

Novel Sleep-Circadian Treatment Approaches for Depression in Children and Adolescents Living with HIV

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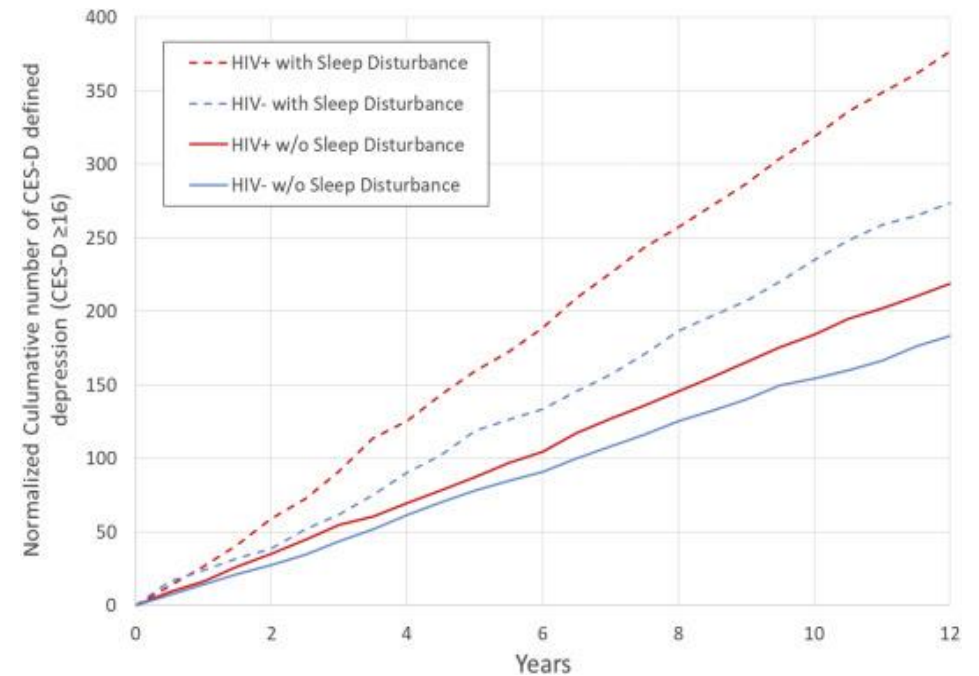
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Sleep, Rhythms, and Depression in PLWH

- 50-70% of people with living with HIV (PLWH) experience sleep disturbance¹, and sleep disturbance is associated with incident depression risk²
- Consistent evidence that poor sleep quality is tied to depression severity in PLWH³⁻⁴, and emerging data regarding dysregulation of behavioral and circadian rhythmicity⁵⁻⁷.
- **Non-pharmacological psychosocial and chronotherapeutic depression treatment approaches targeting sleep-circadian processes may be viable options for youth living with HIV**

Sleep and incident depression risk



From Irwin et al., 2018, *eBiomedicine*

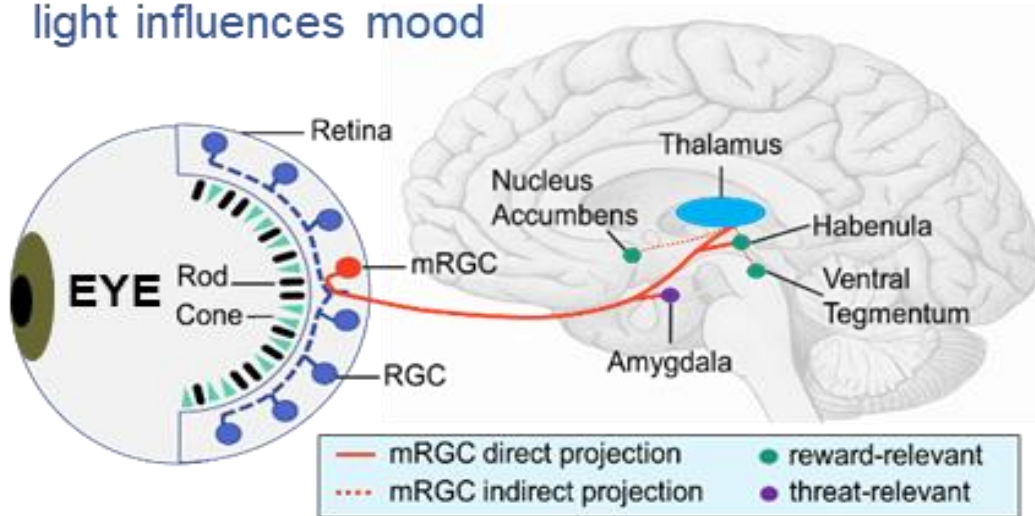
Psychosocial Therapies Targeting Sleep & Rhythms

- **Interpersonal and Social Rhythms Therapy**
 - Interpersonal therapy improves depression in PLWH^{1,2}
 - **Social Rhythms Therapy** additionally stabilizes daily routines, including the timing of meals, exercise, and sleep
- **Transdiagnostic Sleep-Circadian Intervention for Youth (TSC)**
 - Flexible, modular treatment that aims to improve ‘sleep health’ versus a specific sleep disorder³
 - **Reduction of circadian misalignment** mediated treatment-related improvement in depression severity in depressed youth⁴

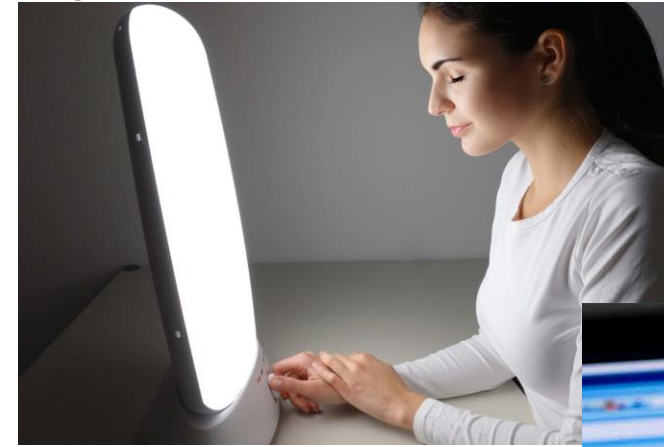
Light Therapies

Morning bright light therapy (30-60min) improves seasonal and non-seasonal depression¹ via the direct impact of light on mood regulatory and circadian brain circuitry².

Retinal-mRGC-limbic circuits through which light influences mood



Light box



ReTimer



Luminette



Novel light therapies, which deliver light flashes during sleep, are in development³.

¹ Al-Karawi et al, 2016 *J Affective Disorders*; ²LeGates et al, 2014 *Nat Neurosci*; ³Lok et al., 2023 *Sci Reports*

Therapeutic Sleep Deprivation Approaches

Total or partial sleep deprivation acutely improves mood in 50% of depressed adults¹ and initial pilot studies in teens report similar response rates²⁻³.

Selective suppression of specific sleep stages, such as slow wave sleep, can elicit improvement in mood and negative affect without curtailing sleep^{4,5}.

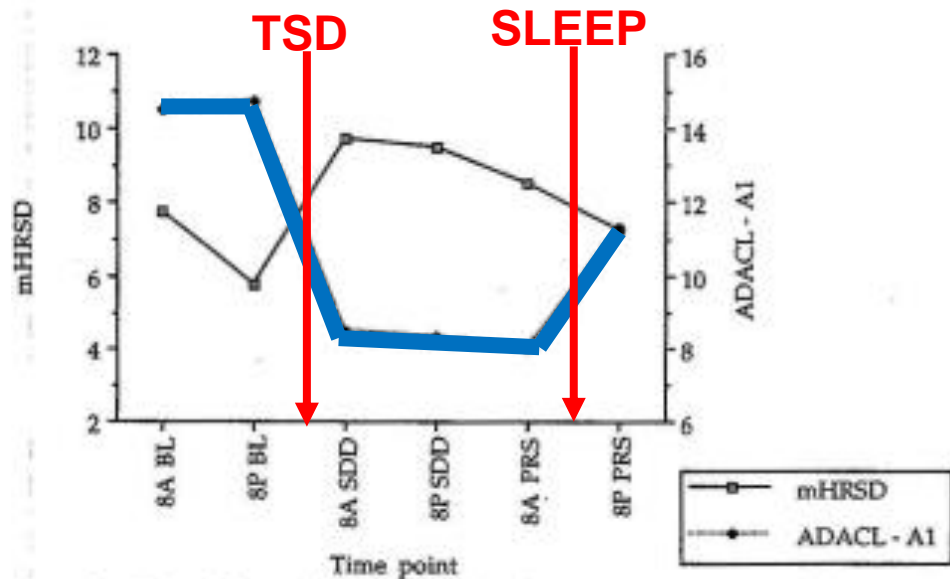
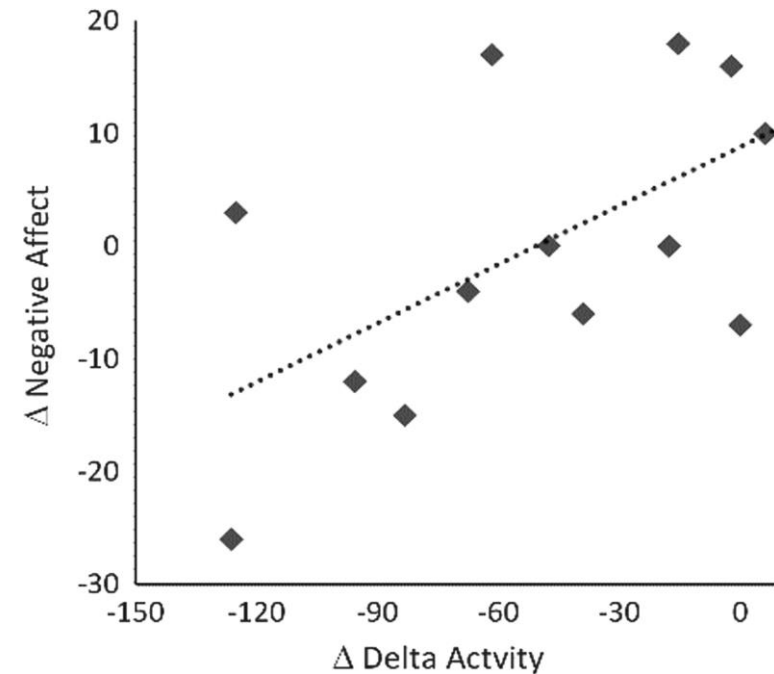


FIG. 2. The effect of sleep deprivation on measures of depression and arousal in mildly depressed adolescents ($N = 4$).



¹Boland et al., 2017. *J Clin Psychiatry*; ²Naylor et al., 2013 *JAACAP*; ³Detrinis et al., 1990 *Sleep Research*; ⁴Landsness et al., 2011. *J Psychiatr Res*; ⁵Cheng et al., 2015, *Psychiatry Res*

'Triple Chronotherapy' (TCT)

TCT combines therapeutic sleep deprivation, sleep phase advance, and light therapy to rapidly improve mood, mostly used in severely depressed inpatient samples. A TCT protocol showed promise in depressed adolescent inpatients¹.

TCT Protocol:

- Day 0: One night of total sleep deprivation
- Day 1: Sleep at 6 pm.
- Day 2: Awaken at 1 am. Sleep at 8 pm.
- Day 3: Awaken at 3 am. Sleep at 10 pm.
- Day 4: Awaken at 5 am; discharge following light therapy

