**Treatment of excessive gingival display and diastema closure: a case report**

***Basak KARASU 1,[[1]](#footnote-1)\*[C:\Users\Abdullah\AppData\Local\Microsoft\Windows\INetCache\Content.Word\ORCID-iD_icon-16x16.gif](https://orcid.org/0000-0001-6537-9902), Musa ACARTÜRK 2[C:\Users\Abdullah\AppData\Local\Microsoft\Windows\INetCache\Content.Word\ORCID-iD_icon-16x16.gif](https://orcid.org/0000-0002-7386-805X)***

*1Faculty of Dentistry, Department of Periodontology, Çankırı Karatekin University, Çankırı, Turkiye*

*2Faculty of Dentistry, Department of Restorative Dentistry, Çankırı Karatekin University, Çankırı, Turkiye*

|  |
| --- |
| **Abstract**  Smile is an important facial expression and affects a person's self-confidence. Excessive gingival display while smiling and the gap between the proximal surfaces of the maxillary incisors are among the most notable aesthetic concerns. In this case report, the gingivectomy procedure and diastema closure were performed on a 23-year-old male patient who applied to our department with the chief complaint of excessive gingival display, short clinical crowns and spacing in the upper front tooth region. |
| Keywords: Diastema, Gingivectomy, Gummy smile |

1. **Introduction**

The primary concern for many people these days is facial aesthetics. The smile has a significant impact on one's self-confidence and facial appearance. In terms of appearance, patients, particularly younger ones, find diastema between teeth disturbing. Differences in the space between teeth and arch sizes, as well as variations in tooth morphology (such as narrow or cone-shaped teeth), can result in diastema [1]. Midline diastema can be caused by various conditions, including proclination of the upper labial segment, an enlarged labial frenum, a missing tooth, a peg-shaped lateral, midline supernumerary teeth, habits such as finger sucking, tongue thrusting, and/or lip sucking and self-inflicted disease brought on by tongue piercing. Conservative and prosthetic approaches are used for diastema closure [2].

A gummy smile (GS) has an impact on one's appearance as well as psychological well-being because it results in a decrease in self-confidence that makes one hide or control their smile. A gummy smile is defined as having more than 2 mm of exposed gingiva [3]. It is considered a normal smile when less than 3 mm of gingiva is visible in the front area. In GS, more than 3 mm of the gingiva are exposed between the canine teeth when smiling [4]. The various causes of GS include altered passive eruption of teeth, short or hyperactive upper lip muscles, short clinical crowns, dentoalveolar extrusion and vertical maxillary excess or combinations of them. Therefore, in order to accurately diagnose and treat GS, dentists must identify its primary causes [5].

The harmony of teeth and periodontium, as well as their interaction with perioral structures, particularly extraoral soft tissues, are critical factors in enhancing the aesthetics of a smile [6]. A person's smile greatly influences their facial appearance. Front teeth, maxillary alveoler bone, and upper lip (levator) muscles work together to produce a smile that is pleasing to the eye. An unpleasant smile may result from dysfunction in any one of these areas [7]. When designing an aesthetically pleasing smile, it's crucial to have a proportionate, symmetrical tooth arrangement where the proper dominance of particular teeth is recognized. Teeth differ in size and proportion from person to person and even within a single individual over the course of their life due to pathological or physiological tooth wear. In every smile, the dominant teeth should be the maxillary central incisors [8]. Smile line refers to a line along the incisal edges of the maxillary anterior teeth which should mimic the curvature of the superior border of the lower lip when smiling [9]. The lip line refers to the position of the inferior border of the upper lip while smiling and thus determines the display of tooth or gingiva at this interface between hard and soft tissue [10]. The maxillary central incisor's visibility during smiling ranges from showing 2 mm of gingival tissue to showing 3/4 of the clinical crown [11].

Gingivectomy refers to excision of the gingiva [12]. If there are appropriate osseous levels, more than 3 mm of gingival tissues (from bone to gingival crest) and the adequate zone of attached gingiva, gingivectomy could be done with beveled incisions to remove soft tissues without disturbing the papillary tissue [13, 14]. Nonetheless, gingivectomy is contraindicated if osseous levels are approximate the cementoenamel junction because this could violate the biologic width [15].

Diastema and gummy smile are multifactorial conditions that adversely impact the sense of aesthetics. This case report demonstrates the multidisciplinary approach to treating a patient with a gummy smile, short crown lengths, and a diastema between the maxillary central incisors.

1. **Materials and Methods**

A 23-year-old male patient applied to Çankırı Karatekin University Faculty of Dentistry Periodontology clinic with a chief complaint of excessive gingival display, short clinical crowns, and spacing in the upper front tooth region. The patient’s medical and dental histories revealed that he was systemically and dentally healthy. Clinical examination revealed the presence of midline spacing between maxillary central incisors and gummy smile.

Minimal amounts of plaque and calculus deposits were recorded during the periodontal examination. The gingiva was firm, pink, and thick phenotype. On initial probing depth measurements of maxillary anterior teeth, relatively 2–3 mm were measured by the Williams probe without clinical attachment loss or bleeding. The cementoenamel junction and the osseous crest were in a normal relationship. While smiling, the patient’s teeth were visible from maxillary right first premolar to the maxillary left first premolar. Additionally, 5–6 mm of vertical exposure of gingiva was measured from the inferior border of the upper lip and gingival margins of maxillary anterior teeth.

The patient was informed about all the procedures and complications, and written informed consent was obtained. After obtaining the informed consent, supragingival and subgingival scaling were performed, and oral hygiene instructions were given.

In the second visit, local anesthesia (ultracain-articain HCl 40 mg/ml, epinephrine HCI 6 mcg/ml) was first administered in the vestibular mucosa from maxillary right canine to maxillary left canine. In order to prepare a line of excision, bleeding points were secondarily marked. The surgical blade #15c was positioned at a 45° angle to the tooth's long axis, apically to the bleeding points, and external bevel gingivectomy incisions were made in the anterior region on the facial surface only. After that, the excised gingival segment was removed with forceps. The gingiva was recontoured and scraped to remove residual tissue tags. 600 mg ibuprofen three times a day for three days was used to treat the postoperative pain. For the first twenty-four hours following the surgery, the patient was advised to apply an ice pack and abstain from hot beverages. The patient was advised to rinse gently with 0.12% Chlorhexidine Gluconate twice daily for 2 weeks. Follow-up examinations revealed exposure of the complete anatomical crowns of upper anterior teeth, thereby enhancing the esthetic appearance of the teeth and reducing the gingival display. The patient was consulted to the department of Restorative Dentistry.

No dental caries and pathological findings were observed in both clinical and radiographical examinations. However, an uncomplicated tooth fracture was detected at the enamel-dentin level in the mesial part of the incisal edge in the right upper central tooth. After the patient was informed about the treatment options, it was decided to restore the diastema and the tooth fracture in the incisal area with composite resin.

After the healing period, the color selection of the resin composite was carried out, and A1 (Estelite Sigma Quick, Tokuyama Dental, Italy) resin was selected. A slight recontouring was performed using fine-cut diamond burs ((858 H, 014, Bosphorus, Turkey). Following absolute isolation of the operative field, the bonding procedures were executed with Panora 200 Etching Gel (IMICRYL, Turkey) for 30 seconds, washing with water/air spray for the same amount of time and application of the bonding system (Hybrid Bond One, Sun Medical Co., Ltd., Japan). A light-emitting diode was used for light curing after 20 seconds of air jet application to improve solvent volatilization. The space between the two upper incisors was successfully closed. Finishing strips were used at the approximal regions. The finishing was completed using flexible sand discs, rubber points, and felt discs with polishing paste, thus concluding the clinical case according to the proposed treatment plan.

1. **Results and Discussion**

Minimally invasive procedures present several advantages compared to more destructive traditional treatments by minimizing unnecessary loss of dental tissue, violation of the dentin-pulp complex, and reducing the risk of iatrogenic damage to adjacent hard and soft tissues. These techniques reserve the maximum amount of dental tissue using optimal restorative materials to restore function and aesthetics with long-lasting restorations [16].

Composite resins were used for diastema closure in this clinical case, and they have clear advantages as a more conservative, quicker,and economical option than ceramic veneers [17].The use of direct composite resin to close midline diastema is a minimally invasive procedure. This method creates a greater bond strength at the tooth/adhesive system interface and extends the life of the restoration because the enamel connection provides greater retention even though it does not have dentin collagen fibers [18].

Anterior crown lengthening is indicated in patients with excessive gingival display or insufficient clinical crowns [19]. Gingivectomy is a surgical procedure used to remove excessive gingival tissue. The physiological contour can be restored with this method. Gingivectomy and gingivoplasty are efficient treatment options to provide gingival aesthetics [12].The purpose of gingival recontouring is to establish an adequate relationship between the gingival margin and the lip, to increase the appearance of the crown, and to achieve aesthetic harmony between the height and width of the crowns of the front teeth. Composite resins can improve aesthetic results in diastema closure cases, as in this case [20].

The use of a multidisciplinary approach for enhancing smile esthetics, including periodontal surgery with the direct composite resin technique, proved to be an excellent treatment option, as it presented satisfactory esthetic and functional results for the patients, and reduced treatment time and cost compared to other approaches. In aesthetic dentistry, the participation of various specialties in diagnosis and treatment planning allows the dentist to give each patient the best possible care and meet their expectations for the outcome.

1. **Conclusion**

In this case report, the diastema was closed with the direct application of composite resin, and the excessive gingival appearance was eliminated with gingivectomy, providing highly satisfactory results without requiring extensive surgery or ceramic veneer.

**References**

1. de Araujo Jr, E.M., et al., *Direct adhesive restoration of anterior teeth: Part 2. Clinical protocol.* Practical Procedures & Aesthetic Dentistry: PPAD, 2003. **15**(5): p. 351-7; quiz 359.

2. Izgi, A.D. and E. Ayna, *Direct restorative treatment of peg-shaped maxillary lateral incisors with resin composite: A clinical report.* The Journal of prosthetic dentistry, 2005. **93**(6): p. 526-529.

3. Allen, E.P., *Use of mucogingival surgical procedures to enhance esthetics.* Dental Clinics of North America, 1988. **32**(2): p. 307-330.

4. Mangano, A. and A. Mangano, *Current strategies in the treatment of gummy smile using botulinum toxin type A.* Plastic and reconstructive surgery, 2012. **129**(6): p. 1015e.

5. Silberberg, N., M. Goldstein, and A. Smidt, *Excessive gingival display--etiology, diagnosis, and treatment modalities.* Quintessence Int, 2009. **40**(10): p. 809-18.

6. Parekh, S.M., *The perception of selected aspects of smile esthetics-smile arcs and buccal corridors*. 2005, The Ohio State University.

7. Mate, P.P., et al., *Clinical and electromyographic evaluation of botulinum toxin type A in the treatment of gummy smile: A prospective clinical study.* Journal of dental research, dental clinics, dental prospects, 2021. **15**(2): p. 122.

8. Sharma, P.K. and P. Sharma. *Dental smile esthetics: the assessment and creation of the ideal smile*. in *Seminars in orthodontics*. 2012. Elsevier.

9. Sarver, D.M., *The importance of incisor positioning in the esthetic smile: the smile arc.* American journal of orthodontics and dentofacial orthopedics, 2001. **120**(2): p. 98-111.

10. Sabri, R., *The eight components of a balanced smile.* J Clin Orthod, 2005. **39**(3): p. 155-67.

11. Peck, S. and L. Peck. *Selected aspects of the art and science of facial esthetics*. in *Seminars in orthodontics*. 1995. Elsevier.

12. Newman, M., H. Takei, and P. Klokkevold, *Periodontología clínica de Carranza. Vol 1 y 2*. 2014, Mexico: Mc Graw-Hill. Interamericana.

13. Duruel, O., et al., *Treatment of various types of gummy smile with botulinum toxin-A.* Journal of Craniofacial Surgery, 2019. **30**(3): p. 876-878.

14. Dolt, A.H. and J.W. Robbins, *Altered passive eruption: an etiology of short clinical crowns.* QUINTESSENCE INTERNATIONAL-ENGLISH EDITION-, 1997. **28**: p. 363-374.

15. Mostafa, D., *A successful management of sever gummy smile using gingivectomy and botulinum toxin injection: A case report.* International journal of surgery case reports, 2018. **42**: p. 169-174.

16. Mackenzie, L. and A. Banerjee, *Minimally invasive direct restorations: a practical guide.* British dental journal, 2017. **223**(3): p. 163-171.

17. Durán, G., et al., *The use of direct composite resin to close maxillary midline diastema complementary to orthodontic treatment.* Revista clínica de periodoncia, implantología y rehabilitación oral, 2019. **12**(2): p. 106-108.

18. Prabhu, R., et al., *Clinical evaluation of direct composite restoration done for midline diastema closure–long-term study.* Journal of pharmacy & bioallied sciences, 2015. **7**(Suppl 2): p. S559.

19. Mantovani, M.B., et al., *Use of modified lip repositioning technique associated with esthetic crown lengthening for treatment of excessive gingival display: A case report of multiple etiologies.* Journal of Indian Society of Periodontology, 2016. **20**(1): p. 82.

20. Storrer, C.L.M., et al., *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.* Journal of Indian Society of Periodontology, 2014. **18**(5): p. 656.

1. \* Corresponding author. *e-mail address: basakkarasu.@karatekin.edu.tr* [↑](#footnote-ref-1)