

Self-luminous Light Table to Treat Sleep Disturbance, Depression, Agitation in Persons with Dementia

Light can be used to consolidate sleep in individuals with Alzheimer's disease and related dementias (ADRD), but the light delivery method is one of the biggest challenges for successful treatment. Based on field observations, it was hypothesized that a light table would be a practical way to deliver light because ADRD patients typically spend a significant amount of time sitting at tables.

LRC technicians built a light table from a light-emitting diode (LED) edge-lit television, delivering approximately 2,000 lux at the cornea of a 25,000 K (bluish white) light (Figure 1). The light table was placed in a dining area in a long-term care facility. Six ADRD patients experienced a baseline week, four intervention weeks with the energized light table, and four post-intervention weeks. A wrist-worn, calibrated Daysimeter was used to collect one week of activity-rest patterns prior to and after the lighting intervention. Measures of sleep quality, depression and agitation were collected using standardized questionnaires. Four weeks after the lighting intervention was removed, a post-intervention assessment (questionnaires only) was performed to investigate the carry-over effects of the light treatment.



Figure 1. An LED edge-lit television was inserted in a table frame to deliver light to ADRD patients.

References

Figueiro MG, Plitnick BA, Rea MS. Light Table to Treat Sleep Disturbance, Depression and Agitation in Persons with Dementia Living in Long-Term Care Facilities. *SLEEP 2015: 29th Annual Meeting of the Associated Professional Sleep Societies*. Seattle. June 6-10, 2015.

Figueiro MG, Plitnick BA, Rea MS. 2015. A self-luminous light table: a practical and effective means for delivery of circadian-effective light during the day to individuals with Alzheimer's disease and related dementias. *Lighting Research & Technology*. Submitted.

Light treatment significantly increased percent sleep calculated from the actigraphy data (Figure 2).

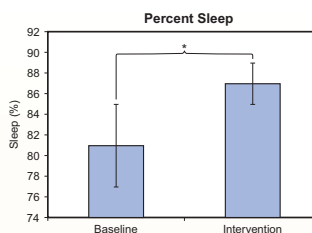


Figure 2. Mean and standard deviation of percent sleep calculated from the activity data during baseline and intervention. Percent sleep was increased ($p = 0.02$) after the light intervention. (* = statistical significance)

Compared to baseline, light treatment also significantly reduced depression scores from the Cornell Scale for Depression in Dementia (CSDD) (Figure 3) and agitation scores from the Cohen-Mansfield Agitation Inventory (CMAI) (Figure 4). Both depression and agitation scores remained significantly lower after post intervention compared to baseline, suggesting a carryover effect of light after removal of the treatment.

Recognizing that the light delivery method is one of the biggest challenges for successful light treatment, the self-luminous light table tested here is probably a highly effective and practical way to improve sleep and reduce mood disorders for individuals with ADRD living in controlled environments or at home.

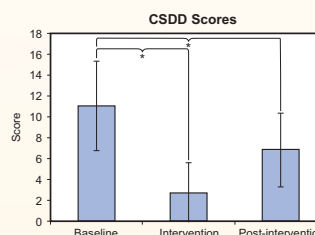


Figure 3. Mean and standard deviation of CSDD scores at baseline, four weeks after lighting intervention and four weeks after the intervention was removed (post-intervention). (* = statistical significance)

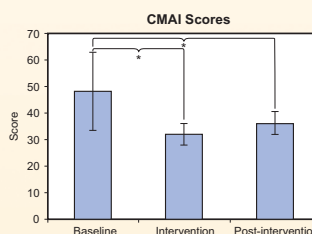


Figure 4. Mean and standard deviation of CMAI scores at baseline, four weeks after lighting intervention and four weeks after the intervention was removed (post-intervention). (* = statistical significance)

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