Ndubisi S, Lio P. Rapid Improvement of Pediatric Atopic Dermatitis with a Standardized Isosorbide Diester Moisturizer Used Alongside NB-UVB Phototherapy: A Case Report. *Journal of Integrative Dermatology*. Published online 2026.

Case Study/ Case Series

Rapid Improvement of Pediatric Atopic Dermatitis with a Standardized Isosorbide Diester Moisturizer Used Alongside NB-UVB Phototherapy: A Case Report

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Keywords: atopic dermatitis, eczema, skin barrier, moisturizer, Isosorbide Diester

Journal of Integrative Dermatology

Atopic dermatitis (AD) is a chronic inflammatory skin condition characterized by impaired epidermal barrier function, dryness, and itching. It often requires long-term management with moisturizers and anti-inflammatory agents to reduce symptoms and restore barrier function. We describe a 9-year-old boy with moderate refractory AD who showed rapid improvement within four weeks of starting a standardized isosorbide diester moisturizer during ongoing narrowband UVB phototherapy.

INTRODUCTION

Atopic dermatitis (AD) is a chronic inflammatory skin condition characterized by impaired epidermal barrier function, dryness, and itching.[1] Management often focuses on restoring the barrier with moisturizers and reducing inflammation to control symptoms and prevent flares.[1] Standardized isosorbide fatty acid diesters, including isosorbide dicaprylate and isosorbide di-(linoleate/oleate), have emerged as barrier-supporting compounds that can improve hydration and influence keratinocyte differentiation in laboratory and clinical settings.[2,3] In laboratory and skin-tissue models that mirror key features of AD, these diesters protect tissue integrity and reduce inflammatory signals, with combined use showing synergy.[4] In adults with mild-to-moderate AD, a 4-week randomized, double-blind, vehicle-controlled study reported greater improvement in itch, higher EASI-75 responses, and lower topical steroid use with isosorbide diesters plus colloidal oatmeal compared with colloidal oatmeal alone.[5] This growing evidence supports further evaluation of standardized isosorbide diesters in pediatric AD, particularly for families seeking non-systemic options and consistent daily skincare.

CASE REPORT

A 9-year-old boy with a long history of moderate AD had persistent disease despite numerous topical preparations. Prior treatments included multiple moisturizers, mometasone ointment, triamcinolone 0.1% cream, tacrolimus 0.03% ointment, topical ruxolitinib, and topical tapinarof, all with unsatisfactory relief. Several skin infections required courses of oral cephalexin. The family was not open to systemic therapy and started narrowband UVB phototherapy with partial improvement.

On examination, approximately 15% of body surface area showed eczematous patches and lichenified plaques, with an Investigator Global Assessment (IGA) score of 3. The family expressed interest in trying a new moisturizer that contained a proprietary standardized blend of isosorbide diesters with colloidal oatmeal. The product was applied twice daily and narrowband UVB phototherapy was continued. No prescription topical anti-inflammatory agents were used during the four-week observation period. Within four weeks of starting the moisturizer, the patient's mother reported marked improvement. The family described this as the most helpful topical agent they had used. The patient remains on narrowband UVB phototherapy and continues daily use of the isosorbide diester moisturizer with sustained improvement and no adverse effects reported.

DISCUSSION

This case shows rapid improvement of moderate pediatric AD after adding a standardized isosorbide diester moisturizer while narrowband UVB continued. The clinical course aligns with adult randomized data in which isosorbide diesters with colloidal oatmeal improved itch and increased EASI-75 rates compared with colloidal oatmeal alone, resulting in less need for topical steroids.[5] The observed response is consistent with a barrier-focused approach that families often prefer when systemic therapy is not desired.

Laboratory and translational data offer a plausible explanation for the outcome. Isosorbide dicaprylate increases AQP3 and CD44 while supporting keratinocyte differentiation, which correlates with improved hydration and barrier integrity in human studies.[2] Isosorbide di-(linoleate/oleate) promotes expression of barrier proteins such as FLG and IVL, reducing interferon-related and inflammatory gene activity implicated in AD pathophysiology.[3] In AD-like cytokine models, the combination of these diesters preserves tissue structure and reduces cellular stress, suggesting complementary actions on hydration and inflammation.[4] Together, these findings support the biologic plausibility of the improvement seen in this child.

Important limitations should be noted. Narrowband UVB continued during the observation period and likely contributed to improvement; therefore, the independent effect of the moisturizer cannot be isolated in a single case. The four-week follow-up assessment was based on clinician observation and caregiver report, without repeat objective scoring. Even with these limitations, the timing of improvement and photographic comparison are compelling and align with the known actions of isosorbide diesters. Prospective pediatric studies that include standardized scoring and control for phototherapy would help define efficacy, durability, and safety in children.

CONCLUSION

In this pediatric case, a standardized isosorbide diester moisturizer used twice daily during ongoing narrowband UVB was associated with rapid improvement of moderate refractory atopic dermatitis over four weeks. The result aligns with adult clinical data and mechanistic studies supporting improved hydration, barrier repair, and reduced inflammation.[2-5] Further pediatric trials are needed to determine the independent efficacy, durability, and safety of this emollient strategy.

Submitted: November 16, 2025 PST. Accepted: December 08, 2025 PST.

Figure 1. Posterior legs before and after treatment.

Figure 2. Dorsal right foot before and after treatment.

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