. Sulcus depth is usually 2 to 3mm. If this junction is located in a normal position in the gingival sulcus, the patient does not have an APE. If the CEJ is not detectable in the sulcus, an APE diagnosis can be made and the top of the crestal bone is then identified.<sup>2,10</sup> The top of the crestal bone is identified by a probe through the attachment system once the site is anesthetized, or by performing a retro-alveolar X-ray using the parallel planes technique.<sup>2,10</sup> A height of 2 mm must be found between the top of the crestal bone and the CEJ junction; this is the case in subcategory A. When the summit of the crestal bone is at the same level as the cemento-enamel junction, this is subcategory B.

In the case 1, patient showed APE type 1 because she had an increase in gingiva when free gingiva from mucogingival junction was measured. The subcategory was A because the presence of a normal distance between the CEJ and the top of the crestal bone. In the clinical case 2, patient showed APE classified as type I, because she had an increase of gingival height, short and square teeth. Her condition was subclassified as subgroup B because a proximity between the top of the crestal bone and the cemento-enamel junction was shown.

The fact that there are many clinically similar etiologies of the gingival smile can lead to confusion for practitioners. Hence, the advantage of knowing all the etiologies of the gingival smile, their clinical manifestations, and the elements that allow us to differentiate them from one another.<sup>2,11</sup>

Treatment options for APEs depending upon the diagnosis can be selected.<sup>2,11</sup> Periodontal treatment of an APE is surgical, and relies on a crown lengthening performed via gingivectomy or apically displaced flap procedure (if the initial keratinized gingiva is not enough) to remove excess tissue and reconstruct the anatomical shape of the dental crowns.<sup>2,11,12</sup> When the bone crest is less than 3 mm distant from the CEJ, it is necessary to perform bone resection by osteotomy to recreate a biological space compatible with periodontal health.<sup>11,12</sup> In some cases, treatment of APE involves a prosthesis or an orthodontic forced eruption.<sup>2,11,12</sup> In the first case, the appropriate treatment was crown lengthening with mucoperiosteal flap through internal-beveled, due to the large amount of keratinized gingiva to remove excess keratinized tissue and restore an adequate shape to the gingival margin. In the second case, the gingivectomy was associated with a bone resection by osteotomy to recreate the necessary biological width.

## CONCLUSION

The management of gingival smile related to an APE presents a real challenge for the practitioner which must know the various signs of APE in order to make the correct diagnosis and establish an appropriate treatment plan to meet the esthetic request of the patient.

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