

Negotiating a gummy smile by multidisciplinary approach

(Abordaje de la sonrisa gingival mediante un enfoque multidisciplinario)

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Abstract(english)

Excessive gingival display, commonly referred to as a gummy smile, results from a combination of periodontal, dentoalveolar, and muscular etiologies. Effective management demands a multidisciplinary treatment strategy directed toward establishing an ideal tooth–gingiva–lip relationship. This series of two case reports presents the comprehensive management of a patient with an unaesthetic gummy smile. One case highlights the importance of stent as a guide path for esthetic crown lengthening. While the other case presents an interdisciplinary protocol comprising periodontal crown lengthening, frenectomy, endodontic intervention and, prosthetic rehabilitation. A detailed diagnostic evaluation established altered passive eruption and aberrant labial frenum attachment as the primary contributory factors. Crown lengthening was performed to re-establish the biological width and to achieve symmetrical gingival contours, while frenectomy reduced excessive tension and improved labial mobility. Following adequate healing, prosthetically driven restorations were placed to optimize tooth proportions and smile line alignment in the second case after the completion of endodontic treatment. The interdisciplinary sequencing of surgical periodontal procedures with prosthetic planning yielded stable peri-gingival architecture, improved gingival-tooth ratio, and enhanced esthetic outcome. This report underscores the importance of accurate etiologic diagnosis and integrated periodontal–endodontic–prosthodontic treatment planning in the predictable resolution of gummy smile.

Keywords(english)

Crown lengthening, Frenectomy, Gummy smile, Intentional Root Canal Treatment Interdisciplinary dentistry, prosthesis.

Resumen(español)

La exposición gingival excesiva, comúnmente denominada sonrisa gingival, se debe a una combinación de factores etiológicos periodontales, dentoalveolares y musculares. Su manejo eficaz requiere una estrategia de tratamiento multidisciplinario orientada a establecer una relación ideal entre dientes, encías y labios. Esta serie de dos casos clínicos presenta el abordaje integral de pacientes con sonrisa gingival poco estética. Uno de los casos destaca la importancia de utilizar una guía quirúrgica (férula) para el alargamiento coronario estético, mientras que el otro presenta un protocolo interdisciplinario que incluye alargamiento coronario periodontal, frenectomía, tratamiento endodóncico y rehabilitación protésica. Una evaluación diagnóstica detallada identificó la erupción pasiva alterada y la inserción anómala del frenillo labial como los principales

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factores contribuyentes. Se realizó un alargamiento coronario para restablecer el espacio biológico y lograr contornos gingivales simétricos, al tiempo que la frenectomía redujo la tensión excesiva y mejoró la movilidad labial. Tras una cicatrización adecuada, y una vez finalizado el tratamiento endodóncico en el segundo caso, se colocaron restauraciones guiadas por la planificación protésica para optimizar las proporciones dentales y la alineación de la línea de la sonrisa. La secuencia interdisciplinaria de procedimientos quirúrgicos periodontales y planificación protésica permitió obtener una arquitectura perigingival estable, mejorar la relación encía-diente y lograr un resultado estético superior. Este informe subraya la importancia de un diagnóstico etiológico preciso y de una planificación integrada de tratamientos periodontales, endodóncicos y protésicos para lograr una resolución predecible de la sonrisa gingival.

Palabras clave(español)

Alargamiento coronario, frenectomía, sonrisa gingival, tratamiento de conducto intencional, odontología interdisciplinaria, prótesis.

Introduction

A healthy smile is an expression of face which determines the happiness and displays the mental and physical well-being of an individual. Therefore, it is important for an individual to have an attractive and healthy smile which mainly comprises of components namely Lip line, Smile arc, Upper lip curvature, Lateral negative space, Smile symmetry, frontal occlusal plane, dental component and Gingival components. Discrepancy in any one of the components may contribute to an unesthetic smile which tends to lower the social and psychological confidence of an individual.

Most common presentation of such discrepancy is the gummy smile, a condition that is characterized by more than 3 mm of the gingiva display while smiling. This condition may not only affect the facial aesthetics but also compromise the oral functionality. It has been observed that females have a higher prevalence of gummy smile as compared to males. Gummy smile may be considered to have multifactorial origin which may either be of muscular, skeletal, dental or soft tissue origin. , Therefore, it becomes imperative for the dental fraternity to accurately identify the origin of the gummy smile and follow a suitable protocol to manage it. Various classifications have been proposed based on the structures involved in smiling which broadly include Muscular and Dento-gingival unit , Facial Esthetics and Function and Complex customized evaluation consisting of detailed three dimensional analysis of teeth and clinical attachment levels. The most common

treatment modality used widely for the management of gummy smile is fixed orthodontics but, it can only manipulate the position of teeth or the skeletal abnormalities. However, soft tissue management also plays a critical role in achieving the aesthetic outcome of the treatment as well. Hence, the surgical procedure undertaken to create a gingival symmetry to expose a sound tooth and harmony is known as Crown Lengthening Procedure (CLP) which involves excision of gingiva as well as alveolectomy. CLP can be either Esthetic or Functional. Esthetic crown lengthening involves excision of excessive gingival tissue in the anterior teeth region resultant of altered passive eruption without violating the biologic width. It is the most commonly used to negotiate gummy smiles. Functional crown lengthening involves exposure of sound tooth surface from the subgingival region by means of gingivectomy as well as resective osseous surgery while preserving the biologic width. It is commonly indicated in cases where there is scarcity of tooth structure to place a prosthesis either due to severe attrition, caries or fracture of the tooth. -

So, this series of two case reports aims to highlight the multidisciplinary surgical treatment approaches followed to provide a harmony and symmetry to a gummy smile and help the patient in regaining self-confidence to face the society.

Case report

Case report- 1

Introduction. A 29-year-old female presented to the outpatient department with the

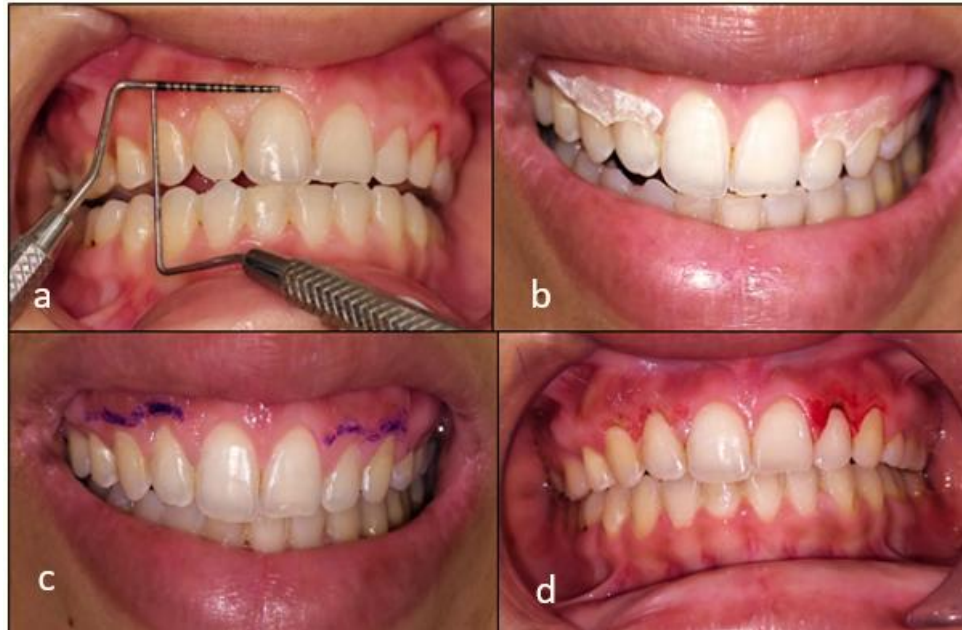


Figure 1. Laser Assisted Crown Lengthening procedure. a) Short bilateral vertical crown length of maxillary lateral incisors and canines; b) Placement of clear acrylic stent to demonstrate and mark the final length of the crown to be achieved; c) Marking made with Hematoxylin pencil; d) Immediate post operative photograph.

chief complaint of excessive gum exposure during smiling, desiring improved smile esthetics. Clinical examination confirmed competent lips at rest, with average facial height and movement and no evidence of vertical maxillary excess. Intraorally, short vertical crown lengths were noted bilaterally in the maxillary lateral incisors and canines, contributing to the unaesthetic gingival display. Radiographic assessment confirmed adequate bone height in the concerned region.

Diagnosis and Treatment Planning.

Given the absence of skeletal discrepancies and adequate facial proportions, an esthetic crown lengthening procedure was indicated to enhance clinical crown exposure. A minimally invasive protocol using a diode laser was formulated, eliminating the need for osseous correction. Preoperative models were utilized to fabricate an acrylic stent, serving as a precise guide to mark and maintain dimensions during gingivectomy. After patient education and informed consent, all relevant hematological investigations were completed. Prior to the procedure, Phase 1 periodontal therapy was performed to optimize tissue health for surgery.

Surgical Procedure. On the day of surgery, bone sounding was performed to confirm dimensions and guide safe excision relative to the underlying bone. Under anesthesia, laser-assisted gingivectomy was carried out using the EPIC X Diode Laser (BioLase) at CP0 mode, 1.1 W power, with an ep 4 tip. Guided by the acrylic stent, 3 mm of gingiva was precisely excised from teeth #13 and #23, while 2 mm was removed from #12 and #22. Immediate hemostasis and minimal postoperative discomfort were achieved, illustrating the advantages of modern laser protocols for soft tissue crown lengthening.

Postoperative Care and Outcome. The patient was given detailed postoperative instructions, and healing proceeded uneventfully. At follow-up, gingival margins were stable, and crown contours were aesthetically pleasing. The procedure resulted in marked improvement in smile esthetics and patient satisfaction, with no complications or tissue rebound observed at review. This case highlights the value of patient-specific, minimally invasive laser crown lengthening in correcting excessive gingival display and achieving predictable clinical outcomes.

Case report- 2

Introduction. A 26-year-old female presented to the outpatient department with a chief complaint of an unaesthetic (gummy smile) and sought comprehensive care to improve her smile esthetics. Initial intraoral examination revealed a traumatic deep bite resulting in severe palatal wear facets on the maxillary anterior teeth. Additionally, a papillary frenal attachment was observed, contributing to midline diastema progression. An integrative treatment plan was indicated to manage gingival exposure and restore the vertical dimension of occlusion (VDO) through a staged multidisciplinary approach.

Diagnostic Assessment and Treatment Planning.

Following thorough clinical and radiographic evaluation, the patient was counseled about the treatment objectives and plans. Informed consent was obtained, and preoperative hematological investigations were completed. Patch test was performed to exclude local anesthetic hypersensitivity.

Phase I: Etiotrophic Phase. Oral prophylaxis was performed at the first visit to establish healthy gingival tissues,

Phase II: Esthetic Surgical Procedures.

Intentional root canal treatment (RCT) was carried out for teeth #12–#22 and #32–#42 after confirming anesthetic tolerance. Post and core build-up restored integrity and provided structural support for subsequent prosthetic work.

Pocket depths were accurately measured and bleeding points marked with a Krane Kaplan pocket to preserve biologic width. Approximately 2 mm of gingival tissue was planned to be excised for optimal results. Aesthetic crown lengthening was performed to re-contour the gingival architecture and increase clinical crown length using electrocautery (ART-Electron E1 Electrosurgical System, 50 watts, 400 ohm load, 1.7 MHz, T4-fine wire tip, Cut and coagulation mode) on teeth #33–#43 and #13–#23.

Concurrent frenectomy was performed on the papillary frenum using a #15 blade under local anesthesia to correct the midline diastema trajectory and reduce gingival tension. Sutures were placed and postoperative instructions were given for optimal healing.

Phase III: Prosthetic Rehabilitation. Three weeks post-surgery, eight zirconia crowns were fabricated and precisely cemented, ensuring



Figure 2. a) Pre-operative photograph; b) Papillary frenal attachment markings for the gingivectomy; c) Immediate post-operative photograph; d) Zirconia crown cementation i.r.t. 12-22 and 32-42.

closure of the midline diastema and restoring tooth proportions according to smile design principles. The restoration significantly increased the VDO, provided functional stability, and delivered an aesthetically pleasing outcome

Discussion

The management of gummy smile often requires a multidisciplinary approach to address its multifactorial etiology, including excessive gingival display due to altered passive eruption, hypermobile upper lip, or dentoalveolar discrepancies. The presented series of two case reports demonstrates successful management of gummy smile attributed to altered passive eruption and presence of traumatic deep bite by combining aesthetic crown lengthening using different surgical modalities—scalpel, soft tissue laser, and electrocautery—along with frenectomy to curb the progress of midline diastema, endodontic therapy with post and core cementation to increase the vertical dimension, and final restoration with zirconia crowns to achieve optimal esthetic and functional outcomes.

Aesthetic crown lengthening plays a pivotal role in correcting gummy smile by surgically exposing more tooth structure through gingivectomy alone or sometimes osseous recontouring. This procedure restores the ideal crown-to-root ratio and improves the gingival margin position, thereby reducing excessive gingival display and enhancing smile aesthetics. Different techniques such as conventional surgery using scalpel provide precise tissue removal with tactile feedback, while soft tissue lasers offer advantages of minimal bleeding, reduced postoperative discomfort, and faster healing. A split mouth randomized clinical trial comparing the patient comfort, satisfaction, achievement and maintenance of ideal gingival margin after aesthetic crown lengthening levels using both conventional method and diode laser concluded acceptable outcomes after both the treatment modalities for the management of gummy smile. Electrocautery, though less commonly used today, allows for efficient soft tissue contouring with hemostasis but requires careful technique to avoid thermal damage. Similar procedure performed by Dhingra Y, et al (2023) concluded electrosurgery to

be a safe and efficient method for aesthetic crown lengthening without any post-operative complications. The choice of treatment depends on the clinical parameters, skill of the operator and patient preference.

Midline diastema is one of the major concerns as far as esthetics of smile are concerned. Normally, it closes with the eruption of the permanent maxillary canines. However a persistence of midline diastema may be attributed to high frenal attachment. In cases where a high frenal attachment contributes to midline diastema, gingival display or limits lip mobility, frenectomy is indicated. This procedure facilitates better lip positioning and complements crown lengthening by preventing relapse due to muscular pull. The integration of frenectomy in the treatment protocol ensures a stable and harmonious gingival margin. Suvitha. S., et al (2023) concluded in by their systematic review conducted on clinical trials that frenectomy in combination with orthodontic therapy helps in a stable closure of midline diastema.

The inclusion of intentional root canal treatment prior to prosthetic rehabilitation is justified in cases where significant tooth structure is removed during crown preparation, potentially compromising pulp vitality. In the above mentioned case intentional RCT was not only indicated because of significant loss of tooth structure during crown preparation but also due to traumatic deep bite with respect to the anterior teeth that had caused severe palatal wear facets and unwillingness of the patient to undergo orthodontic intervention. RCT allows for safe tooth preparation and subsequent placement of zirconia prostheses, which provide superior esthetics, biocompatibility, and strength. It also facilitates in increasing the vertical dimension of occlusion (VDO). Zirconia crowns mimic natural tooth translucency and color, essential for a pleasing smile makeover, especially in the anterior region. A similar protocol was followed by Hasanzade M, et al (2021) to rehabilitate the worn dentition attributed to deep bite using a minimally invasive approach and the obtained results were satisfactory.

The multidisciplinary strategy combining periodontal surgery, endodontics, and prosthodontics ensures comprehensive management of gummy smile, addressing both soft and hard tissue components as well as restorative

needs. This approach aligns with recent literature emphasizing the importance of tailored treatment plans based on individual etiologies and anatomical considerations. Similarly, Horn and Joly (2023) demonstrated the effectiveness of combining crown lengthening with adjunctive techniques to prevent relapse in complex cases.

In conclusion, smile designing plays a crucial role in amplifying both the aesthetic consideration and functional orchestration of a patient's smile. Through a holistic approach including personalized treatment plans, and careful

attention to the patient's distinctive features, smile designing can yield significant results in facial aesthetics and patient satisfaction. The positive outcomes in the above cases highlight the impact of smile design on both the patient's appearance and self-confidence.

Conflict of interest

None to declare.

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