

# Management of Gingival Enlargement in Patient with Fixed Orthodontic Appliances in Undiagnosed Type-2 Diabetic Patient: A Case Report

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## Abstract

*Gingival enlargement (GE) is a common periodontal condition that may result from inflammatory processes, medications, hormonal changes, or systemic diseases, including diabetes mellitus, which has a well-established bidirectional relationship with periodontal health. This case report aims to describe the clinical effectiveness of conventional gingivectomy in the management of gingival enlargement in an orthodontic patient with previously undiagnosed type 2 diabetes mellitus. A 37-year-old female undergoing fixed orthodontic treatment for two years presented with a complaint of gingival swelling in the mandibular anterior region accompanied by frequent bleeding during tooth brushing for approximately one year. The patient denied persistent pain, prolonged bleeding, or any known systemic disease. Clinical examination revealed localized gingival enlargement, most prominent around tooth 33, with the presence of plaque and calculus accumulation. The enlarged gingival tissue covered nearly half of the clinical crown, corresponding to a gingival overgrowth index score of 2, contributing to plaque retention and aesthetic concerns. Further assessment revealed a random blood glucose level of 272 mg/dL, indicating uncontrolled type 2 diabetes mellitus, while blood pressure was within normal limits. Following medical management and stabilization of blood glucose levels, conventional scalpel gingivectomy and gingivoplasty were performed to remove excess gingival tissue, restore normal gingival contours, reduce plaque-retentive areas, support ongoing orthodontic treatment, and improve aesthetics. Postoperative evaluation demonstrated satisfactory healing and improvement in gingival morphology and oral hygiene maintenance. This case highlights that conventional gingivectomy is an effective treatment modality for gingival enlargement when appropriately indicated and underscores the importance of identifying and controlling underlying systemic conditions, particularly diabetes mellitus, to achieve favorable periodontal and surgical outcomes.*

**Keyword:** Orthodontic Induced Gingival Enlargement, Gingivectomy, Scalpel, Orthodontic Therapy, Type 2 Diabetes Mellitus.



## A. INTRODUCTION

Gingival enlargement is a condition known as an increase in the size of gingiva. The symmetry and form of gingival tissues can substantially impact the harmonious appearance of dentition. An ideal anterior appearance is provided by healthy periodontal tissues that are completely free of inflammation. Accurate identification of the cause of the enlargement is necessary for effective management. Fixed orthodontic equipment and persistent periodontal diseases affected by systemic conditions may be related. The purpose of the given case report is to demonstrate and discuss the clinical effectiveness of conventional scalpel gingivectomy on patients

with fixed orthodontic appliances impacted with undiagnosed type 2 diabetes (Newman et al., 2011).

Plaque accumulation and the colonisation of periodontopathic bacteria surrounding the retentive components attached to the surface of teeth are affected by the presence of fixed orthodontic appliances<sup>2</sup>. However, in severe cases, the enlargement may persist despite the elimination of etiological factors and the provision of nonsurgical periodontal therapy. Extensive gingival enlargement can compromise oral hygiene practices and may not respond adequately to scaling and root planing alone. Therefore, surgical approaches such as gingivectomy are often indicated to re-establish normal gingival architecture (Maboudi et al., 2023).

Uncontrolled diabetes can exacerbate the inflammatory response to local irritants and contributes to more severe gingival overgrowth. Along with the accumulation of plaque and calculus that trigger inflammation, uncontrolled diabetes acts as a predisposing factor that intensifies the inflammatory response and reduces collagen degradation. This results in collagen and extracellular matrix accumulation that leads to gingival thickening and enlargement. The enlarged gingiva was then treated with surgical therapy (gingivectomy and gingivoplasty) followed with non-surgical therapy (diabetes mellitus treatment) and dental health education (Newman et al., 2011).

## **B. CASE PRESENTATION**

A 37-year-old female patient undergoing orthodontic treatment for 2 years was referred to the Department of Periodontics, Mangusada Regional Hospital with a complaint of swollen gums in the lower anterior region that frequently bleed when brushing her teeth for the past  $\pm 1$  year. The patient denied a history of persistent pain, difficult-to-stop bleeding, or any other history of systemic illness. Examination revealed extensive gingival tissue and pseudo pockets associated with pale pink edematous gingival characteristics on the mandibular anterior region with the most prominent enlargement located at tooth 33. Calculus and plaque was seen on each tooth. General examination was done and results showed that the patient had a random blood glucose (RBG) 272 mg/dL and blood pressure of 115/75 mmHg.



**Figure 1. Gingival Enlargement in Patient with Orthodontic Appliances**

### **C. CASE MANAGEMENT**

Based on the findings, the patient was first referred to the internal medicine department to receive diabetic treatment. After 2 weeks of diabetic therapy, blood glucose is in control, the patient was advised to undergo initial therapy followed with surgical intervention along with long-term evaluation. Treatment was initiated after vital sign assessment and completion of informed consent form. The patient's vital signs were found to be within normal limits. The patient has undergone supragingival scaling and polishing as initial treatment on second visit to remove calculus and plaque accumulated under fixed orthodontic appliance. On the third visit, follow-up was done one week after initial therapy to assess the patient's gingival and periodontal conditions. Inflammation was reduced and curettage was done to remove granulation tissues. On the fourth visit, two weeks post curettage showed good oral hygiene maintained yet gingival enlargement remained present. A gingivectomy procedure was indicated to resolve the condition.



**Figure 2. Gingivectomy Procedure**

The Gingivectomy procedure began with asepsis of the operative field using povidone-iodine. Anesthesia was initiated with topical application, followed by labial and lingual infiltration anesthesia at the mucogingival junction of teeth 33 using a Citojet syringe. Bleeding points were created with a pocket marking forceps and followed with external bevel incision with no.15 scalpel blade, positioned 1 mm apical to the bleeding points at a 45-degree angle toward the coronal direction, in order to create a zero pocket. The excised gingival tissue was then separated with a Gracey curette. Gingivoplasty was done to smooth and thin to establish the physiological contour of the gingiva followed by irrigation with saline solution. Amoxicillin, mefenamic acid, and 0,12% chlorhexidine mouthrinse was prescribed. The patient was advised to undergo regular blood glucose monitoring. At the 2-week follow-up, gingival enlargement in the region tooth 33 has resolved. Owing to well-controlled blood glucose and good oral hygiene, the gingival enlargement index in the remaining mandibular region has also decreased. Though gingival enlargement was still present in the remaining mandibular anterior region, the patient did not consent to further surgical management.



**Figure 3. Immediate Post-operative Outcome of Gingivectomy Procedure**

Gingival enlargement is a condition characterized by an increase in gingival size beyond its normal dimensions. In addition to causing aesthetic concerns, it also provides a niche for microbial growth. Gingival enlargement can be classified into two types: hypertrophy and hyperplasia. In the present case, gingival hyperplasia was identified, as clinical examination revealed firm and dense gingival tissue, more pronounced stippling and a paler appearance. This differs from hypertrophic gingiva, which typically presents with a redder coloration (Kwon, et al. 2024; Lopez Arrieta, et al. 2024).

The etiology of gingival enlargement may be multifactorial, involving both local and systemic factors (Rădeanu et al., 2024). In this case, the enlargement was primarily attributed to local factors, such as plaque and calculus accumulation, exacerbated by fixed orthodontic appliances. The uncontrolled diabetes mellitus also serves as a systemic predisposing factor. Gingival enlargement represents a host inflammatory response to microbial products in dental plaque. Placement of fixed orthodontic appliances facilitates biofilm accumulation and bacterial colonisation, which in turn triggers inflammation (Agrawal et al., 2024). A positive correlation has been demonstrated between the duration of orthodontic appliances use and the incidence of gingival enlargement. This aligns with the finding of the patient's subjective report of wearing fixed orthodontic appliances for two years without adequate oral hygiene maintenance (Niu et al., 2024).

Once gingival enlargement develops, it further complicates access to tooth surfaces and hinders self-cleansing, resulting in increased plaque accumulations. This process represents the initial stage of gingival enlargement (Papadopoulou et al., 2024). In this case, despite scaling and root planning, the gingiva did not show any reduction in size due to a possibility of residual subgingival calculus that could not be

reached due to limited accessibility and visibility. In addition, uncontrolled diabetes mellitus in this case acted as a predisposing factor that aggravated the inflammatory process (Al-Abdaly et al., 2022). Thus, non-surgical intervention such as diabetic medication and dental health education followed with surgical intervention in the form of gingivectomy and gingivoplasty was indicated.

Uncontrolled diabetes mellitus has been shown to exacerbate or induce gingival enlargement through multiple pathological mechanisms. According to a case report by Nomura et al., patients with poorly controlled type 2 diabetes exhibited persistent and generalized gingival overgrowth (Al-Abdaly et al., 2022). Hyperglycemia in uncontrolled diabetes contributes to an exaggerated inflammatory response and impairs collagen metabolism, leading to an accumulation of extracellular matrix in the gingival tissues. Additionally, microvascular dysfunction and delayed wound healing further amplify the severity of gingival enlargement. The case demonstrated that upon achieving glycemic control and substituting the offending medication, gingival overgrowth regressed significantly, underscoring the critical role of systemic metabolic regulation in periodontal tissue response (Al-Abdaly et al., 2022).

Inflammation that is induced by glucotoxicity and lipotoxicity increase systemic inflammation and dysregulation of the immune system. This results in delayed wound healing and prolonged inflammatory response. This can exacerbate gingival tissue response to local irritants with gingival enlargement as the outcome. The increase of collagen production in diabetes patients, where fibroblast produces more collagen as part of a chronic inflammatory response. At the same time, the process of collagen breakdown decreases. With more collagen being produced and less collagen being degraded, there is progressive increase of extracellular matrix accumulation in gingival connective tissue. This state results in thickening of gingiva and contributing to gingival enlargement. These findings highlight the importance of interdisciplinary management between medical and dental professionals for diabetic patients presenting with gingival pathology (Nomura et al., 2021).

Both non-surgical and surgical therapy was done in the given case. It is shown that conventional gingivectomy effectively resolves gingival enlargement with local and systemic complications. It is a straightforward minor surgical procedure that does not require advanced equipment, making it widely applicable in clinical practice<sup>1</sup>. Long-term follow-up was done, there was no recurrence in the region of tooth 33. Owing to well-controlled blood glucose and good oral hygiene, the gingival enlargement index in the remaining mandibular region has also decreased.

#### **D. CONCLUSION**

Conventional scalpel gingivectomy combined with gingivoplasty proved to be an effective treatment for managing gingival enlargement in an orthodontic patient with previously undiagnosed type 2 diabetes mellitus. The procedure successfully eliminated excess gingival tissue, restored physiological gingival contours, reduced plaque-retentive areas, and improved both oral hygiene maintenance and aesthetics.

This case also highlights the importance of comprehensive patient evaluation, as gingival enlargement may serve as an early clinical indicator of an underlying systemic condition such as diabetes mellitus. Appropriate medical management and glycemic control prior to periodontal surgery are essential to ensure optimal healing and treatment outcomes. Interdisciplinary collaboration between dental and medical practitioners is therefore crucial in achieving successful periodontal and overall patient care.

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