

Transepidermal Delivery With a Proprietary Low-Frequency Ultrasound: A New Novel Treatment Option for Androgenetic Alopecia?

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Background: Transepidermal delivery (TED) is a new potential method in general medicine and dermatology. Permeability alterations induced by a proprietary low-frequency Ultrasound (US – Alma TED) and air pressure to disrupt the lipid membrane and increase the delivery of a hair growth compound for the treatment of androgenetic alopecia.

Objective: To clinically evaluate the efficacy and safety as well as patient’s satisfaction in relation to a method using acoustic sound waves and air pressure with TED+ hair care formulation for androgenetic alopecia.

Methods and Materials: Ten patients with androgenetic alopecia were treated with three step procedure: (1) US was applied to prime the treatment area for lipid membrane permeability (2) topical application of TED+ hair care formulation was applied to the treatment area (3) US was applied for topical delivery to the treatment area for topical delivery. Treatment results were assessed at baseline, post 1-3 months with a standard photography and a hair density camera.

Results: All patients had no side effects or damage to the treatment area. All patients had a positive improvement with noticeable results seen as early as two weeks. Less shedding was observed after the initial treatment and during each treatment interval.

Conclusion: Low-frequency Ultrasound (US) and air pressure of the Alma TED that delivers a safe and effective treatment for androgenetic alopecia.

Key Words: *androgenetic alopecia, low-frequency Ultrasound, transepidermal delivery, transdermal drug delivery*

Introduction

The stratum corneum acts as a barrier that limits the penetration of compounds through the skin. Alma TED a new novel device that delivers low-frequency ultrasound (US) and air pressure has been shown to improve skin permeability. Androgenetic Alopecia (AGA) is the most common cause of non-scarring alopecia. It is suspected to be an autoimmune disease with a genetic predisposition.

MATERIALS AND METHODS

Ten patients clinically diagnosed with androgenetic alopecia were enrolled to the study. All of them had not been previously treated with any medical or surgical methods. All 10 patients were assessed at baseline with subjective measurements of the disease made by three different physicians. The patients were recruited for another assessment 1 month following their last treatment.

In this study, ten patients were treated one-month intervals with Alma TED technology and proprietary TED+ Two to three treatments. Hair count, density, thickness, volume as well as ratio of terminal to vellus hairs were reported. Up to 44% increase in hair thickness as well as increase in density and terminal hair to vellus hair was observed.



Baseline

1 month post 2 txs

1 month post 3 txs

HD / T : 68 / cm²
 HD / V : 14 / cm²
 HD / A : 82 / cm²
 T/V : 4.85
 HT: 0.042 mm



Baseline

1 month post 2 txs

Frontal region
 +12% in hair thickness
 +26% T/V

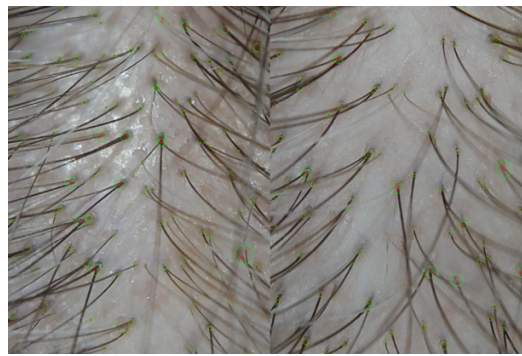
HD / T : 98 / cm²
 HD / V : 16 / cm²
 HD / A : 115 / cm²
 T/V : 6.13
 HT : 0.047 mm



Baseline

1 month post 2 txs

$HD / T : 112 / \text{cm}^2$
 $HD / V : 21 / \text{cm}^2$
 $HD / A : 134 / \text{cm}^2$
 $T/V : 5.33$
 $HT : 0.039 \text{ mm}$



Baseline

1 month post 2 txs
 Crown
 +14% in hair thickness
 +27% T/V

$HD / T : 115 / \text{cm}^2$
 $HD / V : 17 / \text{cm}^2$
 $HD / A : 132 / \text{cm}^2$
 $T/V : 6.76$
 $HT : 0.044 \text{ mm}$



Baseline

1 month post 2 txs

1 month post 3 txs

$HD / T : 33 / \text{cm}^2$
 $HD / V : 8 / \text{cm}^2$
 $HD / A : 41 / \text{cm}^2$
 $T/V : 4.12$
 $HT : 0.049 \text{ mm}$



Baseline

$HD / T : 38 / \text{cm}^2$
 $HD / V : 7 / \text{cm}^2$
 $HD / A : 45 / \text{cm}^2$
 $T/V : 5.43$
 $HT : 0.058 \text{ mm}$

1 month post 3 txs
 Frontal region
 +18% in hair thickness
 +32% T/V



Baseline

1 month post 1 tx

1 month post 2 txs

1 month post 3 txs

$HD / T : 43 / \text{cm}^2$
 $HD / V : 12 / \text{cm}^2$
 $HD / A : 44 / \text{cm}^2$
 $T/V : 3.58$
 $HT : 0.048 \text{ mm}$



Baseline

$HD / T : 61 / \text{cm}^2$
 $HD / V : 11 / \text{cm}^2$
 $HD / A : 72 / \text{cm}^2$
 $T/V : 5.54$
 $HT : 0.069 \text{ mm}$

1 month post 3 txs
 Crown
 +44% in hair thickness
 +55% T/V

Conclusion: Low-frequency Ultrasound (US) and air pressure of the Alma TED that delivers a safe and effective treatment for androgenetic alopecia.