With practice parameters or meta-analytic endorsement of light therapy for circadian sleep phase disorders [1,2] and seasonal [3] and nonseasonal depression [4,5] now in place, the field is focusing on other disorders and illnesses that also may be light responsive. Though professional consensus may be years away, the promise of these initiatives should turn clinicians toward judicious consideration. Here we consider clinical trials of light therapy for antepartum depression, premenstrual dysphoric disorder and PMS, geriatric depression, bulimia nervosa, adult attention deficit/hyperactivity disorder, dementia and Parkinson’s disease. Wherever possible, we have hyperlinked the references to PubMed journal abstracts.

Antepartum Depression

Both open-label [6] and controlled [7] studies have successfully employed light therapy for major depression during pregnancy, which offers a safe somatic treatment alternative to antidepressant drugs regardless of whether the woman has a history of seasonal depression. Both efficacy and side effects have been shown to be dose-dependent [7]. For example, a nonresponder to 60 minutes of 7000-lux light administered upon awakening for 5 weeks showed full remission when session duration was increased to 75 minutes. A responder who developed irritable hypomania under the same initial treatment conditions became depressed when duration was reduced to 45 minutes but responded without hypomania when duration was increased to 50 minutes. Although larger-scale trials are needed, morning light therapy is a viable option for treatment of antepartum depression.

Two cases of successful light therapy (10,000 lux, 30 minutes between 7-9 AM, 4 weeks) for postpartum depression have been described [8], although a subsequent controlled trial using a 500-lux placebo failed to show bright light superiority [9]. Five hundred lux may have been too bright to demonstrate a difference.

Premenstrual Dysphoric Disorder (PMDD)

Patients with both seasonal and nonseasonal PMDD or milder premenstrual syndrome (PMS) have responded favorably to 1 week of bright light therapy (2500 lux for 2 hours) during the luteal phase, in a series of clinical trials by Parry and colleagues [10]. However, a placebo-controlled crossover study showed no difference between morning and evening exposures in 1-month trials [11]. Furthermore, bright and dim light had similar effects. By contrast, a 2-month study by Lam and colleagues [12] using 10,000-lux, 30-minute evening light during the luteal phase found significant improvement relative to a dim light control, with alleviation of both depressed mood
and physical symptoms. Although larger controlled trials are needed and the relative
advantage of morning light awaits investigation, Lam’s method is a viable option for
the open treatment of PMDD and PMS, especially for women who have not responded
to medication.

**Bulimia Nervosa**

Lam and coworkers [13] became interested in this potential application of light
therapy when a seasonal mood pattern was noted in many patients with bulimia;
beside the spectrum of winter depression symptoms, this included binge eating and
purging. In a 2-week crossover study, they showed a marked superiority of morning
bright light therapy (30 minutes, 10,000 lux) over dim light, for both mood and
bulimic symptoms. Furthermore, a 4-week open-treatment study yielded average
reductions of 46% in binge eating and 36% in purging, along with 56% reduction in
depression scale scores [14].

In a placebo-controlled, parallel group study of morning light therapy during
the winter months, Braun and colleagues [15] also obtained greater reductions in
bingeing and purging under bright light than under a dim-light placebo. Interestingly,
their patients did not have comorbid winter depression, and mood improvement was
unrelated to light intensity. The data thus augur well for the use of light therapy in
seasonal bulimia with or without winter depression.

**Attention Deficit/Hyperactivity Disorder (AD/HD)**

Having noted a high incidence of winter depression and oversleeping in patients with
AD/HD, Rybak and colleagues [16] hypothesized that symptoms might improve with
circadian rhythms advances to light therapy. They recruited 29 patients on the basis
of AD/HD criteria regardless of seasonal mood pattern, who showed twice the
frequency of MEQ evening type relative to morning type [17]. A 3-week open trial of
morning bright light therapy (10,000 lux, 30 minutes) produced clinically meaningful,
statistically significant improvement in core AD/HD symptoms and
neuropsychological deficits, including impulsive responding and poor target
discrimination. Importantly, improvement was unrelated to depression status, and
increased score on the MEQ—a proxy measure of circadian rhythm phase advance—
strongly correlated with better cognitive test performance.

**Dementia**

The disrupted rest–activity pattern that accompanies dementia has long been a
target of light therapy studies, including a substantial set with promising results but
small sample size [19-26] and larger studies without success [27,28]. Three
comprehensive reviews have found the results weak or negative [29-31]. There are
hints, however, that further work will pay off. Sloane and colleagues [32] presented
3-week crossovers of 2500-lux room light for approximately 3 hours in the morning
(7-11 AM), evening (4-8 PM), or daylong (~8 hours between 7 AM-8 PM), to 66
patients. Nighttime sleep, measured by actigraphy, increased by approximately 15
minutes under morning or all-day exposure, but not evening exposure. Activity
acrophase advanced by 29 minutes under morning light and delayed by 15 minutes
under evening light. Although the benefit was modest, the orderliness of results—
which was most evident in the severely demented subgroup—warrants further
development of circadian lighting regimens in long-term care facilities.

Fontana Gasio and colleagues [33] administered naturalistic, diffuse dusk and
dawn simulation (white light peaking at 200 lux or a dim red placebo) at the bedside
of 13 demented patients for 3 weeks. Globally, there was no improvement in circadian rhythm stability or amplitude. However, the dusk-to-dawn signal advanced nocturnal sleep onset by more than 1 hour, with commensurate increases in sleep duration and nocturnal quiescence.

In a controlled study of 189 patients, by Riemersma-van der Lek and colleagues [34], presented a treatment combination intended more to amplify circadian rhythms than to phase shift them—daylong bright light exposure (~1000 lux vs. ~300 lux standard room light) coupled with high-dose melatonin (2.5 mg) before bedtime. The bright light group showed modestly enhanced stability and amplitude of the rest–activity rhythm, improved mood and reduced cognitive deterioration. By contrast, mood deteriorated under the normal room light control, which indicates a risk of melatonin monotherapy, at least in supraphysiological dose, in chronotherapeutics for dementia.

Parkinson’s Disease

Though it might be hypothesized that light therapy would reduce the depressive symptoms often seen in Parkinson’s disease, it would be surprising also to obtain improvement in core motor symptoms, which is the aim of dopamine replacement therapy. Willis and colleagues [35] conducted a 12-patient case study, using presleep light exposure of 1000–1500 lux for 1–1.5 hours. Within two weeks of treatment, a majority of patients showed clinically significant reduction in bradykinesia and rigidity (but not tremor) in parallel with an antidepressant effect. Patients could not tolerate high intensity levels, and the choice of evening light was based on the presumption of advanced melatonin onset and peak phases, which are especially prominent under dopamine replacement therapy. Despite such phase advances, initial insomnia is prevalent in these patients, and evening light paradoxically served to reduce sleep onset latency. Of note, under light therapy many patients were able to sustain up to 50% dose reduction of dopaminergic medication without loss of symptom control, which offers promise for alleviating treatment-emergent levodopa-related motor complications.

Shift Work and Jet Lag Disturbance

Disruption of the circadian timing system is ubiquitous in rotating and nightshift work and after long distance jet travel across time zones. The trigger is external and the symptoms are not indicative of endogenous pathology, in contrast with the disorders and illnesses that are our focus here. Much work, primarily in laboratory simulations, has focused on minimizing the magnitude and duration of symptoms upon entering the shifts [36], or arranging appropriate phase adjustments in preparation for the shifts using combinations of timed melatonin, light treatment, dark exposure and sleep scheduling [37]. Unfortunately, confirmatory field trials are still pending.

REFERENCES

Click on the authors’ names to read the journal abstract and link further into the literature.


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