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WORD COUNT 1798
TIME SUBMITTED 14-DEC-2023 10:07AM
PAPER ID 105479434

PROCEEDINGS OF IKSTC 2023 - 2ND INTERNATIONAL KARATEKİN SCIENCE AND TECHNOLOGY CONFERENCE
21-22 DECEMBER 2023, ÇANKIRI, TURKIYE

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

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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]. A peg-shaped lateral, proclination of the upper labial segment, an enlarged labial frenum, a missing tooth, midline supernumerary teeth, and habits like lip or finger sucking, tongue thrusting can all result in midline diastema. 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]. The appearance of less than 3 mm of gingiva in the front area is considered a normal smile. When the gingiva between the canine teeth appear more than 3 mm while smiling, it is considered GS. [4]. GS can caused by various reasons including 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]. The relationship between the incisal edge slope of the upper incisors and the upper edge slope of the lower lip during smiling is expressed as the smile line. [9]. The lower edge of a person's upper lip when smiling is defined as the lip line. This line affects the appearance of the teeth and gingiva [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]. In order to perform gingivectomy, a sufficient amount of bone level, gingival thickness of more than 3 mm (from bone tissue to gingival crest) and a sufficient amount of attached gingival tissue are required. [13, 14]. Nonetheless, gingivectomy is contraindicated if osseous levels are approximate the cementoenamel junction because this could violate the biologic width [15].

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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.

2. Materials and Methods

A 23-year-old female patient applied to Çankırı Karatekin University Faculty of Dentistry department of Periodontology with a chief complaint of excessive gingival display, short clinical crowns, and spacing in the upper front tooth area. As a result of the medical and dental history taken from the patient, no systemic or dental disorders were detected. Midline spacing between the maxillary central incisors and gummy smile was observed during the clinical examination.

The phenotype of the gingiva was thick, pink and firm. Minimal amounts of calculus and plaque deposits were recorded during the periodontal evaluation. Relatively 2-3 mm were measured by the Williams probe during the first probing depth measurements without any bleeding or clinical attachment loss. The cementoenamel junction-alveoler bone crest distance were in a normal range. 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 recorded from the inferior border of the upper lip and gingival margins of maxillary anterior teeth.

After the clinical evaluation was completed, the patient was informed about all surgical and restorative procedures. Written consent form was obtained from the patient before starting dental treatment. Supragingival and subgingival scaling were performed by curettes and scalers. Oral hygiene instructions were given following the treatment.

In the second visit, local anesthesia (ultracain-articain HCl 40 mg/ml, epinephrine HCI 6 mcg/ml) was first administered in the vestibular mucosa between the maxillary right canine and the maxillary left canine. In order to prepare an 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 gingivectomy incisions were made in the anterior area on the facial surface only. After that, the excised gingiva tissue was removed with forceps. The gingiva was recontoured. 600 mg ibuprofen three times a day for three days was prescribed for the postoperative pain. For the first twenty-four hours following the surgery, the patient was advised to abstain from hot beverages. The patient was instructed to rinse with 0.12% Chlorhexidine Gluconate twice daily for 2 weeks. Follow-up examinations showed exposure of the complete anatomical crowns of upper anterior teeth, thus enhancing the esthetics of the teeth and correcting the excessive gingival display. The patient was consulted to the department of Restorative Dentistry.

First, a restorative dental examination was performed on the patient, whose gingivoplasty procedure was completed and the anatomical crown lengths reached a sufficient length, in order to close the diastema between the upper central teeth. Although no tooth decay was found in the upper central teeth in the mouth, 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. No pathological findings were detected in the radiological examination. 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.

The mesial regions of 1/3 of the mesiodistal length of the teeth and the fractured area were bevelling process performed with a flame-tipped diamond bur (858 H, 014, Bosphorus, Turkey). After bevelling process, cotton rolls were placed between the upper central teeth and the upper lip. In order to increase the roughness of the enamel surface, the beveled incisal edges and 1/3 mesial parts of the teeth were etched with Panora 200 Etching

Gel (IMICRYL, Turkey) for 30 seconds. After etching, the teeth were washed for 30 seconds and then dried. Wet cotton rolls were replaced. Before the restoration, the color selection process was made for the composite resin to be applied to the teeth and it was decided to use the composite resin in A1 color tone (Estelite Sigma Quick, Tokuyama Dental, Italy).

After a transparent tape (Dispodent, Turkey) was placed on the upper right central tooth, where color selection was made and saliva isolation was provided, bonding agent (Hybrid Bond One, Sun Medical Co., Ltd., Japan) was applied and then a suitable form was given to the tooth with composite resin. The same procedures were applied to the upper left central tooth. Following the composite application, the approximal surfaces of the teeth were polished with composite sandpaper (Ref. 8276, KG Sorensen, Brazil) and the vestibule surfaces were polished with composite discs (No 1.075, Tor VM, Russia). Finally, the restoration was completed by polishing the vestibule surfaces of the teeth with the help of yellow rubber (Ref. 905.C.100, Kenda AG, Liechtenstein).

3. Results and Discussion

Minimally invasive procedures present several advantages compared to more destructive traditional therapies by minimizing unnecessary loss of dental tissue, violation of the dentin-pulp complex, and lowering the risk of iatrogenic harm to adjacent hard and soft tissues. In order to restore function and aesthetics with restorations in the long term, these approaches preserve the maximum amount of dental tissue while utilizing the best restorative materials[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 significant 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 the gingival surgery is to establish an sufficient relationship between the gingival margin and the lip, to enhance 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].

When combined with the direct composite resin technique, periodontal surgery offered patients satisfactory functional and aesthetic outcomes while requiring less time and money for treatment than alternative approaches. This multidisciplinary approach to improving smile esthetics proved to be an excellent treatment option.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.

4. 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.

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