



MANAGEMENT OF GINGIVAL ENLARGEMENT IN PATIENT WITH FIXED ORTHODONTIC APPLIANCES IN UNDIAGNOSED TYPE-2 DIABETIC PATIENT : A CASE REPORT

Muliyanto EC^{1*}, Yunanthi RAE², Muliyanto JA³

¹Internship Dentist, Mangusada Regional Hospital, Jalan Raya Kapal, Mangupura, Mengwi, Jl. Raya Denpasar - Gilimanuk, Kapal, Mengwi, Badung, Bali 80351, Indonesia

²Department of Periodontics, Mangusada Regional Hospital, Jalan Raya Kapal, Mangupura, Mengwi, Jl. Raya Denpasar - Gilimanuk, Kapal Mengwi, Badung, Bali 80351, Indonesia

³Faculty of Medicine, Universitas Katolik Widya Mandala Surabaya, Jl. Kalisari Selatan Jl. Raya Kalisari Dharma No.1, Kalisari, Mulyorejo, Surabaya, Jawa Timur 60112, Indonesia

*Itsevelynchristina@gmail.com

ABSTRACT

Gingival enlargement (GE) can be caused by inflammation, medications, or systemic conditions. Diseases such as hypertension and diabetes have a reciprocal relationship. This case report aims to discuss the clinical effectiveness of conventional gingivectomy in an orthodontic patient with undiagnosed type 2 diabetes. A 37-year-old female patient who had been undergoing orthodontic treatment for 2 years presented with complaints of swollen gums in the anterior region of the lower jaw that frequently bled while brushing her teeth over the past ± 1 year. The patient denied persistent pain, uncontrollable bleeding, or a history of other systemic diseases. A general examination revealed a random blood glucose (RBG) level of 272 mg/dL, indicating uncontrolled diabetes with normal blood pressure. An intraoral examination showed gingival enlargement in the anterior mandibular region, particularly around tooth 33, accompanied by plaque and calculus. After blood glucose levels were controlled, conventional scalpel gingivectomy and gingivoplasty were performed. The gingival tissue appeared to cover nearly half of the tooth crown with a gingival overgrowth index of 2, leading to plaque accumulation and aesthetic concerns. The procedure was performed to remove excess gingival tissue, improve gingival contour, reduce plaque accumulation, support orthodontic treatment, and address the patient's aesthetic concerns. Conventional gingivectomy has proven effective in managing gingival overgrowth when performed according to indications.

Keywords: gingivectomy; orthodontic induced gingival enlargement; orthodontic therapy; scalpel; type 2 diabetes mellitus

How to cite (in APA style)

EC, M., RAE, Y., & JA, M. (2026). Management of Gingival Enlargement in Patient with Fixed Orthodontic Appliances in Undiagnosed Type-2 Diabetic Patient : A Case Report. *Indonesian Journal of Global Health Research*, 8(4), 775–780. <https://doi.org/10.37287/ijghr.v8i4.2104>.

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 (Bamani et al., 2023; Pandit et al., 2023). 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 (Wang et al., 2025). 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., 2019).

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 (García-Ríos, 2025). The equilibrium between the microbial agent and the host's

immune response determines periodontal disease's initial stage and development. Some causative factors for gingival enlargement caused by orthodontic treatment were discussed by Kloehn and Pfeifer, including mechanical irritation from bands, chemical irritation from cement and poor oral hygiene that favour plaque build up and retention. The periodontal tissue must be completely free of these harmful substances to heal (Kwon, 2024). However, when gingival enlargement is widespread and self-oral hygiene procedures are hampered, nonsurgical therapy such as scaling and oral hygiene instructions are not effective enough. Through the given case surgical and non-surgical therapy are combined with systemic medication due to the patient's type 2 diabetes and unattractive appearance of enlarged gingiva (García-Ríos, 2025).

Uncontrolled diabetes can exacerbate the inflammatory response to local irritants and contributes to more severe gingival overgrowth (Ranbhise et al., 2025). 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 (Dhande et al., 2022). 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., 2019). This case report aims to demonstrate and discuss the clinical effectiveness of conventional scalpel gingivectomy in a patient with fixed orthodontic appliances who presented with gingival overgrowth and undiagnosed type 2 diabetes mellitus. It is hoped that the findings of this case report will contribute to a better understanding of the importance of identifying systemic conditions underlying gingival overgrowth, as well as the importance of a multidisciplinary approach to successful periodontal therapy in orthodontic patients.

METHOD

The research method used in this case report involved the collection of clinical and observational data on a 37-year-old female patient undergoing fixed orthodontic treatment who presented with gingival enlargement in the anterior region of the mandible. Data were obtained through a medical history, intraoral clinical examination, and a general physical examination to assess the patient's systemic condition. The medical history was taken to identify the main complaint, the course of the disease, the history of orthodontic treatment, and the history of systemic diseases. The intraoral examination included an evaluation of the gingival condition, the presence of plaque and calculus, and the degree of gingival enlargement. Supporting examinations, such as random blood glucose and blood pressure measurements, were performed to support the diagnosis and determine an appropriate treatment plan.

Case management is carried out in stages, beginning with control of the patient's systemic condition through referral to the internal medicine department for diabetes mellitus therapy. Once blood glucose levels are controlled, initial periodontal therapy is performed, consisting of supragingival scaling and polishing, along with periodic evaluation of periodontal condition. Subsequently, conventional gingivectomy and gingivoplasty are performed on areas with persistent gingival overgrowth. Post-procedural evaluation is conducted through clinical observation of the tissue healing process, reduction in the gingival overgrowth index, and improvement in the patient's oral hygiene during follow-up visits.

RESULT

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 ± 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

Case Management



Figure 2. Gingivectomy Procedure

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.

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.

DISCUSSION

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 (Pandit et al., 2023). 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, 2024; López-Arrieta, 2024).

The etiology of gingival enlargement may be multifactorial, involving both local and systemic factors (Efe 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 (Cureus, 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, 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, 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, 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 overgrowth⁹. 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, 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 (Newman et al., 2019). 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.

CONCLUSION

Conventional gingivectomy combined with proper periodontal therapy and systemic diabetic management was shown to be effective in reducing gingival enlargement in patients undergoing fixed orthodontic treatment with previously undiagnosed type 2 diabetes mellitus. In this case, plaque accumulation associated with orthodontic appliances, aggravated by uncontrolled blood glucose levels, contributed significantly to gingival overgrowth and persistent inflammation. Following glycemic control, scaling, curettage, gingivectomy, and gingivoplasty, the patient demonstrated satisfactory clinical improvement with reduced gingival enlargement, improved gingival contour, and no recurrence in the treated area during follow-up. These findings emphasize the importance of interdisciplinary collaboration between dental and medical professionals, as well as the need for adequate oral hygiene maintenance and systemic disease control to achieve optimal periodontal outcomes in orthodontic patients.

REFERENCES

- Al-Abdaly, M. (2022). Influence of fixed orthodontic treatment duration on severity of inflammatory gingival enlargement and salivary properties.
- Bamani, M. S., Al Malki, N. H., Alghamdi, Z. M., Alghamdi, S. A., Alotaibi, A. O., Kamel, A. M., ... & Al Hazmi, A. M. (2023). Types and characteristics of gingival enlargements. *Int J Community Med Public Health*, 10(1), 491-495. <https://dx.doi.org/10.18203/2394-6040.ijcmph20223579>
- Cureus. (2024). Gingivectomy as a treatment for orthodontic-induced gingival enlargement: case-based article.
- Dhande, S., Khan, M., Muglikar, S., Chaudhari, S., Jangale, S. A., & Jangale, A. G. (2022). Diabetes and periodontal disease: The reciprocal relationship. *J. Gen. Dent*, 3, 1-8.
- Efe, D., Çolak, İ. & Buduneli, N. (2024). Calcium Channel Blockers-Induced Gingival Enlargements: Pathogenic Mechanisms, Clinical Findings, and Management. *Current Oral Health Reports*, 11(4), 312-317. <https://doi.org/10.1007/s40496-024-00388-x>
- García-Ríos, P. (2025). The influence of diabetes on orthodontic treatment: clinical considerations and challenges. *Systematic Review*.
- Kwon, T. H. (2024). Periodontal considerations in orthodontic treatment.
- López-Arrieta, Z. (2024). Gingival enlargement associated with orthodontics: mechanisms, oxidative biomarkers, and clinical manifestations.
- Newman, M. G., Takei, H., Klokkevold, P. R., & Carranza, F. A. (2019). *Carranza's Clinical Periodontology* (13th ed.). Elsevier.
- Niu, Q. (2024). Dynamics of the oral microbiome during orthodontic treatment: contribution to inflammation and gingival overgrowth.
- Nomura, Y., Morozumi, T., Numabe, Y., Ogata, Y., Nakayama, Y., & Sugaya, T. (2021). Estimation of the Periodontal Inflamed Surface Area by Simple Oral Examination. *Journal of Clinical Medicine*, 10(4), 723. <https://doi.org/10.3390/jcm10040723>

- Pandit, N., Grover, V., Gugnani, S., Bali, D., & Ranjan, A. (2023). A Systematic Approach to the Diagnosis of Gingival Enlargements. *Journal of Oral Health and Community Dentistry*, 17(2), 66-74. <https://doi.org/10.5005/jp-journals-10062-0170>
- Papadopoulou, E. (2024). Challenges in differential diagnosis of diffuse gingival enlargement: distinguishing orthodontic-induced, systemic, and drug-related causes.
- Ranbhise, J. S., Ju, S., Singh, M. K., Han, S., Akter, S., Ha, J., ... & Kang, I. (2025). Chronic inflammation and glycemic control: exploring the bidirectional link between periodontitis and diabetes. *Dentistry Journal*, 13(3), 100. <https://doi.org/10.3390/dj13030100>
- Wang, Y., Wang, S., Chen, Y., Lin, K., Gao, G., Wu, S., ... & Guo, J. (2025). Orthodontic treatment improves gingival morphological symmetry parameters: a retrospective study. *BMC Oral Health*, 25(1), 1285. <https://doi.org/10.1186/s12903-025-06452-x>