

LIGHT THERAPY FOR SEASONAL AFFECTIVE DISORDER WITH 470 NM NARROW-BAND LIGHT-EMITTING DIODES (LEDs)

B. Byrne, G. Glickman, C. Pineda, G.C. Brainard
Department of Neurology, Thomas Jefferson University, Philadelphia, PA, USA

Objectives

Human studies have identified 446-477 nm as the most potent wavelength range for suppressing melatonin (Brainard et al. 2001, Thapan et al. 2001) and 460 nm (vs. 555 nm) as significantly more potent for circadian phase shifting (Lockley et al. 2003). This study tested short wavelength LED light for efficacy in treating SAD.

Methods

Subjects were diagnosed with major depression with a seasonal pattern (DSM-IV criteria) and had scores of at least 20 on the SIGH-SAD scale. Subjects were screened medically and randomly assigned one of two light conditions for three weeks of daily light treatment (45 min between 6:00 and 8:00 AM). The SIGH-SAD was administered weekly. Each light unit consisted of a 20 cm by 24 cm LED array within a metal frame mounted behind a plastic lens diffuser (Apollo Light Systems). An independent ACGIH hazard analysis confirmed the ocular safety of both light units. The light units produced either 470 nm (30 nm half-peak bandwidth) at 500 microwatts/sq.cm, or 700 nm (20 nm half-peak bandwidth) at 15 microwatts/sq.cm. A preliminary study showed that the 470 nm LED units, but not the 700 nm LED units, elicited a significant suppression of melatonin (Glickman et al. 2003).

Results

Of the 26 subjects entered, 23 completed 3 weeks and one completed 2 weeks of treatment; 11 patients were treated with the blue light condition and 13 with the dim red light condition. There was no significant difference between pre-treatment SIGH-SAD scores across the two light treatment conditions. There was a significant effect of treatment with 470 nm exposure. Short wavelength light decreased SIGH-SAD scores significantly more than did the alternate condition at each assessment week, including the final week.

Conclusions

Light therapy via a 470 nm LED array appears to be an effective treatment for subjects with major depression with a seasonal pattern. This is an important step towards optimizing light therapy for treatment of SAD.

Key words: Seasonal Affective Disorder, Light, Phototherapy, Wavelength, Circadian

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