

A Management of Severe Papillary Denture Stomatitis with A Double Treatment of Nystatin Mouthwash and Diode Laser. A Case Report

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I. INTRODUCTION

The inflammation of the oral mucosa beneath the denture base is known as denture stomatitis, prosthetic stomatitis, denture sore mouth, and inflammatory papillary hyperplasia.[1] It is characterized by inflammation and erythema of the oral mucosa tissues that are covered by the denture.[2] With a prevalence ranging from 15% to over 70%, it is the most common issue among denture wearers.[3] Denture stomatitis is a complex condition with an intricate etiology that remains poorly understood. However, several factors contribute to its development, including inadequate denture hygiene, continuous and nocturnal denture wearing, accumulation of plaque on dentures, poorly fitting dentures, and denture-related trauma. These factors create an environment that promotes the colonization of *Candida* on both the oral mucosa and denture surfaces, ultimately leading to stomatitis. Although most cases of this disorder are asymptomatic, some individuals may experience clinical manifestations such as alterations in the color and texture of the mucous membranes, dry mouth, breathing difficulties, a burning sensation, halitosis, and painful symptoms.[4]

In 1962, Newton established a classification system that serves as the foundation for categorizing denture stomatitis. Newton identified three distinct forms of denture stomatitis. The first form, known as Type I or (Punctiform Hyperemia), involves the identification of isolated hyperemic regions, which are primarily caused by trauma. The second form, referred to as Type II or generalized simple inflammation, is characterized by widespread and diffuse erythematous patches. This appearance is the most commonly observed and typically covers either the entire denture-bearing region or a portion of it. Lastly, Type III, also known as the granular type, is distinguished by inflammatory papillary hyperplasia in the central section of the hard palate and alveolar ridge.[5]

A benign lesion of the oral mucosa known as inflammatory papillary hyperplasia (IPH) is defined by the development of one or more nodules that are no more than two millimeters in size. While the lesion primarily appears on the hard palate, it has also been observed on the mandible in rare cases. Most of the time, the lesion is asymptomatic, and the mucosa's color might range from pink to red. While IPH is typically associated with removable upper dentures, it has also been observed in

individuals without any prosthetics. In cases where it occurs with a removable denture, it aligns with the third category of denture stomatitis in Newton's classification (1962). [6, 7]

The severity of the condition and its clinical presentation determine the type of treatment administered.[7] In cases when there are significant papillae lesions with an aggressive clinical presentation, medical professionals have recommended the use of laser[8], or electrosurgery[9] Traditionally, mouth rinses containing antifungal medications or gels have been employed to manage localized lesions [10], Furthermore, the utilization of mouthwash containing 0.12% chlorhexidine gluconate can also provide benefits.[11]

Here, we report a case of a smoker male with an old denture who presented to the department of oral medicine with a primary complaint of pain associated with dentures. Following a comprehensive assessment, the patient was diagnosed with class three of denture stomatitis (inflammatory papillary hyperplasia) and was subsequently treated with a combination therapy involving a diode laser and nystatin mouthwash 500000 I U.

II. CASE PRESENTATION

A 58-year-old male patient presented to the Oral Medicine Department at Damascus University with a chief complaint of pain beneath his denture. The patient's denture was fabricated five years ago and was made of acrylic. The denture fit poorly, and the patient had not seen a dentist regularly since getting the denture due to financial constraints.

The patient was a heavy smoker with almost a whole packet every day, he was taking aspirin for prophylaxis.

Extraoral examination revealed no abnormalities.

Intraoral examination of the maxilla revealed numerous small papillary nodules on the palate, along with acute pseudomembranous candidiasis and diffuse erythematous and inflammatory oral mucosa (Figure 1). In addition, the denture exhibited plaque accumulation on its palatal surface. Examination of the mandible revealed numerous well-rounded papillary nodules in the buccal shelf area and labial aspect of the lower edentulous ridge (Figure 2), The nodules were similar in color to the mucosa and did not cause bleeding.



Figure 1



Figure 2

Based on the patient's clinical examination and medical history, a diagnosis of denture stomatitis (type 3 according to Newton's classification in 1962) or inflammatory papillary hyperplasia was made, and before any interference fungal culture swab was performed using Sabouraud agar to identify the presence of fungi. The swab was collected from the palate area using a sterile cotton swab and cultured in a tube containing Sabouraud agar. After 48 hours of incubation at 28°C, the swab was positive for large *Candida albicans* colonies (Figure 3). The patient was advised to discontinue using the ill-fitting denture until the completion of treatment.



Figure 3

The goal of the first stage of treatment was to reduce the fungal load in the oral cavity by prescribing an oral nystatin rinse at 500,000 I U four times a day, 15 ml, for three to five minutes each time, for a total of twenty-one days, with the emphasis on stopping the use of the old removable denture, following the antifungal treatment for 21 days, the diffuse redness and acute pseudomembranous candidiasis had significantly improved (Figure 4).



Figure 4

The second stage of treatment was carried out using Diode laser therapy to remove the papillary nodules from the oral cavity, the laser settings were (continuous mode, wavelength of 980 nm, and average power of 3 W).

The treatment for the papillary nodules on the palate required two sessions, while the nodules on the lower edentulous ridge required only one session, each treatment session lasted approximately 20 minutes and was performed under topical anesthesia, the papillary nodules were ablated using the diode laser tip, and the epithelial debris was removed using saline-

soaked gauze.

The nodules on the palate were removed systematically from front to back. In the lower jaw, the nodules were removed on the right side, followed by the left side (figure 5).

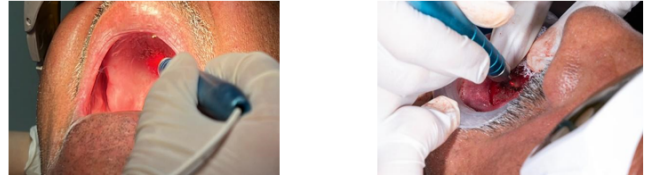


Figure 5

Each session ended with the patient receiving post-treatment advice, such as refraining from smoking and eating spicy or acidic foods for three days. At first, no medication was recommended. However, due to the patient's report of mild discomfort the day after the treatment, we suggested Prodol Plus K (500 mg paracetamol and 50 mg diclofenac potassium) 500mg after meals every six hours or as needed. This effectively reduced or eliminated the pain entirely. The second palate treatment session, fourteen days after the first, used the same technique. This time, the patient reported no pain, discomfort, or irritability. This was likely due to the patient's strict adherence to cessation instructions as well as the smaller treatment area (figure 6).



Figure 6

One month after the completion of treatment, the patient's oral mucosa had completely healed, and denture fabrication was initiated. (Figure 7) The patient was followed up at three months after the completion of therapy.



Figure 7

III. DISCUSSION

This case highlights the successful management of denture stomatitis with a combination of antifungal therapy, oral hygiene measures, and diode laser ablation. Notably, the case presented with a unique clinical feature - localized, papillary hyperplasia – classified as Newton's Class III.

The prevalence and risk factors of denture stomatitis have been the subject of varying research findings, mostly because of

disparate approaches. However, there is a clear correlation between poor prosthesis hygiene and denture stomatitis. Additionally, it was discovered that patients with smoking habits and continuous denture usage had a significantly greater prevalence of the illness,[12] which primarily affects adult males in the upper jaw,[13] Due to its larger surface area and reduced capacity for saliva to flow beyond the top denture, the palatal mucosa is the most frequently involved tissue in denture stomatitis.[2]

Studies uncover a strong link between oral candidiasis and local factors like denture wear and smoking. These factors promote the transformation of *Candida albicans* into its pathogenic form, ultimately leading to denture stomatitis [14] Antifungals drugs are the first-line treatment against denture stomatitis. However, there are concerns about side effects and fungal recurrence after medication, they are classified into two groups: polyenes and azoles, Among the polyenes, nystatin is a preferred drug for denture stomatitis because it has a number of advantages over other antifungal drugs. First, nystatin has a low risk of side effects.[15] second Nystatin binds to ergosterol, a crucial component of fungal cell membranes. This interaction creates pores in the membrane, causing leakage of essential cellular contents and ultimately leading to fungal cell death. This mechanism is responsible for nystatin's potent antifungal activity.[16] third, nystatin penetrate the oral epithelium, exhibit superior efficacy against *candida albicans*, which adherence to the oral mucosal cells and subsequent colonization.[17] Fourth, Systemic adverse effects are not caused by oral nystatin therapy because it is not absorbed through the gastrointestinal tract [21]. However, the optimal dosage, formulation, and the duration of nystatin for the treatment of oral candidiasis remain variable and depend on the severity of the infection.[18] Therefore, in this case, we chose oral nystatin suspension because of its advantages over other antifungals, and the highest available concentration (500,000 I U) was chosen due to the severity of the infection and the presence of a large number of *candida* colonies in the swab tube of this patient.

The treatment of papillary hyperplasia and denture stomatitis has significant overlap, but for persistent tissue overgrowth that does not respond to conservative measures, more aggressive management is required. Therefore, the specific treatment plan varies depending on the severity and clinical presentation of the condition.[19], In this case, we chose diode laser therapy to ablate the nodules present in the oral cavity, due to its demonstrated ability to provide a bloodless operating field, eliminate the need for sutures, and exhibit antibacterial efficacy, making it a favorable alternative to traditional surgical methods. [20] Certain wavelengths of the diode laser are strongly absorbed by pigmented tissues, making it an excellent hemostatic agent during soft tissue surgeries[21] Unlike traditional surgeries, diode laser surgery boasts the distinct advantage of simultaneous bacterial elimination and surgical site sterilization, significantly enhancing patient safety.[22] "Diode laser wavelengths in the range of 810–980 nm offer high absorption in pigmented tissues, making them a suggested alternative to scalpels for oral soft tissue surgery." [23] For photothermal excision of small oral lesions (diameter < 1 cm), a diode laser with a wavelength range of 800-900 nm was used at a power of 5-10 W in continuous mode[24] in this case we

used a 980 nm diode laser at a power of 4 w in continuous mode for remove papillary.

CONCLUSION

A class three denture stomatitis can be managed with diode laser and oral nystatin. This approach offers several advantages, including eradication of the large fungal load associated with the infection and elimination of the undesirable side effects following other invasive surgical procedures that can be used to remove the lesions, as the laser is very efficient at coagulation. It is important to complete the case completely by making a new and appropriate removable oral appliance and emphasizing the need for regular sterilization procedures.

REFERENCES

1. Iba, B., et al., Denture stomatitis. *Orapuh Literature Reviews*, 2021. 1(1): p. OR006-OR006.
2. Sartawi, S.Y., et al., Denture stomatitis revisited: a summary of systematic reviews in the past decade and two case reports of papillary hyperplasia of unusual locations. *International Journal of Dentistry*, 2021. 2021.
3. Fayad, M., et al., Prevalence of denture stomatitis among complete denture wearers in Aljouf. *Al-Azhar Dental Journal for Girls*, 2018. 5(3): p. 219-223.
4. Gauch, L.M.R., et al., Isolation of *Candida* spp. from denture-related stomatitis in Pará, Brazil. *Brazilian Journal of Microbiology*, 2018. 49: p. 148-151.
5. Grover, C., et al., Denture stomatitis review. *The Journal of Prosthetic and Implant*, 2022. 5(2): p. 8-73.
6. Emami, E., et al., The association of denture stomatitis and partial removable dental prostheses: a systematic review. *International Journal of Prosthodontics*, 2012. 25(2).
7. Gual-Vaqués, P., et al., Inflammatory papillary hyperplasia: A systematic review. *Medicina oral, patologia oral y cirugía bucal*, 2017. 22(1): p. e36.
8. Infante-Cossio, P., et al., Inflammatory papillary hyperplasia of the palate: treatment with carbon dioxide laser, followed by restoration with an implant-supported prosthesis. *British Journal of Oral and Maxillofacial Surgery*, 2007. 45(8): p. 658-660.
9. Rathofer, S.A., F.M. Gardner, and S.G. Vermilyea, A comparison of healing and pain following excision of inflammatory papillary hyperplasia with electrosurgery and blade-loop knives in human patients. *Oral surgery, oral medicine, oral pathology*, 1985. 59(2): p. 130-135.
10. Salonen, M.A., A.M. Raustia, and K.S. Oikarinen, Effect of treatment of palatal inflammatory papillary hyperplasia with local and systemic antifungal agents accompanied by renewal of complete dentures. *Acta Odontologica Scandinavica*, 1996. 54(2): p. 87-91.
11. Orenstein, N.P. and T. Taylor, A nonsurgical approach to treating aggressive inflammatory papillary hyperplasia: a clinical report. *The Journal of prosthetic dentistry*, 2014. 111(4): p. 264-268.
12. Kossioni, A.E., The prevalence of denture stomatitis and its predisposing conditions in an older Greek population. *Gerodontology*, 2011. 28(2): p. 85-90.
13. Canger, E.M., P. Celenk, and S. Kayipmaz, Denture-related hyperplasia: a clinical study of a Turkish population group. *Brazilian dental journal*, 2009. 20: p. 243-248.
14. Di Stasio, D., et al., Management of denture stomatitis: a narrative review. *Journal of Biological Regulators and Homeostatic Agents*, 2018. 32(2 Suppl. 1): p. 113-116.
15. de Souza, R.F., et al., Improving practice guidelines for the treatment of denture-related erythematous stomatitis: a study protocol for a randomized controlled trial. *Trials*, 2017. 18: p. 1-8.
16. Kinoshita, H., et al., Cryptic antifungal compounds active by synergism with polyene antibiotics. *Journal of bioscience and bioengineering*, 2016. 121(4): p. 394-398.

17. Rai, A., et al., Nystatin Effectiveness in Oral Candidiasis Treatment: A Systematic Review & Meta-Analysis of Clinical Trials. *Life*, 2022. 12(11): p. 1677.
18. Akpan, A. and R. Morgan, Oral candidiasis. *Postgraduate medical journal*, 2002. 78(922): p. 455-459.
19. da Costa, R.M.B., et al., The effectiveness of microwave disinfection in treating Candida-associated denture stomatitis: a systematic review and metaanalysis. *Clinical Oral Investigations*, 2020. 24: p. 3821-3832.
20. Çayan, T., et al., Comparative evaluation of diode laser and scalpel surgery in the treatment of inflammatory fibrous hyperplasia: A split-mouth study. *Photobiomodulation, photomedicine, and laser surgery*, 2019. 37(2): p. 91-98.
21. Akbulut, N., et al., Is the 810-nm diode laser the best choice in oral soft tissue therapy? *European journal of dentistry*, 2013. 7(02): p. 207-211.
22. Preethee, T., et al., Bactericidal effect of the 908 nm diode laser on *Enterococcus faecalis* in infected root canals. *Journal of conservative dentistry: JCD*, 2012. 15(1): p. 46.
23. Amaral, M., et al., Diode laser surgery versus scalpel surgery in the treatment of fibrous hyperplasia: a randomized clinical trial. *International journal of oral and maxillofacial surgery*, 2015. 44(11): p. 1383-1389.
24. Sattayut, S. and S. Namour, LASER IN ORAL SOFT TISSUESURGERY. *Laser Dentistry: Current Clinical Applications*, 2018: p. 123.