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 ORIGINAL ARTICLE

Psoriasis and Skin Barrier Dysfunction: The Role of Gentle Cleansers and Moisturizers in Treating Psoriasis

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ABSTRACT

Background: Psoriasis is a chronic immune-mediated dermatologic disorder with multisystemic comorbidities, which is effectively treated with a range of prescription therapies. Studies have reported epidermal barrier abnormalities in the lesional skin of psoriasis patients; however, there is currently insufficient information about skin barrier function in psoriasis patients. This review discusses the potential role of gentle cleansers and moisturizers in the management of psoriasis and in promoting a healthy skin barrier.

Methods: A literature review was followed by the authors' discussions and agreement on 5 statements to provide expert guidance for gentle cleansers and moisturizer use in psoriasis patients.

Results: In a workshop, the authors provided feedback on 15 draft statements created prior to the meeting, and agreed upon 5 statements. The authors agreed that guidelines rarely mention skincare for psoriasis patients, demonstrating a potential knowledge gap. Skincare may play a role in managing psoriasis as an adjuvant treatment of acute psoriasis and for maintenance treatment of healing skin during asymptomatic periods. Studies of patients with psoriasis applying topical moisturizers (such as those containing salicylic acid or ceramides) showed softened plaques, enhancing the absorption of topical treatments such as corticosteroids. Studies applying ceramide-containing skincare showed an overall improvement in the appearance of the skin and provided relief for psoriasis.

Conclusion: The authors agreed that skincare and barrier restoration in treating psoriasis is a relatively new concept for most dermatologists. There is a need to develop a more robust body of evidence on skincare for psoriasis to influence clinical practice in a meaningful way.

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INTRODUCTION

Psoriasis is a chronic, immune-mediated, multisystemic skin disease with an estimated prevalence rate of over 2% of the United States population.[1] Adults are more frequently affected by psoriasis than children, and generally, there are 2 peaks of onset, the first at 16 to 22 years and the second at 50 to 60 years.[2,3] About 70% to 80% of psoriasis patients suffer from a mild-to-moderate disease that can be successfully controlled with topical treatments.[4] Moderate-to-severe cases are usually treated with ultraviolet (UV), oral, or biological therapies.[4] Concomitant topical treatments and skincare can support the efficacy of systemic treatments.[5]

Psoriasis significantly negatively impacts a patient's health-related quality of life (HRQoL).[6,7] Psoriasis patients often experience difficulties with body image, self-esteem, and feelings of stigma, shame, and embarrassment regarding their appearance.[6,7] Patients have reported the perception of being evaluated by others based on their skin condition.[6,7] Psoriasis causes a more significant reduction in quality of life (QoL) than tumors or coronary heart disease.[6,7] The median disease duration is about 50 years, especially when the onset is at a young age. Patients with psoriasis have significantly fewer employment opportunities.[7] Effective short- and long-term management of psoriasis is crucial to ensure sufficient control

of the disease and limit the burden of the disease and its impact on QoL and the ability to work.[7]

The multifactorial pathophysiology of psoriasis involves genetic, environmental, and immunologic factors.[8,9] Psoriatic lesions are characterized by inflammation, epidermal hyperproliferation, abnormal keratinocyte differentiation, and skin barrier dysfunction.[8-10] Inflammatory skin diseases are often associated with skin barrier dysfunction; although the cause-and-effect relationship is complex.[9] Psoriasis and gene mutations within the epidermal differentiation complex are associated with development, maturation, cornification, cross-linking, and thermal differentiation.[9-12] Alterations to several structures in the epidermal barrier in psoriasis might be responsible for barrier dysfunction leading to hyperproliferation of the epidermis.[9,10]

Skincare is rarely mentioned in published guidelines and algorithms to treat psoriasis, unlike atopic dermatitis.[13-15] There is a knowledge gap concerning using moisturizers, either alone or as adjunctive therapy, to restore skin barrier function, reduce symptoms, and delay relapse in patients with psoriasis.[15] This review aims to summarize aspects of skin barrier dysfunction in patients with psoriasis and to provide insights into the role of gentle cleansers and moisturizers in managing psoriasis and promoting a healthy skin barrier and better patient outcomes

MATERIALS AND METHODS

On July 21, 2022, an expert panel composed of 6 dermatologists (5 American and 1 Canadian) who commonly manage psoriasis patients was convened in Vancouver, British Columbia, Canada. The panel used the Delphi communication technique for interactive decision-making for medical projects for the review.[12,13] In preparation for the meeting, a literature review was conducted on skin barrier dysfunction in psoriasis, possible implications for the management, and the potential role of skin care.

Literature Review

A structured search of the English-language literature on skin barrier dysfunction and skincare in psoriasis was performed on June 17, 2022, using PubMed, with Google Scholar as a secondary source. The search included literature on skin barrier function in psoriasis, possible implications for managing psoriasis patients, and the use of nonprescription skincare, including cleansers and moisturizers as adjuncts to prescription treatment. Guidelines, consensus papers, and reviews published in English from 2010 to September 2022 were included in the search. Articles with no original data (except in cases where a review was the best available evidence), articles on prescription therapy alone (without discussion of nonprescription skin care), and publication language other than English were excluded from the search.

Search terms used: *Psoriasis AND skin barrier function(s); OR Psoriasis AND skin barrier dysfunction; OR Psoriasis AND skin lipids AND ceramides; OR Psoriasis prescription treatment AND cleansers; OR Psoriasis prescription treatment AND moisturizers; OR Psoriasis AND OTC skincare; OR psoriasis AND skincare efficacy, safety, tolerability.*

The searches yielded 41 clinically relevant papers (12 guidelines, algorithms, and consensus papers, 12 reviews, 2 randomized controlled trials, 8 clinical studies, 4 epidemiology, and QoI studies, and 3 other studies) to inform current best practices in psoriasis patients and skincare use. (Table 1 and Table 2). Robust comparative studies on skincare used as monotherapies or adjuncts to prescription topical and systemic therapies are scarce and did not allow for a systematic review.

RESULTS

In a workshop, the authors provided feedback on 15 statements created before the meeting and agreed upon 5 statements to offer expert guidance for gentle cleansers and moisturizer use in psoriasis patients.

Statement 1: *Inflammatory skin diseases are often associated with barrier defects, although the cause-and-effect relationship is complex in psoriasis and requires further studies.*

Psoriasis, an immune-mediated disease, is associated with comorbidities, such as psoriatic arthritis, metabolic syndrome, diabetes, and cardiovascular disease.[8] Psoriasis comprises multiple phenotypes that can be generalized or localized.[13,16-18] The pathophysiology of psoriasis is complex and includes many cytokines and signaling pathways[9-12] Research has led to insights into the psoriasis disease pathway, including the role of the tyrosine kinase 2 (TYK2) pathway.[19,20] The TYK2, a protein-coding gene, has been identified as part of the psoriasis susceptibility loci and is linked to interleukin (IL) -23 signaling.[19,20] TYK2 plays a critical role in the IL-23/IL-17 inflammatory axis, which is central to the pathophysiology of psoriasis.[11,19,20] Inflammatory skin diseases such as psoriasis are often associated with epidermal barrier dysfunction, although the cause-and-effect relationship is unclear and requires further studies.[9-12,16-22] Alterations to epidermal differentiation complex genes and several structures in the epidermal barrier in psoriasis may be responsible for the hyperproliferation of the epidermis in an attempt to repair the skin barrier.[10,16-22]

Stabilization of the skin barrier depends on intact keratinocytes and physiologic lipid synthesis. Depletion of ceramides in the stratum corneum has been reported in patients with psoriasis.[23-25] Animal studies and clinical studies that take skin biopsies from patients with psoriasis have suggested that ceramides play a relevant role in the pathophysiology of psoriasis.[23-25] However, data on moisturizers containing ceramides for psoriasis, either

TABLE 1.

Psoriasis and Skincare Studies			
Reference	**Type of Study**	**Population**	**Results**
Wolf R, 2012[10]	Analysis of skin barrier structure and function	Hyperproliferative skin diseases, such as psoriasis.	Alterations in the epidermal barrier caused by derangement of lipids or ceramide synthesis may be one of the inducers of psoriasis.
Nakajima K, 2013[23]	A mouse model study	--	Barrier abnormality due to ceramide deficiency leads to psoriasiform inflammation.
Cho Y, 2004[24]	Samples from lesional and nonlesional epidermis obtained from psoriasis patients were analyzed	Korean patients with psoriasis	An inverse relationship between ceramide synthesis and clinical severity of psoriasis.
Hong KK, 2007[25]	A study on altered expression of serine palmitoyltransferase and ceramidase in psoriatric skin lesions	Psoriatic skin lesions	The ceramide-generating enzyme in the de novo synthesis in psoriatic epidermis, was significantly less than that of the nonlesional epidermis, which was inversely correlated with PASI score
Drealos ZD, 2008[32]	Open-label 4 week study of moisturizing cream in patients receiving topical psoriasis treatment	Mild-to-moderate plaque psoriasis (N=30)	NS TEWL change, increase skin hydration. Desquamation improved from very dry or normal. (P<0.0001 for all time points).
Del Rosso JQ, 2019[33]	Consumer usage study	Psoriasis	Ceramide- and keratolytic-containing body cleanser and cream application relieved psoriasis (84.8% of patients) and softened/smoothed skin (90.9%).
Liu M, 2015[34]	Randomized controlled trial T1: Combination of linoleic acid-ceramide moisturizer (LA-Cer) and mometasone furoate 0.1% cream (TCS) T2: Mometasone furoate monotherapy	Psoriasis vulgaris (N=106)	Topical application of a linoleic acid-ceramide-containing moisturizer showed benefits. Pruritus improved in both T1 and T2. T1 had better PASI-50 results at week 8 vs T2. T1 continued for another year with half of the patients with moisturizer and half only TCS. Less rebound and better skin condition in the combined TCS with moisturizer group.
Li X, 2020[39]	Multicenter, randomized, controlled trial on the efficacy and safety of a topical moisturizer containing linoleic acid and ceramide in combination with TCS	Mild-to-moderate psoriasis vulgaris (N=178)	After 4 weeks, improved skin condition. Maintenance with the moisturizer achieved a continuous improvement of BSA involvement, PASI score, investigators' assessment of skin dryness and desquamation, Physician Global Assessment of Psoriasis score, and patient QoL.
Man MQ, 2019[40]	Two self-controlled cohort studies. Both studies applied an emollient to one arm TID for 20 and 30 days and the other arm was not treated (control).	Psoriasis (n=30, and (n=60)	Delayed relapse on the treated arm was seen in 54.5% and 71% of patients in the first and second cohort, respectively.

BSA, body surface area; NS, not significant; QoL, quality of life; SA, salicylic acid; TEWL, transepidermal water loss; TCS, topical corticosteroids.

alone or in combination with other topical therapies, are limited and do not allow for evaluating possible clinical relevance.

Statement 2: *Guidelines and algorithms rarely mention skincare for psoriasis patients, demonstrating an important need gap.*

Guidelines and algorithms for psoriasis patients discuss prescription treatments.[11-15,20-22,26-29] There is a role for topical prescription therapy in all patients with psoriasis if the disease is limited (>5% body surface area), as a single treatment, and, in more extensive cases, as an adjunct therapy.[23,24] The main topical prescription classes are corticosteroids, Vitamin D3 analogs, combination steroids, vitamin D products, topical calcineurin inhibitors, topical retinoids, and a combination of topical steroids and retinoids.[23-29]

Topical prescription therapy can be combined with ultraviolet B (UVB) phototherapy (narrowband [NB] or broadband [BB]), or psoralen plus ultraviolet A (PUVA).[23-25] For more severe cases systemic treatment is available, such as with biologics (adalimumab, etanercept, infliximab, secukinumab, and ustekinumab[23-27] One guideline mentioned salicylic acid-containing skincare added to topical or systemic therapy to remove scales. More robust data on skincare use are needed to have skincare incorporated into guidelines and pathways.

Statement 3: *Skincare may play a role in the management of psoriasis, regardless of disease severity or the therapy, both as adjuvant treatment of acute psoriasis and for follow-up treatment of healing skin during asymptomatic periods.*

TABLE 2.

Psoriasis Guidelines, Consensus Papers, and Algorithms Including Skincare With Gentle Cleansers and Moisturizers			
Reference	**Type of Study**	**Population**	**Results**
Menter A, 2008[13]	Guideline	Psoriasis and psoriatic arthritis	Non-medicated moisturizers are applied 1 to 3 times a day. SA supports keratolysis, reduces scaling and softens plaques.
Hsu S, 2012[14]	Consensus guidelines	Plaque psoriasis	Non-medicated gentle cleansers and moisturizers and moisturizers with SA or urea soften plaques and improve the absorption of prescription topicals.
Elmets CA, 2021[15]	Guidelines for topical therapy and alternative medicine modalities	Psoriasis	Skincare as an adjunct to prescription topical treatment.
Navarini AA, 2017[16]	Consensus	Pustular psoriasis	Adjunctive skincare
Maul JT, 2021[26]	Swiss treatment pathway	Psoriasis	Adjunctive skincare with gentle cleansers and moisturizers. SA or urea-containing moisturizers to soften plaques.
Mrowietz U, 2011[28]	Consensus	Moderate to severe psoriasis	Adjunctive skincare with gentle cleansers and moisturizers.
Luger T, 2014[31]	Consensus	Psoriasis	Recommendations for adjunctive basic skincare.
Fluhr JW, 2008[32]	Review	Psoriasis	Recommendations for adjunctive moisturizers and keratolytic agents.
Menter A, 2009[13]	Guideline	Psoriasis	Traditional systemic treatments may be combined with non-medicated moisturizers or products with keratolysis.
Nast A, 2012[37]	Guideline	Psoriasis	Adjunctive skincare with gentle cleansers and moisturizers.
Jacobi A, 2015	Systematic review and recommendations	Psoriasis	Keratolytics and emollients have benefits for psoriasis.

SA, salicylic acid.

Clinically, moisturizers are well known for their role in hydration, moisture retention, and symptom control in psoriasis; however, these products may be underused.[14,15,26]

Published treatment guidelines on adjunctive skincare for psoriasis recommend gentle cleansers with a near physiologic stratum corneum pH[4-6] and moisturizers containing lipids and humectants.[28-33] Some authors suggest using keratolytic agents in the initial phase of treating psoriasis plaques and switching to moisturizing products and emollients in the intermediate and chronic/remission phases of psoriasis.[14,31] Keratolytics such as salicylic acid, urea, lactic acid, allantoin, glycolic acid, and trichloroacetic acid cause swelling and hydrolysis of skin to remove scales and calluses.[31] These keratolytics can irritate the skin, enhancing inflammation and potentially worsening the disease.[31] In a study of 30 patients with psoriasis who received a moisturizing cream for 4 weeks, skin hydration had increased with no change in transepidermal water loss measurements.[32] A significant percentage of patients showed improvements in desquamation measurements from very dry to dry or normal skin condition (P=.0001 for all time points).[32]

Two skincare products containing ceramides, salicylic acid, and urea (the first a body cleanser and the second a body cream) showed efficacy in a study of 33 patients with psoriasis.[33] Skin appearance overall had improved in 72.7% of patients who used body cream alone and in 75.8% of patients with the combination regimen of the body cream and the body cleanser. For the combined regimen, 84.8% reported that it provided relief from psoriasis, and 90.9% reported that their skin felt soft and smooth.[33]

The stratum corneum serves as an effective barrier against moisture loss.[9,24] Depletion of ceramides in the stratum corneum, which can result in increased moisture loss, has been reported in patients with psoriasis, leading to xerosis, which can benefit from skincare using gentle cleansers and moisturizers.[23-25]

Statement 4: *Studies of patients with psoriasis applying topical moisturizers showed softened plaques, enhancing the absorption of topical treatments such as corticosteroids.*

Epidermal barrier dysfunction is a clinically manageable feature of psoriasis.[33] Skincare, including gentle cleansers and moisturizers, is recommended for the prevention, treatment, and maintenance of psoriasis, together with prescription topical and systemic therapy.[14,34-37]

Ceramides are the predominant lipids in the stratum corneum, contributing to the intercellular lipid bilayer important for TEWL regulation. Ceramide-containing products promote a healthy skin barrier, reduce TEWL, and maintain stratum corneum hydration.[33,37] Keratolytics, such as salicylic acid and urea (a component of natural moisturizing factors), can be added to moisturizers to minimize xerosis, scaling, and hyperkeratosis.[33,37] Moreover, salicylic acid promotes a physiological stratum corneum pH.[38]

Moisturizers have shown benefits when used as adjunctives to prescription treatment. A study of a ceramide-containing moisturizer applied in combination with topical prescription treatment with mometasone furoate 0.1% cream demonstrated less psoriasis relapse than topical therapy alone.[34]

Although the benefits of adjunctive skincare application have been reported in small studies and clinical reviews, the panel recognized the need to develop a more robust body of evidence to influence clinical practice in a meaningful way. Nevertheless, the panel members agreed that incorporating skincare principles into the psoriasis paradigm may evolve into the standard of care and be included in future treatment guidelines.

Statement 5: *Studies applying ceramides-containing skincare showed an overall improvement in the appearance of the skin and provided relief for psoriasis. These results suggest that improvements in epidermal function with topical emollients can prevent/attenuate the development of psoriasis.*

A common clinical feature of psoriasis is the scaling typically associated with hyperkeratosis, pruritus, inflammation, and xerosis.[9,15,24] Moisturizers promote moisture retention in the stratum corneum and can help reduce pruritus and desquamation.[15]

Topical moisturizers in psoriasis have been reported to increase hydration, decrease desquamation, improve the skin's overall appearance, improve Psoriasis Area and Severity Index (PASI)-50 in conjunction with topical steroids, and delay relapse. In a randomized controlled study of 106 patients with psoriasis, the treatment group (T1) received a combination of linoleic acid-ceramide moisturizer and mometasone furoate 0.1% cream) and the control group (C1) received mometasone furoate monotherapy.[34] Improvement in pruritus was observed in both groups after 4 weeks. The treatment group reported superior PASI-50 results at week 8 compared with the control group. Higher water content and earlier reduction of lesional transepidermal water loss (TEWL) were observed in T1 vs C1. Subsequently, T1 patients were randomized for another year to 2 groups: T2 received a combination of linoleic acid-ceramide moisturizer and mometasone furoate 0.1% cream, and the control group (C2) did not receive a moisturizer. After one year, less relapse of psoriasis was observed in T2 compared with C2.[34] Lesional TEWL, water content, and PASI measurements remained stable in T2 patients.[34] In a second multicenter, randomized, controlled trial of 178 patients with psoriasis, treatment with mometasone furoate combined with a linoleic acid-ceramide-containing moisturizer for 4 weeks resulted in decreased rates of relapse.[39]

Maintenance therapy with linoleic acid-ceramide-containing moisturizer demonstrated continuous improvement in body surface area (BSA) involvement, PASI score, investigators' xerosis and desquamation assessment, Physician Global Assessment of Psoriasis score, and patient QoL.[39]

Patients with mild plaque psoriasis, seborrheic dermatitis, sebo-psoriasis, or persistent post-psoriasis sequelae may experience some symptom improvement even without prescription therapy when compliant with a rigorous moisturization regimen.[39]

In a study of psoriasis relapse prevention with ceramide-based adjunctive skincare, 2 cohorts of patients with psoriasis (n=30 and n=60) were treated topically with a proprietary emollient ceramide-based cream applied twice daily to one forearm.[40] The same sites on the contralateral arm served as the untreated control. A delayed relapse on the treated arm was observed in 54.5% of patients in the first cohort (20 days of use) and 71% of patients in the second cohort (30 days of use).[40] These results suggest that using moisturizers to promote a healthy skin barrier may prevent or attenuate psoriasis flares.

Limitations

A detailed discussion of the pathophysiology of psoriasis is outside this review's scope.

Despite the widespread availability of nonprescription skincare products, there are few robust evidence-based studies on skincare for psoriasis patients.

CONCLUSION

The literature published on skincare in psoriasis is limited compared with other common skin conditions with known barrier defects. Topical moisturizers have shown several benefits in psoriasis, such as improved hydration and overall skin appearance, increased attainment of PASI-50, decreased desquamation, and delayed relapse.

Clinicians and patients would benefit from increased awareness of the importance of skincare in psoriasis. Early initiation and maintenance of well-tolerated treatment regimens and the use of carefully selected adjunctive skincare are potential considerations for increasing patient compliance and outcomes.

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All the authors developed the manuscript, reviewed it, and agreed with its content.

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