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# Efficacy of Topical Glucosamine in Oral Lichen Planus

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**ABSTRACT**

Lichen planus (LP) is a chronic, immune-mediated, inflammatory condition that can affect the skin, nails, and mucous membranes. Oral lichen planus (OLP) is the mucosal counterpart, presenting as white, reticular lesions (asymptomatic) or erythematous erosions (symptomatic) that can cause symptoms ranging from spontaneous soreness to severe pain interfering with eating, speech, swallowing, and patients' daily activities.

Treatment strategies for OLP vary depending on the severity and extent of the lesions. Despite this, corticosteroids remain the cornerstone of management; various treatment modalities have also been introduced and used, particularly in refractory cases. Glucosamine (GlcN) is an amino sugar that plays a crucial role in the synthesis of essential components of cartilage and connective tissue. It has anti-inflammatory and immunomodulatory effects. This is a case of successful management of symptomatic OLP with GlcN as a promising treatment modality for OLP.

***Keywords:*** *Oral lichen planus; Glucosamine*

## 1. INTRODUCTION

Lichen planus (LP) is described as a chronic, non-infectious, inflammatory disease of unknown etiology that involves the skin and mucous membranes ***(Scully and El-Kom, 1985).***

Oral lichen planus (OLP) lesions primarily affect the buccal mucosa, followed by the tongue, lips, gingiva, palate, and floor of the mouth ***(Eisen, 2002; Carrión et al., 2008).*** The typical clinical feature is a bilateral white reticular pattern, known as the Wickham striae. clinically, OLP can be categorized as non-erosive or erosive ***(Didona et al., 2022).***

OLP most frequently presents in middle-aged women, by a ratio of approximately 3:1 to 3:2 compared with men, of the same age ***(Al-Hashimi et al., 2007; McCartan and Healy, 2008; Li et al., 2020) .***

The World Health Organization (WHO) classifies OLP as an oral potentially malignant disorder (OPMD) that carries a risk of malignant transformation into oral squamous cell carcinoma (OSCC), with reported rates ranging from 1.1% to 1.37% ***(Roopashree et al., 2010; Fitzpatrick et al., 2014; Aghbari et al., 2017; Naggar, 2017; Ruokonen et al., 2017; Giuliani et al., 2019; Warnakulasuriya et al., 2021).***

Several proposed treatment protocols differentiate between topical and systemic corticosteroid use. Topical corticosteroids are considered the first-line therapy, particularly for mild lesions, whereas systemic corticosteroids are reserved for severe, extensive, or refractory cases. Nevertheless, corticosteroid therapy carries risks and many side effects, including secondary infections, osteoporosis, diabetes, as well as psychological and cardiovascular complications. Consequently, there has been considerable interest in identifying alternative therapeutic options ***(Coondoo et al., 2014; Andabak-Rogulj et al., 2023)***

Glucosamine (GlcN) is a naturally occurring amino monosaccharide that plays a key role in the biosynthesis of glycosaminoglycans, essential components of cartilage and connective tissues. Widely used as a dietary supplement, glucosamine has been shown to possess anti-inflammatory and chondroprotective properties. In medical practice, it is commonly employed to manage osteoarthritis by promoting cartilage repair and reducing joint pain. GlcN can inhibit the activation of nuclear factor-kappa beta (NF-κB), a key regulator of inflammation and reduces production of pro-inflammatory cytokines (e.g., interleukin- 1 beta (IL-1β), tumor necrosis factor- alpha (TNF-α), interleukin- 6 (IL-6)), which are elevated in OLP lesions ***(Largo et al., 2003; Nagaoka et al., 2011; Chen et al., 2012; Dalirfardouei et al., 2016).***

In dentistry, emerging evidence suggests that glucosamine may aid in the treatment of OLP by modulating immune responses and enhancing tissue repair, making it a promising adjunct in managing immune-mediated oral diseases ***(Hesen et al., 2017)***.

This case highlights the successful management of a symptomatic multivariant form of OLP using GlcN therapy.

## 2. CASE PRESENTATION

A 54-year-old female came to the oral medicine clinic for evaluation of chronic oral discomfort and inflamed mucosal tissues. She reported experiencing a burning sensation and discomfort throughout her mouth for many years, especially affecting the buccal mucosa and gingiva. The symptoms had significantly impacted her ability to eat and speak comfortably.

She described the course of her symptoms as fluctuating, with periods of remission followed by painful flare-ups, often triggered by spicy or acidic foods. Despite consulting multiple healthcare providers over the years, she had not received a definitive diagnosis. She denied any associated skin, genital, or ocular lesions. Her medical history was unremarkable, and she had occasionally used over-the-counter analgesics to manage her oral discomfort.

Intra-oral examination revealed bilateral, red atrophic lesions on the buccal mucosa and gingiva, interspersed with characteristic white keratotic reticular striae. The lesions were non-scraped and showed no loss of tissue flexibility or pliability—clinical features consistent with oral lichen planus (OLP).

To confirm the diagnosis and rule out malignancy, a punch biopsy was performed. Histopathological analysis was consistent with OLP oral, showing a band-like lymphocytic infiltrate in the lamina propria and degeneration of the basal cell layer **(Figure 1)**.

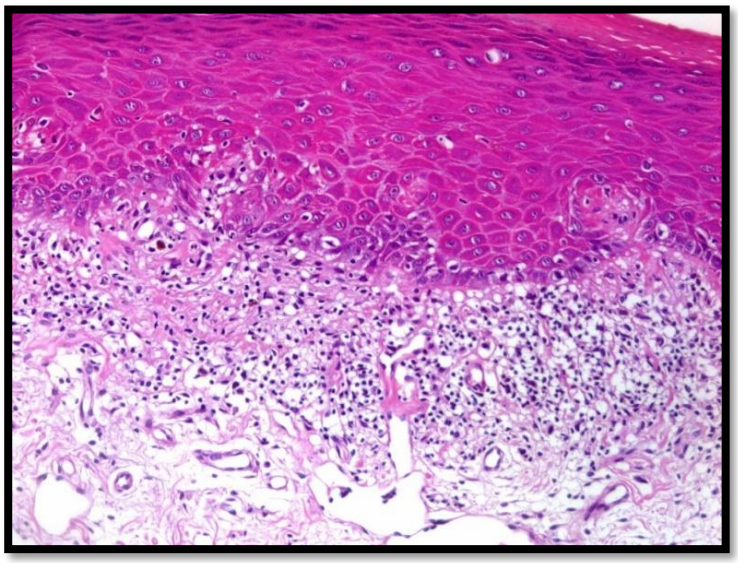

**Figure 1: Histopathological feature represents OLP**

Following diagnosis, the patient underwent periodontal scaling and was prescribed a topical GlcN gel (GlcN 1% in custom made inert hydrophilic adhesive oral gel prepared and characterized at the Pharmaceutics & Pharmaceutical Technology Department, Faculty of Pharmacy, Heliopolis University) to be applied in a thin layer 3 to 4 times daily for 8 weeks, with instructions to avoid eating or drinking for at least 30 minutes after each application. She was also advised to avoid dietary irritants and maintain meticulous oral hygiene. Regular follow-up visits were scheduled to monitor clinical response. The patient was examined after one week and eight weeks and showed marked improvement in the gingiva, right buccal mucosa, and left buccal mucosa **(Figure 2).**

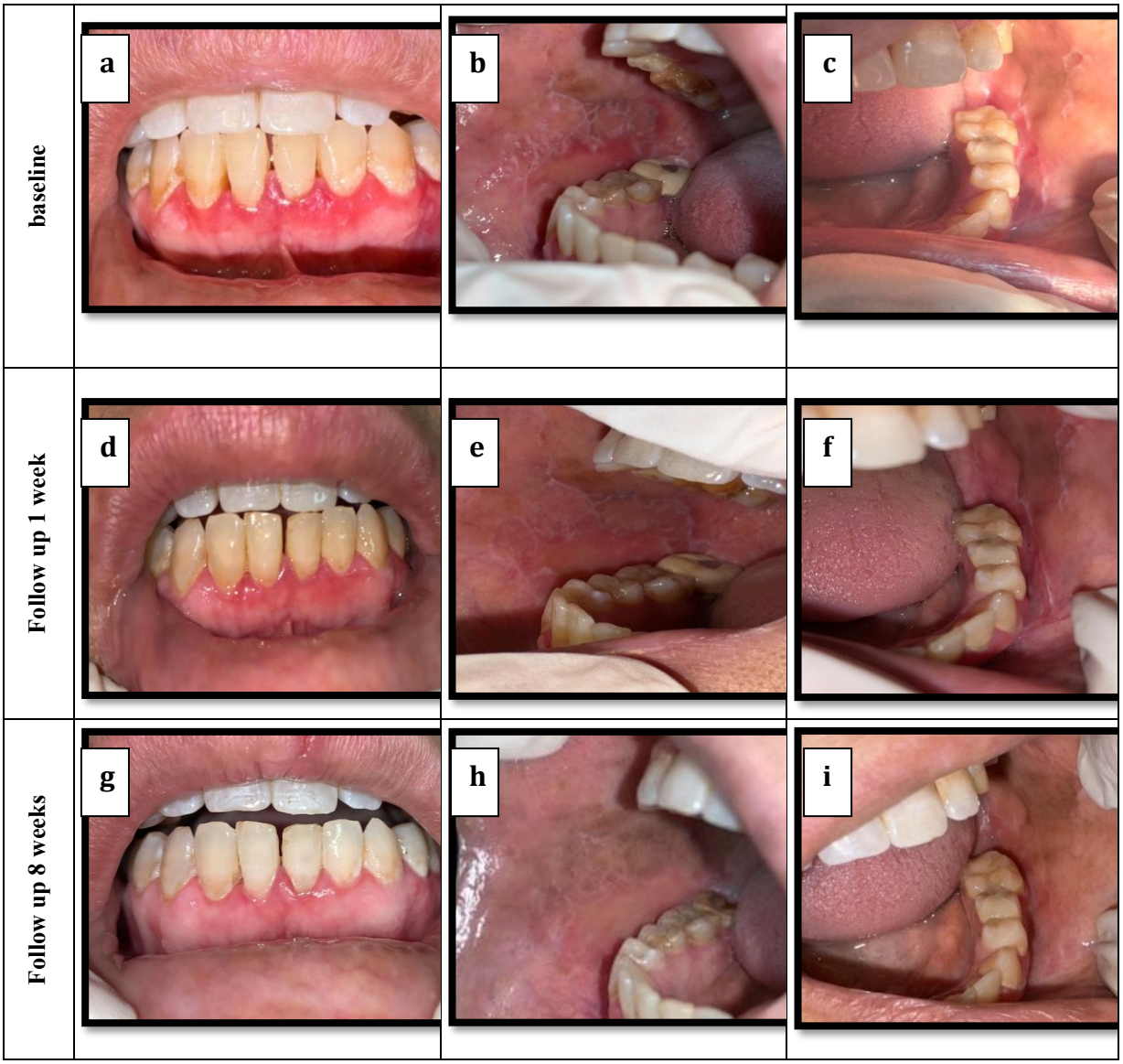


**Figure 2: (a) Desquamation of the gingiva on the labial aspect of the mandible before treatment. (b) Atrophic and reticular OLP on the right buccal mucosa before treatment. (c) Atrophic and reticular OLP on the left buccal mucosa before treatment. (d), (e) and (f) Follow up in 1 week. (g), (h) and (i) Follow up in 8 weeks.**

## 3. DISCUSSION

OLP, a T-lymphocyte-mediated disease of the oral mucosa, has a complex pathogenesis that involves several factors. The disease is characterized by alternating periods of remission and exacerbation that require continuous follow-up ***(Boorghani et al., 2010)***.

While the exact etiology remains unclear, genetic predisposition, psychological conditions such as stress, anxiety, and depression, auto-immune mechanisms, and other environmental factors may contribute to the development of OLP ***(Sugerman et al., 2002; Roopashree et al., 2010; Brănişteanu et al., 2016; Tziotzios et al., 2018; Lopez-Jornet et al., 2019; Manczyk et al., 2019; Chandavarkar et al., 2020; El-Howati et al., 2023).***

Systematic reviews and meta-analyses done by ***González-Moles et al. (2021)*** and ***Sandhu et al.(2022)*** showed that the prevalence of oral lesions ranges from 0.1 to 2%, with a global prevalence of 0.89%.

The typical age range for the manifestation is between 30 and 60, with female predilection, but cases have been reported in children ***(Moger et al., 2013; Shikha et al., 2022 ).***

OLP presents in various clinical forms, with the erosive type typically causing the most discomfort, making its diagnosis a challenge, especially when symptoms are temporarily relieved or attributed to non-specific inflammation ***(Thongprasom and Dhanuthai, 2008; Kumar et al., 2013).***

However, the use of topical corticosteroids is often limited by their adverse effects such as local atrophy, fragility, telangiectasias and infection, such as acute candidiasis, in addition to bad taste and smell, nausea, dry mouth, sore throat and swollen mouth ***(Zakrzewska et al., 2005)***, they remain the first-line treatment for symptomatic OLP due to their potent anti-inflammatory effects ***(Andabak-Rogulj et al., 2023)***.

In the present case, an 8-week course of GlcN led to marked reduction in subjective pain and clinical improvement in the lesion severity without the use of corticosteroids

Topical GlcN gel was selected as a therapeutic option and it has been shown to have anti-inflammatory properties, promoted mucosal healing and it was well-tolerated by the patient without any adverse reactions, making it a potential alternative in cases where steroids is poorly tolerated or contraindicated.

To our knowledge, only one study regarding the use of systemic GlcN as adjunctive therapy in the management of OLP ***(Hesen et al., 2017)***, thus the present case therefore adds to a growing interest in repurposing supplements with anti-inflammatory properties in oral mucosal disease.

Several studies have explored other alternatives (e.g., hyaluronic acid (HA) and curcumin) to corticosteroids, particularly agents that modulate immune pathways through mechanisms similar to GlcN such as modulation of NF-κB pathway and regulation of pro-inflammatory cytokines (e.g., IL-1β, IL-6, TNF-α). In this context, GlcN represents a promising approach with similar immunomodulatory effects ***(Nagaoka et al., 2011; Amirchaghmaghi et al., 2016; Dalirfardouei et al., 2016; Shetty et al., 2016).***

***Waingade et al. (2022)*** showed in their systematic review that HA can be equally effective as steroids in the management of OLP. Considering the anti-inflammatory effect and lack of side effects associated with its use, reduction in lesion size, degree of erythema, pain scores, and sign scores, HA could be utilized as an alternative therapy in the treatment of OLP.

***Khaitan et al. (2022)*** stated in their non-randomized controlled trial that curcumin, an active ingredient of turmeric, is commercially available in gel form to treat different oral lesions and is significantly effective in reducing spread and providing symptomatic relief in OLP without any adverse effects.

***Derwich et al. (2023)*** concluded in their systematic review that administration of oral GlcN for a longer time, i.e., 3 months, led to a significant reduction of TMJ pain and a significant increase in maximum mouth opening. It also resulted in long-term anti-inflammatory effects within the TMJs.

## 4. CONCLUSION

In conclusion, the present case demonstrates that topical GlcN gel may be an effective and well-tolerated treatment option for managing oral lichen planus, resulting in significant clinical improvement. Further studies are warranted to confirm these findings, validate the efficacy and safety of GlcN in broader patient populations, and establish standardized protocols.

## REFERENCES

[1] Aghbari, S. M. H., Abushouk, A. I., Attia, A., Elmaraezy, A., Menshawy, A., Ahmed, M. S., … Ahmed, E. M. (2017). Malignant transformation of oral lichen planus and oral lichenoid lesions: A meta-analysis of 20095 patient data. *Oral Oncology*, *68*(5), 92–102. https://doi.org/10.1016/j.oraloncology.2017.03.012

[2] Al-Hashimi I, Schifter M, Lockhart PB, Wray D, Brennan M, Migliorati CA, et al. (2007). Oral lichen planus and oral lichenoid lesions: diagnostic and therapeutic considerations. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, *103*(SUPPL.), S25.e1-S25.e12.

[3] Amirchaghmaghi, M., Pakfetrat, A., Delavarian, Z., Ghalavani, H., & Ghazi, A. (2016). Evaluation of the efficacy of curcumin in the treatment of oral lichen planus: A randomized controlled trial. *Journal of Clinical and Diagnostic Research*, *10*(5), ZC134-ZC137. https://doi.org/10.7860/JCDR/2016/16338.7870

[4] Andabak-Rogulj, A., Vindiš, E., Aleksijević, L. H., Škrinjar, I., Juras, D. V., Aščić, A., & Brzak, B. L. (2023). Different Treatment Modalities of Oral Lichen Planus—A Narrative Review. *Dentistry Journal*, *11*(1), 26. https://doi.org/10.3390/dj11010026

[5] Boorghani, M., Gholizadeh, N., Taghavi Zenouz, A., Vatankhah, M., & Mehdipour, M. (2010). Oral lichen planus: clinical features, etiology, treatment and management; a review of literature. *Journal of Dental Research, Dental Clinics, Dental Prospects*, *4*(1), 3–9. https://doi.org/10.5681/joddd.2010.002

[6] Brănişteanu, D. E., Pintilie, A., Andreş, L. E., Dimitriu, A., Oanţă, A., Stoleriu, G., & Brănişteanu, D. C. (2016). Ethiopatogenic Hypotheses in Lichen Planus. *Revista Medico-Chirurgicala a Societatii de Medici Si Naturalisti Din Iasi*, *120*(4), 760–767.

[7] Carrión, A. B., Rey, E. O., Mallón, M. P., & Freitas, M. D. (2008). Diagnóstico del liquen piano oral. *Avances En Odontoestomatologia*, *24*(1), 11–31. https://doi.org/10.4321/s0213-12852008000100002

[8] Chandavarkar, V., Mishra, M., Sangeetha, R., & Premalatha, B. (2020). The current understanding on langerhans' cells and its role in oral lesions. *Contemporary Clinical Dentistry*, *11*(3), 211–216. https://doi.org/10.4103/ccd.ccd_4_20

[9] Chen, C. L., Liang, C. M., Chen, Y. H., Tai, M. C., Lu, D. W., & Chen, J. T. (2012). Glucosamine modulates TNF-α-induced ICAM-1 expression and function through O-linked and N-linked glycosylation in human retinal pigment epithelial cells. *Investigative Ophthalmology & Visual Science*, *53*(4), 2281–91. https://doi.org/10.1167/iovs.11-9291

[10] Coondoo, A., Phiske, M., Verma, S., & Lahiri, K. (2014). Side-effects of topical steroids: A long overdue revisit. *Indian Dermatology Online Journal*, *5*(4), 416–425. https://doi.org/10.4103/2229-5178.142483

[11] Dalirfardouei, R., Karimi, G., & Jamialahmadi, K. (2016). Molecular mechanisms and biomedical applications of glucosamine as a potential multifunctional therapeutic agent. *Life Sciences*, *152*(May 1), 21–29. https://doi.org/10.1016/j.lfs.2016.03.028

[12] Derwich, M., Górski, B., Amm, E., & Pawłowska, E. (2023). Oral Glucosamine in the Treatment of Temporomandibular Joint Osteoarthritis: A Systematic Review. *International Journal of Molecular Sciences*, *24*(5), 4925. https://doi.org/10.3390/ijms24054925

[13] Didona, D., Caposiena Caro, R. D., Sequeira Santos, A. M., Solimani, F., & Hertl, M. (2022). Therapeutic strategies for oral lichen planus: State of the art and new insights. *Frontiers in Medicine*, *4*(9), 997190. https://doi.org/10.3389/fmed.2022.997190

[14] Eisen, D. (2002). The clinical features, malignant potential, and systemic associations of oral lichen planus: A study of 723 patients. *Journal of the American Academy of Dermatology*, *46*(2), 207–14. https://doi.org/10.1067/mjd.2002.120452

[15] El-Howati, A., Thornhill, M. H., Colley, H. E., & Murdoch, C. (2023). Immune mechanisms in oral lichen planus. *Oral Diseases*, *29*(4), 1400–1415. https://doi.org/10.1111/odi.14142

[16] Fitzpatrick, S. G., Hirsch, S. A., & Gordon, S. C. (2014). The malignant transformation of oral lichen planus and oral lichenoid lesions A systematic review. *Journal of the American Dental Association*, *145*(1), 45–56. https://doi.org/10.14219/jada.2013.10

[17] Giuliani, M., Troiano, G., Cordaro, M., Corsalini, M., Gioco, G., Lo Muzio, L., … Lajolo, C. (2019). Rate of malignant transformation of oral lichen planus: A systematic review. *Oral Diseases*, *25*(3), 693–709. https://doi.org/10.1111/odi.12885

[18] González-Moles, M. Á., Warnakulasuriya, S., González-Ruiz, I., González-Ruiz, L., Ayén, Á., Lenouvel, D., … Ramos-García, P. (2021). Worldwide prevalence of oral lichen planus: A systematic review and meta-analysis. *Oral Diseases*, *27*(4), 813–828. https://doi.org/10.1111/odi.13323

[19] Hesen, R. R., Helmy, I. M., Sayed, M. H. El, & Ezzatt, O. M. (2017). Glucosamine as a Novel Adjunctive Therapy in Symptomatic Oral Lichen Planus, *9*(6), 941–946.

[20] Khaitan, T., Vishal, Kabiraj, A., Sinha, D., Ranjan, R., & Singh, R. (2022). Curcuma longa in the treatment of symptomatic oral lichen planus: A non-randomized controlled trial. *Indian Journal of Dermatology*, *67*(4), 478. https://doi.org/10.4103/ijd.ijd_1065_20

[21] Kumar, P., Bahirwani, S., Raja, J. V., Pujari, M., Tuteja, M., & Garg, S. (2013). Oral mini pulse therapy: report of a case and review of the literature. *Oral Health and Dental Management*, *12*(2), 112–8.

[22] Largo, R., Alvarez-Soria, M. A., Díez-Ortego, I., Calvo, E., Sánchez-Pernaute, O., Egido, J., & Herrero-Beaumont, G. (2003). Glucosamine inhibits IL-1β-induced NFκB activation in human osteoarthritic chondrocytes. *Osteoarthritis and Cartilage*, *11*(4), 290–8. https://doi.org/10.1016/S1063-4584(03)00028-1

[23] Li, C., Tang, X., Zheng, X., Ge, S., Wen, H., Lin, X., … Lu, L. (2020). Global Prevalence and Incidence Estimates of Oral Lichen Planus. *JAMA Dermatology*, *156*(2), 172–181. https://doi.org/10.1001/jamadermatol.2019.3797

[24] Lopez-Jornet, P., Zavattaro, E., Mozaffari, H. R., Ramezani, M., & Sadeghi, M. (2019). Evaluation of the salivary level of cortisol in patients with oral lichen planus: A meta-analysis. *Medicina (Lithuania)*, *55*(5), 213. https://doi.org/10.3390/medicina55050213

[25] Manczyk B, Gołda J, Biniak A, Reszelewska K, Mazur B, Zając K, et al. (2019). Evaluation of depression, anxiety and stress levels in patients with oral lichen planus. *J Oral Sci*, *61*(3), 391–397.

[26] McCartan, B. E., & Healy, C. M. (2008). The reported prevalence of oral lichen planus: A review and critique. *Journal of Oral Pathology and Medicine*, *37*, 447–53. https://doi.org/10.1111/j.1600-0714.2008.00662.x

[27] Moger, G., Thippanna, C. K., Kenchappa, M., & Puttalingaiah, V. D. (2013). Erosive oral lichen planus with

cutaneous involvement in a 7-year-old girl: A rare case report. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, *31*(3), 197–200. https://doi.org/10.4103/0970-4388.117972

[28] Nagaoka, I., Igarashi, M., Hua, J., Ju, Y., Yomogida, S., & Sakamoto, K. (2011). Recent aspects of the anti-inflammatory actions of glucosamine. *Carbohydrate Polymers*, *84*(2), 825–830. https://doi.org/10.1016/j.carbpol.2010.04.007

[29] Naggar AK, R. P. (2017). *Proliferative verrucous leukoplakia and precancerous conditions, In: El-Naggar AK, Chan JKC, Grandis JR, Takata T, Slootweg PJ (Eds). WHO Classification of Head and Neck Tumours. WHO Classification of Tumours, 4th edn.*

[30] Roopashree, M. R., Gondhalekar, R. V., Shashikanth, M. C., George, J., Thippeswamy, S. H., & Shukla, A. (2010). Pathogenesis of oral lichen planus - a review. *Journal of Oral Pathology and Medicine*, *39*(10), 729–734. https://doi.org/10.1111/j.1600-0714.2010.00946.x

[31] Ruokonen, H. M. A., Juurikivi, A., Kauppila, T., Heikkinen, A. M., & Seppänen-Kaijansinkko, R. (2017). High percentage of oral lichen planus and lichenoid lesion in oral squamous cell carcinomas. *Acta Odontologica Scandinavica*, *75*(6), 442–5. https://doi.org/10.1080/00016357.2017.1332777

[32] Sandhu, S., Klein, B. A., Al-Hadlaq, M., Chirravur, P., Bajonaid, A., Xu, Y., … Sonis, S. (2022). Oral lichen planus: comparative efficacy and treatment costs—a systematic review. *BMC Oral Health*, *22*(1), 161. https://doi.org/10.1186/s12903-022-02168-4

[33] Scully, C., & El-Kom, M. (1985). Lichen planus: review and update on pathogenesis. *Journal of Oral Pathology & Medicine*, *14*(6), 431–458. https://doi.org/10.1111/j.1600-0714.1985.tb00516.x

[34] Shetty, R. R., Burde, K. N., & Guttal, K. S. (2016). The efficacy of topical hyaluronic acid 0.2% in the management of symptomatic oral lichen planus. *Journal of Clinical and Diagnostic Research*, *10*(1), ZC46–ZC50. https://doi.org/10.7860/JCDR/2016/15934.7101

[35] Shikha, Gupta, S., Mahajan, A., Ambika, Garg, R., & Ghosh, S. (2022). Childhood oral lichen planus: a case series with review of literature. *European Archives of Paediatric Dentistry*, *23*(2), 341–353. https://doi.org/10.1007/s40368-021-00690-7

[36] Sugerman, P. B., Savage, N. W., Walsh, L. J., Zhao, Z. Z., Zhou, X. J., Khan, A., … Bigby, M. (2002). The pathogenesis of oral lichen planus. *Critical Reviews in Oral Biology and Medicine*, *13*(4), 350–365. https://doi.org/10.1177/154411130201300405

[37] Thongprasom, K., & Dhanuthai, K. (2008). Steriods in the treatment of lichen planus: a review. *Journal of Oral Science*, *50*(4), 377–385. https://doi.org/10.2334/josnusd.50.377

[38] Tziotzios, C., Lee, J. Y. W., Brier, T., Saito, R., Hsu, C. K., Bhargava, K., … McGrath, J. A. (2018). Lichen planus and lichenoid dermatoses: Clinical overview and molecular basis. *Journal of the American Academy of Dermatology*, *79*(5), 789–804. https://doi.org/10.1016/j.jaad.2018.02.010

[39] Waingade, M., Medikeri, R. S., & Gaikwad, S. (2022). Effectiveness of hyaluronic acid in the management of oral lichen planus: a systematic review and meta-analysis. *Journal of Dental Anesthesia and Pain Medicine*, *22*(6), 405–417. https://doi.org/10.17245/jdapm.2022.22.6.405

[40] Warnakulasuriya, S., Kujan, O., Aguirre-Urizar, J. M., Bagan, J. V., González-Moles, M. Á., Kerr, A. R., … Johnson, N. W. (2021). Oral potentially malignant disorders: A consensus report from an international seminar on nomenclature and classification, convened by the WHO Collaborating Centre for Oral Cancer. *Oral Diseases*, *27*(8), 1862–1880. https://doi.org/10.1111/odi.13704

[41] Zakrzewska, J. M., Chan, E. S. Y., & Thornhill, M. H. (2005). A systematic review of placebo-controlled randomized clinical trials of treatments used in oral lichen planus. *British Journal of Dermatology*, *153*(2), 336–41. https://doi.org/10.1111/j.1365-2133.2005.06493.x