Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/1jdwt046

COMPARATIVE ASSESSMENT OF PERIODONTAL STATUS IN PEDIATRIC AND ADULT PATIENTS WITH ORAL LICHEN PLANUS AND THE ROLE OF BIOCOMPATIBLE RESTORATIVE MATERIAL

Dr Palwasha Khan[1], Dr Shabir Ahmed[2*], Dr Zaheer Hussain Chachar[3], Dr Jayyad Salim Awal[4], Dr Syed Amjad Abbas[5], Dr Shaukat Shahzad[6]

[1]Senior Registrar, Department of Periodontolgy, Sardar Begum Dental College, Peshawar, Pakistan
[2*]Associate Professor and Head of Department, Department of Prosthodontics, Bibi Aseefa Dental College, Larkana, Pakistan
[3]Assistant Professor and Head of Department, Department of Periodontology, Altmash Institute of Dental Medicine, Karachi, Pakistan
[4]Registrar, Department of Periodontology, Watim Medical and Dental Hospital, Islamabad, Pakistan
[5]Assistant Professor, Department of Oral Pathology, Rehman College of Dentistry, Peshawar, Pakistan
[6]Assistant Professor, Community and Preventive Dentistry, Margalla Institute of Health Sciences, Islamabad, Pakistan

***Corresponding author :** Dr Shabir Ahmed
*Email: ahmedshabir80@gmail.com

ABSTRACT

Objective: This study aimed to compare periodontal health in pediatric and adult patients diagnosed with Oral Lichen Planus (OLP) and assess the impact of biocompatible restorative materials on their periodontal status.

Methods: A total of 101 patients were examined at Sardar Begum Dental College and Hospital, Peshawar from January 2023 to January 2024. Patients were categorized into pediatric (<18 years) and adult (≥18 years) groups. Periodontal health was assessed using plaque index, gingival index, probing pocket depth, clinical attachment loss, bleeding on probing, and tooth mobility. The influence of restorative materials, including resin composites, glass ionomer cement, zirconia, and bioceramics, was also evaluated. Diagnosis of OLP was confirmed clinically and histopathologically, and data were analyzed using Chi-square and independent t-tests.

Results: Periodontal health indicators were generally similar between pediatric and adult patients, with no significant differences in plaque index, gingival index, clinical attachment loss, or probing pocket depth. However, bleeding on probing was more prevalent in adults, indicating a higher inflammatory response. Resin composites and glass ionomer cement were the most commonly used restorative materials, showing higher patient satisfaction and lower association with periodontal inflammation. Adults had a significantly higher presence of systemic conditions, which may have contributed to their increased gingival inflammation.

Conclusion: Although periodontal health was largely comparable between pediatric and adult OLP patients, adults exhibited greater gingival inflammation. The choice of restorative materials played a role in periodontal outcomes, with resin composites and glass ionomer cement being associated with

better periodontal health. Regular periodontal assessments and careful selection of biocompatible materials are essential for long-term oral health management in OLP patients.

Keywords: Oral Lichen Planus, periodontal health, pediatric patients, adult patients, biocompatible restorative materials, plaque index, gingival inflammation, clinical attachment loss, resin composite, glass ionomer cement.

INTRODUCTION

Oral Lichen Planus (OLP) is a chronic inflammatory disease affecting the mucous membranes of the oral cavity(1). It presents as reticular, erosive, atrophic, or plaque-like lesions, often causing discomfort, pain, and an increased risk of secondary infections. While the exact cause remains unclear, OLP is believed to be an immune-mediated condition influenced by genetic, environmental, and systemic factors(2). The disease predominantly affects adults, but pediatric cases are also reported, although less frequently. Given its chronic nature, OLP requires long-term management to prevent complications such as periodontal disease and secondary infections(3).

Periodontal health is a crucial factor in patients with OLP, as chronic inflammation in the oral tissues can contribute to plaque accumulation, gingival bleeding, and loss of attachment(4). Studies have suggested that OLP patients may experience higher levels of periodontal disease due to an altered immune response and increased susceptibility to bacterial colonization(5). Differences in periodontal health between pediatric and adult patients remain an area of interest, as younger individuals typically exhibit stronger immune responses and better tissue healing, while adults may experience more severe inflammatory effects(6).

Restorative materials also play a significant role in the management of OLP patients. Biocompatible materials such as resin composites, glass ionomer cement, zirconia, and bioceramics are commonly used to restore function and aesthetics. However, certain materials can trigger hypersensitivity reactions or inflammatory responses, which may exacerbate OLP symptoms. Understanding the impact of different restorations on oral tissues is essential for selecting the most suitable materials for long-term use in these patients(7).

This study aims to compare periodontal health between pediatric and adult OLP patients while assessing the role of different biocompatible restorative materials in disease management. By evaluating plaque index, gingival inflammation, clinical attachment loss, and other periodontal indicators, this research seeks to provide insights into the best treatment strategies for maintaining oral health in OLP patients of different age groups.

METHODOLOGY

This study was conducted at Sardar Begum Dental College and Hospital, Peshawar from January 2023 to January 2024. A total of 101 patients diagnosed with Oral Lichen Planus (OLP) participated. The objective was to compare periodontal health between pediatric patients under 18 years and adults 18 years and older while also assessing the impact of biocompatible restorative materials. ‘The study received approval from the Institutional Review Board of Sardar Begum Dental College and Hospital, Peshawar’. ‘Informed consent was obtained from all participants, and for pediatric patients, consent was obtained from their parents or guardians’. ‘All procedures were conducted in accordance with the Helsinki Declaration for ethical research involving human subjects’.

Patients were selected based on clinical and histopathological confirmation of OLP. Inclusion criteria required patients to have a confirmed diagnosis of OLP, at least 20 natural teeth, and no history of periodontal treatment in the last six months. Patients with systemic diseases affecting

periodontal health, those on immunosuppressive therapy, or pediatric patients with a history of tobacco or betel nut use were excluded.

Each participant underwent a detailed oral examination, and relevant medical and dental history was recorded. Demographic data, including age, gender, occupation, education level, and socioeconomic status, were collected through structured interviews. Patients were categorized into pediatric and adult groups for comparative analysis.

Periodontal health was assessed using various clinical indices. The plaque index was measured using the Silness and Löe Plaque Index, scoring plaque accumulation from 0 to 3. Gingival inflammation was assessed using the Löe and Silness Gingival Index, also on a scale from 0 to 3. Probing pocket depth was measured in millimetres using a UNC-15 periodontal probe at six sites per tooth. Clinical attachment loss was recorded as the distance from the cementoenamel junction to the base of the periodontal pocket. Bleeding on probing was evaluated by gently probing the sulcus and recording the presence or absence of bleeding. Tooth mobility was classified using Miller's Mobility Index into Grade 0 (normal), Grade 1 (slight movement), Grade 2 (moderate movement), and Grade 3 (severe movement with vertical displacement). Alveolar bone loss was assessed using digital panoramic radiographs and measured as a percentage of total root length.

All periodontal examinations were conducted by trained periodontists to ensure consistency. Measurements were taken using a manual periodontal probe under standardized conditions.

Diagnosis of OLP was confirmed based on the modified World Health Organization criteria. Clinical features were observed during intraoral examination under proper illumination to assess lesion type and location. When necessary, a punch biopsy was performed under local anesthesia. Tissue samples were fixed in 10% buffered formalin, then stained with hematoxylin and eosin (H&E) to confirm liquefaction degeneration of the basal layer, saw-tooth rete ridges, and band-like lymphocytic infiltration in the lamina propria.

To evaluate the impact of biocompatible restorations, patients with existing restorations were assessed for the type of material used, which included resin composites, glass ionomer cement, zirconia, and bioceramics. The age of restorations was recorded in months or years. The success or failure of restorations was determined based on factors such as fracture, marginal discoloration, secondary caries, or restoration loss. Patient satisfaction was recorded using a Likert scale from 1 to 5. Restoration failures were re-evaluated, and patients were provided with alternative treatment options when necessary.

Saliva samples were collected from each participant to assess salivary pH. Unstimulated saliva was collected in sterile tubes, and pH was measured immediately using a digital pH meter to prevent alteration due to buffering effects.

Digital panoramic radiographs (OPG) were taken for all participants using standardized exposure settings to assess alveolar bone loss and possible changes related to OLP. Radiographs were analyzed using imaging software, and measurements were performed by two independent examiners to reduce bias.

All collected data were analyzed using SPSS software. 'Categorical variables were compared using Chi-square tests, while continuous variables were analyzed using independent t-tests'. 'A p-value of less than 0.05 was considered statistically significant'.

RESULT

The study included 101 participants, divided into 40% pediatric patients and 60% adults. The gender distribution was almost equal, with 50.5% male and 49.5% female participants. Among adults, 45% were employed, while 35% were unemployed, and 20% were students. Education levels varied, with 30% having primary education, 50% having secondary education, and 20% attaining higher education. Regarding socioeconomic status, 40% of participants belonged to the low-income group,

45% to the middle class, and only 15% were categorized as high-income. These demographic differences were important in understanding the variations in oral health and treatment choices.

Table 1: Demographic Variables

Variable	Category	Percentage/Details
Age Group	Pediatric (<18)	40%
	Adult (≥18)	60%
Gender	Male	50.5%
	Female	49.5%
Occupation (Adults)	Employed	45%
	Unemployed	35%
	Student	20%
Education Level (Adults)	Primary	30%
	Secondary	50%
	Higher Education	20%
Socioeconomic Status	Low	40%
	Middle	45%
	High	15%

Among the different types of Oral Lichen Planus (OLP), the reticular type was the most common (30%), followed by erosive (25%), atrophic (15%), and other less frequent forms. The average duration of OLP in patients was 4.2 years, with a standard deviation of 2.5 years, indicating some variation in disease persistence. The most affected site was the buccal mucosa (55%), followed by the gingiva (20%), tongue (10%), lips (10%), and palate (5%). Regarding symptom severity, 50% of patients experienced moderate symptoms, 30% had mild symptoms, and 20% suffered from severe OLP. The average burning sensation, measured on the Visual Analogue Scale (VAS), was 5.6, showing that discomfort was significant in most cases. These findings highlight the varying manifestations of OLP, which could influence treatment approaches.

Table 2: Oral Lichen Planus (OLP) Clinical Variables

Variable	Category	Percentage/Details
OLP Type	Reticular	30%
	Erosive	25%
	Atrophic	15%
	Plaque-like	10%
	Bullous	10%
	Papular	10%
OLP Duration	Mean ± SD	4.2 ± 2.5 years
Lesion Site	Buccal mucosa	55%
	Gingiva	20%
	Tongue	10%
	Lips	10%
	Palate	5%
Symptom Severity	Mild	30%
	Moderate	50%
	Severe	20%
Burning Sensation	Mean VAS Score	5.6 ± 2.3

The plaque index and gingival index were slightly higher in adults than in pediatric patients, though the differences were not statistically significant ($p > 0.05$). 'Clinical attachment loss was nearly the same in both groups, with an average of 2.13 mm in children and 2.12 mm in adults, showing no major variation ($p = 0.985$)'. Probing pocket depth was slightly deeper in pediatric patients (3.49 mm) than in adults (3.46 mm), though again, this difference was not significant. However, bleeding on probing was higher in adults (59.3%) compared to pediatric patients (51.1%), suggesting a greater prevalence of gingival inflammation in older individuals. Similarly, tooth mobility and alveolar bone loss were more frequent in adults, though statistical significance was not reached. These findings suggest that while periodontal health declines with age, the differences between pediatric and adult OLP patients were not substantial in this sample.

Table 3: Periodontal Status Indicators

Variable	Category	Pediatric (<18)	Adult (≥18)	P-Value
Plaque Index	Mean ± SD	1.41 ± 0.46	1.51 ± 0.50	0.293
Gingival Index	Mean ± SD	1.85 ± 0.56	1.76 ± 0.71	0.503
Clinical Attachment Loss	Mean ± SD	2.13 ± 0.73	2.12 ± 0.77	0.985
Probing Pocket Depth	Mean ± SD	3.49 ± 0.78	3.46 ± 1.18	0.884
Bleeding on Probing	Yes	51.1%	59.3%	0.531
Tooth Mobility (Grades 1-3)	Yes	40.3%	52.6%	0.437
Alveolar Bone Loss	Mean %	35.5%	48.8%	0.398

Resin composite was the most commonly used restorative material in both groups, followed by glass ionomer cement, zirconia, and bioceramics. The preference for resin composite may be attributed to its aesthetic appeal and ease of use. 'The average age of restorations was significantly higher in adults (3.8 years) than in pediatric patients (2.5 years), with a p-value of 0.003, indicating a meaningful difference'. 'Patient satisfaction was slightly higher among pediatric patients (4.1 on a 5-point Likert scale) compared to adults (3.8), with a p-value of 0.048, suggesting that younger patients were more content with their restorations'. The overall success rate of restorations was high in both groups, with 87% in pediatric patients and 82% in adults, indicating that biocompatible materials were performing well in both populations.

The presence of secondary caries was slightly higher in adults (31.5%) than in children (28.2%), though this difference was not statistically significant. These results emphasize the importance of material choice and oral hygiene in maintaining long-term restoration success.

Table 4: Biocompatible Restorative Materials

Variable	Category	Pediatric (<18)	Adult (≥18)	P-Value
Type of Restoration Used	Resin Composite	40%	35%	0.612
	Glass Ionomer Cement	35%	30%	
	Zirconia	15%	20%	
	Bioceramics	10%	15%	
Restoration Age	Mean ± SD	2.5 ± 1.2 years	3.8 ± 1.7 years	0.003*
Patient Satisfaction	Mean Likert Score ± SD	4.1 ± 0.8	3.8 ± 1.0	0.048*

Restoration Success Rate	Success	87%	82%	0.429
Presence of Secondary Caries	Yes	28.2%	31.5%	0.621

Significant p-values ($p < 0.05$) indicate a statistically meaningful difference.

Oral hygiene habits showed some differences between the two groups, with 68.5% of pediatric patients brushing their teeth at least twice daily compared to 60.2% of adults. Mouthwash use was slightly more common among adults (50.5%) than pediatric patients (45.0%), and flossing was more frequent in adults (38.7%) than in children (30.2%). Among adults, 42.3% were smokers or used betel nut, which is a known risk factor for oral diseases. Systemic conditions such as diabetes and hypertension were significantly more prevalent in adults (29.4%) than in children (12.8%), with a p-value of 0.014, indicating a significant association. Similarly, medication use, including immunosuppressants and corticosteroids, was more common in adults (22.7%) than in pediatric patients (8.3%), with a p-value of 0.026. Salivary pH was slightly lower in adults (6.7) compared to pediatric patients (6.9), though this difference was not statistically significant. These findings highlight the influence of systemic health on oral conditions and the importance of medical history in treatment planning.

Table 5: Oral Health and Systemic Factors

Variable	Category	Pediatric (<18)	Adult (≥18)	P-Value
Oral Hygiene Habits	Brushing ≥ 2x/day	68.5%	60.2%	0.482
	Mouthwash Use	45.0%	50.5%	0.529
	Flossing Regularly	30.2%	38.7%	0.338
Smoking/Betel Nut Use	Yes	N/A	42.3%	-
Systemic Conditions	Yes	12.8%	29.4%	0.014*
Medication History	Yes	8.3%	22.7%	0.026*
Salivary pH	Mean ± SD	6.9 ± 0.3	6.7 ± 0.4	0.071

*Statistically significant values indicate a notable association.

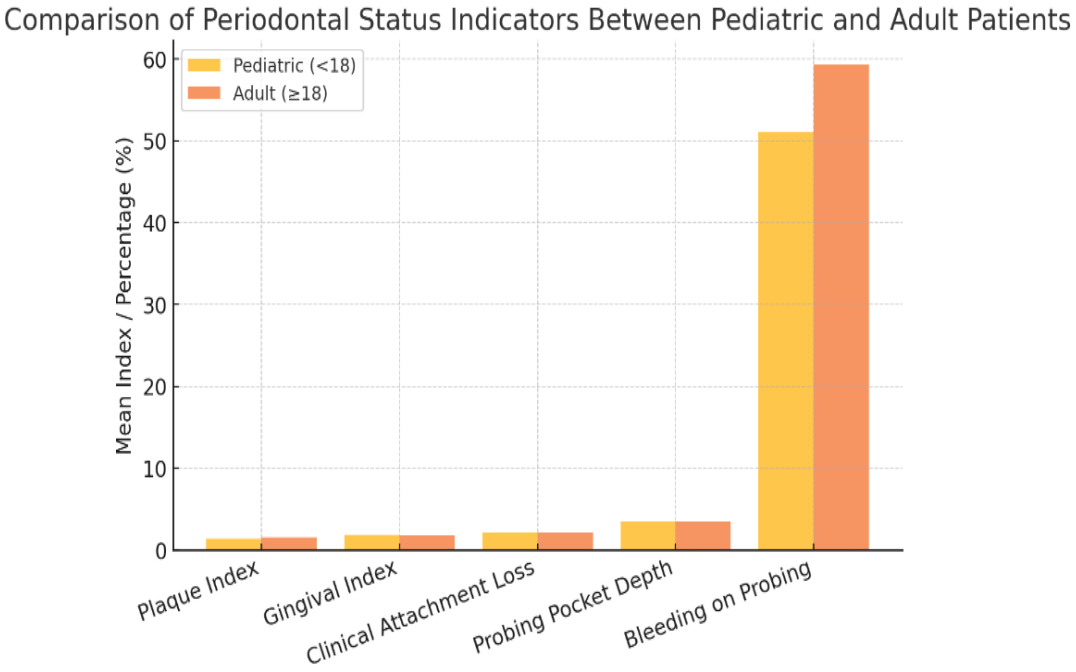

Figure 1: The bar chart compares periodontal health indicators between pediatric and adult patients with Oral Lichen Planus. The plaque and gingival indices were slightly higher in adults, but the difference was minimal. Clinical attachment loss and probing pocket depth showed almost no variation between the two groups. Bleeding on probing was more frequent in adults, suggesting higher gingival inflammation, possibly due to systemic conditions or prolonged exposure to irritants. Despite this, overall periodontal health was similar across both age groups, emphasizing the importance of preventive care for all patients.

DISCUSSION

This study aimed to compare the periodontal health of pediatric and adult patients diagnosed with Oral Lichen Planus (OLP) and to assess the impact of various biocompatible restorative materials on their periodontal status. The findings provide insights into the relationship between age, periodontal health, and the choice of restorative materials in OLP patients(5, 8, 9).

The analysis revealed that both pediatric and adult patients exhibited similar periodontal health indicators, with no significant differences in plaque index, gingival index, clinical attachment loss, or probing pocket depth. However, bleeding on probing was more prevalent in adults, suggesting a higher degree of gingival inflammation in this group. This observation aligns with previous research indicating that OLP patients, particularly those with more extensive or erosive forms, tend to have increased plaque accumulation and gingival inflammation(10-12). A studies found that patients with atrophic-erosive OLP lesions had higher plaque and calculus indices, which were associated with greater periodontal deterioration(13-15).

The choice of restorative materials plays a crucial role in maintaining periodontal health. In this study, resin composites were the most commonly used materials, followed by glass ionomer cement, zirconia, and bioceramics. Patient satisfaction was higher with resin composites, which may be attributed to their aesthetic appeal and favorable handling properties. The success rate of restorations was high across all materials, with no significant differences between pediatric and adult patients(16-18).

Previous studies have highlighted the influence of restorative materials on periodontal parameters. Studies assessed the oral health status and histopathological gingival response to different restorative materials among patients. The findings suggested that amalgam restorations were associated with higher plaque and gingival indices compared to composite resin and glass ionomer restorations(19-21).

The findings underscore the importance of meticulous oral hygiene and regular periodontal assessments in OLP patients, regardless of age. Dental practitioners should consider the biocompatibility of restorative materials and their potential impact on periodontal health when planning treatments for OLP patients. Resin composites and glass ionomer cements appear to be favorable choices due to their lower association with plaque accumulation and gingival inflammation.

Limitations and Future Directions

This study has certain limitations, including its cross-sectional design and the relatively small sample size. Longitudinal studies with larger cohorts are warranted to further elucidate the long-term effects of restorative materials on periodontal health in OLP patients. Additionally, future research should explore the underlying mechanisms linking OLP, periodontal health, and restorative materials to develop targeted therapeutic strategies.

In conclusion, while periodontal health indicators were similar between pediatric and adult OLP patients, adults exhibited higher gingival inflammation. The choice of restorative materials significantly impacts periodontal health, with resin composites and glass ionomer cements being associated with more favorable outcomes. These insights can guide clinicians in optimizing treatment plans for OLP patients to maintain both oral health and patient satisfaction.

CONCLUSION

This study found that periodontal health indicators were generally similar between pediatric and adult OLP patients, though adults exhibited higher gingival inflammation. The choice of restorative materials played a key role in maintaining periodontal health, with resin composites and glass ionomer cements showing better patient satisfaction and lower plaque accumulation. These findings emphasize the need for individualized treatment planning, regular periodontal monitoring, and careful selection of biocompatible restorations to ensure optimal oral health in OLP patients. Further longitudinal studies are needed to assess the long-term impact of restorative materials on periodontal outcomes in this population.

REFERENCES

1. P Unnikrishnan S, Boggon J, Mclaughlin B, Cruickshank ME, Abu-Eid R, Hijazi K. Clinical predictors of disease severity in oral lichen planus. Clinical and Experimental Dermatology. 2025:llae558.
2. Górski B. Dental implant treatment in patients suffering from oral lichen planus: a narrative review. International Journal of Environmental Research and Public Health. 2022;19(14):8397.
3. Anitua E, Alkhraisat MH, Piñas L, Torre A, Eguia A. Implant-prosthetic treatment in patients with oral lichen planus: a systematic review. Special Care in Dentistry. 2022;42(1):60-72.
4. Arduino PG, Gambino A, Macciotta A, El Haddad G, Conrotto D, Carbone M, et al. Population-based cohort study to assess the gingival lesions in 1319 patients with lichen planus. Oral diseases. 2023;29(8):3393-9.
5. Bozhyk S. ASPECTS OF ORAL MUCOSA CYTOLOGICAL SCREENING IN PATIENTS WITH RED LICHEN PLANUS. 2022.
6. Huang H-Y, Lin P-Y, Chen C-C, Chen Y-K. Risk factors for the development of oral precancerous lesions in a cohort of 293 oral lichen planus patients with or without chronic periodontitis in southern Taiwan. Journal of Dental Sciences. 2024;19(1):594-600.
7. Kakar J, Sokolovska L, Dabuzinskiene A, Murovska M, Čēma I, editors. Analysing Clinical and Demographic Data from a Study on Oral Lichen Planus Patients. Proceedings of the Latvian Academy of Sciences, Section B: Natural, Exact, and Applied Sciences; 2024.
8. Okumuş İ, Akgün S, Sakın Ulubay S. Nanotechnological Agents and Bioactive Materials Used for Remineralization in Pediatric Dentistry.
9. Sakın Ulubay S, Akgün S, Okumuş İ. Bioactive Materials Used in Vital Pulp Treatments.

10. Fayazi M, Rostami M, Amiri Moghaddam M, Nasiri K, Tadayonfard A, Roudsari MB, et al. A state-of-the-art review of the recent advances in drug delivery systems for different therapeutic agents in periodontitis. Journal of Drug Targeting. 2024:1-36.
11. Şenel S, Özdoğan AI, Akca G. Current status and future of delivery systems for prevention and treatment of infections in the oral cavity. Drug Delivery and Translational Research. 2021;11:1703-34.
12. Daume L, Kreis C, Bohner L, Jung S, Kleinheinz J. Clinical characteristics of oral lichen planus and its causal context with dental restorative materials and oral health-related quality of life. BMC Oral Health. 2021;21(1):262.
13. Arya R, Sharma RK, Tanwar N, Gupta A. Assessment of periodontal status in patients with oral lichen planus. Quintessence International. 2024;55(1).
14. Nunes GP, Pirovani BO, Nunes LP, Silva ANA, Morábito MJSD, Nunes-Junior NA, et al. Does oral lichen planus aggravate the state of periodontal disease? A systematic review and meta-analysis. Clinical oral investigations. 2022;26(4):3357-71.
15. Svitich OA, Teplyuk NP, Stepanov MA, Vartanova NO, Damdinova BS. Studying the relationship between oral lichen planus and periodontal disease: Value on periodontal pathogens and oral hygiene. Russian Journal of Skin and Venereal Diseases. 2024;27(1):45-54.
16. Sanadi RM, Khandekar PD, Chaudhari SR, Javali MA, Gurav NU. Association of periodontal disease with oral lichen planus: A systematic review and meta analysis. Journal of Oral and Maxillofacial Pathology. 2023;27(1):173-80.
17. Gonzaga AKG, Vasconcelos RC, de Sousa Lopes MLD, de Souto Medeiros MR, de Araújo AA, da Silveira ÉJD, et al. Oxidative stress markers in the saliva of patients with oral lichen planus. Pathology-Research and Practice. 2023;248:154569.
18. Wu Y, Xu H, Wang Y, Li C, Tang G, Hua H, et al. An improved scoring system for monitoring oral lichen planus: A preliminary clinical study. Oral Diseases. 2023;29(8):3337-45.
19. Ma KSK, Thota E, Huang JY, Huang YF, Wei JCC. Onset of oral lichen planus following dental treatments: A nested case–control study. Oral Diseases. 2023;29(3):1269-81.
20. Rodriguez-Galvez R, Tvarijonaviciute A, Peres-Rubio C, Lopez-Jornet P. Efficacy of Combined vs. Monotherapy in Oral Lichen Planus: A Randomized Clinical Trial. Oral Diseases. 2024.
21. Mutafchieva MZ, Draganova MN, Tomov GT. Histological Improvement and Cytokine Levels Reduction in Patients with Oral Lichen Planus after Photobiomodulation Therapy. Biomedicines. 2024;12(10):2300.