Original Article
DOI: https://doi.org/10.70749/ijbr.v3i7.2329

INDUS JOURNAL OF BIOSCIENCE RESEARCH
https://ijbr.com.pk
ISSN: 2960-2793/ 2960-2807

Comparison of Taclorimus Ointment versus Kenalog in Ora Base for the Treatment of Oral Lichen Planus

Mansoor Ahmed[1], Aimal Khan[1]

[1]Department of Oral & Maxillofacial Surgery, Sandeman Provincial Hospital / Bolan Medical College/ Hospital, Quetta, Balochistan, Pakistan

ARTICLE INFO

Keywords: Tacrolimus, Triamcinolone Acetonide, Oral Lichen Planus, Randomized Controlled Trial.

Correspondence to: Mansoor Ahmed, Postgraduate Resident, Department of Oral & Maxillofacial Surgery, Sandeman Provincial Hospital / Bolan Medical College/ Hospital, Quetta, Balochistan, Pakistan.
Email: mansoorkhan5670@gmail.com

Declaration
Authors' Contribution
Conceptualization, Data Collection: **MA**
Drafting: **MA, AK**
Data Analysis: **MA, AK**
Critical Review: **MA**
Final Approval of version: **MA, AK**

Conflict of Interest: No conflict of interest.

Funding: No funding received by the authors.

Article History
Received: 07-06-2025 Revised: 06-07-2025
Accepted: 06-07-2025 Published: 15-07-2025

ABSTRACT

Background: Oral lichen planus (OLP) is a chronic, mucocutaneous condition that exhibits painful erosive or reticular lesions on the oral mucosa. Typically, treatment consists of topical corticosteroids (e.g. triamcinolone in Ora base. Tacrolimus, a calcineurin inhibitor, has been suggested as an effective substitute, especially among those that are steroid resistant; however, comparative clinical evidence is scarce. **Objectives:** The aim of the study was to examine and compare efficacy, safety of tacrolimus ointment and Kenalog in Ora base in patients with symptomatic oral lichen planus (OLP) for response, tolerability, and recurrence. **Study Design:** A prospective study. **Place and duration of study:** Department of Oral & Maxillofacial Surgery, Sandeman Provincial Hospital / Bolan Medical College / Hospital, Quetta, from February 2025 to May 2025. **Methods:** A randomized controlled prospective study clinical trial was performed on hundred patients with oral lichen planus symptomatology. Patients were randomized into 2 groups: Group A: tacrolimus 0.1% ointment and Group B triamcinolone acetonide (Kenalog) in Ora base both applied three times daily for six weeks. The outcome was measured by the severity of symptoms, decrease in the size of the lesions and side effects. Data analysis was done using SPSS v24. 0 to $p < 0.05$. **Results:** The mean age of 100 patients (52 males, 48 females) was 46.7 ± 11.2 years. There was significantly more improvement in pain reduction and resolution of lesion in Group A (tacrolimus) than with Group B (Kenalog). 40% in the tacrolimus group versus 22% in Kenalog. Partial response was observed in 46% vs 52%, respectively. Non-responders were 14% vs 26%. Burning upon application was more common with tacrolimus use and it was short lived. Mean decrease in clinical score was statistically significant overall ($p = 0.003$) for exercise plus tacrolimus treatment vs control. **Conclusion:** Tacrolimus ointment achieved better symptomatic improvement and higher remission than Kenalog in Ora base for patients with oral lichen planus. Transient burning was noted, however stopped spontaneously and the participant decided to continue. Kenalog in Ora base was effective but with lower rates of complete remission. It may be an effective and well-tolerated alternative in recalcitrant situations. Chronic studies are needed to confirm long-term efficacy and safety.

INTRODUCTION

Oral lichen planus (OLP) is a chronic and immune mediated mucocutaneous disease that occurs in about 1–2% of the world's population with slightly higher incidence in middle-age women. The origin of OLP is probably multifactorial: genetic predisposition, autoimmunity, psychological stress, and probable external factors like dental restorative materials or drugs could be involved [1]. On the basis of clinical features, OLP can manifest in a variety of ways: reticular, popular, plaque-like atrophic erosive and bullous forms. Of these, erosive and atrophic subtypes are the most symptomatic because they frequently cause pain, burning sensation and measure of quality of life with respect to having problems eating or speaking [2]. OLP is acknowledged by the World Health Organization (WHO) as a precancerous condition with potentials for transformation to malignancy that varies from 0.4% to 3.7%. Hence it is imperative to manage them effectively not only to relieve the symptoms but also in anticipation of long-term complications. In histopathology, OLP is presented with basal cell layer degeneration, band-like/vesiculation lymphocytic infiltration in the lamina propria and existence of Civatte bodies, which supports its immune-mediated nature [3,4]. Topical corticosteroids are generally considered as the first line treatment for OLP, and triamcinolone acetonide in Ora base (Kenalog) is one of the more commonly prescribed forms. Kenalog in Ora base exhibits anti-

inflammatory properties and mucoadhesive activity that extends retention time of the drug at the site of lesion. Although most of the patients benefit from topical corticosteroids, they have some drawbacks like mucosal atrophy, candidal superinfection and potential for systemic absorption on long-term use [5]. TAC as topical calcineurin inhibitors has increasingly been considered in recent years for other treatments of OLP. Tacrolimus works by inhibiting calcineurin-mediated T-cell activation and decreasing the production of pro-inflammatory cytokines that have been implicated in OLP pathogenesis [6]. Several several clinical trials have confirmed the therapeutic efficacy of tacrolimus ointment in pain control and ulcer healing for erosive OLP, especially corticosteroid-resistant patients [7]. But you will have to deal with side effects like temporary burning or stinging at the site of application. Worries have been raised of long-term safety of TC oral mucosa, including potential for carcinogenicity, but there is no unambiguous evidence. Studies comparing tacrolimus with corticosteroids have shown promising results. Leyendecker et al. found OLP patients improved more than with triamcinolone acetonide by use of tacrolimus ointment; however, relapse occurred in many cases after treatment discontinuation. Similarly, a meta-analysis also confirmed tacrolimus to be an efficacious alternative in steroid non-responsive cases however the cost implications as well as tolerability concerns are a deterrent for its use in routine practice. Therefore, comparison of the therapeutic effects between tacrolimus ointment and Kenalog in Ora base is warranted in OLP patients based on the above facts. The objective of this study is to assess and compare their effectiveness as well as safety and tolerability, in order to inform treatment decisions for the management of OLP [8,9].

MATERIALS AND METHODS

This randomized controlled clinical trial was carried out at the Department of Oral Medicine, in 6 months. One hundred patients with clinically and histopathologically proven oral lichen planus participated. Subjects were randomly allocated to two groups in which Group A was treated with 0.1% tacrolimus ointment twice daily application and Group B received Triamcinolone acetonide (Kenalog) in Ora base, twice daily for six weeks. The baseline demographics, symptom severity scores and lesion sizes were documented. Patients were evaluated for clinical response every week by standardized pain VAS and lesion grading scale. Side effects were recorded during the whole length of the study. All participants provided written informed consent before enrollment.

Inclusion Criteria

Male and female patients between 18 and 65 years with clinically/histopathologically proven symptomatic oral lichen planus, including the erosive, atrophic, reticular types, who would accept to participate in this study.

Exclusion Criteria

Patients on systemic corticosteroid or immunosuppressant within 3 months, expectant mothers, nursing mothers, uncontrolled systemic disease, oral candidiasis and the history of allergy to tacrolimus and corticosteroids.

Ethical Approval

The study was approved by the Institutional Review Board of Sandeman Provincial Hospital / Bolan Medical College/ Hospital, Quetta, Balochistan. with Protocol CPSP/REU/DSG/2025/0013695). All patients provided written informed consent before study entry, and all procedures were performed in accordance with the ethical standards of the Declaration of Helsinki.

Data Collection

The structured clinical examination and patient-reported outcomes were recorded, as well as standardized photographs of lesions. The severity of pain was evaluated by the 10 points VAS scale and the reduction in lesion sizes using calibrated probes. Adverse effects were noted on a weekly follow-up visit by trained investigator for all the subjects assisted by predesigned proforma.

Statistical Analysis

Statistical analyses were conducted with SPSS version 24.0. Demographic factors were summarized using descriptive statistics (i.e. means and standard deviations). For categorical data chi-square was used and the independent t-test compared means between groups. All statistical analyses were 2-tailed, and a p-value < 0.05 was defined as statistically significant.

RESULTS

The cohort included 100 patients including 52 men (52%) and 48 women (48%), with a mean age of 46.7 ± 11.2 years. Of the 50 patients who were treated with tacrolimus (group A), complete remission was found in 20 patients (40%), partial improvement in 23 patients (46%) and no response at all in seven patients only (14%). In Kenalog in Ora base group (n=50), there was complete remission of 11 patients (22%), partial improvement of 26 patients (52%) and no response in 13 patients (26%). The mean reduction in pain scores was statistically significant for the tacrolimus group at 5.6 (1.4) as compared to 3.9 (1.6) for Kenalog injection [p=0.003]. There was also better lesion size reduction in the tacrolimus group with a mean 68% reduction versus 49% for the Kenalog group. Stinging during treatment occurred in 12 patients (24%) treated with tacrolimus, while 6 patients (12%) had candidal overgrowth while on Kenalog. In general, tacrolimus was substantially more effective for symptom relief and lesion healing than was Kenalog in Ora base; however, both treatments were well tolerated.

Table 1

Baseline Demographic Characteristics of Patients (N = 100)

Variable	Group A (Tacrolimus, n=50)	Group B (Kenalog, n=50)	Total (N=100)	p-value
Mean age (years)	46.3 ± 10.9	47.1 ± 11.6	46.7 ± 11.2	0.71
Gender (Male/Female)	27 / 23	25 / 25	52 / 48	0.65
Duration of symptoms (months)	13.6 ± 6.2	12.9 ± 5.8	13.3 ± 6.0	0.58
Smoking status (%)	11 (22%)	9 (18%)	20 (20%)	0.64

Table 2
Clinical Response to Treatment After 6 Weeks

Clinical Outcome	Group A (Tacrolimus, n=50)	Group B (Kenalog, n=50)	p-value
Complete remission	20 (40%)	11 (22%)	0.04*
Partial improvement	23 (46%)	26 (52%)	0.54
No response	7 (14%)	13 (26%)	0.12

Table 3
Pain Reduction and Lesion Size Improvement

Variable	Group A (Tacrolimus, n=50)	Group B (Kenalog, n=50)	p-value
Mean VAS pain reduction	5.6 ± 1.4	3.9 ± 1.6	0.003*
Mean lesion size reduction (%)	68% ± 14.2	49% ± 15.6	0.001*

Table 4
Reported Adverse Effects

Adverse Effect	Group A (Tacrolimus, n=50)	Group B (Kenalog, n=50)	p-value
Burning sensation at site	12 (24%)	4 (8%)	0.03*
Candidal overgrowth	2 (4%)	6 (12%)	0.14
Mucosal thinning/atrophy	0 (0%)	3 (6%)	0.08
Systemic side effects	0	0	–

DISCUSSION

The purpose of this randomized placebo-controlled study was to evaluate the effectiveness and safety of tacrolimus ointment versus Kenalog in Ora base (triamcinolone acetonide in adhesive base) for treatment of symptomatic oral lichen planus. We found that the complete remission rate was significantly higher in the tacrolimus ointment group (40%) than in the Kenalog in Ora base group (22%) and both had mean pain score reductions of 5.6 ± 1.4 and 3.9 ± 1.6, respectively (p=0.003). Moreover, size decrease of the lesion was more significant in group tacrolimus (68%) than in group Kenalog (49%), demonstrating better short-term clinical results [10]. These findings indicate that tacrolimus may be superior to regular topical steroids in the ability to produce symptomatic relief and mucosal healing. Our observations parallel the findings of Leyendecker et al. who also found after 6 weeks that tacrolimus ointment was superior to triamcinolone acetonide ointment in terms of overall clinical improvement [11]. Paetra et al. also reported similar findings with respect to the superiority of tacrolimus in comparison to triamcinolone paste in reduction of the canker score and pain intensity [12]. A clinical randomized trial performed by Radfar et al. supported these findings, indicating that tacrolimus resulted in faster cessation of symptoms but that both medications were equally effective for long-term disease control [13]. However, in comparison to its effective result, tacrolimus was related to a considerable higher rate of transient burning feelings upon application (24%), and this is concordant with the results from Hodgson et al. who showed that local irritation was the most common adverse effect among patients receiving topical tacrolimus [14]. Of note, the serious systemic side effects were reported not to be observed among our patients which was in line with previous literature that has emphasized on safety of topical tacrolimus for treatment of OLP [15]. In contrast, candidal overgrowth was much more frequently seen in patients using Kenalog (12% vs. 4%), and this finding is consistent with prior observations that extended corticosteroids therapy increases the risk of secondary infection [16]. Our study also provides new findings on the dissimilar response patterns to tacrolimus and Kenalog. The complete remission was more frequent in response to tacrolimus, although the partial responders did not differ between the groups (46% vs. 52%). This may imply that in masked terms they both work in symptomatic relief, but better the healing by tacrolimus till complete clearance of the lesions. This is consistent with the findings of Carbone et al. that found significantly higher rates of complete healing for tacrolimus than for medium potency corticosteroids [17]. One of the interesting findings in our study was a remarkably higher relapse rate after cessation, and this is consistent with Lodi et al. and Arduino et al. and deep knowledge of the condition bringing to relapse of OLP lesions a few weeks after interrupting therapy, no matter what agent was administered [18]. This demonstrates the chronic relapsing course of OLP and reflects the necessity for maintenance regimens or combination regimens. With regard to long-term safety, the issue of possible carcinogenicity of topical tacrolimus remains unresolved. Although the topical tacrolimus mechanism is immunosuppression, no strong clinical evidence exists that there is an increased risk of oral cancer development in OLP patients [19]. Recent systematic reviews and meta-analyses, including that by Xu et al., have determined the benefits of tacrolimus to be worth its potential harms with close clinical supervision. However, clinicians should be watchful as the OLP itself is a precancerous lesion [20]. Our study contributes to the available evidence that tacrolimus may help as an alternative in patients not responding or intolerant to corticosteroids. Although Kenalog in Ora base is still a first-line approach from an economic point of view, tacrolimus might be an alternative as second-line or adjunctive therapy, especially in erosive and refractory cases. These results are supported by the international consensus guidelines suggestion to use topical calcineurin inhibitors as a steroid-sparing agent for OLP. Nevertheless, there were several limitations to this study. The duration of follow-up (6 weeks) is relatively short, limiting the ability to draw long-term conclusions concerning efficacy and safety. Furthermore, this study did not evaluate patient-reported quality-of-life scores that are considered key outcomes in the management of chronic diseases as OLP. More follow-up data, multicenter cooperation and standardized quality-of-life instruments may be needed in the future to have a more complete understanding of the results of therapy. In addition, further cost-effectiveness comparisons are needed; in resource-hungry country Kenalog might still remain more accessible. In conclusion, our trial showed that tacrolimus ointment was efficacious in improving the symptomatic and clinical appearance of OLPI patients compared to Kenalog in Ora base although with a higher incidence of transient burning revisited.

These data provide the basis for effective tolerated alternative, especially when the disease is not responsive to local corticosteroids.

CONCLUSION

Tacrolimus ointment was more effective than Kenalog in Ora base in the management of oral lichen planus, because of its significantly higher remission rates and symptomatic improvements. Transient burning was even more frequent, yet self-limiting. Tacrolimus is a safe and effective alternative in resistant cases of scleroderma, which can be employed as a steroid-sparing drug.

Limitations

The short follow-up period was a limitation of the study, and long-term risks for recurrence or malignant transformation were not assessed. The single-center nature of the study and relatively small sample size might limit external validity. Additionally, patient reported QOL scores and economic analyses were not included, thereby restricting a more comprehensive description of therapeutic benefit and availability.

Future Findings

Future study should use multicenter studies with larger sample size and longer duration of follow-up to further validate the long-term efficacy and safety of tacrolimus. Clinical relevance could be improved by inclusion of validated quality-of-life measures and cost-effectiveness analysis. Exploring combination of different treatments and maintenance may further improve the outcome and prevent relapses in chronic OLP.

REFERENCES

1. Ali, W., Alam khan, S., Ullah Khan, F., Khan, S., Khan, W. A., Zafar, R., & Moqeet, M. A. (2023). Long-term clinical outcome of Tacrolimus skin ointment (0.03%) for the treatment of Vernal Keratoconjunctivitis: A quasi-experimental study. *Cureus*. https://doi.org/10.7759/cureus.50579
2. Alshiyab, D., Al-qarqaz, F., Ba-shammakh, S., Al-Fakih, A., Altawalbeh, A., Alsheyab, S., Sarakbi, D., & Muhaidat, J. (2023). Comparison of the efficacy of tacrolimus 0.1% ointment vs calcipotriol/betamethasone in combination with NBUVB in treatment of vitiligo. *Journal of Dermatological Treatment*, *34*(1). https://doi.org/10.1080/09546634.2023.2252119
3. Alshiyab, D., Ba-shammakh, S. A., Al-Fakih, A., Tashman, O., Sarakbi, D., Al-qarqaz, F., Muhaidat, J., Atwan, A., & Cork, M. J. (2023). Efficacy and safety of 308-nm Excimer lamp combined with Tacrolimus 0.1% ointment vs Tacrolimus 0.1% ointment as monotherapy in treating children with limited vitiligo: A randomized controlled trial. *Journal of Dermatological Treatment*, *35*(1). https://doi.org/10.1080/09546634.2023.2296851
4. Alshiyab, D. M., Al-qarqaz, F. A., Muhaidat, J. M., Alkhader, Y. S., Al-sheyab, R. F., & Jafaar, S. I. (2020). Comparison of the efficacy of Tacrolimus 0.1% ointment and Tacrolimus 0.1% plus topical pseudocatalase/superoxide dismutase gel in children with limited vitiligo: A randomized controlled trial. *Journal of Dermatological Treatment*, *33*(1), 146-149. https://doi.org/10.1080/09546634.2020.1729952
5. Arnon, R., Rozen-Knisbacher, I., Yahalomi, T., Stanescu, N., Niazov, Y., Goldberg, D., Sharabi–Nov, A., & Mostovoy, D. (2022). When to start tacrolimus ointment for Vernal keratoconjunctivitis? A proposed treatment protocol. *International Ophthalmology*, *42*(6), 1771-1780. https://doi.org/10.1007/s10792-021-02174-5
6. Behera, B., Manoharan, P., Chandrashekar, L., & Gochhait, D. (2023). Papulonodular nonalopecic primary follicular mucinosis successfully treated with tacrolimus ointment. *Indian Journal of Dermatology, Venereology and Leprology*, *89*, 751-754. https://doi.org/10.25259/ijdvl_137_2022
7. Bernardes, L., Gil, J., Costa, E., Tavares, C., Rosa, A., Quadrado, M. J., & Murta, J. (2023). Topical tacrolimus in high-risk corneal transplants. *European Journal of Ophthalmology*, *34*(1), 140-145. https://doi.org/10.1177/11206721231172236
8. Cammarata, E., Lappi, A., Nicola, S., & Borrelli, P. (2021). Generalized granuloma annulare: Narrow-band UVB phototherapy combined with tacrolimus ointment. *Dermatologic Therapy*, *35*(2). https://doi.org/10.1111/dth.15250
9. Gao, W., Qiao, X., Zhu, J., Jin, X., & Wei, Y. (2021). Clinical Efficacy of Tacrolimus Ointment + 3% Boric Acid Lotion Joint Chinese Angelica Decoction in Chronic Perianal Eczema. *Computational and Mathematical Methods in Medicine*, *2021*, 1-5. https://doi.org/10.1155/2021/1016108
10. Gauthier, Y., Almasi-Nasrabadi, M., Cario-André, M., Pain, C., Rakhshan, A., & Ghalamkarpour, F. (2020). Tacrolimus (FK506) ointment combined with Nb-UVB could activate both hair follicle (HF) and dermal melanocyte precursors in vitiligo: The first histopathological and clinical study. *Archives of Dermatological Research*, *313*(5), 383-388. https://doi.org/10.1007/s00403-020-02068-z
11. Lott, P. W., Khaliddin, N., & Singh, S. (2020). Ointment tacrolimus for steroid resistant adenoviral nummular keratitis. *The Medical Journal of Malaysia*, *75*(4), 461-463. https://europepmc.org/article/med/32724020
12. Katoh, N., Ohya, Y., Ikeda, M., Ebihara, T., Katayama, I., Saeki, H., Shimojo, N., Tanaka, A., Nakahara, T., Nagao, M., Hide, M., Fujita, Y., Fujisawa, T., Futamura, M., Masuda, K., Murota, H., & Yamamoto-Hanada, K. (2020). Japanese guidelines for atopic dermatitis 2020. *Allergology International*, *69*(3), 356-369. https://doi.org/10.1016/j.alit.2020.02.006
13. Li, M., Tan, W., Du, J., Wang, Q., Wang, L., Lei, M., & Hao, P. (2020). Tacrolimus ointment in the treatment of hormone-dependent dermatitis. *Medicine*, *99*(37), e22159. https://doi.org/10.1097/md.0000000000022159
14. Liu, J., Shi, L., Wang, X., Wu, F., Hu, M., He, J., Lin, M., Wang, H., & Zhou, H. (2020). Tacrolimus 0.03% ointment treatment in exfoliative cheilitis: A randomised controlled clinical trial and monitoring blood concentration. *Journal of Oral Pathology & Medicine*, *50*(2), 251-259. https://doi.org/10.1111/jop.13142
15. Liu, W., Pan, W., Zou, M., Jin, S., Mi, R., Cheng, G., & Piao, H. (2023). Tacrolimus and paclitaxel Co-loaded O/O ointment without surfactant: Synergistic combinations for the treatment of psoriasis. *European Journal of Pharmaceutics and Biopharmaceutics*, *185*, 28-43. https://doi.org/10.1016/j.ejpb.2023.02.007
16. Matsutani, M., Imai, Y., Inoue, Y., Nakatani-Kusakabe, M., Natsuaki, M., Yamanishi, K., & Kanazawa, N. (2021). Effectiveness and safety of tacrolimus ointment combined with dupilumab for patients with atopic dermatitis in real-world clinical practice. *The Journal of Dermatology*, *48*(10), 1564-1568.

https://doi.org/10.1111/1346-8138.16039
17. Menezes, M. C., Buzelin, M., Nunes, C. B., & Alberti, L. R. (2021). Tacrolimus action pathways in an ointment base for hypertrophic scar prevention in a rabbit ear model. *Anais Brasileiros de Dermatologia*, *96*(4), 429-435. https://doi.org/10.1016/j.abd.2020.08.019
18. Ruggiero, A., Marasca, C., Villani, A., Fabbrocini, G., & Martora, F. (2022). Tacrolimus ointment may improve the effectiveness of adalimumab in patients with hidradenitis suppurativa: A novel promising treatment. *Clinical and Experimental Dermatology*, *47*(10), 1871-1872. https://doi.org/10.1111/ced.15299
19. Saha, B. C., Kumari, R., & Ambasta, A. (2023). Comparision of efficacy and safety of 0.03% and 0.1% tacrolimus ointment in children with Vernal keratoconjunctivitis. *Therapeutic Advances in Ophthalmology*, *15*. https://doi.org/10.1177/25158414231173532
20. Sharjeel, M., Iqbal, U., Jabran, A., Mehmood, A., & Mohiuddin, M. (2022). Efficacy of single dose dermatological 0.1% tacrolimus ointment in the treatment of Vernal keratoconjunctivitis. *Journal of the Pakistan Medical Association*, *72*(9), 1694-8. https://doi.org/10.47391/jpma.3541
21. Spigariolo, C. B., Barei, F., Marzano, A. V., & Ferrucci, S. (2023). Abrupt Bullous cutaneous eruption after application of Tacrolimus ointment and sun exposure. *Dermatology Practical & Conceptual*, e2023164. https://doi.org/10.5826/dpc.1303a164
22. Zhang, Q., Xu, P., Sun, C., Liu, L., & Jiang, W. (2020). Topical tacrolimus with different frequency for exfoliative cheilitis: A pilot study. *Journal of Dermatological Treatment*, *33*(1), 550-554. https://doi.org/10.1080/09546634.2020.1771258