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The Right Way to Treat Seasonal Depression

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Is the cold, dark winter making you SAD? Seasonal affective disorder (SAD) is a condition that can bring on a full-blown depression that reappears yearly, usually in winter, with major relief in the late spring and summer. It can destroy your ability to work, meet family obligations, and engage socially (or sexually). Feelings of anxiety and despair are also common.

SAD-related depression is usually accompanied by physical symptoms: difficulty waking up, sleeping longer hours, craving carbohydrate-rich foods, and gaining weight that is easily lost in late spring. Nearly 10 million people in the US have SAD, and three times as many have "winter doldrums," with similar, though not clinically severe, symptoms.

Since good mood, sunlight, and spring and summer tend to go together, many once believed that sprawling in the sun or a tanning bed was the answer to SAD — that the ultraviolet (UV) light they give off was a virtually magical cure. And, as it turns out, light does play a role in the treatment of SAD. But it's *visible* light, not UV, that accounts for light's antidepressant effect.

What's the right way to treat SAD and the winter doldrums? Visible light therapy, which is generally provided by a light box. This light provides a spring-like sunrise signal that travels from the retina in the eye to the biological clock in the base of the brain, so that the internal clock and the clock on the wall stay coordinated. Ordinary indoor lighting is about 50-300 lux (the equivalent of twilight), while a light box with 10,000 lux of illumination provides a true, early, outdoor daylight level. If you sit at a light box — usually for 30 minutes after rising — even your most disruptive clinical symptoms can clear up quite quickly, sometimes within days.

So, if you see a salon advertising UV tanning as a cure for SAD, don't believe it. Early morning sunlight, which light therapy approximates, provides the *lowest* amount of UV radiation of the day, and the UVR therapy hypothesis was disproved when investigators found no reduction of antidepressant effect when UVR was eliminated from light boxes.[1] However, in a recent study, college women who showed either mild or severe symptoms of SAD were far more likely to abuse indoor tanning (having 40 sessions or more per year).[2] Since UVR stimulates the body to produce endorphins, chemicals that produce feelings of calm and well-being, this temporary "high" may influence tanning's popularity among women with SAD. However, it is *not* the solution; bona fide light therapy works through the eyes, not through the skin.

UV radiation is not the solution: bona fide light therapy works through the eyes, not the skin.

HOW SAD MAKES US SAD

SAD is linked to melatonin, a sleep-related hormone. Generally, melatonin levels in the body are higher at night and lower in the morning. For people with SAD, however, the cycle is often delayed, and melatonin levels remain elevated into the morning, causing them to oversleep or leaving them fatigued. Meanwhile, the brain's internal clock relies on early morning light to keep our circadian rhythms in sync with local time, but the late sunrises of winter deny our bodies that essential signal. Depression can result when we have to keep waking up while it's still dark. SAD is more frequent in the northern half of the US, where winter sunrise is significantly later than in the south. It is also more common toward the western edge of time zones – sunrise is about an hour earlier on the eastern edges.

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LIGHT BOX ESSENTIALS

Many light therapy products are commercially available. However, few have been clinically tested, and some may pose risks to the skin or eyes. Here are some guidelines, based on the recommendations of the Center for Environmental Therapeutics:

- The light box should have been tested successfully in peer-reviewed, placebo-controlled clinical trials.
- The box should be able to provide 10,000 lux illumination.
- The box should have a smooth diffusing screen that filters out the small amount of UVR emitted by the fluorescent bulbs in most light boxes. The safest light boxes use a polycarbonate diffuser.
- The light should project downward toward the eyes to minimize glare.
- Smaller is not better. Miniature devices cause glare, and even small head movements will take your eyes out of the therapeutic range. In general, light boxes should be no smaller than 15″ wide and 12″ high (180 sq. in.).

Finally, the lamp should give off white, not colored, light. Soft white light is highly recommended. Full spectrum and blue (or bluish) light provide no known therapeutic advantage — blue light causes glare, and over the long term may harm the retina.[3] Boxes that give off inadequately filtered UV are particularly hazardous to the skin and eyes[4] of people taking photosensitizing drugs (medications that sensitize the skin to the sun). Photosensitive people may develop rashes, itchiness, bumps, or lesions on the skin as a result of exposure to UV light and have a higher risk of developing skin cancer. Typical UV photosensitizers include antibiotics and NSAIDs (non-steroidal anti-inflammatories, like ibuprofen). Everyone who uses a light box should make sure it has a polycarbonate diffuser to screen out UV light adequately, but for people taking photosensitizing drugs, a filter is especially important.

Other drugs can photosensitize people to visible blue light, which exists in varying degrees as a component of white light. Anyone using tricyclics or neuroleptics[5] (common psychiatric drugs), antiarrhythmics, or antimalarial drugs should check with a dermatologist before starting bright light therapy.

Additionally, people with conditions including age-related macular degeneration, lupus erythematosus, chronic actinic dermatitis, and solar urticaria may react poorly (photosensitively) to the blue light produced by light boxes. For these SAD patients, a milder form of light therapy, *dawn simulation*, has seen initial clinical success.[6] In dawn simulation, timed lights are activated automatically to gradually replicate a low-level springtime sunrise while you're still in bed.

It can be difficult to tell whether your winter slump is clinically significant. You can get anonymous, confidential feedback online using the *Personal Inventory for Depression and SAD* in the Self-Assessment section at the nonprofit Center for Environmental Therapeutics (www.cet.org). If your depression is severe, consult a mental health specialist. Print out the report, and discuss it with your doctor if indicated.

CONCLUSION

Light therapy for SAD can be a boon for quality of life for half the year. But users must keep an eye out for safety and efficacy: much commercial apparatus has received inadequate testing, or none at all. Many doctors are still unacquainted with this powerful non-drug technique. To learn more about light therapy, the newly published *Chronotherapeutics for Affective Disorders*[7] is a comprehensive guide. And remember: Visible light, not harmful UV radiation, is the key to relieving symptoms of SAD. A light box, not a tanning machine, can help improve your mood and sleep without risking your health. ■

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References available on p.97.

2. Robinson JK. Sun exposure, sun protection, and vitamin D. *JAMA* 2005; 294:1541-3.
3. Young JL, Jr., Percy CL, Asire AJ, et al. Cancer incidence and mortality in the United States, 1973-77. *Natl Cancer Inst Monogr* 1981:1-187.
4. Abreu L, Kruger E, Tennant M. Lip cancer in Western Australia, 1982-2006: a 25-year retrospective epidemiological study. *Aust Dent J* 2009; 54:130-5.
5. Molnar L, Ronay P, Tapolcsanyi L. Carcinoma of the lip. Analysis of the material of 25 years. *Oncology* 1974; 29:101-21.
6. Veness M. Lip cancer: important management issues. *Australas J Dermatol* 2001; 42:30-2.
7. Mohs FE, Snow SN. Microscopically controlled surgical treatment for squamous cell carcinoma of the lower lip. *Surg Gynecol Obstet* 1985; 160:37-41.
8. Zitsch RP, 3rd, Park CW, Renner GJ, Rea JL. Outcome analysis for lip carcinoma. *Otolaryngol Head Neck Surg* 1995; 113:589-96.
9. Armstrong BK, Kricker A. How much melanoma is caused by sun exposure? *Melanoma Res* 1993; 3:395-401.
10. Fincham SM, Hanson J, Berkel J. Patterns and risks of cancer in farmers in Alberta. *Cancer* 1992; 69:1276-85.
11. van Leeuwen MT, Grulich AE, McDonald SP, et al. Immunosuppression and other risk factors for lip cancer after kidney transplantation. *Cancer Epidemiol Biomarkers Prev* 2009; 18:561-9.
12. Dantal J, Hourmant M, Cantarovich D, et al. Effect of long-term immunosuppression in kidney-graft recipients on cancer incidence: randomised comparison of two cyclosporin regimens. *Lancet* 1998; 351:623-8.
13. Grulich AE, van Leeuwen MT, Falster MO, Vajdic CM. Incidence of cancers in people with HIV/AIDS compared with immunosuppressed transplant recipients: a meta-analysis. *Lancet* 2007; 370:59-67.
14. Holmkvist KA, Roenigk RK. Squamous cell carcinoma of the lip treated with Mohs micrographic surgery: outcome at 5 years. *J Am Acad Dermatol* 1998; 38:960-6.
15. Pogoda JM, Preston-Martin S. Solar radiation, lip protection, and lip cancer risk in Los Angeles County women (California, United States). *Cancer Causes Control* 1996; 7:458-63.
16. Busick TL, Uchida T, Wagner RF, Jr. Preventing ultraviolet light lip injury: beachgoer awareness about lip cancer risk factors and lip protection behavior. *Dermatol Surg* 2005; 31:173-6.
17. Maier H, Schauberger G, Brunnhofer K, Honigsmann H. Assessment of thickness of photoprotective lipsticks and frequency of reapplication: results from a laboratory test and a field experiment. *Br J Dermatol* 2003; 148:763-9.
18. Maier H, Schauberger G, Martincigh BS, Brunnhofer K, Honigsmann H. Ultraviolet protective performance of photoprotective lipsticks: change of spectral transmittance because of ultraviolet exposure. *Photodermatol Photoimmunol Photomed* 2005; 21:84-92.

THE RIGHT WAY TO TREAT SEASONAL DEPRESSION (p. 56)

1. Lam RW, Buchanan A, Mador JA, Corral MR, Remick RA. The effects of ultraviolet-A wavelengths in light therapy for seasonal depression. *J Affect Disord* 1992; 24:237-43.
2. Hillhouse J, Stapleton J, Turrisi R. Association of frequent indoor UV tanning with seasonal affective disorder. *Arch Dermatology* 2005; 141:1465.
3. Roberts D. Artificial lighting and the blue light hazard. Accessible at http://www.mdsupport.org/library/hazard.html, 2008.
4. Terman M, Remé CE, Rafferty B, Gallin PF, Terman JS. Bright light therapy for winter depression: Potential ocular effects and theoretical implications. *Photochem Photobiol* 1990; 51:781-793.
5. DeLeo VA, Remé CE. Bright light exposure risks. Accessible in the Therapy section at http://www.cet.org, 2008.
6. Terman M, Terman JS. Controlled trial of naturalistic dawn simulation and negative air ionization for seasonal affective disorder. *Am J Psychiatry* 2006; 163:2126-2133.
7. Wirz-Justice A, Benedetti F, Terman M. *Chronotherapeutics for Affective Disorders: a Clinician's Manual for Light and Wake Therapy*. Basel, Karger, 2009. Information at www.chronotherapeutics.org.

PROTECT YOUR EYES: EVERYDAY STEPS TO SUN SAFETY (p.58)

1. Implications of the blue light hazard and (ROS) in the pathogenesis of age-related macular degeneration, Dr. George Banyas, OD.
2. HEV Light and Macular Degeneration, *Midwest Monthly*, Vol. 5, Issue 3, March, 2008, http://mwlabs.cc/pdf/MMMarch2008.pdf.
3. National Eye Institute, National Institutes of Health, Age-Related Macular Degeneration, www.nei.nih.gov/health/maculardegen/armd_facts.asp
4. Rene S. Rodriguez-Sains, MD, The sun, the eyelids, and the eye, *The Skin Cancer Foundation Journal*, Vol. 23, 2005, pp. 36-7.
5. Eyelid basal cell carcinoma: non-Mohs excision, repair, and outcome, Hamada S, Kersey T, Thaller VT, *Br J Ophthalmol*, August 2005; 89(8): 992-994.
6. EyecareAmerica, The Foundation of the American Academy of Ophthalmalogy, Eyelid and Orbital Tumors. http://www.eyecareamerica.org/eyecare/conditions/eye-tumors/index.cfm
7. Emily Tierney, MD, and C. William Hanke, MD, MPH, The Eyelid: A High Risk Area for Skin Cancer, *Skin Cancer Foundation Journal*, 2009; 27:53-54.
8. Intraocular (Eye) Melanoma Treatment—National Cancer Institute. http://www.cancer.gov/cancertopics/pdq/treatment/intraocularmelanoma/patient/allpages/print]
9. Guo-Pei Yi, MD, Dan-Nin Hu, MD, Steven McCormick, MD, and Paul T. Finger, MD, Conjunctival Melanoma: Is It Increasing in the United States? *American Journal of Ophthalmology*, June 2003; 135:800-806. Elsevier, Inc.
10. Gies PH, Roy CR, Toomey S, McLennan A. Protection against solar ultraviolet radiation. *Mutat Res* 1998; 422:15-22.
11. Tucker MA, Shields JA, Hartge P, et al. Sunlight exposure as a risk factor for intraocular malignant melanoma. *N Eng J Med* 1985; 313:789-792.
12. American Cancer Society booklet, Eye Cancer – Intraocular Melanoma, page 5.
13. Sunlight exposure and risk of lens opacities in a population-based study, The Salisbury Eye Evaluation Project, West SK, Duncan, DD, Munoz B, Rubin GS, et al. *JAMA* Aug. 26, 1998, Vol. 280, No. 8, 714-718.
14. The content and cost of cataract surgery, Steinberg EP, Javitt JC, Sharkey PD, Zuckerman A, Legro MW, Anderson GF, Bass EB, O'Day D, *Arch Derm* 1993; Aug; 111:1041-9.
15. FDA: Saving Your Sight—Early Detection is Critical, by Michelle Meadows. cites NEI for over 1.5 million surgeries a year. http://www.fda.gov/fdac/features/2002/202_eyes.html]
16. Blue Light and Macular Degeneration, from The Complete Guide to Saving and Maximizing Your Sight, by Lylas G. Mogk, MD, and Marja Mogk, at Macular Degeneration Support online, www.mdsupport.org/library/blulight.html
17. What are the effects of UV on the eye? World Health Organization: http://www.who.int/uv/faq/uvhealtfac/en/index3.html.
18. CDC: Excite: Skin Cancer Module: Practice Exercises. Module 6: Ultraviolet Radiation. http://www.cdc.gov/excite/skincancer/mod06.htm]

BREAST CANCER AND MELANOMA (p.60)

1. Jemal A, Siegel R, Ward E, et al. Cancer statistics, 2008. *CA Cancer J Clin* Mar-Apr 2008; 58(2):71-96.
2. Ho WL, Comber H, Hill ADK, Murphy GM. Malignant melanoma and breast carcinoma: a bidirectional correlation. *Ir J Med Sci* Mar 2009:10.1007/s11845-009-0297-5.
3. Schoenberg BS, Christine BW. Malignant melanoma associated with breast cancer. *South Med J* Nov 1980; 73(11):1493-1497.
4. Goggins W, Gao W, Tsao H. Association between female breast cancer and cutaneous melanoma. *Int J Cancer* Sep 20 2004; 111(5):792-794.
5. Levi F, Te VC, Randimbison L, La Vecchia C. Cancer risk in women with previous breast cancer. *Ann Oncol* Jan 2003; 14(1):71-73.
6. Rubino C, de Vathaire F, Diallo I, Shamsaldin A, Le MG. Increased risk of second cancers following breast cancer: role of the initial treatment. *Breast Cancer Res Treat* Jun 2000; 61(3):183-195.
7. Mellemkjaer L, Friis S, Olsen JH, et al. Risk of second cancer among women with breast cancer. *Int J Cancer* May 1 2006; 118(9):2285-2292.
8. Galper S, Gelman R, Recht A, et al. Second nonbreast malignancies after conservative surgery and radiation therapy for early-stage breast cancer. *Int J Radiat Oncol Biol Phys* Feb 1 2002; 52(2):406-414.
9. Bhatia S, Estrada-Batres L, Maryon T, Bogue M, Chu D. Second primary tumors in patients with cutaneous malignant melanoma. *Cancer* Nov 15 1999; 86(10):2014-2020.
10. Schmid-Wendtner MH, Baumert J, Wendtner CM, Plewig G, Volkenandt M. Risk of second primary malignancies in patients with cutaneous melanoma. *Br J Dermatol* Dec 2001; 145(6):981-985.
11. Borg A, Sandberg T, Nilsson K, et al. High frequency of multiple melanomas and breast and pancreas carcinomas in CDKN2A mutation-positive melanoma families. *J Natl Cancer Inst* Aug 2 2000; 92 (15):1260-1266.
12. Nagore E, Montoro A, Garcia-Casado Z, et al. Germline mutations in CDKN2A are infrequent in female patients with melanoma and breast cancer. *Melanoma Res* Aug 2009; 19(4):211-214.
13. Monnerat C, Chompret A, Kannengiesser C, et al. BRCA1, BRCA2, TP53, and CDKN2A germline mutations in patients with breast cancer and cutaneous melanoma. *Fam Cancer* 2007; 6(4):453-461.
14. Cancer risks in BRCA2 mutation carriers. The Breast Cancer Linkage Consortium. *J Natl Cancer Inst* Aug 4 1999; 91(15):1310-1316.
15. Debniak T, Scott RJ, Huzarski T, et al. XPD common variants and their association with melanoma and breast cancer risk. *Breast Cancer Res Treat* Jul 2006; 98(2):209-215.
16. Driscoll MS, Grant-Kels JM. Hormones, nevi, and melanoma: an approach to the patient. *J Am Acad Dermatol* Dec 2007; 57(6):919-931; quiz 932-916.