Review

DENTAL MEDICINE

Treatment outcomes of Janus kinase inhibitors in oral lichen planus; a systematic review of cases reported globally

Najla Dar-Odeh[1], Ibrahim N. Shawaqfeh[1], Deya Alsughair[1], Dana Altoum[1], Aseel Samara[2], Dilnoza Bobamuratova[3], Osama Abu-Hammad[1]

1) School of Dentistry, The University of Jordan, Amman, Jordan

2) School of Medicine, The University of Jordan. Amman, Jordan

3) Tashkent Medical Academy, Tashkent, Uzbekistan

Abstract

Objective. This study aims to review studies on Janus kinase inhibitors (JAKi) in order to determine their efficacy and safety in the treatment of erosive oral lichen planus (OLP).

Design and data sources. A systematic review was conducted through PubMed/ Medline, Google Scholar, and ScienceDirect databases using PRISMA guidelines. Study quality assessment was performed using Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Case Reports and Case Series.

Eligibility criteria. Case reports, and case series published between January 2020 - November 2025 with no language or geographic restrictions.

Data extraction and synthesis. Retrieved data included patient demographics and disease outcomes. Descriptive statistical analyses and qualitative data synthesis were employed.

Results. A total of 15 case reports / series described 45 patients. Patients were mostly females (94.7%), with an age range of 30-89 years (weighted mean=55.31 years). A total of seven JAKi have been described for the management of OLP, of which tofacitinib and upadacitinib were the most commonly prescribed. A total of 18 patients (40.0%) showed complete resolution with treatment durations extending from 3 months-6 years. Seventeen patients (37.7%) required adjunctive corticosteroids, or other immunosuppressive treatment. Reported adverse effects were mostly mild in the form of cutaneous, gastrointestinal and liver disturbances.

Conclusions. To date, seven different JAKi have been reported to be effective in the treatment of erosive OLP. Current evidence suggests that JAKi may represent a promising and generally well-tolerated therapeutic option for erosive OLP patients, particularly those with refractory disease. Nevertheless, further research is warranted to establish their long-term efficacy and safety. Future studies should focus on optimizing treatment duration, evaluating the role of combination immunomodulatory therapies, and identifying patient-related factors that may influence treatment outcomes.

Registration: The study protocol was registered in PROSPERO (ID#CRD420251184459)

Keywords: lichen planus, Janus kinase inhibitors, oral ulcers

DOI: 10.15386/mpr-2974

Manuscript received: 25.02.2026
Received in revised form: 02.08.2026
Accepted: 14.08.2026

Address for correspondence:
Najla Dar-Odeh
najla@ju.edu.jo

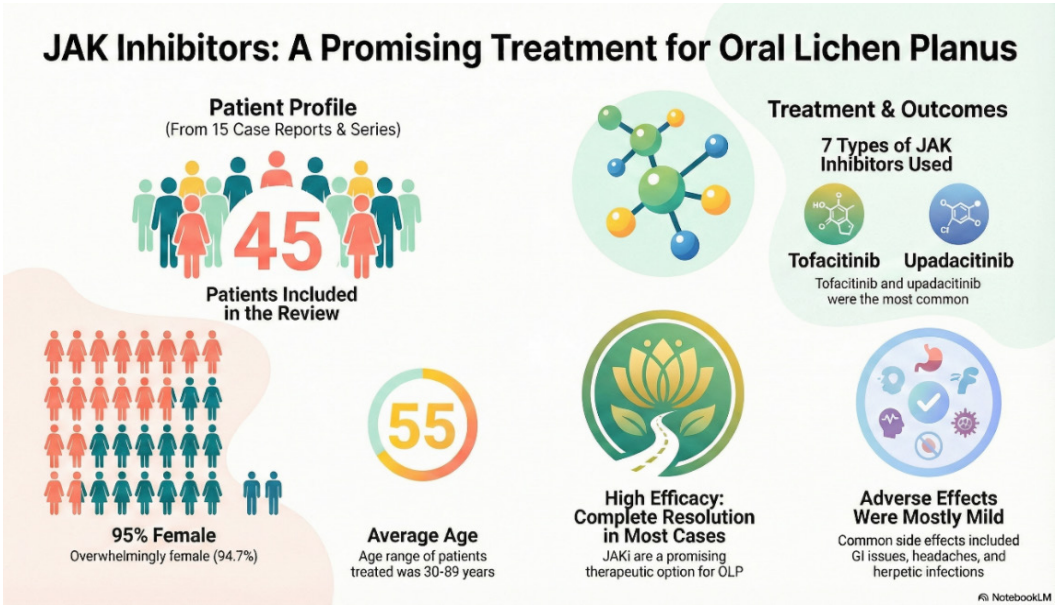

Figure 0. Graphical abstract.

Introduction

Lichen planus is a mucocutaneous disease of unclear etiology, heterogeneous clinical spectrum, unpredictable history and therapeutic uncertainty [1]. Oral lichen planus (OLP) affects approximately one in two LP patients making oral mucosa one of the most commonly affected sites. Among the different phenotypes of OLP, the erosive type represents the most severe type with a profound adverse impact on the quality of life. It is commonly associated with persistent pain, burning sensation, impaired oral function and a potential for malignant transformation [2].

Treatment of OLP is based on several medications with corticosteroids being used as first line therapy [3]. According to the most recent guidelines, topical corticosteroids remain the mainstay of treatment in localized OLP [4]. Other modalities include systemic corticosteroids, retinoids, and oral cyclosporine [4]. According to the Italian Consensus on the Treatment of Oral Lichen Planus which was published in 2025, second- or third-line treatments have been recommended such as methotrexate, dapsone, hydroxychloroquine, azathioprine, mycophenolate mofetil, thalidomide and colchicine [5].

While the treatment burden of OLP often impacts emotional and social well-being of affected patients [6], there is scarcity of information regarding the potential adverse effects of corticosteroids as the most commonly employed agents [3]. However, several treatment outcomes were reported including relapse [7], failed therapy [1], fungal infections and oral mucosa scarring [1].

Janus Kinase inhibitors (JAKi) are a relatively new emerging category of immunomodulatory drugs. First reports described the use of tofacitinib in the treatment of rheumatoid arthritis [8]. Next generations were developed in successive years with deucravacitinib being the latest addition and the first selective TYK2 (tyrosine kinase 2) inhibitor, whic has shown promising results in the treatment of psoriasis [9]. The most recent consensus on OLP treatment recommends attempting (JAKi) in severe and refractory cases [5], due to the role of JAKi in suppressing IFN-γ–driven immune activation. JAKi selectively inhibit JAK enzymes, thereby suppressing cytokine signaling, reducing immune-mediated epithelial damage, and promoting lesion resolution [10]. In recent years several critical reviews explored recent advances in the treatment of OLP [11–15]. More effective therapies and emerging immunomodulators have been developed, among which the use of JAKi in erosive and recalcitrant OLP lesions has gained great attention [16–18]. Previous reviews on the use of JAKi in LP treatment have focused on cutaneous lesions with little attention to OLP [18]. On the other hand, reviews on the treatment of OLP with JAKi, have not addressed adequately the safety profile of these medications [16]. A limitation of these reviews is the narrative nature, which lacks the methodological rigor of a systematic review, including predefined protocols, exhaustive search strategies, and formal critical appraisal procedures. To cover the critical knowledge gaps, a few clinical trials are now ongoing to evaluate the use of JAKi in OLP, including a proof-of-concept trial of baricitinib [19] and a randomized controlled trial of tofacitinib [20]. However, these trials are still in the research phase, which highlights the lack of high-level evidence in this important aspect of OLP treatment.

While the evidence-based rationale for the use of JAKi in the treatment of OLP is still lacking, clinicians are yet to reach a consensus regarding relapse-prevention strategies, the optimal agent and treatment protocols involving JAKi in erosive OLP. More information is warranted on the effectiveness, and safety profile of these medications taking into consideration the inherent obscure nature of OLP and its characteristic age and gender prevalence.

Therefore, we critically and systematically reviewed the literature to retrieve data available from the reported case reports, and case series on the clinical use of JAKi as a therapeutic modality for patients with erosive OLP. The review objectives were two-fold; to examine the efficacy and explore the safety profile of JAKi in erosive OLP.

Methods

This study is a systematic review of case reports and case series describing JAKi use in the treatment of OLP. The primary objective of this review is to identify the types of JAKi used so far for the treatment erosive OLP, their dosing regimens, and treatment efficacy. The secondary objective is to explore adverse effects associated with their use in erosive OLP patients. The research question was developed using PEO statement (Patient; Exposure; Outcome), and was formulated in the following: What are the treatment outcomes (Outcome) in adult patients with erosive OLP (Patients) that are treated by a JAKi (Exposure). The protocol was registered in PROSPERO (ID #CRD420251184459), and it was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [21].

Search strategy

A comprehensive literature search was conducted independently by two reviewers (N.D-O., D.Als.) across three online databases: PubMed/MEDLINE, Google Scholar, and ScienceDirect. The search was performed in November 2025 with a primary objective of identifying all relevant case reports and case series describing OLP cases treated with one or more JAKi. The search terms included a combination of keywords and Medical Subject Headings (MeSH) related to JAKi and OLP, as follows: “Janus kinase inhibitor”; Tofacitinib; Baricitinib; Upadacitinib; Ruxolitinib; Abrocitinib; Filgotinib; Ritlecitinib, ,”Oral Lichen Planus”, “Oral Ulcers”, “case report”, “case series”. Boolean operators (AND/OR/NOT) were used to refine the search queries, and filters were applied to include only articles published in peer-reviewed journals during the period 2020-2025 with no language restrictions. Search queries were as follows:

PubMed/Medline: (“Lichen Planus, Oral”[MeSH] OR “oral lichen planus”[Title/Abstract] OR OLP[Title/Abstract]) AND (“Janus Kinase Inhibitors”[Mesh] OR “Janus kinase inhibitor”[Title/Abstract] OR “JAK inhibitor”[Title/Abstract] OR JAKi[Title/Abstract] OR jakinib*[Title/Abstract] OR tofacitinib[Title/Abstract] OR baricitinib[Title/Abstract] OR upadacitinib[Title/Abstract] OR ruxolitinib[Title/Abstract] OR ritlecitinib[Title/Abstract] OR filgotinib[Title/Abstract] OR abrocitinib[Title/Abstract]).

***ScienceDirect*:** (OLP OR “oral lichen planus”) AND (“Janus kinase inhibitor” OR “Janus kinase inhibitors” OR “JAK inhibitor” OR “JAK inhibitors” OR JAKi OR jakinib); (OLP OR “oral lichen planus”) AND (tofacitinib OR baricitinib OR upadacitinib OR ruxolitinib OR ritlecitinib OR filgotinib OR abrocitinib).

Google Scholar: (“oral lichen planus” OR OLP) AND (“Janus kinase inhibitor” OR “JAK inhibitor” OR “JAK inhibitors” OR JAKi OR jakinib OR tofacitinib OR baricitinib OR upadacitinib OR ruxolitinib OR ritlecitinib OR filgotinib OR abrocitinib) AND (“case report” OR “case series” OR “cross-sectional”)

Detailed search strategy throughout the three databases is presented as supplementary material.

Eligibility criteria

Articles were screened for inclusion based on the following criteria:

- ***Inclusion criteria:***

o Case reports and case series describing OLP treated with one or more JAKi administered in systemic or topical routes

o Reports providing clinical details regarding oral manifestations, drug name, dose, frequency, route of administration, and duration of therapy.

o Patients: adults

o Articles published in peer-reviewed journals.

o Date of publication: January 2020- November 2025

- ***Exclusion Criteria:***

o Review articles, letters, editorials, animal studies, or in vitro research.

o Reports lacking sufficient clinical details to confirm OLP treatment and outcome.

o Studies lacking any of the included data items namely patient (demographics, medical history, clinical manifestations), and treatment details (treatment modalities and outcomes).

o Articles solely investigating extraoral lichen planus, disorders other than OLP, and drugs other than JAKi

o Pediatric population

Study selection and data extraction

Two reviewers (I. S; D. A.) conducted independently an initial screening of 433 articles identified through database search. Titles and abstracts were reviewed to determine relevance. Full-text articles were then assessed for eligibility. Those that did not follow inclusion criteria were excluded. Discrepancies between reviewers were resolved by discussion.

After applying the eligibility criteria, 15 scholarly

articles were selected, reporting on 45 patients with erosive OLP treated with one or more JAKi.

Data items from included studies were extracted by four authors (I.S., D.A., D.T., A.S.) using a standardized data collection form. Extracted data were further reviewed by a fifth author (N.D-O) to ensure accuracy and completeness of information. The following data items were extracted:

- Demographics: Age, gender, and geographic location of the patient(s).
- Drug name, dose, frequency, route of administration, and duration of therapy.
- Treatment outcomes including:

➢ Lesion resolution: Complete or partial healing of oral lesions (measured by clinical examination or photographic assessment). We relied on the researchers' wording in describing resolution. Complete resolution was defined as complete healing (resolution) of oral lesions, whereas partial resolution referred to a substantial but incomplete improvement in clinical signs and/or symptoms.

➢ Symptom improvement: Reduction in pain, burning, or discomfort reported by patients, measured (when available) using validated scales such as the Visual Analog Scale or Numeric Rating Scale.

➢ Time to improvement: Duration (in weeks or months) from initiation of JAKi therapy to the first documented clinical improvement or remission.

➢ Safety and tolerability profile, in the form of treatment discontinuation, incidence and type of adverse events.

➢ Resolution: Lesion resolution for ≥6 months was considered long term outcome.

Quality assessment

The methodological quality of the included case reports and case series was evaluated using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Case Reports and Case Series [22]. Studies were assessed for clarity in reporting patient history, clinical presentation, diagnostic workup, interventions, and outcomes. Studies missing some clinical data were discussed among reviewers before making the decision for inclusion.

Data synthesis

A qualitative synthesis of data was conducted due to nature of included studies (case reports/series). Descriptive statistical analysis was carried out for patient's age range, weighted mean age of patients, number of patients distributed according to gender and treatment outcomes, and weighted mean time to clinical improvement in weeks.

Ethical considerations

This study retrieved previously published case reports/case series with no aim to collect direct patient data. Therefore, institutional review board (IRB) approval and patient consent were not required. All efforts were made to ensure accurate reporting and adherence to ethical guidelines for systematic reviews [23].

Patient and public involvement: None

Results

A total of 15 studies describing 45 OLP cases treated with one or more JAKi were finally included.

The flowchart that describes the selection process is presented in figure 1.

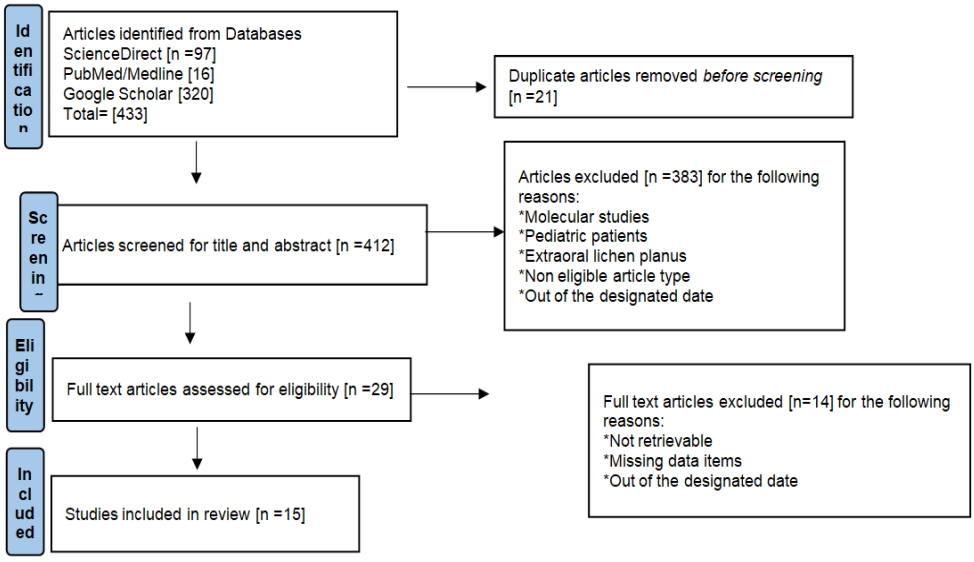

Figure 1. Flowchart presenting the identification and selection process of case reports/series that were published in the period 2020-2025, and describing treatment outcomes of Janus Kinase inhibitors in erosive oral lichen planus.
Studies were retrieved via MEDLINE/PubMed, ScienceDirect and Google Scholar databases according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Patient demographics

Patients were 38 females, 4 males; while gender was not identified for 3 patients. Age range was 30-89 years (Table I). All patients were aged ≤70 years except for one patient aged 89 years. Therefore, weighted mean age was calculated to be 55.31 years for a total of 41 patients after excluding the patient aged 89 years and three patients with non-specified age.

Table I presents findings of case reports and case series published in the past 5 years.

Table I. Treatment outcomes of Januse kinase inhibitors used for erosive oral lichen planus patients in case reports and case series published during the period 2020-2025.

Author (year)	Patients (n, sex, age/ yrs)	Drug	Dose Route Frequency Duration (months)	Signs and symptoms Resolution	Time to improvement (weeks)	Adjunctive treatment	Adverse effects (discontinuation)	Comments
Gowda (2024)	n=5 F=3, M=2 mean age= 44.6	Tofacitinib	5 mg PO 1X2 3	DLQI reduced from 18 to 6; VAS from 5.6 to 1.4 Near complete clinical resolution (ODDS reduction 70%)	4	Not specified	None	2 patients followed up, and showed relapse within 2 months
Katz (2025)	n=1; F; age=60	Ritlecitinib	50 mg PO 1X1 3	Symptomatic and clinical improvement	1	Prednisolone+ dexamethasone MW (tapered off by day 14)	None	Tapering of ritlecitinib to once every 3 days led to relapse
Mansouri (2024)	n=6; F=5, M=1; mean age= 45.5	Tofacitinib	5 mg PO 1X2 4-6	Mean VAS reduction 9.16 and high satisfaction score	11.6 (mean)	None	None	No patient had recurrence during a 6-12 month follow up.
Min (2024)	n=1; F; age=61	Baricitinib + Ruxolitinib (topical) Ruxolitinib (topical)	2-4 mg PO 1X1 4 1.5% cream Topical 1X2 Not specified	Complete resolution after adding topical ruxolitinib to baricitinib	4 (after starting topical ruxolitinib)	Topical corticosteroid and prednisone (per needed)	None	Oral lesions recurred 3 weeks after stopping ruxolitinib then healed after restarting it
Sheehan (2025)	n=1; F; age=39	Upadacitinib	15mg PO 1X1 3	Complete clearance	4	None	Mild headache Exacerbation of recurrent HSV infection	Valacyclovir prophylaxis initiated
Balestri (2022)	n=1; F; age=45	Upadacitinib	15 mg PO 1X1 3	Complete pain and lesion resolution	1	None	Not specified	Primarily intended to treat reluctant psoriatic arthritis
Noot (2025)	n=10; F; mean age= 68.2	Upadacitinib	15-30 mg PO 1X1 5-20 (mean 10.6)	5: complete clearance 3: large improvement 2: small improvement	6.5	One or more of the following: Topicals (not specified) HCQ Azathioprine, Dexamethasone Prednisone Tildrakizumab None	None	One patient previously used tofacitinib with inadequate disease control
Landells (2023)	n=1; F; age=70	Upadacitinib	15mg PO 1X1 Not specified	Tongue lesions; no improvement Other oral mucosal lesions; near complete improvement	Not specified	Methotrexate	None	Non healed erosion was diagnosed as SCC after several months of initiation of Upadacitinib. patient passed away.
Stolte (2024)	n=3; sex not specified; age <65	Deucra-vacitinib	6 mg PO 1X1 3	ODSS, VAS, and BOP improved; 2: complete resolution 1: near-complete resolution	12	None	Mild acneiform eruption (weeks 4-6) in one patient	Patients were examined at baseline and at week 12

Table I. Treatment outcomes of Januse kinase inhibitors used for erosive oral lichen planus patients in case reports and case series published during the period 2020-2025 (continuation).

Author (year)	Patients (n, sex, age/ yrs)	Drug	Dose Route Frequency Duration (months)	Signs and symptoms Resolution	Time to improvement (weeks)	Adjunctive treatment	Adverse effects (discontinuation)	Comments
Vu (2024)	n=1; F; age=52	Deucra-vacitinib	6 mg PO 1X1 5	Significant pain improvement; near complete resolution of erythema and ulceration	Not specified	Not specified	Perioral acneiform eruptions after 1 month	Acneiform eruption resolved spontaneously 1-2 weeks later.
Kassels (2023)	n=6; F; mean age= 61	Tofacitinib	5 mg PO 1X2 6-72	Significant clinical and pain improvement	Not specified	Intralesional triamcinolone (for 2 patients)	Mild liver enzymes elevation Gastrointestinal bleeding (temporary discontinuation).	All patients had oral/ vulvovaginal lichen planus. One self-discontinued, relapsed within 2 months and restarted therapy. One lost to follow-up. Strong, durable response in those who continued treatment.
Kozlov (2023)	n=1; F; age=89	Tofacitinib	5 mg PO 1X2 ongoing at time of publication (months).	Complete resolution	Not specified	None	None	Cutaneous, oral and genital LP No relapse while continuing tofacitinib.
Miao (2025)	n=7; f=7; mean age= 48.4	Tofacitinib	5 mg PO 1X2 9-30 (mean= 17)	Complete resolution	27.4 (complete resolution)	Monotherapy in 5 patients Methotrexate in 1 patient Prednisolone in 1 patient	Hyperlipidemia Mild gastrointestinal upset Mild liver enzyme elevation Acneiform eruption Herpes zoster 1 case of breast cancer Only 1 self-discontinuation due to gastrointestinal upset.	Total of 23 erosive vulvovaginal lichen planus, 7 cases had oral lichen planus
Solimani (2023)	n=1; M; age=58	Abrocitinib	100-200 mg PO 1X1 3	Near-complete resolution measured by DLQI, ABSIS and histological re-examination	4	None	None	200mg reduced to 100mg at week 8 Twelve weeks after treatment discontinuation and switch to topical triamcinolone acetonide paste (week 24), the patient sustained resolution demonstrating a long-term effect of abrocitinib

DLQI: Dermatology Life Quality Index; ODSS: Oral disease severity score; VAS: Visual Analogue Scale; BOP: Bleeding on Probing; ABSIS: Autoimmune Bullous Skin Disorder Intensity Score II; HSV: Herpes Simplex Virus; SCC: Squamous cell carcinoma

Janus Kinase inhibitors treatment outcomes

A total of seven types of JAK inhibitors were used in treatment. All were prescribed by the oral route (tofacitinib, baricitinib, upadacitinib, ritlecitinib, deucravacitinib, and abrocitinib), except ruxolitinib which was used as a topical cream. Tofacitinib was the most frequently reported drug (n= 25 patients), and used mostly in case series [24–26]. Upadacitinib was the second most frequently used drug (n=13 patients).

A total of 18 patients (40.0%) showed complete resolution with treatment durations extending from 3 months-6 years. Only two studies reported long-term

remission (≥6 months) involving six patients treated with tofacitinib and one patient treated with abrocitinib [31,32]. Time to improvement was reported in 36 patients, whereby the weighted mean time for clinical improvement was 11.0 weeks. Lesions tended to relapse upon tapering [26] or stopping medication [23,27]. A total of 17 patients (37.7%) required adjunctive corticosteroids, [25–29], or other immunosuppressive treatment [25,29,30]. Further, some patients showed clinical clearance of erosive lesions, however they had residual pain [28]. Notably, OLP demonstrated greater resistance to therapy compared to cutaneous lichen planus and showed a disease course comparable to erosive genital lichen planus [28].

Figure 2 presents Treatment regimens of JAK inhibitors used for patients with erosive OLP.

Janus kinase inhibitors adverse effects

A total of 21 patients (46.7%) reported no adverse effects [24,27–29,31,32], while 16 patients (35.6%) encountered mild adverse effects. These effects were identified as headache, gastrointestinal disturbances, herpetic infections, hyperlipidemia, mild elevation of liver enzymes [26,33–35], and acneiform eruptions [33,35], which resolved spontaneously in few weeks albeit the continuation of therapy [35]. One patient experienced GI bleeding, necessitating temporary discontinuation of treatment, however, treatment was successfully reinstated upon resolution of bleeding [26].

Risk of bias assessment

Studies included in the review presented no-low risk of bias. Total assessment scores and reasons for this assessment are presented in table IIa (case series) and table IIb (case reports).

Figure 2. Treatment regiments of Janus kinase inhibitors used for the treatment of erosive oral lichen planus in case studies published during 2020-2025.

Table IIa. Quality assessment for Case series (Source: Moola et al. 2020) [26].

Study	Inclusion criteria	Reliable, standard measures	Valid methods for identification	Consecutive inclusion	Complete inclusion	Patients' demographics	Patients' clinical information	Outcomes and follow ups	Clinics/ sites demographics	Statistical analysis	Score
Gowda	Yes	Yes	Yes	Unclear	No	Yes	Unclear	Yes	Unclear	Yes	7/10
Mansouri	Yes	Yes	Unclear	Unclear	Unclear	Yes	Unclear	Yes	Unclear	Yes	6/10
Noot	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	9/10
Kassels	Yes	Yes	Yes	Yes	No	Yes	Unclear	Yes	Yes	Yes	8/10
Miao	Yes	Yes	Yes	Unclear	No	Yes	Unclear	Yes	Yes	Yes	7/10
Stolte	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	Unclear	Yes	8/10

Table IIb. Quality assessment for Case reports (Source: Moola et al. 2020) [26].

Study	Patient's demographics	Patient's history	Current clinical condition on presentation	Diagnostic or assessment methods and the results	Intervention(s) or treatment procedure(s)	Post-intervention clinical condition	Adverse events or unanticipated events	Takeaway lessons	Score
Katz	Yes	No	No	Yes	Yes	Yes	Yes	Yes	6/8
Min	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	7/8
Sheehan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8/8
Balestri	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8/8
Landells	Yes	No	Yes	Unclear	Yes	Yes	Yes	Yes	6/8
Vu	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	7/8
Kozlov	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8/8
Solimani	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8/8

Discussion

This systematic review examined the available literature on the use of JAKi in erosive OLP to evaluate the evidence supporting their efficacy and safety. So far, the use of JAKi in the treatment of OLP is limited to case reports and series [13]. To date no systematic review has specifically adressedd the use of JAKi in treatment of OLP. Further, we could not retrieve any clinical trials, cross-sectional or cohort studies during literature search.

This review retrieved only studies published between 2020-2025, given that the earliest studies to evaluate JAKi in OLP were published in 2021. Literature presented seven types of JAK inhibitors that were used in erosive OLP treatment; tofacitinib, ritlecitinib, baricitinib, ruxolitinib, upacitinib, deucravacitinib, and abrocitinib. Tofacitinib and upadacitinib were the most frequently investigated probably because these were the earliest generation of JAK inhibitors developed and investigated.

Patients were mostly females and middle aged which probably reflects age and gender prevalence of erosive OLP [36]. Previous studies on OLP highlighted the important role of age in determining response to therapy. Age was identified as a significant predictor of OLP remission, with the likelihood of incomplete remission increasing by 7.9% for each additional year of age [7].

Patients included in this review presented with OLP either alone [24,27,31,33–35,37] or in conjunction with extraoral types such as cutaneous, vulvovaginal, oropharyngeal, or esophageal [25,26,28–30,32,38]. A small minority of cases showed incomplete resolution of lesions [30,35] which may indicate that OLP lesions are less responsive to treatment than extraoral types. It was noticed that lesions tended to relapse upon tapering [27] or stopping medication [24,38], while some required additional corticosteroid therapy [26]. Further, some patients showed clinical clearance of erosive lesions, however they had residual pain [29]. Notably, OLP demonstrated greater resistance to therapy compared to cutaneous LP, and showed a disease course comparable to erosive genital lichen planus. Several studies concluded that the discontinuation or tapering of JAK inhibitors was associated with relapse [24,26–28], therefore long periods of treatment were deemed necessary. In their case report, Kozlov et al (2023) observed no relapse as long as the medication was used [38].

Recalcitrant oral lichen planus (OLP) is associated with persistent immune activation, chronic epithelial injury, and reduced efficacy of topical therapies, which together reduce treatment responsiveness [39] . OLP is primarily driven by IFN-γ/JAK–STAT signaling, while oxidative stress further sustains inflammation through JAK-independent pathways within oral epithelial cells [40]. While total antioxidant capacity and uric acid are increased, other markers such as malondialdehyde and nitric oxide are significantly decreased in the saliva and serum/plasma of OLP patients [41]. These mechanisms may necessitate prolonged JAK inhibitor therapy ≥6 months for optimal outcomes, or switching to a different JAK inhibitor in case of therapeutic failure [27,42].

Like any immunomodulatory medications the use of JAK inhibitors is not without side effects. They may be associated with gastrointestinal disturbances, headaches, increased susceptibility to serious infections, major adverse cardiac events, increased incidence of cancer, and thrombosis [13,26]. Cases reported here showed either no adverse effects [24,27–29,31,32], or mild effects in the form of headache, gastrointestinal disturbances, herpetic infections, hyperlipidemia or mild elevation of liver enzymes [26,33–35]. Other mild side effects reported were acneiform eruptions[33,35], which resolved spontaneously in few weeks albeit the continuation of therapy [35]. Furthermore, Kassels reported that one patient in their case series encountered GI bleeding, necessitating temporary discontinuation of treatment. Later, treatment resumed with no recurrent GI bleeding, which may indicate that bleeding is not attributed to the medication itself, but to the patient's original medical status [26]. The association between JAKi and the development of cancer was confirmed in previous

literature. This review identified that one patient developed tongue squamous cell carcinoma after commencing JAKi therapy. However, this may not imply a causal effect, rather it may confirm the potential for malignant transformation in erosive OLP [30]. Other serious adverse effects previously reported for JAKi, such as thromboembolic events were not identified in this study. Kotyla et al (2021) argue that JAKi should be administered with caution to susceptible patients such as elderly patients, patients with a past history of thromboembolic episodes or those taking sex hormone therapy [43]. Furthermore, it is important to obtain medical history of patients including past history of viral infections, as patients who have a history of recurrent zoster may require prophylactic antivirals [34], and receive the shingles vaccine.

This study has limitations. A major limitation is that the available evidence was derived predominantly from case reports and small case series. Such study designs are inherently susceptible to selection, reporting, and publication biases, lack control groups, and provide limited generalizability. Consequently, the findings should be interpreted with caution, and definitive conclusions regarding treatment efficacy and safety cannot be drawn until higher-quality prospective studies and randomized controlled trials become available. On the other hand, case reports included in this review had no-low risk of bias, and they have provided the data items sufficient to identify treatment outcomes and adverse effects of JAKi. Including only case reports or case series as the only type of eligible study type has been used previously by several important systematic reviews to describe specific clinical problems where there are lacking cohort studies [44], or in recent emerging diseases [45].

Conclusions

The available evidence suggests that JAKi may have potential as a therapeutic option for erosive OLP, particularly in patients with refractory disease. To date, seven different JAKi have been reported in the literature, most commonly administered orally and, in some cases, for extended treatment periods lasting several years. However, the current evidence is derived predominantly from case reports and small case series, limiting the ability to draw definitive conclusions regarding efficacy and safety. Future research should evaluate newer generations of JAKi, clarify the role of adjunctive immunomodulatory therapies, and assess the long-term outcomes of prolonged treatment. Well-designed clinical trials are needed to determine the influence of patient demographics, comorbidities, and disease characteristics on treatment response. Additional aims include exploring potential differences in outcomes between oral and extraoral forms of lichen planus.

Authors contributions

ND-O: conceptualization, methodology, writing, review and editing. OA-H: methodology and statistical analysis. IS, DAls, DA, AS: methodology. ND-O and DB: writing, first draft. All authors critically revised the manuscript, approved the final version to be published, and agree to be accountable for all aspects of the work

References

1. Macken JH, Senusi A, O'Toole EA, Caley M, Rognoni E, Fortune F. Erosive lichen planus: an unmet disease burden. Front Med (Lausanne). 2024;11:1457667. doi: 10.3389/fmed.2024.1457667.
2. Offen E, Allison JR. What is the malignant transformation potential of oral lichen planus? Evid Based Dent. 2022;23:36-37. doi: 10.1038/s41432-022-0240-4.
3. Lodi G, Manfredi M, Mercadante V, Murphy R, Carrozzo M. Interventions for treating oral lichen planus: corticosteroid therapies. Cochrane Database Syst Rev. 2020;2:CD001168. doi: 10.1002/14651858.CD001168.pub3.
4. Ioannides D, Vakirlis E, Kemeny L, Marinovic B, Massone C, Murphy R, et al. European S1 guidelines on the management of lichen planus: a cooperation of the European Dermatology Forum with the European Academy of Dermatology and Venereology. J Eur Acad Dermatol Venereol. 2020;34:1403-1414. doi: 10.1111/jdv.16464.
5. Cinotti E, D'Onghia M, Calabrese L, Bardazzi F, Corazza M, Cozzani EC, et al. Italian Consensus on the treatment of oral lichen planus. Ital J Dermatol Venerol. 2025;160:83-96. doi: 10.23736/S2784-8671.25.08143-5.
6. Daume L, Kreis C, Bohner L, Kleinheinz J, Jung S. Does the Clinical Form of Oral Lichen Planus (OLP) Influence the Oral Health-Related Quality of Life (OHRQoL)? Int J Environ Res Public Health. 2020;17:6633. doi: 10.3390/ijerph17186633.
7. Wongpakorn P, Chantarangsu S, Prapinjumrune C. Factors involved in the remission of oral lichen planus treated with topical corticosteroids. BDJ Open. 2024;10:34. doi: 10.1038/s41405-024-00217-4.
8. Fleischmann R, Kremer J, Cush J, Schulze-Koops H, Connell CA, Bradley JD, et al. Placebo-controlled trial of tofacitinib monotherapy in rheumatoid arthritis. N Engl J Med. 2012;367:495-507. doi: 10.1056/NEJMoa1109071.
9. Armstrong AW, Lebwohl M, Warren RB, Sofen H, Imafuku S, Ohtsuki M, et al. Safety and Efficacy of Deucravacitinib in Moderate to Severe Plaque Psoriasis for Up to 3 Years: An Open-Label Extension of Randomized Clinical Trials. JAMA Dermatol. 2025;161:56-66. doi: 10.1001/jamadermatol.2024.4688.
10. Alarcón I, Alarcón C, Arellano J. Overview of lichen planus pathogenesis and review of possible future therapies. JAAD Reviews 2025 1;3:146–54. doi: 10.1016/j.jdrv.2025.01.011
11. Didona D, Caposiena Caro RD, Sequeira Santos AM, Solimani F, Hertl M. Therapeutic strategies for oral lichen planus: State of the art and new insights. Front Med (Lausanne).

2022;9:997190. doi: 10.3389/fmed.2022.997190.

12. Popa C, Sciuca AM, Onofrei BA, Toader S, Condurache Hritcu OM, Boțoc Colac C, et al. Integrative Approaches for the Diagnosis and Management of Erosive Oral Lichen Planus. Diagnostics (Basel). 2024;14:692. doi: 10.3390/diagnostics14070692.
13. Kang K-H, Kim J-R, Jung J-K, Byun J-S. Pharmacological Treatment of Oral Lichen Planus: A Review of Evaluated Therapeutics. JOMP 2025;50:6–15.
14. Wu T, Bai Y, Jing Y, Chen F. What can we learn from treatments of oral lichen planus? Front Cell Infect Microbiol. 2024;14:1279220. doi: 10.3389/fcimb.2024.1279220.
15. Abdusalamova K, Solimani F, Worm M. Therapie des oralen Lichen planus – eine aktuelle Übersicht [Treatment of oral lichen planus-a review]. Dermatologie (Heidelb). 2025;76:491-498. German. doi: 10.1007/s00105-025-05540-x.
16. Didona D, Caposiena Caro RD, Calabrese L, D'Onghia M, Galluccio G, Di Nicola MR, et al. Use of JAK Inhibitors in Lichen Planus: An Update. Medicina (Kaunas). 2025;61:1056. doi: 10.3390/medicina61061056.
17. Motamed-Sanaye A, Khazaee YF, Shokrgozar M, Alishahi M, Ahramiyanpour N, Amani M. JAK inhibitors in lichen planus: a review of pathogenesis and treatments. J Dermatolog Treat. 2022;33:3098-3103. doi: 10.1080/09546634.2022.2116926.
18. Corbella-Bagot L, Riquelme-McLoughlin C, Morgado-Carrasco D. Long-Term Safety Profile and Off-Label Use of JAK Inhibitors in Dermatological Disorders. Actas Dermosifiliogr. 2023;114:784-801. English, Spanish. doi: 10.1016/j.ad.2023.06.012.
19. ClinicalTrials.gov. Efficacy and safety of baricitinib for the treatment of oral lichen planus: a proof-of-concept study. University of North Caroline, Chapel Hill. 2023 27 Available from: https://clinicaltrials.gov/study/NCT06158113
20. ClinicalTrials.gov. Evaluation of efficacy and safety of add-on tofacitinib in patients with oral lichen planus: a randomized clinical trial . All India Institute of Medical Sciences, Bhubaneswar 2025 13 Available from: https://clinicaltrials.gov/study/NCT07131813
21. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021;372:n71. doi: 10.1136/bmj.n71.
22. JBI. Critical Appraisal Tools. Available from: https://jbi.global/critical-appraisal-tools
23. Suri H. Ethical Considerations of Conducting Systematic Reviews in Educational Research. In: Zawacki-Richter O, Kerres M, Bedenlier S, Bond M, Buntins K, editors. Systematic Reviews in Educational Research: Methodology, Perspectives and Application. Wiesbaden: Springer Fachmedien Wiesbaden; 2020;41–54. doi: 10.1007/978-3-658-27602-7_3.
24. Gowda SK, Thakur V, Behera B, Garg S, Sahu DK, Sethy M, et al. The efficacy and safety of oral tofacitinib in oral erosive lichen planus: a case series. Int J Dermatol. 2024;63:1785-1786. doi: 10.1111/ijd.17262.
25. Miao VY, Branyiczky MK, Saunderson RB, Fischer G. Erosive Lichen Planus Treated With Tofacitinib: A Case Series of 23 Patients. Australas J Dermatol. 2025;66:234-237. doi: 10.1111/ajd.14452.
26. Kassels A, Edwards L, Kraus CN. Treatment of erosive vulvovaginal lichen planus with tofacitinib: A case series. JAAD Case Rep. 2023;40:14-18. doi: 10.1016/j.jdcr.2023.08.001.
27. Katz A, Lambert R, Ahmed A, Patel D, Soto-Canetti G, Talia J, et al. Erosive oral lichen planus successfully treated with JAK3/TEC inhibitor ritlecitinib: A case report. JAAD Case Rep. 2025;63:70-72. doi: 10.1016/j.jdcr.2025.05.017.
28. Min M, Dulai AS, Sivamani RK. Recalcitrant multi-variant lichen planus successfully treated with oral baricitinib and topical ruxolitinib cream. Dermatol Online J. 2024;30. doi: 10.5070/D330363864.
29. Noot CH, Hansen AM, Frost Z, Rhoads JLW, Hull CM, Zone JJ, et al. Oral lichen planus treated with upadacitinib: A case series. JAAD Case Rep. 2025;63:125-127. doi: 10.1016/j.jdcr.2025.05.041.
30. Landells FM, Goudie S, McGrath J, Tibbo J, Landells ID. Successful treatment of erosive lichen planus with Upadacitinib complicated by oral squamous cell carcinoma. SAGE Open Med Case Rep. 2023;11:2050313X231213144. doi: 10.1177/2050313X231213144.
31. Solimani F, Mesas-Fernández A, Dilling A, Nast A, Hilke FJ, Ghoreschi FC, Worm M, et al. The Janus kinase 1 inhibitor abrocitinib for the treatment of oral lichen planus. J Eur Acad Dermatol Venereol. 2023. doi: 10.1111/jdv.19069.
32. Mansouri P, Jafari MA, Chalangari R, Roohaninasab M, Goodarzi A. Successful Treatment of Erosive Lichen Planus With Tofacitinib: A Case Series and Review of the Literature. Clin Med Insights Case Rep. 2024;17:11795476241237350. doi: 10.1177/11795476241237350.
33. Stolte KN, Mesas-Fernández A, Meier K, Klein EK, Dommisch H, Ghoreschi K, et al. TYK2 inhibition with deucravacitinib ameliorates erosive oral lichen planus. Exp Dermatol. 2024;33:e15080. doi: 10.1111/exd.15080.
34. Sheehan CA, Brownstone ND, Lee JB, Hsu S. Use of upadacitinib for recalcitrant oral erosive lichen planus. JAAD Case Rep. 2025;60:167-169. doi: 10.1016/j.jdcr.2025.02.042.
35. Vu M, Abdin R, Issa NT. Treatment of oral lichen planus using deucravacitinib. JAAD Case Rep. 2023;44:94-97. doi: 10.1016/j.jdcr.2023.12.006.
36. Xue JL, Fan MW, Wang SZ, Chen XM, Li Y, Wang L. A clinical study of 674 patients with oral lichen planus in China. J Oral Pathol Med. 2005;34:467-72. doi: 10.1111/j.1600-0714.2005.00341.x.
37. Balestri R, Bortolotti R, Rech G, Girardelli CR, Zorzi MG, Magnano M. Treatment of Oral Erosive Lichen Planus With Upadacitinib. JAMA Dermatol. 2022;158:457-458. doi: 10.1001/jamadermatol.2022.0147.
38. Kozlov M, Levit EK, Silvers DN, Brichkov I. Severe Esophageal Lichen Planus Treated With Tofacitinib. Cutis. 2023;111:155-163. doi: 10.12788/cutis.0717.
39. Sun A, Wu YH, Chang JY, Wang YP, Chiang CP, Chia JS. FoxP3+CD4+, IFN-γ+CD4+, and IFN-γ+CD8+ cell levels in erosive and non-erosive types of oral lichen planus patients. J Dent Sci. 2021;16:751-756. doi: 10.1016/j.jds.2021.01.005.

40. Shao S, Tsoi LC, Sarkar MK, Xing X, Xue K, Uppala R, et al. IFN-γ enhances cell-mediated cytotoxicity against keratinocytes via JAK2/STAT1 in lichen planus. Sci Transl Med. 2019;11:eaav7561. doi: 10.1126/scitranslmed.aav7561.

41. Wang J, Yang J, Wang C, Zhao Z, Fan Y. Systematic Review and Meta-Analysis of Oxidative Stress and Antioxidant Markers in Oral Lichen Planus. Oxid Med Cell Longev. 2021;2021:9914652. doi: 10.1155/2021/9914652.

42. Radia C, Abdel-Aziz S, Ratcliff S, Blake T, Medcalf L, Dubois P, et al. P113 Upadacitinib in patients with steroid dependent ulcerative colitis refractory to advanced therapies including tofacitinib: a case series. Gut 2023;72:A112–A113.

43. Kotyla PJ, Engelmann M, Giemza-Stokłosa J, Wnuk B, Islam MA. Thromboembolic Adverse Drug Reactions in Janus Kinase (JAK) Inhibitors: Does the Inhibitor Specificity Play a Role? Int J Mol Sci. 2021;22:2449. doi: 10.3390/ijms22052449.

44. Dar-Odeh N, Arabiat D, Abu-Hammad A, Alshamasneh L, Meer R, Al-Fatafta D, et al. Recent Trends in Risk Factors and Clinical Presentation of Oral Cancer in Women: A Systematic Review. Journal of Advanced Oral Research 2025;16:152–165. doi:10.1177/23202068251330130

45. Abu-Hammad A, Alshamasneh L, Abu-Hammad O, Albdour B, Maraqa I, Alkhader M, et al. Patterns and characteristics of cranial nerve neuropathy in West Nile virus infection: a systematic review of cases reported globally. BMJ Open. 2025;15:e104855. doi: 10.1136/bmjopen-2025-104855.

46. Moola S, Munn Z, Tufanaru C, Aromataris E, Sears K, Sfetcu R, Currie M, Lisy K, Qureshi R, Mattis P, Mu P. Systematic reviews of etiology and risk (2020). Aromataris E, Lockwood C, Porritt K, Pilla B, Jordan Z, editors. JBI Manual for Evidence Synthesis. JBI; 2024. Available from: https://synthesismanual.jbi.global. https://doi.org/10.46658/JBIMES-24-06