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Impact of Skin Hydration on Microvascular Function and Wound Healing in Diabetic Foot Patients

Maintaining adequate skin hydration is essential in patients with diabetic foot, as xerotic skin can crack and develop fissures, increasing the risk of ulceration and infection. Although the nervous system is believed to play a key role in regulating skin moisture, no clinical studies have directly assessed its impact. Additionally, we observed that patients with impaired microcirculation often present with dry, rough, shiny, and desquamated skin. Based on these findings, we hypothesized that skin hydration levels may be associated with microvascular function and may, in turn, influence diabetic wound healing. This study aimed to: (1) evaluate the influence of peripheral nerve function and microvascularity on skin hydration in patients with diabetic foot, and (2) determine the impact of skin hydration on diabetic wound healing. For the first analysis, data from 266 patients with diabetic foot were included. Skin hydration was assessed using corneometry, and microvascular function was evaluated via transcutaneous partial oxygen tension (T_{cp}O₂). Peripheral neuropathy was assessed using the Semmes–Weinstein monofilament test, electromyography, and nerve conduction studies. Statistical analyses included linear-by-linear association trend tests and Pearson's chi-square. For the second analysis, wound healing outcomes were assessed in 263 patients with diabetic forefoot ulcers and categorized as healed without amputation, minor amputation, or major amputation. Skin hydration showed a strong and significant correlation with T_{cp}O₂ ($p < 0.001$), but no significant association with peripheral nerve function ($p = 0.338$). Additionally, skin hydration levels were significantly associated with wound healing outcomes ($p < 0.001$). In patients with diabetic foot, skin hydration is primarily influenced by microcirculatory status rather than peripheral nerve function. Furthermore, skin hydration level may serve as a useful predictor of wound healing outcomes.

Keywords: skin hydration, diabetic foot, wound healing

Biography

Dr. Seung-Kyu Han is a tenured Professor of Plastic Surgery at Korea University College of Medicine. With a distinguished career spanning three decades, Dr. Han has devoted his efforts to pioneering innovative techniques and materials aimed at improving both functional and aesthetic outcomes in skin and soft tissue restoration. Dr. Han's extensive literary contributions include authoring six books, nine book chapters, and over 320 scientific articles, 100 as the principal author in SCI journals. He's also edited six books. Previously, Dr. Han held prestigious roles as President of the Korean Wound Management Society and the Korean Society for Diabetic Foot.