Clinical Efficacy of an At-Home, 620 and 660 nm Red Light Treatment on Scalp Pruritus and Irritation

Mark S. Nestor1, Brian Berman2, Rodney Sinclair3, Nicholas Medendorp4, Matt Womble4, Nathan Stasko4

1 Center for Clinical and Cosmetic Research, Department of Surgery, Division of Plastic and Reconstructive Surgery, Department of Dermatology and Cutaneous Surgery, University of Miami Miller School Of Medicine, Miami, FL  2 Center for Clinical and Cosmetic Research, Department of Dermatology and Cutaneous Surgery, University of Miami Miller School of Medicine, Miami, FL  3 Department of Dermatology, University of Melbourne, East Melbourne, Australia  4 PhotonMD Inc., Durham, North Carolina (nstaasko@photonmd.com)

Introduction

Scalp burning, stinging and pruritus are common patient complaints in the dermatological setting and can be frustrating for both the patient and the Dermatologist. Indeed, the prevalence of pruritus of the scalp is up to 45% of patients with chronic pruritus1. These symptoms are often associated with conditions such as seborrheic dermatitis and scalp psoriasis, where up to 80% of patients with psoriasis report scalp itch with a positive correlation between the severity of the lesions and severity of itch2; but these symptoms also may appear without any clinical findings. Treatment options for scalp disorders and associated symptoms include topical corticosteroids and, in some cases, anti-fungals, but the wide variety of underlying disease pathologies and limited compliance with dosing regimens hinder their clinical benefit.

Indeed, patients with androgenetic alopecia often complain of scalp itch and irritation and may also have concomitant seborrheic dermatitis. Based on this, the symptoms of pruritus, irritation, burning of the scalp were measured in an ongoing multicenter study evaluating the safety and efficacy of a dual wavelength LED light device in subjects being treated with androgenetic alopecia.

Methods

Eighty-one subjects were randomized to either a dual wavelength 620 nm and 660 nm light therapy device paired with a Bluetooth-connected mobile app (REVIAN RED System) or to a sham comparator device with a similar user experience through the mobile app to track daily treatment compliance between both groups. Device usage was fixed at once daily, 10-minute treatment durations for a period of 26-weeks. The trial population consisted of adult men and women between 18 and 65 years of age with a diagnosis of androgenetic alopecia or female pattern hair loss. The Norwood Hamilton Classification II to V patterns of hair loss and fenestrated vertex were required for inclusion. The treatment was administered using the Dermatology, University of Melbourne, East Melbourne, Australia  4 PhotonMD Inc., Durham, North Carolina (nstaasko@photonmd.com)

Results

The Hair Specific Skindex-29 Quality of Life Questionnaire (HSSQOL) is a 29-item questionnaire with 3 domains: 7 questions for symptoms domain, 10 questions for emotion domain and 12 questions for function domain. The Hair Specific Skindex 29 Quality of Life Questionnaire (HSSQOL) is a 29 item questionnaire with 3 domains: 7 questions for symptoms domain, 10 questions for emotion domain and 12 questions for function domain. Specifically, for the symptom of “my scalp burns or stings”, at the end of the 16-week trial 100% of the active treated group showed never or rarely having the symptom versus 66.6% of the sham group and 0% of the active group reported the symptoms sometimes or often versus 33.4% of the sham treated group (p= 0.007). For the symptom of “my scalp itches” (pruritus), 77.8% of the active treatment group and 44% of the sham treated group reported the symptom never or rarely versus 16.7% of the active group and 57.6% of the sham treated group reporting the symptom sometimes or often (p=0.02) Finally regarding my scalp is irritated 83.4% of the active treatment group and 55.5% of the sham treated group reported the symptom never or rarely versus 66.6% of the sham group and 0% of the active group reported the symptoms sometime or often (p=0.07).

“Proposed Mechanism of Action

Red and Infrared Low Level Light Therapy (LLLT) has previously been shown to have anti-inflammatory effects in patients with plaque psoriasis, leading to clearance of recalcitrant plaque and reductions in plaque desquamation, induration, and erythema. The addition of 620 nm LED light results in increased release of nitric oxide (NO) in the skin and provides a complementary mechanism to reduce inflammation, irritation and pruritus.

“Proposed Mechanism of Action

Induced Mechanism of Action Associated with Nitric Oxide


References


Conclusion

The FDA-cleared dual wavelength device (K173729) was found to be safe and well tolerated, with statistically significant differences observed in patient reported pruritus and burning/stinging compared to sham after 16 wks of once daily, at home treatment. The MDA for improved scalp symptoms are proposed to be a combination of the benefits of traditional anti-inflammatory and antipruritic effects of red (660 nm) LLLT and the anti-inflammatory effects of nitric oxide (NO) released with 620 nm light.

The authors are unaware of any previous reports of a reduction in scalp pruritus with traditional LLLT devices used to treat androgenetic alopecia. Independent, well controlled studies are warranted to confirm these findings for the broader population of individuals suffering from itch and irritation symptoms associated with scalp conditions such as seborrheic dermatitis or psoriasis.

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