SKIN

BRIEF ARTICLE

# Topical Roflumilast for the Treatment of Cutaneous Lichen Planus in a Hispanic Patient

Gabriela Soto-Canetti, MPH[1,2] , Graham H. Litchman, DO, MS[3], Jordan Talia, MD[1]

[1] Icahn School of Medicine at Mount Sinai, Department of Dermatology, NY, New York, USA
[2] Ponce Health Sciences University School of Medicine, Ponce, Puerto Rico, USA
[3] Touro University Nevada College of Osteopathic Medicine, Henderson, Nevada, USA

## ABSTRACT

**Background:** Cutaneous lichen planus (CLP) is an immune-mediated disorder that traditionally affects middle-aged adults and can cause significant morbidity. CLP is often treated with topical corticosteroids, with additional therapy alternatives including phototherapy and systemic agents like oral corticosteroids, acitretin, methotrexate, and mycophenolate mofetil. Topical roflumilast is a phosphodiesterase-4 (PDE-4) inhibitor that is approved for plaque psoriasis, atopic dermatitis, and seborrheic dermatitis and has a favorable safety profile inhibits key pro-inflammatory cytokines. Oral PDE-4 inhibitors have previously demonstrated success in treating oral lichen planus and are thought to modulate type 1 interferon signaling implicated in the pathogenesis of CLP.
**Case Presentation:** We report the case of a 94-year-old woman with biopsy-confirmed CLP recalcitrant to hydrocortisone and minimally responsive to triamcinolone. She was treated with topical roflumilast once daily, resulting in significant clinical improvement within five weeks and near-complete resolution of lesions by six months, with only residual post-inflammatory hyperpigmentation.
**Conclusion:** This case highlights topical roflumilast as a novel steroid-sparing option for CLP, particularly in elderly patients or those in whom systemic therapy is not indicated. Further large-scale studies are warranted to validate its efficacy and long-term safety in the treatment of CLP.

## INTRODUCTION

Cutaneous lichen planus (CLP) is a subtype of lichen planus (LP), a heterogeneous immune-mediated disease that traditionally affects middle-aged adults. LP can present with a wide range of clinical manifestations, typically affecting the skin, scalp, nails, and mucosa.[1] CLP may resolve by itself within 6-18 months, with hypertrophic and mucosal variants known to persist longer and be recalcitrant to treatment.[1] CLP is characterized by pruritic flat and erythematous to violaceous papules and plaques that classically present on the wrists, forearms, shins, and dorsal feet.[1] Upon resolution of CLP, affected areas may remain with post-inflammatory hyperpigmentation.[1] The pathogenesis of LP is believed to be T-lymphocyte mediated, with cytotoxic CD8+ T cells causing direct tissue damage to the epidermis, along with release of pro-inflammatory cytokines such as interferon-γ

(IFN-γ) and tumor necrosis factor alpha (TNF-α).[1] Type 1 interferons, including interferon-α (IFN-α) and interferon-β (IFN-β), which are produced by plasmacytoid dendritic cells (pDC), have also been implicated in the pathogenesis of LP, with evidence of a type 1 interferon signature in CLP samples.[2, 3] Type 1 interferons are theorized to modulate the Th1 cytotoxic immune response involved in LP.[3] Initial treatment of localized CLP is with topical corticosteroids.[1] Other treatment modalities for recalcitrant or diffuse disease include phototherapy and systemic agents like oral corticosteroids, acitretin, methotrexate, and mycophenolate mofetil.[1] Recently, steroid-sparing treatment alternatives have been explored for the treatment of LP. Topical roflumilast, a phosphodiesterase-4 (PDE-4) inhibitor that is FDA-approved for plaque psoriasis, atopic dermatitis, and seborrheic dermatitis, has upstream effects in the inhibition of pro-inflammatory factors such as TNF-α, IFN- γ, interleukin (IL)-2, IL-8, IL-12, IL-17, IL-22, and IL-23.[4,5] Oral roflumilast has demonstrated reduced IFN-α and IFN-β signaling in patients with psoriasis compared to placebo via the downregulation of pDCs.[6] This case highlights topical roflumilast as a potential therapeutic alternative for CLP in patients where systemic therapy is not indicated.

## CASE PRESENTATION

A 94-year-old Hispanic female presented to our dermatology clinic with a rash of one month's duration on her right lower extremity which was unresponsive to hydrocortisone cream. On physical examination, there were numerous well-demarcated polygonal violaceous papules and plaques on the right and left lower extremities and overlying the dorsal feet (**Figure 1**). No oral involvement was present on exam. A punch biopsy revealed a bandlike infiltrate of mononuclear cells with effacement of the dermoepidermal junction, hydropic change, colloid bodies, and eosinophilic hypertrophy of keratinocytes consistent with CLP (**Figure 2**). Triamcinolone 0.1% cream was initiated for two weeks, resulting in mild improvement in the lesions. At this time, triamcinolone was discontinued, and she was treated with topical roflumilast 0.3% cream once daily. After five weeks of treatment with roflumilast, there was significant improvement of lesions, with notable resolution of erythema. The patient was continued on roflumilast and demonstrated significant improvement of lesions in a follow-up visit six months later, with predominantly residual post-inflammatory hyperpigmentation noted on exam (**Figure 3**).

## DISCUSSION

Apremilast, an oral PDE-4 inhibitor, which is FDA-approved for plaque psoriasis and psoriatic arthritis, has been successfully utilized off-label in several cases of oral lichen planus (OLP) and CLP.[5, 7, 8] Fewer reports have evaluated the potential of oral roflumilast for the treatment of LP, demonstrating improvement of mucocutaneous lesions and allowing for the successful tapering of oral corticosteroids.[9-11] Oral PDE-4 inhibitors have also been demonstrated to reduce type 1 interferon production (IFN-α) by pDCs, with previous studies showing upregulated levels of type 1 interferons in CLP samples and elevated serum IFN-α levels in LP patients compared to healthy controls.[2, 12] A post hoc analysis of data from a randomized controlled trial of oral roflumilast for the treatment of psoriasis showed lower signaling activity of IFN-α and IFN-β at week 12 among the treatment group compared to placebo.[6] Given the existing literature on the use of oral apremilast and

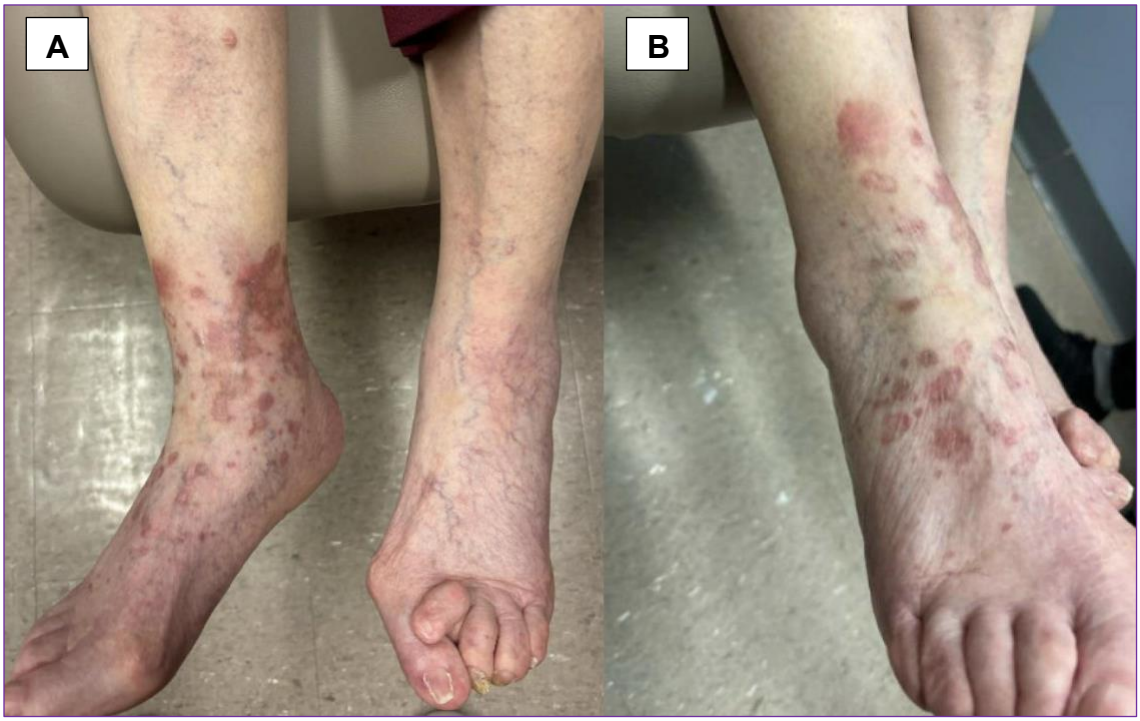


**Figure 1.** Physical exam after two weeks of treatment with topical steroids showing well-demarcated polygonal violaceous papules and plaques on the right lower extremity (**A**) and overlying the right dorsal foot (**B**).

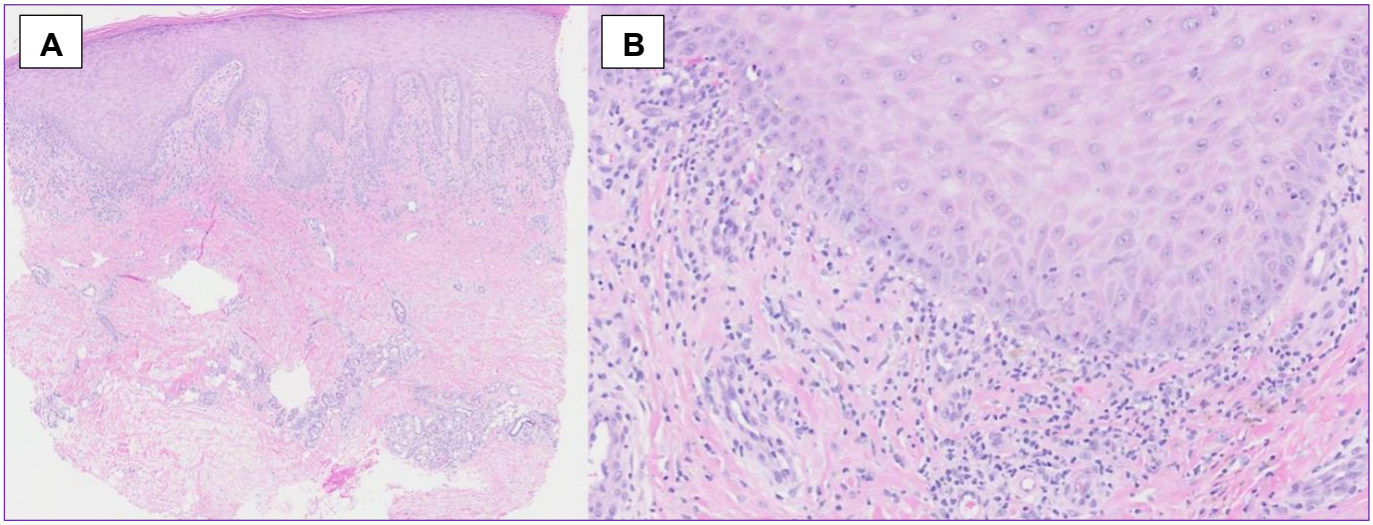


**Figure 2.** Skin punch biopsy stained with hematoxylin and eosin (H&E). (**A**) Low power shows irregular acanthosis of the epidermis, with hypergranulosis and overlying orthokeratosis and a band-like infiltrate in the dermis along the dermoepidermal junction. (**B**) Higher power shows a lichenoid interface change with pigment dropout and necrotic keratinocytes (4x and 20x magnification, respectively).

roflumilast for the treatment of LP and considering the favorable safety profile compared to topical steroids, we proceeded to treat our patient with topical roflumilast with notable success.[4] Our results add to the existing literature demonstrating effectiveness of topical roflumilast for CLP.[11] Topical roflumilast may serve as a safe topical option for cases of CLP; however, additional studies are needed to confirm its efficacy.

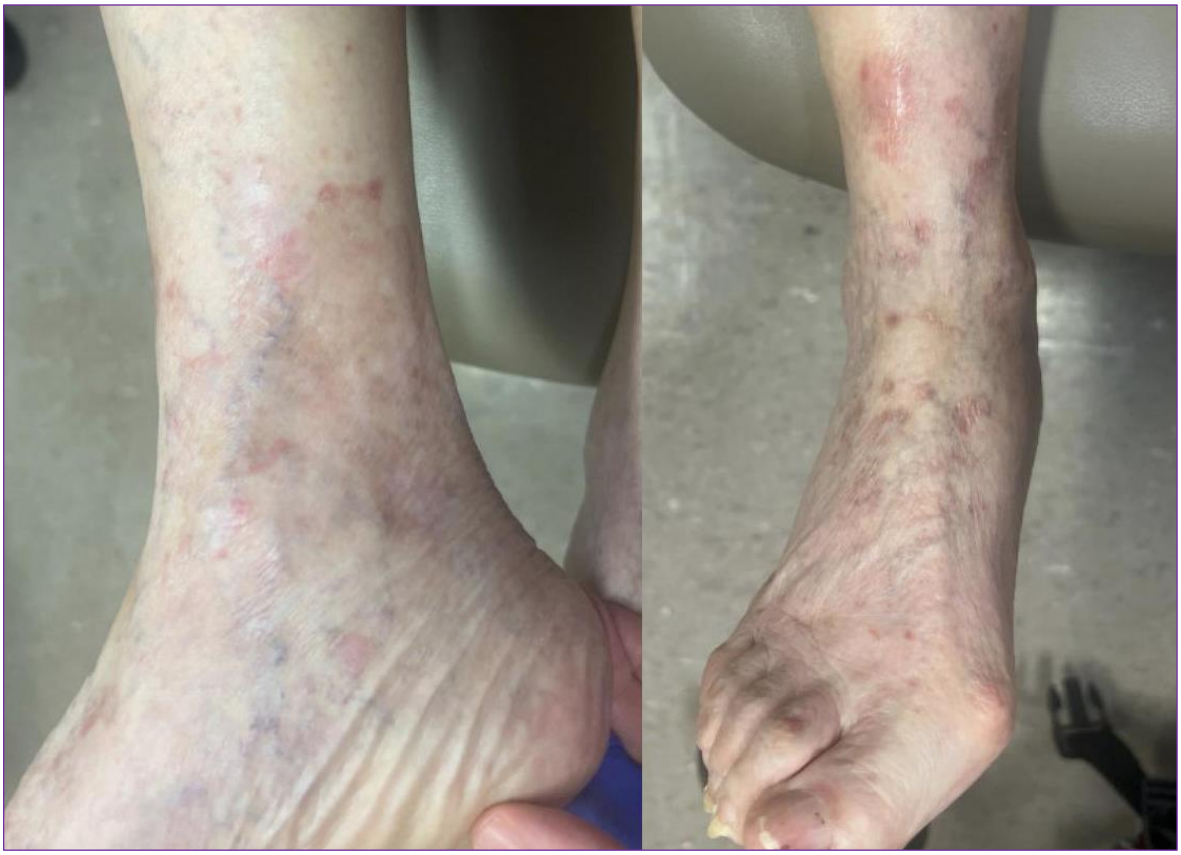

**Figure 3.** Results after six months of therapy with roflumilast showing significant resolution of most erythematous plaques and papules with residual post-inflammatory hyperpigmentation.

**Conflict of Interest Disclosures:** Dr. Jordan Talia has served as a consultant for Abbvie, Arcutis Biotherapeutics, Bristol-Meyers Squibb, Calliditas Therapeutics, Johnson & Johnson, Galderma, Leo Pharma, Navigator Medicines, Novartis, Primus Pharmaceuticals, Sanofi Genzyme, Stifel Financial, and UCB. He serves as an investigator for LEO Pharma and Sanofi. Dr. Graham Litchman has served as a consultant for Abbvie, Arcutis Biotherapeutics, Amgen, Blueprint Medicines, Boehringer Ingelheim, Bristol-Meyers Squibb, Castle Biosciences, Galderma, Novartis, Pfizer, Sanofi Genzyme, Scibase, Sensus, and UCB. He serves as an investigator for Abbvie, AnaptysBio, ASLAN Pharmaceuticals, Galderma, Incyte, Moonlake Immunotherapeutics, Palvella Therapeutics, RAPT Therapeutics, Regeneron Pharmaceuticals, Sanofi, Sun Pharma, Takeda Pharmaceuticals. Gabriela Soto-Canetti has no conflicts of interest to disclose.

**Funding:** None

**Corresponding Author:**
Jordan Talia, MD
Department of Dermatology at Mount Sinai
5 E 98th St, 5th Floor
New York, NY 10029
Email: Jordan.talia@mountsinai.org

**References:**

1. Tekin B, Xie F, Lehman JS. Lichen Planus: What is New in Diagnosis and Treatment?. *Am J Clin Dermatol*. 2024;25(5):735-764. doi:10.1007/s40257-024-00878-9
2. Grolleau C, Poisot T, Roux C, et al. Single-cell profiling of lichen planus reveals type I interferon response triggering the interface dermatitis reaction, *The Journal of Investigative Dermatology* (2025), doi: https://doi.org/10.1016/j.jid.2025.04.043.
3. Wenzel J, Scheler M, Proelss J, Bieber T, Tüting T. Type I interferon-associated cytotoxic inflammation in lichen planus. *J Cutan Pathol*. 2006;33(10):672-678. doi:10.1111/j.1600-0560.2006.00527.x
4. Mansilla-Polo M, Gimeno E, Morgado-Carrasco D. Topical and Oral Roflumilast in Dermatology: A Narrative Review. Roflumilast tópico y oral en dermatología. Una revisión narrativa. *Actas*

*Dermosifiliogr*. 2024;115(3):265-279. doi:10.1016/j.ad.2023.09.005
5. Nassim D, Alajmi A, Jfri A, Pehr K. Apremilast in dermatology: A review of literature. *Dermatol Ther*. 2020;33(6):e14261. doi:10.1111/dth.14261
6. Baez E, Gyldenløve M, Ben Abdallah H, et al. Oral roflumilast suppresses pro-inflammatory cytokine signaling and reduces CD4+ T cell and neutrophil infiltration in psoriasis. *Journal of Investigative Dermatology*. May 2025. doi: 10.1016/j.jid.2025.04.034.
7. Perschy L, Anzengruber F, Rappersberger K, et al. Apremilast in oral lichen planus - a multicentric, retrospective study. *J Dtsch Dermatol Ges*. 2022;20(3):343-346. doi:10.1111/ddg.14696
8. Paul J, Foss CE, Hirano SA, Cunningham TD, Pariser DM. An open-label pilot study of apremilast for the treatment of moderate to severe lichen planus: a case series. *J Am Acad Dermatol*. 2013;68(2):255-261. doi:10.1016/j.jaad.2012.07.014
9. Prados-Carmona A, Ruiz-Villaverde R, Navarro-Triviño FJ. Is roflumilast a feasible alternative for the treatment of mucocutaneous lichen?. *J Dtsch Dermatol Ges*. 2023;21(12):1554-1556. doi:10.1111/ddg.15204
10. Fage S, Johansen C. Severe and therapeutic challenging oral erosive lichen planus treated with oral roflumilast. *Clin Exp Dermatol*. 2023;48(5):556-557. doi:10.1093/ced/llad041
11. Baker, Andrew MBA, MPAS, PA-C. The treatment of lichen planus with topical roflumilast 0.3%. *Journal of Dermatology for Physician Assistants* 19(2):p 49-50, Spring 2025. | DOI: 10.1097/jdpa.0000000000000050
12. Schafer PH, Parton A, Capone L, et al. Apremilast is a selective PDE4 inhibitor with regulatory effects on innate immunity. *Cell Signal*. 2014;26(9):2016-2029. doi:10.1016/j.cellsig.2014.05.014