

# Evaluating the efficacy of cold air cooling in improving patient comfort during photodynamic therapy as well as its effect on therapeutic outcomes

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## Introduction

Most patients experience stinging or burning during photoactivation of the photosensitizer, which decreases or resolves by 24 hours after light exposure. Presently different modalities are utilized to mitigate the discomfort during photoactivation, including spraying cold distilled water, or using a fan or cold air cooling. Oxygen is needed to generate reactive oxygen species during photodynamic therapy. Applying cold air to the skin during PDT may cause vasoconstriction of dermal vessels leading to a decrease in cutaneous oxygen delivery, which may diminish the effects from PDT.

The primary objective of this study was to evaluate the efficacy of cold air cooling in improving patient comfort during photodynamic therapy (PDT). The secondary objective was to determine if cooling the skin during PDT has any effect on expected outcomes.

## Methods

Patients undergoing PDT for inflammatory acne or photoaging had aminolevulinic acid applied to their entire face and incubation occurred for one hour. All patients received treatment with PDL and IPL.

Patients were then randomized to receive cold air cooling (ArTek Air® by ThermoTek Inc., Flower Mound, TX) to half of their face during blue and red light illumination. The investigating physician was blinded to the side that received cold air.

Patients undergoing PDT for acne were assessed prior to treatment using a 5-point global acne assessment scale, and by counting individual papules, pustules and nodules, at Day 1 (Visit 1) and Day 30 (Visit 3).

Patients undergoing PDT for photoaging were assessed prior to treatment using a 5-point global score for photoaging, fine lines/wrinkles, hyperpigmentation, tactile roughness, sallowness, telangiectasias and erythema at Day 1 (Visit 1) and Day 30 (Visit 3).

Erythema was assessed on a 5-point scale at visit 2 (day 4 through 7). Standardized photography was completed at the first and last clinic visits.

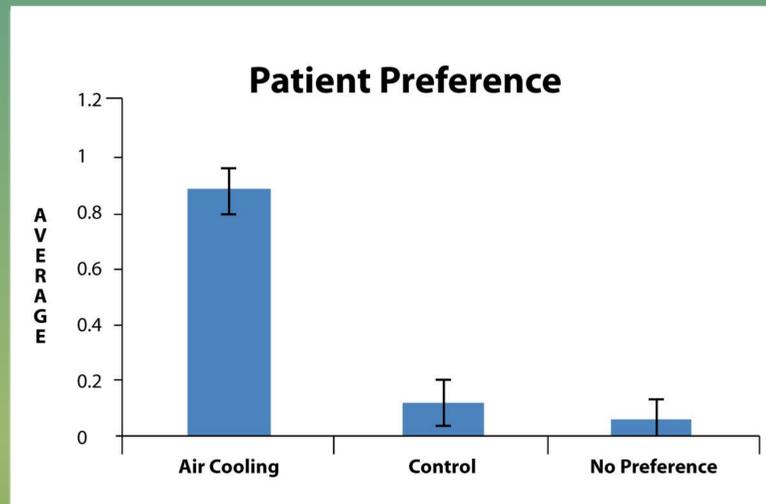


Figure 1. A statistical significance was noted in patients preferring cold air during treatment versus no air or having no preference at all ( $p < 0.001$ ). The difference in pain reported between both sides was statistically significant ( $p = 0.004$ ).

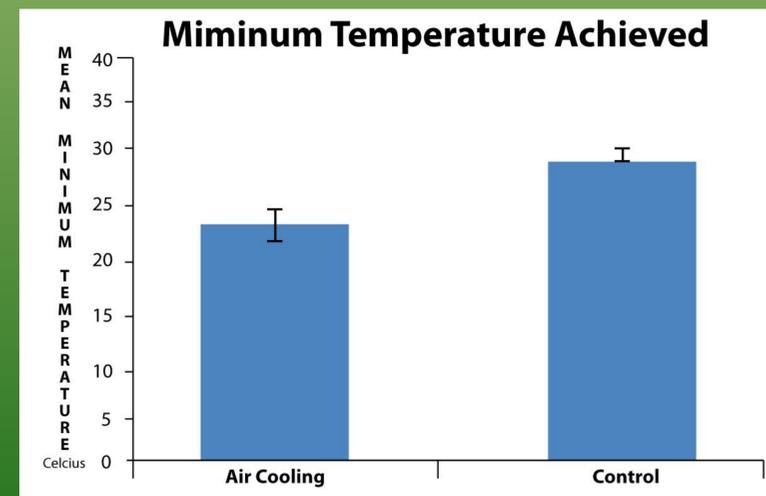


Figure 2. Minimum temperature achieved with cold air cooling = 27.52 C versus a minimum temperature achieved without cold air cooling = 33.38 C ( $p < 0.001$ )

## Results

15 of 20 patients (6 females, 9 males), aged 22-69 years old (mean 46), completed the study. All patients were Fitzpatrick skin types II-IV with moderate to severe photodamage or acne.

- No statistical significance was found in the investigator global acne assessment score comparing baseline to day 30 between both sides
- There was no significant difference noted in the global assessment of improvement score (7-point scale), papules, nodules and pustules, between the cold air exposed side versus the non-exposed side, when comparing baseline to day 30 in acne patients.
- No statistical difference in improvement was noted in photodamaged patients in investigator global assessment of improvement score (7-point scale), global photoaging score, fine lines/wrinkles, hyperpigmentation, tactile roughness, sallowness, telangiectasias, and erythema.
- No differences in post-PDT erythema, 4 to 7 days after treatment, were noted between sides.

## Discussion

Cold air cooling during photodynamic therapy is preferred by patients and statistically significantly decreases pain experienced during treatment, without compromising the benefits of treatment, for both photoaging and acne.

Future studies using larger study cohorts followed for a longer period of time are needed to further investigate these findings.