JPPIPA 11(5) (2025)

Jurnal Penelitian Pendidikan IPA

http://jppipa.unram.ac.id/index.php/jppipa/index

Case Report of Drug-Induced Gingival Overgrowth (DIGO) in Amlodipine User at Bhayangkara Brimob Hospital

Rike Rayanti[1], Sylvia Angela Yasmine[2], How Kim Chuan[3], Susanna Halim[4*]

[1] Bhayangkara Brimob Hospital and World Stomatology Institute.
[2] Internship of Dentist at Bhayangkara Brimob Hospital.
[3] Faculty of Medicine University Tunku Abdul Rahman and World Stomatology Institute.
[4] Faculty of Medicine, Dentistry and Health Sciences, University of Prima Indonesia.

Received: January 23, 2025
Revised: March 27, 2025
Accepted: May 25, 2025
Published: May 31, 2025

Corresponding Author:
Susanna Halim
susannahalim@unprimdn.ac.id

DOI: 10.29303/jppipa.v11i5.10994

Abstract: Drug-induced gingival overgrowth (DIGO) is a condition where the gingiva is abnormally enlarged caused by anticonvulsant, calcium channel blocker, and immunosuppressant drugs. Amlodipine, a calcium channel blocker, is used to treat hypertension and is reported to be the first drug to cause gingival overgrowth. The prevalence of gingival overgrowth induced by calcium channel blockers including amlodipine is 6%-83%. This case report was written with the aim of presenting information on the management of DIGO treatment in hypertensive patients without drug replacement also underlines the importance of integrating science-based health education in dental care to support treatment adherence and patient literacy. The 60-year-old female patient came to the Dental Clinic of Bhayangkara Brimob Hospital with the main complaint of enlarged gums since one year ago almost throughout her mouth. Gum enlargement is slow and painless, but sometimes bleeds when brushing teeth. The patient had a history of high blood pressure and was prescribed amlodipine 10 mg once a day and routinely consumed since the last 5 years. Cleaning of supra and sub-gingival tartar, prescribing chlorhexidine gluconate 0.2% mouthwash to be swished before bedtime, and motivating the patient to continue to maintain oral hygiene. Conclusion: Amlodipine is one of the drugs that cause DIGO (Drug Induced Gingival Overgrowth). Good dental hygiene and patient education have a major role in improving the condition of gingival enlargement.

Keywords: Amlodipine; Ca channel blockers; DIGO; Gingival overgrowth; Scaling

Introduction

Generally, gingival overgrowth and enlargement is an inflammatory process caused by plaque, which can be modified by systemic diseases or drugs (Beaumont et al., 2017). Gingival overgrowth caused by taking certain drugs is known as drug-induced gingival overgrowth (DIGO) (Michael G. et al., 2018; Nath et al., 2024; Tungare et al., 2025). The class of drugs that can cause gingival overgrowth are anticonvulsant drugs, calcium channel blockers, and immunosuppressants which are commonly prescribed to patients with serious health problems such as epilepsy, hypertension, and organ transplant patients (Anuja et al., 2021; Michael G. et al., 2018; Portnoy et al., 2022). Genetic factors, drug dosage, and local factors can affect the development and severity of DIGO.

Genetic factors, drug dosage, and local factors can influence the development and severity of DIGO (Beaumont et al., 2017). DIGO often leads to disruption of patients' aesthetics, oral hygiene, biofilm buildup, and

How to Cite:
Rayanti, R., Yasmine, S. A., Chuan, H. K., & Halim, S. (2025). Case Report of Drug-Induced Gingival Overgrowth (DIGO) in Amlodipine User at Bhayangkara Brimob Hospital. *Jurnal Penelitian Pendidikan IPA*, *11*(5), 1046-1054. https://doi.org/10.29303/jppipa.v11i5.10994

gingivitis. Controlling local factors, however, can significantly reduce gingival growth (Nath et al., 2024).

DIGO lesions generally progress rapidly and become chronic over time. The first signs of gingival overgrowth can be observed as early as 3 months after drug use as localized nodular enlargement of the interdental papillae. As most of the drugs associated with DIGO are prescribed for a long time, the lesions can expand and in some cases go as far as covering the crowns of the teeth. Dental biofilms and bacterial infections often cause inflammation of the tissues characterized by the presence of edema and bleeding. The extent of fibrosis and inflammation depends on the dose, duration, and type of medication; oral hygiene; individual susceptibility, including genetic factor (Michael G. et al., 2018).

Amlodipine is a 3rd generation dihydropyridine derivative of the new anti-anginal Calcium Channel Blocker that works by reducing myocardial contractility and oxygen demand and dilating coronary arteries and arterioles used to treat hypertension and angina (Nath et al., 2024). Amlodipine is used for a long period of time and is reported to be the first drug to cause gingival overgrowth. Generally, amlodipine-induced gingival overgrowth occurs within 3 months of taking the drug, at a dose of 5-10 mg/day (Nath et al., 2024). Gingival overgrowth is a less noticed side effect of amlodipine and is more common in patients with poor dental hygiene. Uncontrolled gingival overgrowth can lead to pain, tooth loss and psychosocial suffering (Erken, 2016; Portnoy et al., 2022; Quenel et al., 2020). The prevalence of gingival overgrowth induced by calcium channel blockers including amlodipine is 6%-83% (Michael G. et al., 2018; Triveni et al., 2009).

Patients at risk or those already suffering from drug-induced adverse reaction gingival enlargement (DIGO) require rigorous dental care. DIGO treatment strategies require a number of approaches that include non-surgical and surgical approaches. In the non-surgical approach, the precipitating and aggravating factors of DIGO need to be controlled. Elimination of local factors such as biofilm, calculus and regular periodontal maintenance are essential to prevent DIGO recurrence. Professional mechanical removal of plaque and calculus including scaling and root-planing has been shown to be helpful in improving gingival conditions in patients with DIGO. In addition, the use of systemic antibiotics, can affect DIGO remission which ranges from three months to two years (Sabarudin et al., 2022).

The purpose of this case report is to present information on the treatment of DIGO (drug-induced gingival overgrowth) by removing only local factors such as plaque and calculus without replacing amlodipine. Treatment was performed non-surgically (Kamei et al., 2022; Machirah et al., 2023; Mona et al., 2019). It is hoped that this case report can be additional information for readers.

Method

Direct observation of patients who came for treatment at Bhayangkara Brimob Hospital and routine control within one and a half months. This research method is a descriptive case report, which is used to provide a detailed description and explanation of a unique case or phenomenon that draws attention (Alpi et al., 2019; Crowe et al., 2011). Additionally, it outlines diagnostic approaches and therapeutic procedures that have not been thoroughly studied due to limitations such as insufficient sample sizes or their recent emergence, making them valuable as the first line of evidence. Consequently, these reports serve as useful starting points for future research that can be conducted with more rigorous methodologies (Ibarra et al., 2023).

Result and Discussion

Result

A 60-year-old female patient came to the Dental Clinic of Bhayangkara Brimob Hospital with a chief complaint of enlarged gums since 1 year ago almost throughout her mouth. The patient felt that her gum enlargement was slow and painless, but sometimes bled when brushing her teeth. The patient claimed to have a history of high blood pressure and had been treated by a general practitioner. The patient was prescribed amlodipine and has been taking it regularly since 5 years ago. The patient wanted her gum condition to be treated to return to normal.

On the first visit, December 04, 2024, a 60-year-old female patient came to the Dental Clinic of Bhayangkara Brimob Hospital with the main complaint of enlarged gums since 1 year ago almost throughout her mouth. A thorough examination was conducted to the patient. Based on anamnesis, the patient felt that her gum enlargement was slow and painless, but sometimes bled when brushing her teeth. In addition, the patient also claimed to have a history of high blood pressure and was prescribed amlodipine 10 mg, which she had been taking regularly since 5 years ago. Currently, the patient felt anxious because of her enlarged gums and wanted to have treatment to get her gums back to normal.

After the taking anamnesis, subjective and objective examinations (extra oral and intraoral examinations) were also conducted. Based on the examination results, a clinical picture was obtained in the form of enlarged and rounded gums in the interdental areas of maxilla and mandible. The gum enlargement appeared larger in

the interdental area of the mandibular teeth, there was diastema between the mandibular front teeth, and thick calculus accumulation both supra and sub-gingival, especially on the RB teeth (Figures 1-3). In the occlusal cross-sectional clinical picture, there was also abnormal gingival enlargement in the palatal interdental area of the maxillary dentition and the lingual area of the mandibular dentition. The patient's gingival enlargement was accompanied by supra- and sub-gingival calculus accumulation (Figure 4-5). On probing examination, the average socket depth was found to be >4 mm without any tooth loosening.

Figure 1. Front view of the patient's oral condition

Figure 2. Right view of the patient's oral condition

Figure 3. Left side view of the patient's oral condition

Figure 4. Occlusal view of the patient's maxilla

Figure 5. Occlusal view of the patient's mandible

Based on all the results of the initial examination in the form of subjective and objective examinations, the patient's initial diagnosis was drug-induced gingival overgrowth. In order to confirm the diagnosis, the patient was asked to perform supporting examinations in the form of panoramic x-rays and complete blood laboratory tests including examination of blood sugar, hemoglobin, leukocytes, hematocrit, platelets, bleeding period, and blood clotting period. Patients are also given information about the condition of their teeth and mouth, diagnosis, treatment plan, treatment procedures and complications that may occur. The patient understood the explanation that had been presented and agreed to sign an Informed Consent when treatment began.

The patient has also undergone panoramic radiography and laboratory examination. Based on the panoramic radiographic examination, there was a decrease in alveolar bone with a horizontal pattern in teeth 34, 46, and 47 (Figure 6).

Figure 6. Panoramic photo of patient

Based on complete blood laboratory examinations including blood sugar, hemoglobin, leukocytes, hematocrit, thrombocytes, bleeding time, and clotting time, all within normal limits (Table 1).

Table 1. Laboratory Examination Results

Inspection Details	Results	References
Random blood glucose	100 mg/dl	70 – 200 mg/dl
Hemoglobin	13,7 g/dL	12,3 – 15,3 g/dL
Leukocytes	8.110 cell/µl	5.000 – 10.000 cell/µl
Hematocrit	42%	36 – 42%
Thrombocytes	316.000 ceil/µl	150.000 – 450.000 cell/µl
Bleeding Time (BT)	3 minutes	1 – 3 minutes
Clotting Time (CT)	13 minutes	9 – 15 minutes

On the second visit on December 13, 2024, the patient came back to continue treatment. The patient admitted that because he felt anxious about his condition and knew that amlodipine was one of the causes of his illness, the patient took the initiative to stop taking his amlodipine medication since returning from the first visit. This second visit, the patient was in a normal blood pressure condition so supra and sub-gingival scaling was performed on the mandibular teeth first which was the most uncomfortable part. After scaling treatment, the bleeding gums were irrigated using H_2O_2 solution which is an antiseptic solution and can reduce bleeding in patients. Then, the patient was prescribed chlorhexidine gluconate 0.2% mouthwash which should be swished before going to bed. The use of this mouthwash was done after the patient had brushed her teeth at night, then the medicine was swished around for 30 seconds-1 minute and then discarded. Patients are prohibited from rinsing their mouth using water, eating and drinking after gargling. This is so that the mouthwash can work effectively. Before the treatment ended, the patient was also educated on how to maintain oral hygiene, and asked not to stop taking anti-hypertensive drugs on their own initiative. The patient was asked to come back the following week.

On the third visit, December 24, 2024, the patient came back after scaling and routinely rinsed her mouth using chlorhexidine gluconate 0.2% before going to bed. The patient felt that her gums were getting better and wanted to continue the treatment (Figure 7-11).

Figure 7. Front view after 1-tame treatment

Figure 8. Right view after 1 treatment

Figure 9. Left view after 1 treatment

Figure 10. Maxilla view after 1 treatment

Figure 11. Mandible view after 1 treatment

On this third visit, scaling was performed on the patient's mandibular teeth both supra and sub gingival. After that, irrigation was done using H_2O_2 solution to help reduce bleeding. The patient was also prescribed

chlorhexidine gluconate 0.2% mouthwash to be swished before bedtime. However, at the end of treatment the patient admitted that she had stopped taking her amlodipine medication. After the patient was examined, her blood pressure was 170/121 mmHg. To prevent infection due to sub gingival tartar removal, the patient was prescribed amoxicillin antibiotic which should be taken 3 x 1 and finished. The patient was re-educated not to stop taking his anti-hypertension medication on his own initiative and was asked to control his general practitioner regarding his systemic condition. After that, the patient was asked to return for control.

On the fourth visit, January 12, 2025, the patient came back to continue treatment. The patient's gum condition was getting better, especially in her lower jaw area (Figure 12-16).

Figure 12. Front view after 3rd treatment

Figure 13. Right view after 3rd treatment

Figure 14. Left view after 3rd treatment

Figure 15. Maxilla view after 3rd treatment

Figure 16. Mandible view after 3rd treatment

Before starting treatment, the patient was first measured for blood pressure. The result showed that the patient's blood pressure was high at 169/90 mmHg. Due to the high blood pressure result, tartar cleaning on the patient's teeth and mouth was limited to the supra gingival area to prevent unexpected bleeding and infection. In addition, the patient also claimed to have returned to her general practitioner regarding her hypertension, and was prescribed amlodipine 10 mg. The patient admitted to taking his amlodipine medication regularly again.

The patient's tartar cleaning at this fourth visit began to cover the lower jaw and also the upper jaw, but was only limited to the supra gingival area. After scaling, the patient's gums were irrigated using H_2O_2 solution and then asked to return for control.

The fifth visit, on February 04, 2025, the patient's gum condition was much improved. The patient was happy with her current gum condition and wanted to continue the treatment.

Before starting treatment, blood pressure was measured again. The results were within the limits of supra- and sub-gingival tartar removal. Tartar removal was performed on both upper and lower jaws. After tartar cleaning was completed, the patient's bleeding gingiva was irrigated using H_2O_2 solution.

Based on the assessment of the patient's gingiva which had improved a lot, the patient was recommended to do a control every 3 months. In addition, the patient was also educated to maintain oral

hygiene until the control time. It is expected that the patient's gingiva will improve further at the time of control. If the patient's gingiva does not improve, multidisciplinary treatment will be carried out by referring the patient to his general practitioner or internal medicine doctor to change his amlodipine medication.

Discussion

Drug-induced gingival overgrowth (DIGO) is an undesirable effect of drug use. Recent studies have reported that DIGO occurs in 77.3% of patients taking antihypertensive drugs for more than five years. Currently, there are twenty drugs known to cause DIGO. The most common types of drugs reported to cause gingival enlargement include antiepileptic drugs such as phenytoin for the treatment and control of seizure disorders in patients with epilepsy, immunosuppressants such as cyclosporine A to prevent rejection in patients receiving organ transplants, and antihypertensive agents including calcium channel blockers (CCBs) such as nifedipine and amlodipine (Kamei et al., 2022; Michael G. et al., 2018; Sabarudin et al., 2022; Sailendranath et al., 2017).

Amlodipine is the most common antihypertensive drug given to hypertensive patients. It is used for a long period of time and is reported to be the first drug to cause excessive gingival enlargement (Nath et al., 2024). The prevalence of excess gingival enlargement induced by calcium channel blockers including amlodipine is 6%-83%.(Michael G. et al., 2018).

Amlodipine is a 3rd generation dihydropyridine derivative of the new anti-anginal Calcium Channel Blocker that works by reducing myocardial contractility and oxygen demand and dilating coronary arteries and arterioles used to treat hypertension and angina (Nath et al., 2024). This excessive gingival enlargement triggered by amlodipine generally occurs within 3 months of taking the drug, at a dose of 5-10 mg/day (Nath et al., 2024; Raghu et al., 2021; Shome et al., 2021). In fact, in one report, it was stated that patients who took amlodipine 10 mg / day tended to experience gingival enlargement in just 2 months, starting with the enlargement of the interdental papillae (Machirah et al., 2023). In this case, the patient only realized that his gums were enlarged after 4 years of taking amlodipine, it is possible that the patient did not realize that his gums were enlarged because there were no complaints of pain felt. When the gingival enlargement had disturbed the aesthetics, the patient only complained about his condition.

The etiopathogenesis of amlodipine as a trigger for gingival enlargement remains unclear. However, it is thought that there are inflammatory and non-inflammatory mechanisms involved in the process of amlodipine-induced gingival enlargement. Based on research, the inflammatory mechanism that causes gingival enlargement occurs due to the accumulation of drugs and bacteria in the gingival sulcus fluid which can cause an increase in pro-inflammatory cytokines and an increase in the regulation of keratinocyte growth factor (KGF). In addition, in non-inflammatory mechanisms, the inhibition of the intracellular influx of calcium (Ca^{2+}) and sodium (Na^{+}) ions causes decreased folic acid absorption and collagenase deficiency, which results in impaired connective tissue catabolism, triggering gingival enlargement. Increased levels of adrenocorticotropic hormone due to feedback from the adrenal cortex after blockage of aldosterone synthesis also have a role in the gingival enlargement process (Misra et al., 2021; Mojsilović et al., 2024; Sabarudin et al., 2022).

DIGO treatment strategies require a number of approaches that include non-surgical and surgical approaches. In the non-surgical approach, the precipitating and aggravating factors of DIGO need to be controlled. Elimination of local factors such as biofilm, and regular periodontal maintenance are essential to prevent DIGO recurrence. The presence of retentive factors, such as poor tooth anatomy or restorative margins, is often associated with gingival inflammation and/or clinical attachment loss. These need to be eliminated to reduce the impact on periodontal health. Orthodontic appliances in areas of gingival enlargement should be removed. Professional mechanical removal of plaque and calculus including repeated scaling and root-planing has been shown to be helpful in improving gingival conditions in DIGO patients. In addition, the use of systemic antibiotics, such as short-term azithromycin (3-5 days, 250 to 500 mg) may affect DIGO remission which ranges from three months to two years (Agnes et al., 2022; Fidan et al., 2024; Maj Raghavendra et al., 2014; Sabarudin et al., 2022).

For CCB-induced DIGO, multidisciplinary care with referral to a general practitioner or internal medicine specialist may be required (for drug discontinuation or replacement) in severe cases especially in patients with low dexterity (Devanoorkar et al., 2019). When this treatment approach is taken, it takes one to eight weeks for DIGO remission to occur. However, the response to this treatment approach seems to be unpredictable, especially in those with long-term DIGO. The most effective treatment for this lesion is discontinuation of the offending drug and replacement with another class of antihypertensive drug by a physician. The replacement of CCB drugs can be to drugs belonging to the B-blocker class, diuretics, or angiotensin-converting enzyme inhibitors. These drugs have not been reported to cause DIGO. Another option is replacement with another CCB drug that has a lower

risk of causing gingival enlargement such as verapamil or isradipine. If medication changes are not an option, the lesions should be managed with or without surgical intervention (Sabarudin et al., 2022).

In this case, the patient was treated with scaling of the supra and sub gingival areas. Without surgical treatment (Sharma et al., 2014; Singh et al., 2023; Stojanovska et al., 2024). Plaque control is an important aspect of management in all periodontal patients (Tungare et al., 2025). Tartar cleaning in this patient has been carried out periodically for 4 visits. In addition to tartar cleaning, the patient was also given chlorhexidine gluconate (CHX) 0.2% antiseptic mouthwash which has an anti-microbial function and can reduce inflammation in the gingiva. The recommended dose of 18 to 20 mg per application can be achieved with CHX mouthwash at concentrations between 0.12% and 0.2%. CHX mouthwash is recommended over gels and toothpastes due to its far superior plaque inhibition without serious side effects (Brookes et al., 2020; Deus et al., 2022). Tartar removal and oral hygiene control in patients in this case had a significant effect (Gaur et al., 2018; Samudrala et al., 2016). In this case, adequate cleaning had an effect on gingival enlargement which returned to normal within 1.5 months.

The patient was not advised to change his amlodipine medication and was asked to have a routine check-up every 3 months regarding his gum condition. This was considered due to the significant improvement progress and the patient's high level of cooperativeness. However, if at the visit after 3 months there is a remission of DIGO, then drug replacement will be recommended.

Conclusion

Non-surgical periodontal treatment can be a potential definitive therapy in Grade III gingival overgrowth associated with gingivitis or moderate periodontitis. DIGO treatment management has a good prognosis if the action is carried out adequately, the source of infection is completely eliminated, and there is multidisciplinary cooperation from various parties involved. Education to patients regarding maintaining their oral hygiene and patient cooperation to be able to control on time and consistently needs to be emphasized to support the success of treatment. Multidisciplinary care and patient education have a major role in the progress of this gingival enlargement condition.

Author Contributions

All authors contributed to writing this article.

Funding

This research received no external funding.

Conflicts of Interest

Human subjects: Consent was obtained or waived by all participants in this study. Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work. Financial relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

Agnes, C., Anna, F., Bence, K., & Peter, V. (2022). Prevention and non-surgical periodontal therapy of calcium channel blockers induced severe gingival overgrowth. *Orvosi Hetilap*, *163*(13), 506–512. https://doi.org/10.1556/650.2022.32385

Alpi, K. M., & Evans, J. J. (2019). Distinguishing case study as a research method from case reports as a publication type. *Journal of the Medical Library Association*, *107*(1), 1–5. https://doi.org/10.5195/jmla.2019.615

Anuja, N., Dyamavva, H., Preethi A, P., Prasanna, K. R., & Raghavendra, K. (2021). Gingival enlargements: A review. *Journal of Dental Problems and Solutions*, *8*, 029–031. https://doi.org/10.17352/2394-8418.000100

Beaumont, J., Chesterman, J., Kellett, M., & Durey, K. (2017). Gingival overgrowth: Part 1: Aetiology and clinical diagnosis. *British Dental Journal*, *222*(2), 85–91. https://doi.org/10.1038/sj.bdj.2017.71

Brookes, Z. L. S., Bescos, R., Belfield, L. A., Ali, K., & Roberts, A. (2020). Current uses of chlorhexidine for management of oral disease: a narrative review. *Journal of Dentistry*, *103*(January). https://doi.org/10.1016/j.jdent.2020.103497

Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A., & Sheikh, A. (2011). The Case Study Aproach. *BMC Medical Research Metohodology*, *11*. https://doi.org/10.1186/1471-2288-11-100

Deus, F. P., & Ouanounou, A. (2022). Chlorhexidine in Dentistry: Pharmacology, Uses, and Adverse Effects. *International Dental Journal*, *72*(3), 269–277. https://doi.org/10.1016/j.identj.2022.01.005

Devanoorkar, A., & Guttiganur, N. (2019). Interdisciplinary approach in the management of medically compromised patient with drug-induced gingival enlargement. *Journal of Interdisciplinary Dentistry*, *9*(1), 44. https://doi.org/10.4103/jid.jid_68_17

Erken, E. (2016). Amlodipine and gingival hyperplasia; case report with review of the literature. *Acta*

Medica Mediterranea, *32*(5), 1605–1608. https://doi.org/10.19193/0393-6384_2016_5_138

Fidan, I., Delamotte, E., Colombier, M.-L., & Agossa, K. (2024). Non-surgical Treatment of Severe Drug-Influenced Gingival Enlargement: A Report of Two Cases. *Cureus*, *16*(6), 1–7. https://doi.org/10.7759/cureus.63214

Gaur, S., & Agnihotri, R. (2018). Is dental plaque the only etiological factor in Amlodipine induced gingival overgrowth? A systematic review of evidence. *Journal of Clinical and Experimental Dentistry*, *10*(6), e610–e619. https://doi.org/10.4317/jced.54715

Ibarra, E. A. D., Pinzón, J. A. A., & Medina, Y. F. (2023). Methodology: How to develop a case report or case series report. *Revista Colombiana de Reumatologia*, *30*(2), 129–136. https://doi.org/10.1016/j.rcreu.2021.05.022

Kamei, H., Furui, M., Matsubara, T., & Inagaki, K. (2022). Gingival enlargement improvement following medication change from amlodipine to benidipine and periodontal therapy. *BMJ Case Reports*, *15*(5), 10–13. https://doi.org/10.1136/bcr-2022-249879

Machirah, Adam, M. A., & Asri, G. D. (2023). Gingivectomy in patients with drug-induced gingival enlargement due to amlodipine consumption. *Makassar Dental Jurnal*, *12*(3), 448–451. https://doi.org/10.35856/mdj.v12i3.888

Maj Raghavendra, M. H., Col Shreehari, A. K., & Srivastava, M. D. (2014). Non-Surgical Management Of A Case Of Amlodipine-Induced Gingival Enlargement. *Journal of Evolution of Medical and Dental Sciences*, *3*(37), 9658–9689. https://doi.org/10.14260/jemds/2014/3252

Michael G., N., Takei, H., R. Klokkevold, P., & Carranza, F. (2018). *Newman and Carranza's Clinical Periodontology* (13th ed., Vol. 47, Issue 6). Elsevier.

Misra, S. R., Koduru Lakshmi, S., & Mohanty, N. (2021). Amlodipine induced gingival enlargement. *BMJ Case Reports*, *14*(8), 1–2. https://doi.org/10.1136/bcr-2021-245098

Mojsilović, J., Jovičić, N., Vujović Ristić, S., Stevanović, M., Mijailović, S., Rosić, G., Janković, S., & Kostić, M. (2024). Novel Insights into Amlodipine-Induced Gingival Enlargement: A Clinical and Molecular Perspective. *Pharmaceuticals*, *17*(8). https://doi.org/10.3390/ph17081075

Mona, D., & Prerna, K. (2019). Effectiveness of Non-Surgical Periodontal Therapy on Amlodipine Induced Gingival Enlargement: a Case Report. *International Journal of Medical and Biomedical Studies*, *3*(11), 112–114. https://doi.org/10.32553/ijmbs.v3i11.722

Nath, D., Chauhan, S. S., Sharma, S., & Sinha, A. (2024). Management Of Amlodipine Induced Gingival Overgrowth Via Non-Surgical Approach Introduction. *Journal of Research & Methodin Education*, *14*(3), 1–4. https://doi.org/10.9790/7388-1403010104

Portnoy, P. S., Lee, S. Y., McMullen, A., & Qu, V. (2022). Amlodipine-Induced Gingival Overgrowth: A Health Justice Issue. *Journal for Nurse Practitioners*, *18*(1), 123–127. https://doi.org/10.1016/j.nurpra.2021.10.014

Quenel, L., Keribin, P., Giran, G., Tessier, M.-H., & Lesclous, P. (2020). Amlodipine-induced gingival enlargement: a case report. *Journal Stomatol Oral Maxillofacial Surgery*, *121*, 308–311. https://doi.org/10.1016/j.jormas.2019.04.014

Raghu, N., Deepak, P., Suresh, R. M., & Manjula, M. J. (2021). *Amlodipine-induced gingival hyperplasia*. *11*(07), 803–805. https://doi.org/10.5455/njppp.2021.11.01025202103022021

Sabarudin, M. A., Taib, H., & Wan Mohamad, W. M. (2022). Refining the Mechanism of Drug-Influenced Gingival Enlargement and Its Management. *Cureus*, *14*(5). https://doi.org/10.7759/cureus.25009

Sailendranath, Saha, A., Kumar, A., Nair, V., & Debabrata. (2017). Anti- Hypertensive Drug Induced Gingival Enlargement-A Case REPORT. *Journal of Disease and Global Health*, *10*(1), 7–11. Retrieved from https://ikprress.org/index.php/JODAGH/article/view/2351

Samudrala, P., Chava, V. K., Chandana, T. S., & Suresh, R. (2016). Drug-induced gingival overgrowth: A critical insight into case reports from over two decades. *Journal Indian Soc Periodontal*, *5*, 496–502. https://doi.org/10.4103/jisp.jisp_265_15

Sharma, N. K., & Roopa, D. A. (2014). Nonsurgical Management of Amlodipine Induced Gingival Enlargement – A Case Report. *International Journal of Dental Sciences and Research*, *2*(6), 137–140. https://doi.org/10.12691/ijdsr-2-6-4

Shome, S., De, A., Ghosh, A., & Saraf, A. (2021). Amlodipine induced generalized gingival overgrowth: A clinical case. *IP Archives of Cytology and Histopathology Research*, *6*(2), 125–127. https://doi.org/10.18231/j.achr.2021.030

Singh, A., Singh, R., & Manjunath, R. G. S. (2023). Non Surgical Treatment of Amlodipine Induced Gingival Overgrowth. *International Journal of Health Sciences and Research*, *13*(6), 108–111. https://doi.org/10.52403/ijhsr.20230618

Stojanovska, A. A., & Isa, M. (2024). Management of amlodipine-induced gingival enlargement-case report. *International Dental Journal*, *74*, S280. https://doi.org/10.1016/j.identj.2024.07.228

Triveni, M., Rudrakshi, C., & Mehta, D. (2009).

Amlodipine-induced gingival overgrowth. *Journal of Indian Society of Periodontology*, *13*(3), 160. https://doi.org/10.4103/0972-124X.60231

Tungare, S., & Paranjpe, A. (2025). *Drug-Induced Gingival Overgrowth*. StatPearls Publishing LLC.