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GUMMY SMILE, PANORAMIC REVIEW, DESCRIPTION, ETIOLOGY, EPIDEMIOLOGY, TREATMENT AND PROGNOSIS

María Alexandra Sarmiento Jaramillo[1], Andrea Estefanía Miranda Faicán[2], Doménica Estefanía Alvarado Guzmán[3], Valeria Soledad Dávila Sarmiento[4], Josue Javier Lombeida Arias[5], Paola Fernanda Rivas Quezada[6], Paola Fernanda Murillo Pineda[7], Karen Michelle Aguirre Tenorio[8], Mauro Jacinto Moyano Ureña[9], Bryam Esteban Coello García[10].

[1]General Odontologist at "Ministerio de Salud Pública del Ecuador MSP", Ecuador. ORCID https://orcid.org/0000-0001-6836-8897
[2]General Odontologist at "Ministerio de Salud Pública del Ecuador MSP", Ecuador. ORCID https://orcid.org/0000-0001-7318-9113
[3]General Odontologist at "Ministerio de Salud Pública del Ecuador MSP", Ecuador. ORCID https://orcid.org/0009-0002-9463-8234
[4]General Odontologist at "Ministerio de Salud Pública del Ecuador MSP", Ecuador. ORCID https://orcid.org/0009-0005-0718-4994
[5]Medical student, faculty of Medical Sciences, Universidad Católica de Cuenca. Ecuador ORCID https://orcid.org/0000-0001-7344-0320
[6]General Odontologist in Independent Practice, Faculty of Medical Sciences, Universidad Católica de Cuenca. Ecuador. ORCID https://orcid.org/0000-0003-2246-4300
[7]General Practitioner at "Ministerio de Salud Pública-Centro de Salud Yunganza" Limón- Ecuador ORCID https://orcid.org/0009-0006-7735-4132
[8]General Practitioner at "Universidad de Cuenca", Faculty of Medical Sciences, Universidad Católica de Cuenca. Azuay- Ecuador ORCID https://orcid.org/0009-0006-2262-2339
[9]General Practitioner at "Ministerio de Salud Pública- Centro de Salud tipo C Nabón", faculty of Medical Sciences, Universidad Católica de Cuenca. Azuay- Ecuador ORCID https://orcid.org/0009-0004-6570-0291
[10]Postgraduate Doctor in Orthopedics and Traumatology at Faculdade de Ciências Médicas Minas Gerais. Belo Horizonte - Brasil. ORCID https://orcid.org/0000-0003-2497-0274

Corresponding Author: *Bryam Esteban Coello García* ***Address:*** *Rua Tiradentes 266.Campo Belo. Minas Gerais. Brasil* ***Postal Code:*** *37270-000*

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SUMMARY

Introduction: gummy smile is defined as a non-pathological condition that causes aesthetic disharmony in which more than 3 mm of gingival tissue is present when smiling. The smile is an essential aesthetic component of the face and significantly determines the perception of beauty and personality of each person.

Objective: to detail the current information related to the gingival smile, description, etiology, epidemiology, evaluation, treatment and prognosis.

Methodology: a total of 42 articles were analyzed in this review, including review and original articles, as well as clinical cases, of which 34 bibliographies were used because the other articles were not relevant to this study. The sources of information were PubMed, Google Scholar and Cochrane; the terms used to search for information in Spanish, Portuguese and English were: gingival smile, gingival hyperplasia, maxillary excess, orthognathic surgery.

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Results: Gummy smile presents a prevalence between 10.5% and 29% of young adults, being more frequent in women, and this prevalence is reduced with age due to the drooping of the upper and lower lips, which reduces the exposure of the gingiva and upper incisors. The perception of excessive gingival display is subject to cultural and ethnic preferences, showing that the amount of gingiva presented that is found to be unaesthetic or excessive is relative and changes between men and women.
Conclusions: the smile is a common human expression that represents multiple feelings, as well as an essential esthetic component of the face and significantly determines the perception of beauty and personality of each person. The gummy smile is a non-pathological condition that causes aesthetic disharmony in which more than 3 mm of gingival tissue is present when smiling. A gummy smile can usually have repercussions in the perception and psychosocial behavior of the affected individual. The etiology of the gummy smile presents several factors, which usually manifest themselves at the same time. Treatment should be targeted according to the origin of the condition. Among the less invasive treatment alternatives are botulinum toxin injection and hyaluronic acid injection. The surgical repertoire includes gingivectomy, modified lip repositioning and orthognathic surgery.
KEY WORDS: *gummy smile, gingival hyperplasia, maxilla, orthognathic surgery.*

INTRODUCTION

The smile is a common human expression that represents multiple feelings, as well as an essential aesthetic component of the face and significantly determines the perception of beauty and personality of each person. Facial asymmetries or expressions and proportions play a remarkable role in the perception of beauty. Gummy smile is defined as a non-pathological condition that causes aesthetic disharmony in which more than 3 mm of gingival tissue is present when smiling. Gummy smiles have an approximate prevalence between 10.5% and 29% of young adults, being more frequent in women. Mimetic facial muscles (MFM) have different peculiarities that distinguish them from other skeletal muscles, for example, they do not have tendinous or aponeurotic intermediates, moreover, MFM are directly attached at each end and usually start on underlying bony surfaces and attach to the facial skin or join other facial muscles.
The muscles of the upper lip are:

- The levator labii superioris (LLS),
- The levator labii superioris alaeque nasi (LLSAN).
- The levator of the angle of the mouth (LAO).
- The zygomaticus minor.
- The zygomatic major.

Several levator muscles pull the upper lip and the corner of the mouth upward, while the zygomatic muscles have a diagonal action.
The lip muscles are classified into dilator and constrictor muscles. The former, in turn, are distributed in two layers, one superficial and one deep.
The superficial layer presents 7 muscles:

- Lesser zygomatic.
- Major zygomatic.
- LLSAN
- LLS
- Risorius.
- Depressor of the angle of the mouth (DAO).
- Platisma.

The peculiarities of the smile are predisposed by the interaction of the static and dynamic relationships of the dento-skeletal structures and facial tissues. The smile is formed in 2 phases. In the first, contraction of the levator muscles raises the upper lip to the nasolabial fold. In the second involves further elevation of the upper lip and crease by 3 muscle groupings:

- Levator labii superioris muscles of the upper lip of the upper lip, originating in the infraorbital area.
- Major zygomatic muscles.
- Superior buccinator fibers.

Although presenting a small amount of gingiva (1 mm-2 mm) is esthetically acceptable and sometimes results in a more youthful appearance, excessive gingival display at the time of smiling generates an esthetic inconvenience for many individuals, even modifying their perception and psychosocial behavior. The perception of excessive gingival display is subject to cultural and ethnic preferences, showing that the amount of gingival display found to be unaesthetic or excessive is relative and changes between men and women, as well as between professionals; an example of this is the different perspective found in the USA where an exposure of more than 2-3 mm is considered unaesthetic, while in certain European countries a gingival exposure of up to 4 mm or more is allowed(1-18).

METHODOLOGY

A total of 42 articles were analyzed in this review, including review and original articles, as well as cases and clinical trials, of which 34 bibliographies were used because the information collected was not important enough to be included in this study. The sources of information were Cochrane, PubMed and Google Scholar; the terms used to search for information in Spanish, Portuguese and English were: gingival smile, gingival hyperplasia, maxillary excess, orthognathic surgery.

The choice of literature exposes elements related to gummy smile; in addition to this factor, etiology, presentation, evaluation, management and prognosis of the condition are presented.

DEVELOPMENT

The etiology of gummy smile presents several factors, which usually manifest themselves at the same time. Practitioners must correctly find the origin of the condition because management depends on the etiology.

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- ➢ Vertical maxillary excess (VME).
- ➢ Altered passive eruption.
- ➢ Dentoalveolar extrusion.
- ➢ Short upper lip length.
- ➢ Hypermobile upper lip.
- ➢ Gingival hyperplasia.

Vertical maxillary excess (VME).
Vertical maxillary excess is the excessive increase of the maxillary bone in the vertical plane that gives an elongated appearance to the lower half of the face. It frequently causes excessive gingival display and often requires cephalometric analysis to corroborate the diagnosis.

Excessive gingival display is caused by a lower occlusal plane than expected. The lower lip overlying the incisal margins of the upper canines and premolars is an almost pathognomonic indication of the disorder. In VME, the anterior occlusal plane is uninterrupted with the posterior occlusal plane, which distinguishes it from incisor overeruption. Although the upper lip remains clinically short, its length usually becomes normal(19).

Altered passive eruption.
Teeth erupt in an active phase, where the tooth achieves its occlusal position and a passive phase, where the gingival tissues are directed apically, exposing the crown. Passive eruption unfolds in 4 phases:

1. Junctional epithelium on the enamel.
2. Junctional epithelium partly in the enamel and cementum apical to the cementoenamel junction (CEJ).
3. Junctional epithelium entirely in the cementum and the base of the sulcus at the CEJ.
4. Stage 3 and part of the root clinically exposed.

Altered passive eruption is the inability of the gingival tissue to apically direct beyond the second stage. Teeth will grow short and square because the gingival tissues are coronal to the UCE.

Vital components in diagnosing altered passive eruption include:

- Rule out a hypermobile lip.
- Verify the location of the UCE and alveolar ridge.

The lips should be evaluated at rest and smiling. In a hyperactive lip, a translational movement from rest can be up to 10 mm, on the other hand in a lip in normal activity, between 6 and 8 mm. In altered passive eruption, the ECU can be seen up to 10 mm apical to the free gingival margin.

The level of the alveolar ridge is the same as in a healthy state: at the level of 1 to 2 mm apical to the ECU. Bone probing and a parallel radiograph will determine the level of the alveolar ridge.
Anterior dentoalveolar extrusion

This is the overeruption of the upper incisors, resulting in an excessive gingival view due to a more coronal position of the gingival margins. Tooth wear and deep anterior bite can be the origin of anterior extrusion. When anterior tooth wear is present, compensatory overeruption of the incisors is evident. A discrepancy between the anterior and posterior occlusal planes is commonly maintained when there is a deep bite(19-23).

Epidemiology
About 10% of the population between 20 and 30 years of age shows excessive gingival exposure, being more frequent in females. The prevalence of the alteration decreases with age due to the drooping of the upper and lower lips, which decreases the exposure of the upper incisors and gingiva(24,25).

Evaluation
Plausible smiles present:

- At least the second premolars, reduced upper gingiva, no gingival recession with healthy interdental papillae completing each of the interdental areas.
- Symmetry between anterior and posterior teeth.
- A lower lip line parallel to the incisal line of the upper teeth and the virtual line joining the contact points of these teeth.
- Teeth with adequate structure, position, color and shade.

By definition several bibliographies connote the gingival smile as more than 3 to 4 mm of exposed gingival tissue in a smile, however some authors consider more than 2 mm of gingival exposure excessive. Commonly, dentists view a lip-to-gum distance of 4 mm or greater at the time of a smile as minimally attractive. Subsequent to the identification of an individual with excessive gingival exposure, the etiology should be determined(14,26).

Medical History
The age of the individual shows the eruptive stage of the dentition, which allows to note a modified passive eruption. Gingival hyperplasia may be seen in those taking calcium channel blockers, anticonvulsants and immunosuppressive drugs following organ transplantation.

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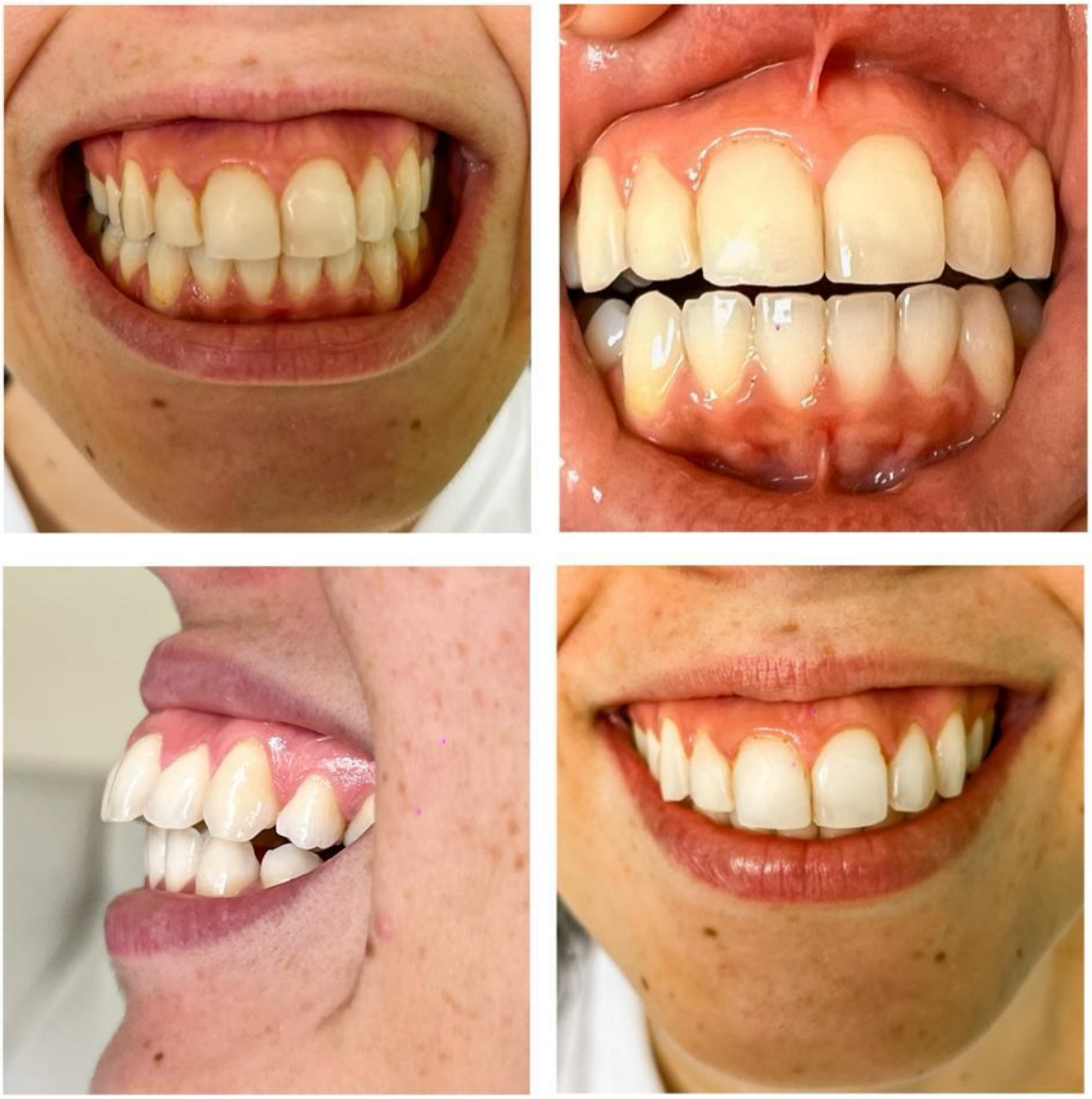
Figure 1.Identification of gingival smile, frontal and lateral plane.



Source: The Authors.

Facial Analysis

The face should be evaluated both in the frontal and lateral planes allowing us to identify any alteration or maxillary vertical excess. Almost all individuals with VME present a second class skeletal relationship.

Lip Analysis, Dynamic and Static

If the origin of the gummy smile is in the lips, it is usually on account of a hypermobile lip, a short lip or both.

The length of the upper lip responds to the distance between the subnasal and the upper lip stoma or lower edge of the upper lip. In young adults the average length is usually 20 to 24 mm and tends to increase with age. When less than 20 mm is evident, it is judged as a short lip, in addition, in these individuals a gummy smile and lip incompetence may be noted.

A hypermobile lip or hyperactive lip is due to an increased activity of the levator muscles of the upper lip at the time of smiling. In particular, hyperactivity of the upper lip elevator

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muscles increases the exposure of the teeth and gingival tissues when smiling due to a higher lip position, leading to a gummy smile.
Observation of the upper central incisors at rest.
3 to 4 mm for young women and 2 mm for young men; however, it decreases with age.
Interlabial distance at rest.
At rest it normally ranges from 0 to 4 mm, an increase in interlabial space may be caused by dentoalveolar extrusion, short lips or VME.

Smile Line
It can be defined as the location of the upper lip in relation to the upper incisors and gingiva at the time of a natural and complete smile. It can be:
Low when it shows less than 75% of the crown, usually a male characteristic.
Standard shows between 75 to 100% of the crowns with the interproximal gingiva.
High or gingival smile shows the entire crown, plus an excessive proportion of gingiva, usually a female peculiarity.

Periodontal Examination
Encompasses measuring:
- The width and thickness of the attached gingiva.
- The clinical and insertion level.
- The level of the crestal bone with respect to the UCE.
- Probing depths.

A clinical short tooth can have different origins such as gingival hyperplasia, gingivitis, tooth wear or altered passive eruption, so the evaluation of periodontal tissues supports the etiological diagnosis(19-21,27).

Treatment
- Gingivectomy.
- Modified lip repositioning.
- Hyaluronic acid.
- Botulinum toxin.
- Orthognathic surgery.
- Orthodontic treatment.

Figure 2. Traction of the levator muscle of the upper lip and ala of the nose with absorbable suture thread. Sutures in a deep layer between the muscle and the upper portion of the keratinized gingiva.

Source: Storrer CM, Valverde FB, Santos F, Deliberador T. Treatment of gummy smile: Gingival recontouring with the containment of the elevator muscle of the upper lip and wing of nose(28).

The forms of treatment change according to the etiology of the gummy smile; the essential thing is to know exactly the origin of the pathology. Usually, the gummy smile is the result of more than one factor, such as vertical excess of the maxilla and hypermobile lip, so a mixture of different techniques can be implemented. Among the less invasive treatment alternatives are botulinum toxin injection and hyaluronic acid injection. Within the surgical repertoire we find gingivectomy, modified lip repositioning and orthognathic surgery, the latter usually reserved for severe VME because it shows high morbidity rates and requires hospitalization. Orthodontic management alone can sometimes be sufficient to meet and resolve a percentage of gummy smile cases(19).

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Gingivectomy
Crown lengthening with or without bone resection, also called gingivectomy, removes the excess gingival tissue and reinserts the attachment appliance.

The choice of performing only gingivectomy or gingivectomy with bone resection will depend on the amount of biological width. A gingivectomy is ideal for resolving a gingival smile as there are adequate bone and gingival levels attached, the gingival tissue from the bone to the gingival ridge is greater than 3 mm. However, a full-thickness periodontal flap in addition to an osteotomy is indicated when the bone level is close to the cemento-amelocemental junction(29).

Lip Repositioning Surgery
Generally its mission is to narrow the vestibule and reduce gingival exposure by restricting muscular traction. It consists of removing a long piece of mucosa from the labial vestibule, then making a partial thickness flap between the mucogingival junction and the muscles of the upper lip. Subsequently, the lip mucosa is sutured to the mucogingival line. A short upper lip of non-skeletal origin can be resolved through lip repositioning. Lip repositioning surgery is indicated in mild VME and hypermobile upper lip. It should be avoided in patients with severe VME and those with insufficient attached gingival width. The technique can be performed by laser, electrocautery or scalpel(22,27,30,31).

Infiltration of Hyaluronic Acid
It consists of injecting a small amount of hyaluronic acid in the paranasal area to compress the lateral fibers of the levator labii superioris alaeque nasi (LLSAN), which will inhibit mobility in the deep portion. This procedure will decrease the superiorization of the upper lip when smiling, significantly tightening the gingival smile
.
The point of infiltration can be performed in the most cranial area of the nasolabial fold, about 3 mm lateral to the wing of the alar cartilage.

Hyaluronic acid placement is an option to botulinum toxin injection, however it is not appropriate for all individuals with excessive gingival display. It requires an experienced and skilled injector with extensive knowledge of anatomy because the substance is infiltrated into a site with considerable vascularity(19,22).

Botulinum Toxin A Injection
Botulinum toxin generates a muscular paralysis because it inhibits the presynaptic release of acetylcholine at the neuromuscular junction. The alternative is striking and sometimes suitable to provide management of the gummy smile especially caused by an overactive lip.

The toxin is placed in the levator labii superioris allaque nasi (LLSAN) muscles, in addition to the levator labii superioris in both halves of the face. Usually about 4 to 6 units of botulinum toxin are infiltrated in:

1. 2 mm lateral to the facial alar sulcus.
2. 2 mm lateral to the first injection point in the same horizontal plane.
3. 2 mm inferior and between the first injection point(27,32).

Botulinum toxin placement and gingival suppression surgery could generate better esthetic results by being associated in front of the application of individualized treatments, particularly by having a muscular component influencing the smile. Sometimes, surgical intervention does not provide the expected result for the affected individual, besides being invasive, which results in a relatively safe, fast and effective option to improve the gingival smile, as long as the dosage and the type of smile are respected(33).

Orthognathic Surgery
Dentoalveolar or orthognathic surgery is sometimes the only option in complex cases of maxillary vertical excess: LeFort osteotomy, or maxillomandibular repositioning, combining LeFort and Obwegeser mandibular osteotomy, in addition to orthodontic treatment(19).

Orthognathic surgery by means of Le Fort I osteotomy is a therapeutic option for the gingival smile in individuals with maxillary modifications or skeletal disproportion. Similarly, the gummy smile is optimally reduced and even eliminated after treatment. However, due to insufficient supporting evidence, the indication for maxillary impaction necessary for this improvement has not been defined, so individual planning is recommended for each patient with his or her respective medical condition(34).

Prognosis
Most of the patients affected with gummy smile can improve greatly with the treatment alternatives currently available, however the amount of reduction of the gingival excess will depend on its cause. Several cases are resolved with less invasive procedures using hyaluronic acid and botulinum toxin, although the results last only a few months. Patients who need and undergo surgical treatment have long-term permanent results.

CONCLUSIONS

The smile is a common human expression that represents multiple feelings, as well as an essential aesthetic component of the face and significantly determines the perception of beauty and personality of each person. A gummy smile is a non-pathologic condition that causes aesthetic disharmony in which more than 3 mm of gingival tissue is present when smiling. A gummy smile can usually have repercussions in the perception and psychosocial behavior of the affected individual. The etiology of the gummy smile presents several factors, which usually manifest themselves at the same time. Treatment should be targeted according to the

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BIBLIOGRAPHY

1. *Micheli-Pellegrini V. About muscle insertions in man (Proposal for a new nomenclature of striated muscle). Acta Otorhinolaryngol Ital Organo Uff Della Soc Ital Otorinolaringol E Chir Cerv-facc. 2011 Jun;31(3):167–76.*
2. *Beall AE. Can a New Smile Make You Look More Intelligent and Successful? Dent Clin North Am. 2007 Apr;51(2):289–97.*
4. *Kokich VO, Kiyak HA, Shapiro PA. Comparing the perception of dentists and lay people to altered dental esthetics. J Esthet Dent. 1999;11(6):311–24.*
5. *Armitage GC. Development of a classification system for periodontal diseases and conditions. Ann Periodontol. 1999 Dec;4(1):1–6.*
6. *Ker AJ, Chan R, Fields HW, Beck M, Rosenstiel S. Esthetics and Smile Characteristics From the Layperson's Perspective. J Am Dent Assoc. 2008 Oct;139(10):1318–27.*
7. *Arnett GW, Bergman RT. Facial keys to orthodontic diagnosis and treatment planning. Part I. Am J Orthod Dentofac Orthop Off Publ Am Assoc Orthod Its Const Soc Am Board Orthod. 1993 Apr;103(4):299–312.*
8. *Mercado-García J, Rosso P, Gonzalvez-García M, Colina J, Fernández JM. Gummy Smile: Mercado-Rosso Classification System and Dynamic Restructuring with Hyaluronic Acid. Aesthetic Plast Surg. 2021 Oct;45(5):2338–49.*
9. *Ioi H, Nakata S, Counts AL. Influence of gingival display on smile aesthetics in Japanese. Eur J Orthod. 2010 Dec;32(6):633–7.*
10. *Geron S, Atalia W. Influence of sex on the perception of oral and smile esthetics with different gingival display and incisal plane inclination. Angle Orthod. 2005 Sep;75(5):778–84.*
11. *Passia N, Blatz M, Strub JR. Is the smile line a valid parameter for esthetic evaluation? A systematic literature review. Eur J Esthet Dent Off J Eur Acad Esthet Dent. 2011;6(3):314–27.*
12. *Flores-Mir C, Silva E, Barriga MI, Lagravere MO, Major PW. Lay person's perception of smile aesthetics in dental and facial views. J Orthod. 2004 Sep;31(3):204–9; discussion 201.*
13. *Jacobs PJ, Jacobs BP. Lip repositioning with reversible trial for the management of excessive gingival display: a case series. Int J Periodontics Restorative Dent. 2013;33(2):169–75.*
14. *Hur MS, Youn KH, Hu KS, Song WC, Koh KS, Fontaine C, et al. New Anatomic Considerations on the Levator Labii Superioris Related With the Nasal Ala. J Craniofac Surg. 2010 Jan;21(1):258–60.*
15. *Peck S, Peck L. Selected aspects of the art and science of facial esthetics. Semin Orthod. 1995 Jun;1(2):105–26.*
16. *Dong JK, Jin TH, Cho HW, Oh SC. The esthetics of the smile: a review of some recent studies. Int J Prosthodont. 1999;12(1):9–19.*
17. *von Arx T, Nakashima MJ, Lozanoff S. The Face – A Musculoskeletal Perspective. A literature review. Swiss Dent J. 2018 Sep 10;128(9):678–88.*
18. *Peck S, Peck L, Kataja M. The gingival smile line. Angle Orthod. 1992;62(2):91–100; discussion 101-102.*
19. *Olszewski R, Liu Y, Duprez T, Xu TM, Reychler H. Three-dimensional appearance of the lips muscles with three-dimensional isotropic MRI: in vivo study. Int J Comput Assist Radiol Surg. 2009 Jun;4(4):349–52.*
20. *Brizuela M, Ines D. Excessive Gingival Display. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2023 Oct 15]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK470437/*
21. *Silberberg N, Goldstein M, Smidt A. Excessive gingival display--etiology, diagnosis, and treatment modalities. Quintessence Int Berl Ger 1985. 2009;40(10):809–18.*
22. *Pavone AF, Ghassemian M, Verardi S. Gummy Smile and Short Tooth Syndrome--Part 1: Etiopathogenesis, Classification, and Diagnostic Guidelines. Compend Contin Educ Dent Jamesburg NJ 1995. 2016 Feb;37(2):102–7; quiz 108–10.*
23. *Diaspro A, Cavallini M, Piersini P, Sito G. Gummy Smile Treatment: Proposal for a Novel Corrective Technique and a Review of the Literature. Aesthet Surg J. 2018 Nov 12;38(12):1330–8.*
24. *Rao A, Koganti V, Prabhakar A, Soni S. Modified lip repositioning: A surgical approach to treat the gummy smile. J Indian Soc Periodontol. 2015;19(3):356.*
25. *Tjan AHL, Miller GD, The JGP. Some esthetic factors in a smile. J Prosthet Dent. 1984 Jan;51(1):24–8.*
26. *Vig RG, Brundo GC. The kinetics of anterior tooth display. J Prosthet Dent. 1978 May;39(5):502–4.*
27. *de Castro MVM, Santos NC de M, Ricardo LH. Assessment of the "golden proportion" in agreeable smiles. Quintessence Int Berl Ger 1985. 2006 Sep;37(8):597–604.*
28. *Dym H, Pierre R. Diagnosis and Treatment Approaches to a "Gummy Smile." Dent Clin North Am. 2020 Apr;64(2):341–9.*
29. *Storrer CM, Valverde FB, Santos F, Deliberador T. Treatment of gummy smile: Gingival recontouring with the containment of the elevator muscle of the upper lip and wing of nose. A surgery innovation technique. J Indian Soc Periodontol. 2014;18(5):656.*
30. *Ezquerra F, Berrazueta MJ, Ruiz-Capillas A, Arregui JS. New approach to the gummy smile. Plast Reconstr Surg. 1999 Sep;104(4):1143–50; discussion 1151-1152.*
31. *Mostafa D. A successful management of sever gummy smile using gingivectomy and botulinum toxin injection: A case report. Int J Surg Case Rep. 2018;42:169–74.*
32. *Rosenblatt A, Simon Z. Lip repositioning for reduction of excessive gingival display: a clinical report. Int J Periodontics Restorative Dent. 2006 Oct;26(5):433–7.*
33. *Suber JS, Dinh TP, Prince MD, Smith PD. OnabotulinumtoxinA for the Treatment of a "Gummy Smile." Aesthet Surg J. 2014 Mar 1;34(3):432–7.*
34. *Pedron IG, Aulestia-Viera PV. La toxina botulínica como adyuvante en el tratamiento de la sonrisa gingival. Rev Clínica Periodoncia Implantol Rehabil Oral. 2016 Jul;S0718539116300295.*
35. *Padilla-Avalos CA, Marroquín-Soto C. Tratamiento estético de la sonrisa gingival. Rev Estomatológica Hered. 2023 Mar 31;33(1):62–7.*

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