

GUMMY SMILE AND ITS MANAGEMENT

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ABSTRACT:

Gummy Smile is a condition in which there is overexposure of the maxillary gingiva during smiling. It can be a source of embarrassment for some patients. It occurs because of various intraoral and extra-oral etiologies. The proper diagnosis and determination of its etiology are essential for the selection of the right treatment modality. This article gives a detailed information about the condition of gummy smile, various etiological factors which are responsible for the condition and the various treatment modalities available such as Gingivectomy, Lip repositioning, Botox etc. which can be used for the effective management and cure of this condition.

Key-words: Gummy smile, vertical maxillary excess, Crown Lengthening, Gingivectomy, Lip Repositioning, Botox



INTRODUCTION

Smile can be described as a status of the orofacial complex where muscles of the facial expression are harmonized. Various muscles such as the frontalis, orbicularis oculi, orbicularis oris, zygomaticus major, risorius, platysma and depressor anguli oris work in harmony to provide various facial expression.^[1]

The components of a smile can be evaluated according to different factors :

- a. Anatomical components.^[2,3]
- b. Smile lip line
- c. Dental smile lines.^[4]
- d. Facial character.^[5,6]

The smile along with speech, visibly displays the results of orthodontic treatment.. The main reason people seek

orthodontic treatment is to improve dental esthetics. The best orthodontically treated subjects may not be satisfied by the treatment, if soft tissue problem is not corrected. Patient desire to look good not only in a static pose but also during dynamic facial expression.

Excessive gingival display is a condition in which there is an overexposure of the maxillary gingiva during smiling.^[7] The gingival smile is also known as —gummy smile, high lip line, short upper lip, and full denture smile. Gummy smile is defined as the exposure of excessive gingival tissue in maxilla. Patients with excessive gingival display experience dissatisfaction with their clinical appearance. It can affect about 10.5% of

the population.^[8] with a female predominance (2:1).^[9] A normal gingival display between the inferior border of the upper lip and the gingival margin of the anterior central incisors during a normal smile is 1-3 mm.^[10] An excessive gingivae-to-lip distance of 4 mm or more is classified as unattractive.^[11]

ETIOLOGY OF GUMMY SMILE

Etiology of gummy smile can be Skeletal, Gingival or Muscular .Various etiologies are :

- 1.Short upper lip which is measured from sub nasal to inferior border of upper lip. The average length of maxillary lip is 20-22 mm in young adult females and 22-24 mm in young adult males ^[11] .
2. Vertical maxillary excess.
- 3.Hypermobile upper lip which lead to exposure of the dentition and undesired gingiva in a smile.
- 4.Compensatory eruption of the maxillary teeth with concomitant coronal migration of the attachment apparatus, which includes the gingival margins.
5. Delayed eruption in which the gingiva fail to complete the apical migration over the maxillary teeth to a position that is 1mm coronal to the cement-enamel junctions.^[12]
6. Other causes include, Plaque-or drug-induced gingival enlargement, short clinical crown length or a combination of multiple causes.

7. Hereditary pattern also play a role in etiology of gummy smile.

8. Uneven balance between facial bones, especially the Maxilla and Mandible.

9. Particular childhood habits like thumb sucking, tongue thrusting, pencil biting can heavily lead to unwanted, uncontrolled growth of the upper jaw along with flaring of the upper front teeth and resultant the fan shaped jaw growth.

Treatment options for correction of gummy smile range from Le fort I osteotomy, crown lengthening, gingivectomy, intrusion, myectomy , muscle resection , Botox injection . The exact cause of gummy smile decides the procedure which will be used to correct it. If the gummy smile is due to small amount of excess gum tissue, a gingivectomy may be a better option. A Botox injection is best for when the upper lip raises to an extreme degree during smile. Botox weakens the response of muscles to nerve signals, so when you smile, your muscle response will be less severe. Botox is indicated when the gummy smile is due to hyper functional upper lip elevator muscles. Muscles responsible for upper lip movement during smile are:^[13]

1. Levatorlabiisuperioris (LLS)
- 2.Levatorlabiisuperiorisalaequenasii (LLSAN)
- 3.Zygomaticus major
4. Zygomaticus minor
5. Depressor septii

MANAGEMENT OF GUMMY SMILE

There are many methods for the treatment of Gummy Smile. For the correct management of gummy smile the etiology of the condition has to be identified correctly. The following treatment methods can be used for the correction of gummy smile :

1. Orthognathic Surgery : In patients which present with excessive gingival display due to anterior dentoalveolar extrusion and vertical maxillary excess, Orthognathic surgery is the treatment of choice. The orthognathic surgical procedure which is performed to treat such a condition is Lefort 1 maxillary osteotomy surgery. In LeFort 1 maxillary osteotomy the maxillary bone is osteotomized in the semi-horizontal plane to disengage it from the cephalic end and the disengaged part can be moved into a more favorable position. The movement can be accomplished in three dimensions as needed. The procedure is mainly directed toward reducing the maxillary excess by moving the maxilla in the superior direction.^[14]

Aadvantages: It improves the shape of the face and smile.

Disadvantages:It requires hospitalization, general anesthesia, requires prolonged recovery time, postoperative complications such as swelling, pain, midface paresthesia, difficulty eating, minor changes in nasal shape, and general discomfort can occur^[15].

2. Gingevectomy : This surgery can be performed in cases of gingival enlargement which is caused due to

plaque or drug induced, altered or delayed passive eruption and short clinical crown length .The procedure involves moving the gingival margins apically through soft resection.

Crown lengthening procedure is used to increase the height of the clinical crowns by removing part of the gingival tissue. Crestal bone can also be removed along with gingival tissue. The procedure designed according to the demand of the clinical crown height or the planned prosthetic crown or veneer.^[16] The removal of gingival tissue is performed using blades, lasers, or electrocautery.^[17] This procedure may also require adjunctive procedures which may include Odontoplasty, placing veneers, crowns, or even extraction, alveolar bone reconstruction, orthodontic treatment, and implant-based rehabilitation.^[18]

Aadvantages:^[17,18]

1. It is done under local anesthesia
2. Less intraoperative bleeding occurs if laser is used
3. Better postoperative recovery.

Ddisadvantages: No major disadvantage but may sometimes require recountouring of gingival tissue.

3. Surgical Lip repositioning : Surgical procedures to correct Excessive gingival Display include detachment of lip muscles , myotomy and lip repositioning (LR) . The procedure includes removing a strip of mucosa from the maxillary buccal

vestibule and creating a partial thickness flap between the mucogingival junction and the upper lip musculature. The lip mucosa is then sutured to the mucogingival line, resulting in a narrower vestibule and restricted muscle pull. This reduces the gummy smile.^[19]

4. Botox : For the correction of gummy smile nonsurgical procedures which can be performed include the use of botulinum toxin A (botox). Botox is the trade name for the neurotoxin protein botulinum toxin type A. This protein is produced by fermentation of anaerobic bacterium clostridium botulinum. Type A toxin is one of the seven distinct botulinum toxins produced by different strains of the bacterium.^[21,22] It is a sterile, vacuum-dried powder which is diluted with saline solution without preservatives for it to be injected. The total "dose" of Botox in each vial is always 100 units but different amounts of saline solution can be used with each vial depending on the intended use.^[13]

Each vial of BOTOX contains :

- a) 100 Units (U) of Clostridium botulinum type A neurotoxin complex,
- b) 0.5 milligrams of Albumin Human
- c) 0.9 milligrams of sodium chloride in a sterile, vacuum dried form without a preservative.

Mechanism of Action of Botox : It causes muscle paralysis by inhibiting acetylcholine release at the neuromuscular junction. This results in

the inhibition of the exocytosis of acetylcholine which causes a neuromuscular blocking effect.^[21] Therapeutic doses of botox causes partial paralysis of the muscles.^[20] The disadvantage of this technique is that it's not permanent and it needs frequent application every several months . The duration of treatment results with Botox is three to four months. Repeated treatments with Botox for lip stabilisation shows sustained results and a lowered required dose of Botox in subsequent treatment episodes.

Procedure for injection: Botox is injected into the hyperactive elevator muscles of lip and blocks excessive contractions and hence prevent the lip from being pulled too far up during smiling. Prior to injection, reconstitute vacuum-dried BOTOX, with 0.9% Sodium Chloride Injection.^[13] Proper amount of diluents are drawn in the appropriate size syringe, and slowly injected into the vial. Administer this solution within four hours after reconstitution. During this time period, reconstituted BOTOX should be stored in a refrigerator (2° to 8°C). Mario Polo has advocated injection of botox at levatorlabii superioris, levatorlabii superioris alaeque nasi , levatorlabii superioris / zygomaticus minor overlap and in severe cases at depressor nasii & Orbicularis Oris also.

The ideal dosage is 2.5 U per side at the levatorlabii superioris & levatorlabii superioris alaeque nasi, 2.5 U per side at the levatorlabii superioris /

zygomaticus minor sites, and 1.25 U per side at the Orbicularis Oris sites.^[13]

Effect of Botox is seen within 5-10 days and it lasts about 6 months. It is important not to give injections prematurely (before the effects of the treatment have worn off), as this can result in a buildup of antibodies to Botox that would dilute the effect of further treatments.

Contraindications :

1. Presence of inflammation or infection at the site of proposed injection
2. During pregnancy or breast feeding.
3. Known hypersensitivity or allergies to human albumin, Botox toxin, or saline solution.
4. Anyone taking Aminoglycoside antibiotics because aminoglycosides may interfere with neuromuscular transmission and potentiate the effect of Botox therapy
5. Anyone with known motor neuropathy, neuromuscular disorders such as amyotrophic lateral sclerosis, myasthenia gravis, Lambert-Eaton Syndrome, muscular dystrophy, multiple sclerosis.
6. Anyone taking Calcium Channel Blockers.

Side effects :

1. Nausea
2. Inflammation
3. Tenderness
4. Localized pain.

5. Infection
6. Redness
7. Swelling

Advantages:

1. This treatment takes less than a minute to perform, is a relatively painless and predictable procedure.
2. Psychological benefit to the patient
3. Minimally invasive

Disadvantages:^[23]

1. Short term effect
2. Asymmetrical or unnatural appearance of smile sometimes due to improper injection technique
3. Cost factor

CONCLUSION:

Smile of a person is an important aesthetic feature and in current modern society a pleasing smile directly have an impact on the personality of a person. Gummy Smile is very unpleasing aesthetic condition and have a psychological effect on the patient and can lower their self confidence. Correction of this condition is very important for the overall pleasing appearance of any person. Correct etiology for gummy smile should be identified and should be managed accordingly from the available options of treatment which is best suitable for the patient.

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FIGURES :



Fig.1 Normal gingival display during smile



Fig.2 Excessive gingival display during smile



Fig. 3 Gingivectomy procedure

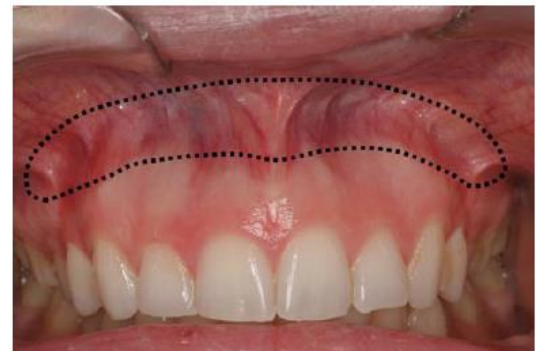


Fig. 4 Marking of incision for surgical lip repositioning



Fig. 5 Exposed submucosa after removal of epithelial discard



Fig. 6 Botulinum Toxin vial

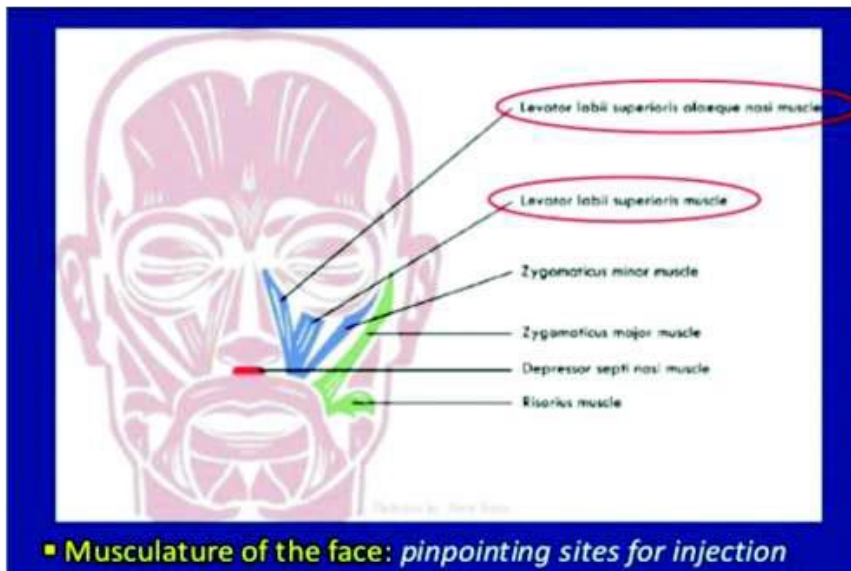


Fig.7 Sites for botox injection