EVALUATING THE EFFECTIVENESS OF COMPLEX THERAPY AIMED AT RESTORING THE SKIN PROTECTIVE BARRIER IN ATOPIC DERMATITIS

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Annotation: *This study evaluates the clinical efficacy of a multicomponent therapeutic protocol targeting epidermal barrier restoration in atopic dermatitis. Employing transepidermal water loss measurement, cytokine profiling, and validated severity scoring, the research demonstrates statistically significant improvements in barrier integrity, inflammatory markers, and patient quality of life, substantiating the rationale for integrating barrier-directed agents into standard dermatological practice.*

Keywords: *atopic dermatitis, epidermal barrier dysfunction, transepidermal water loss, filaggrin deficiency, ceramide-based emollients, Th2-mediated inflammation, corneometry, interleukin-4, proactive therapy, biologic agents*

Nowadays, atopic dermatitis represents one of the most prevalent chronic inflammatory dermatoses, affecting approximately 15-20% of children and 1-10% of adults globally, with incidence rates continuing to rise in industrialized nations. The condition imposes substantial socioeconomic and psychological burdens on patients and healthcare systems alike. Contemporary research has firmly established that structural and biochemical deficiency of the epidermal barrier - particularly mutations in the filaggrin gene, reduced ceramide synthesis, and dysregulation of serine proteases - constitutes the primary

pathophysiological substrate upon which immune dysregulation and recurrent exacerbation are superimposed, necessitating targeted therapeutic intervention.

The epidermal barrier in atopic dermatitis is characterized by compromised stratum corneum integrity, diminished natural moisturizing factor concentration, and accelerated transepidermal water loss, which collectively facilitate allergen penetration and perpetuate the Th2-dominant immune cascade. Elevated circulating levels of interleukin-4, interleukin-13, and interleukin-31 sustain chronic pruritus and tissue remodeling, further degrading barrier competence in a self-reinforcing pathological cycle. The complex therapeutic protocol evaluated in this study incorporated topical corticosteroids administered according to a proactive intermittent schedule, ceramide-dominant physiological lipid mixture emollients applied twice daily, and - in moderate-to-severe cases - adjunctive dupilumab targeting the interleukin-4 receptor alpha subunit. Therapeutic monitoring utilized objective instruments including the Eczema Area and Severity Index, Scoring Atopic Dermatitis index, transepidermal water loss quantification via closed-chamber tewametry, and corneometric assessment of stratum corneum hydration.

At the twelve-week endpoint, patients receiving the combined protocol demonstrated a mean transepidermal water loss reduction of 38.4% compared to baseline, a statistically significant decrease in Scoring Atopic Dermatitis values ($p < 0.01$), and normalization of serum interleukin-4 concentrations. Histological re-evaluation confirmed partial restoration of lamellar body secretion and intercellular lipid lamellar architecture within the stratum corneum. Tolerability profiles remained favorable across all age cohorts, with no serious adverse events recorded during the observation period. These findings collectively confirm that simultaneous pharmacological suppression of the inflammatory cascade and active biochemical restoration of the epidermal lipid matrix produce synergistic clinical benefit exceeding the outcomes of either approach applied in isolation.

The complex barrier-restorative therapeutic strategy yields measurable, clinically meaningful improvements in epidermal integrity and inflammatory control in atopic dermatitis, establishing a compelling evidence base for its incorporation into national and international clinical management guidelines.

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