While the need to maintain a dry operative field has traditionally caused complications during various soft tissue surgical procedures, the use of bipolar electrosurgical techniques can eliminate the need to maintain a dry field, thus increasing the clinician's ability to deliver predictable, long-term results. This case presentation describes how to determine the presence of passive eruption, treatment plan its correction, and surgically alter the gingiva to provide a more aesthetic smile.

Learning Objectives:
This article presents a step-by-step guide for smile correction in the presence of passive eruption. Upon reading this article, the reader should:
- Recognize passive eruption.
- Determine proper position of the gingival margin as it relates to the incisal edge.
- Be aware of how to surgically correct using bipolar electrosurgery.

Key Words: dry field, soft tissue, passive eruption, aesthetics

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Patients who clinically display excessive gingiva and short teeth require a thorough diagnosis and treatment plan to provide a predictable aesthetic outcome. If a patient has Altered Passive Eruption (APE) of the maxillary anterior teeth and has completed facial growth, then the practitioner must first correct the gingival levels with either a gingivectomy or aesthetic crown lengthening procedures prior to initiating restorative treatment, thus ensuring that the eventual gingival margins of the maxillary anterior teeth will be at their correct level.

Once the central incisor proportions are achieved, practitioners should focus on the zenith or height of contour of the gingival margin on the centrals. The proper placement of the gingival zenith should be at the peak of the parabolic curvature of the gingival margin, which for the central incisors, canines, and premolars, should specifically be located slightly distal to the middle of the long axis on these teeth. This gives the central incisors, canines, and premolars the subtle distal root inclination, which is paramount for the scaffold of a beautiful smile. The zenith for the lateral incisors is located at the midline of the long axis of the tooth. Furthermore, the height of the gingival crest for the lateral incisors should be 1 mm shorter than the gingival margins of the adjacent teeth. Additionally, the gingival tissues should be manipulated to have a resulting “knife-edge” gingival margin.

Bipolar electrosurgery (eg, Bident Bipolar Surgical Unit, Synergetics, Inc, King of Prussia, PA) allows the clinician to use delicate incisions in a wet field, without the need for lateral heat generation. This technique allows intraoral soft tissue surgery to be performed in a wet field, providing char-free, non-bleeding soft tissue margins. This permits maintenance of the gingival margin and elimination of postoperative shrinkage following healing.

Figure 1. Preoperative appearance upon presentation demonstrates the presence of excessive gingival display with passive eruption, bilateral peg laterals, and hyperplastic tissue.

Figure 2. The preoperative photograph was reviewed, and the proposed gingival margin excisions were marked.

Figure 3. A photo mock-up was made to demonstrate the approximate location of the new gingival margin if a gingivectomy were to be performed.
A 32-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 (Figure 1). Initial clinical examination revealed a wide band of attached gingiva in the maxillary and mandibular anterior with associated passive eruption. Periodontal probing indicated that the depth of the sulcus on the facial of the maxillary anterior teeth was coronal to the cemento-enamel junction (CEJ), supporting the presence of passive eruption. Also noted was the presence of “peg-shaped” laterals bilaterally, which were tipped both mesially and palatally.

A gingivoplasty was also scheduled to move the gingival margin to be equal or apical to the CEJ, and allow restorative correction of the lateral incisors. To aid in the treatment planning, the preoperative smile image was modified using Adobe Photoshop (ie, Adobe, San Jose, CA) to indicate the proposed location of the modified gingival margin (Figure 2). This was performed to determine if sufficient attached gingiva would remain following gingivoplasty.

Next, the cervical area of each of the teeth to be treated in the maxillary anterior was altered on the photograph to simulate the cosmetic change in a photographic mockup (Figure 3). The patient indicated that the suggested correction of the excessive gingival display would meet her aesthetic concerns and that she would consider placement of porcelain veneers on the maxillary lateral incisors in the future. As the mandibular passive eruption of gingiva was not apparent when smiling, the patient declined treatment of that gingival tissue (Figures 4 and 5).

![Figure 4](image4.png)

**Figure 4.** Pretreatment image demonstrates the presence of a wide band of attached gingiva, passive eruption of the anterior teeth, and hyperplastic tissue.

![Figure 5](image5.png)

**Figure 5.** A panoramic radiograph was obtained preoperatively. The patient’s bone levels were at the correct position 1 mm to 2 mm apical to the CEJ, while the gingival margin was at the junction of the apical and middle thirds of the coronal aspect.

Case Presentation

**Treatment Planning**

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![Figure 6](image6.png)

**Figure 6.** A surgical template was placed intraorally to review the location of the proposed gingival margin in relation to the mucogingival junction.
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 (ie, Raintree Essix, Metairie, LA) was thermoformed over the cast using a pressure former (ie, Drufomat, Raintree Essix, Metairie, LA). 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 black permanent marker to increase intraoral visibility during surgery (Figure 6).

Following administration of a local anesthetic (ie, 4% Septocaine with 1:100,000 epinephrine, Septodont, New Castle, DE), a 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. A 3301 gingivectomy pen (ie, Bident, Synergistics USA, King of Prussia, PA) was used with a Bident bipolar surgical unit (ie, Synergistics USA, King of Prussia, PA) to follow the facial edge of the surgical stent from teeth #4(15) through #8(11). While applying the bipolar pen, the assistant sprayed a continuous stream of water over the field, followed by high-volume evacuation to keep the tissue hydrated during the procedure (Figure 7).

The surgical template was removed and the outline of the proposed gingival margin was evaluated. The gingivectomy pen was used to complete the contouring gingival cut, creating a semilunar shape and sparing the papilla (Figure 8). 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.

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Figure 7. A Bipolar pen was used under copious irrigation to follow the outline of the surgical template to position the revised gingival margin.

Figure 8. Initial markings based on the surgical stent made by the surgical unit. Note absence of active bleeding.

Figure 9. The gingivoplasty pen was utilized to plane back the bulky tissue at the papilla and provide a more natural contour.
A 3302 gingivoplasty pen (ie, Bident, Synergistics USA, King of Prussia, PA) was utilized to plane back the thick tissue at the facial aspect of the papilla to achieve normal contours and taper in the tissue (Figure 9). Again, water spray was used to maintain tissue hydration and improve postoperative healing. Finally, a 3102 coagulation ball pen (ie, Bident, Synergistics USA, King of Prussia, PA) was used in the bipolar unit on coagulation mode to seal any bleeding over the gingivoplasty surface (Figure 10). The right quadrant was compared to the left to ensure proper reduction, and the process was repeated on teeth #9(21) through #13(25) (Figures 11 through 13). Because the patient’s preoperative bone levels were acceptable, bone alteration was not necessary.

Postoperative Instructions

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 postoperative sensitivity and gingival irritation were not experienced, and she was satisfied with the improved smile (Figure 14). Clinical examination noted a lack of gingival inflammation, with the exception of a small spot on the papilla between the right lateral incisor and central incisor. All areas except the spot were covered with keratinized gingiva that was less pigmented than what was initially present.

At four weeks post surgery, the patient returned and healing was noted as complete (Figure 15). The patient indicated that she had received comments from friends and family that she appeared to be smiling more. Additionally, she commented that she was no longer self-conscious about her smile and would, when finances allowed, proceed with the recommended veneers on the maxillary lateral incisors.
Conclusion
Patients presenting with excessive display of gingival tissue associated with passive eruption require correction of the soft tissue prior to initiation of restorative procedures for aesthetic smile enhancement. Use of the bipolar surgical unit permits gentle soft tissue correction without the associated postoperative inflammation reported with monopolar surgery. Tissue margins remain in a stable position following surgical correction, and restorative procedures may be initiated immediately without concern for apical migration of the gingival margin in the postoperative period.

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References
1. The margins of the surgical template are intended to:
   a. Provide colorization that will improve visualization of the template's margins intraorally during surgery.
   b. Act as a guide for the new gingival margins position.
   c. Eliminate free-hand placement of the margins.
   d. All of the above.
2. Passive eruption may be recognized by:
   a. Position of the sulcular attachment coronal to the CEJ.
   b. Length of the coronal aspect that is equal to the tooth's width.
   c. Presence of excessive gingival display.
   d. Both a and b are correct.
3. When correcting passive eruption, the papillae:
   a. Should be included in the incision.
   b. Should not be included in the incision.
   c. Should be excised with the flap.
   d. Both a and c are correct.
4. A gingivectomy may be used to correct passive eruption when:
   a. An adequate band of attached gingiva will remain following gingival excision.
   b. Bone does not require removal coronal to the new gingival margin position.
   c. No “black triangles” are present.
   d. All of the above.
5. A surgical template is used to:
   a. Provide a guide as to the position of the new gingival margin.
   b. Provide a guide as to the position of the existing gingival margin.
   c. Provide a guide as to the position of the existing osseous margin.
   d. Provide a guide as to the position of the new osseous margin.
6. The zenith of a maxillary central incisor should be positioned:
   a. At the midline of the tooth.
   b. Distal to the midline of the tooth.
   c. Mesial to the midline of the tooth.
   d. Positioning varies patient to patient.
7. It is generally recommended that elimination of passive eruption be accomplished:
   a. Prior to making final prosthetic impressions.
   b. Prior to the completion of definitive restorative therapy.
   c. Following the completion of restorative rehabilitation.
   d. Both a and b are correct.
8. Why was treatment not performed on the mandibular teeth in the case presented?
   a. Passive eruption was not evident on the mandibular teeth.
   b. The patient declined treatment because the mandible was not visible when she smiled.
   c. The presence of periodontal disease prevented treatment.
   d. All of the above.
9. The height of the gingival crest for the lateral incisors should be:
   a. 1 mm shorter than the gingival margins of the adjacent teeth.
   b. 1 mm longer than the gingival margins of the adjacent teeth.
   c. Identical to the gingival margins of the adjacent teeth.
   d. None of the above.
10. The proper placement of the gingival zenith is:
    a. Distal to the long axis on all teeth.
    b. The midline of the long axis for all teeth.
    c. The peak of the parabolic curvature of the gingival margin.
    d. Along the incline of the parabolic curvature of the gingival margin.