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A COSMETIC TECHNIQUE CALLED LIP REPOSITIONING IN PATIENT OF EXCESSIVE GINGIVAL DISPLAY

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Excessive gingival display can be managed by a variety of treatment modalities, depending on the specific diagnosis. A 29-year old woman was referred to the Unit of Oral Surgery of the University of Chieti-Pescara by her dentist for a consultation regarding a gummy smile. A partial-thickness dissection was made. The epithelium and connective tissue was excised. Tissue tags were removed. The mucosal flap was advanced and sutured at the mucogingival junction using 5-0 polypropylene sutures and 4.0 chromic gut sutures. No periodontal dressing was placed. Postoperative instructions included recommendations for limited facial movements, no brushing around the surgical site for 14 days, and placing ice packs over the upper lip. This treatment modality was effective, producing esthetically acceptable smiles in these patients. This case report demonstrates the successful management of excessive gingival display with a lip-repositioning procedure.

An attractive or pleasing smile involves the harmonious interaction of three primary components: the lip position, teeth, and associated gingival architecture. Lip position in smile defines the type of smile (1), and influences the clinical and technical procedures required for aesthetic results from prosthetic restorations. The display of excessive gingival tissue in the maxilla upon smiling has been called a "gummy smile," a condition some consider esthetically displeasing. Some people with excessive gingival display are self-conscious or embarrassed about it, and some are psychologically affected. Although the incidence of excessive gingival display has not been established, it is fairly common. Etiological factors can be skeletal, gingival, muscular, iatrogenic, or some combination of these. The literature contains many reports that address the skeletal problem of vertical maxillary excess (2) and gingival problems related to delayed passive eruption. In his review of structural esthetic rules, Rufenacht (3) referred to this condition. Robbins (4) reported differential diagnosis and treatment of excessive gingival display. The muscular capacity to raise the upper lip higher than average (hyperfunctional muscle) can cause excessive gingival display (5). Upper lip elevator muscles include the levator labii superioris, levator labii superioris alaeque nasi, levator anguli oris, zygomaticus major, zygomaticus minor, and the depressor septi nasi.

Several surgical procedures have been reported in the literature to correct a gummy smile caused by hyperfunctional upper lip elevator muscles (mostly the levator labii superioris muscles). Rubinstein and Kostianovsky (6) described a procedure whereby an elliptical portion of gingiva and buccal mucosa was excised and the borders sutured together.

The purpose of this study was to describe a procedure whereby an elliptical portion of gingiva and buccal mucosa was excised and the borders approximated and sutured together in patients with hyperfunctional upper lip elevator musculature to correct a gummy smile.

MATERIALS AND METHODS

A 29-year old woman was referred to the Unit of Oral Surgery of the University of Chieti by her dentist for a

Key words: Gummy smile, lip repositioning, gingivectomy, smile, voltaic arc dermoabrasion

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consultation regarding a gummy smile (Fig. 1). His medical history was noncontributory, and he denied a history of smoking or alcohol consumption. Extraoral examination revealed no significant findings. His smile line was extended to the first molar, and smiling displayed approximately 7 mm of mucosa. Dental examination revealed that the crown of tooth 22, which had been treated endodontically was anaesthetic. Periodontal examination revealed good oral hygiene with minimal plaque and calculus deposits. The gingiva was pink and firm, and the papillae were intact. The anterior teeth were heavily restored (Fig. 1). Clinic al examination revealed shallow probing depths, no mobility and adequate amounts of keratinized attached gingiva. Occlusal analysis revealed, among other findings, an Angle's class I relationship, with 70% overbite and 2 mm of overjet. No signs of fremitus were observed. The patient had adequate anterior guidance upon protrusion and adequate group function upon lateral excursions. A thorough extraoral and intraoral examination was performed. During the patient interview, it was noted that her posed smile did not display as much gingival as her dynamic smile (Fig. 1), which was noticeably wider. During a full smile, the average upper lip mobility ranges from 7 to 8 mm, 22 whereas 11 mm of mobility was measured in our patient.

Profound anesthesia was achieved with Articaine® (Ubistesin 4% - Espe Dental AG Seefeld, Germany) associated with epinephrine 1:100.000. Another treatment is Gingivectomy. Gingivectomies are performed when the amount of gum reduction necessary is minimal such as in mild gummy smiles. During a gingivectomy, a minimal amount of gum tissue is removed with voltaic arc dermoabrasion (EL-Abras, Biomedica Service srl, Roma, Italy). A marking pencil was used to outline the apical, coronal, and lateral boundaries of the elliptical incision (Fig.2). The coronal and apical incisions were parallel to each other and the apical incision gradually angled downward to meet the coronal incision. A partial-thickness dissection was made. The epithelium and connective tissue was excised (Fig.3). Tissue tags were removed. The mucosal flap was advanced and sutured at the mucogingival junction using 5-0 polypropylene sutures and 4.0 chromic gut sutures. No periodontal dressing was placed. Postoperative instructions included recommendations for limited facial movements, no brushing around the surgical site for 14 days, and placing ice packs over the upper lip. Chlorhexidine rinse 0.12% bid was prescribed for 2 weeks, and the patient was given appropriate postoperative instructions. Postoperative pain was managed with 600 mg ibuprofen as needed for pain and antibiotic amoxicillin 500 mg TDS for five days.

RESULTS

The original treatment objectives were achieved because of excellent patient cooperation. Facial harmony was good, and the gummy smile and deep overbite had disappeared (Fig.3-4). The patient complained of mild pain and tension on the upper lip after a week. It was seen later that the suture area healed in the form of a scar, which was not apparent when the patient smiled because it was concealed in the upper lip. The patient reported noticing a difference in the amount of gingival exposure when she talked and laughed. At the 2-week postoperative visit, no bruising or extraoral swelling were seen and the patient reported no discomfort.

DISCUSSION

Gummy smiles can be divided into several categories according to etiologic factors (7). Dentoalveolar gummy smile occurs because of overeruption of the maxillary incisors relative to the upper lip. The dentogingival type, related to abnormal dental eruption, gingival hyperplasia, or lack of gingival recession is evidenced by short crown height (8). A gummy smile of skeletal origin occurs because of excessive vertical height of the maxilla; this requires orthognathic surgery (9). A short upper lip is also a frequent cause of a gummy smile. The muscular type is caused by hyperactivity of the elevator muscles of the upper lip (10). Finally, a gummy smile might be caused by several of these factors.

An excessive display of gingival tissue on smiling, usually referred to as a ''gummy smile,'' is often esthetically displeasing. Several etiologic factors have been proposed in the literature; these include skeletal, unigingival, and muscular factors that may occur alone or in combination (11). Although vertical maxillary dental and/or skeletal excess or gingival problems from delayed passive eruption (12) have been treated in the orthodontic field, hyperactive lip elevator muscles have not been managed as often, possibly because hard tissue has been the main target for most orthodontists.

Garber and Salama (13) have suggested that the relationships between the three primary components the teeth, the lip framework, and the gingival scaffold determine the esthetic appearance of a smile. The appearance of this lip framework is caused by the activity of various facial muscles, such as the levator labii superioris (LLS), the levator labii superioris alaeque nasi (LLSAN), and the zygomaticus minor (ZMi)/major muscles (ZMj). Among these, the LLS, the LLSAN, and the ZMi determine the amount of lip elevation that occurs during smiling. The LLS originates from the orbital rim of the maxilla and inserts into the upper lip; the LLSAN originates from the frontal process of the maxilla and inserts into the upper lip and the skin tissue of the ala of the nose. The ZMi originates from the zygomatic bone and inserts into the skin tissue of the upper lip (14). Variations in the morphology, distribution, and activity of the facial muscles of expression determine variations in facial expression (15). The literature reports that several surgical procedures have been performed to correct gummy smiles caused by hyperfunctional muscles.

The essentials of a smile involve the relationships between the three primary components: the teeth; lip framework; the gingival scaffold;

Fig.1. *Preoperative view of smile showing short nonproportionate teeth as well as an excessive display of gingiva.*

Fig.2. *Gingivectomylgingivoplasty is performed as part of the two-stage procedure using voltaic arc dermoabrasion to fine-tune the harmony of the free gingival margin, ensuring the presence of interdental papillae and realigning the gingival margin optimally, not with the cementoenamel junction, but with the drape of the upper lip. The incisal edge line follows the form of the lower lip (extended 10-12 mm superiorly in the vestibule). The teeth bilaterally extend to fill the vestibules to the commissures of the lips.*

Although surgical techniques have been reported in the literature, they are not routinely used to treat hyperfunctional upper lip elevator muscles resulting in a short upper lip and a concomitant gummy smile. Most of the surgical correction currently used seem to be LeFort I maxillary osteotomies with impaction for skeletal vertical maxillary excess and gingivectomies for delayed passive dental eruption with excessivegingival display. The current case report indicates that after a 1-year follow-up, the elliptical portion of excised gingiva buccal mucosa and giginvectomy procedure can produce stable results that have been already showed by other authors (16, 17).

This can be considered successful short-term evidence. This procedure can have minor postoperative complications including bruising, discomfort, and swelling of the upper lip.

Proper diagnosis and an appropriate case selection are critical for the success of any surgical procedure.

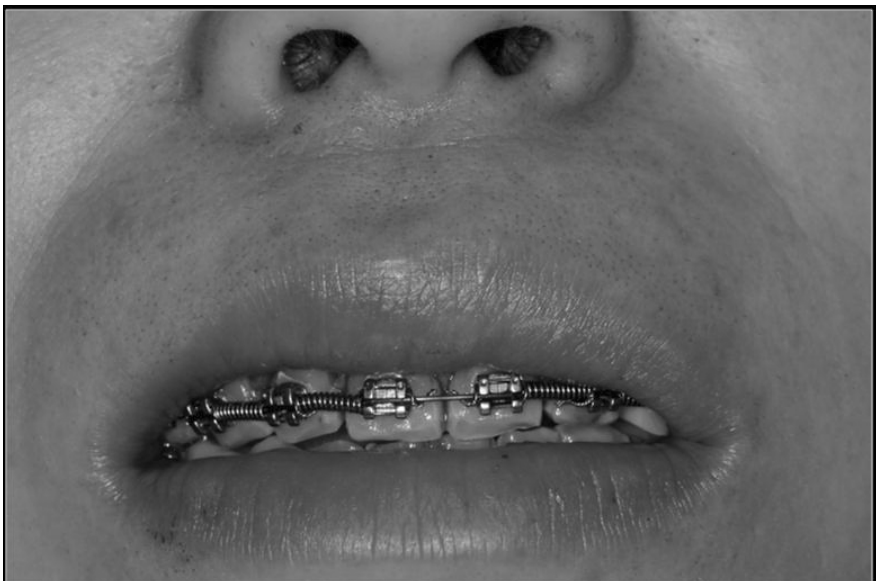

Fig.3. *The mucosa was advanced and sutured to the attached gingiva at the mucogingival junction using multiple interrupted sutures Postoperative visit there was a reduction in the amount of gingival exposure when the patient smiled.*

Fig.4. *At the 10 week postoperative visit there was a reduction in the amount of gingival exposure when the patient smiled.*

Contraindications to excised elliptical portion of gingiva and buccal mucosa include the presence of a minimal zone of attached gingiva, which can create difficulties in flap design, stabilization, and suturing.

In conclusion a gingivectomy with voltaic arc dermoabrasion and elliptical portion of excised gingival, buccal mucosa and the borders approximated and sutured together in patients with hyperfunctional upper lip elevator musculature is a novel, cosmetically effective, minimally invasive alternative for improvement of gummy smiles

caused by hyperfunctional upper lip elevator muscles.

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