Short-term exposure to blue light emitted by electronic devices does not worsen melasma

To the Editor: Blue light from sun exposure is able to induce a potent and long-lasting hyperpigmentation in dark-skinned individuals.[1,2] Melanocytes sense these wavelengths directly through the activation of a specific sensor called Opsin-3.[3] The face is regularly exposed to blue light emitted by screens of devices such as cellular telephones, computers, or televisions. This blue light typically covers a spectrum from 420 to 490 nm, with a peak emission between 440 and 460 nm, depending on the source. Questions in regard to the effect of these devices on skin pigmentation have been logically raised because, although having low intensity, the cumulative doses of blue light emitted by these screens reach the dose demonstrated to induce hyperpigmentation. However, the irradiance of the light has profound influence on its biological effects, and the duration for achieving the dose capable of inducing pigmentation is significantly longer with devices than with sun exposure.[4] Nonetheless, in melasma the skin is more sensitive to external triggers, and blue light emitted by sun rays has been shown to promote relapses.[5] We wished to determine whether short-term exposure to blue light from electronic devices would affect melasma.

We conducted a prospective, randomized, comparative, intraindividual study in 12 melasma patients. First, we measured the intensity of light (between 420 and 490 nm) emitted by several devices, with the spectroradiometer sensor placed at 20 cm (10 cm for cellular telephones). Compared with sunlight in the same spectrum, the intensity is 100 to 1000 times less (Table I). One side of the face was randomly selected to receive blue light at 0.864 J/cm^2 (delivered in 30 minutes), produced by a xenon solar simulator filtered to emit the same spectrum as device screens. This is equivalent to an 8-hour exposure to the most powerful screens, which emit 30 μW/cm^2. Patients were exposed daily for 5 consecutive days on one side of the face; the opposite side was protected with an opaque cover maintained in place by adhesive tape. The main evaluation criterion was colorimetric comparison between the 2 sides at day 1, day 5, and day 15. An evaluator blinded to the side exposed performed a modified Melasma Area and Severity Index score for each half of the face. Experimental setup is detailed in Supplemental Table I and Supplemental Fig 1 via Mendeley at https://doi.org/10.17632/7w7mc87sy3.2.

Ten patients were Fitzpatrick skin type III and 2 were skin type IV (mean age 41 years; range 30-58 years). Population characteristics are described in Supplemental Table I. All patients completed the study. No significant difference in Δ individual topology angle was observed between exposed and nonexposed sides, and there was no evolution over time (Fig 1). Additionally, there were no differences in Δ skin lightness, redness and yellowness, Δ difference between lesional and nonlesional skin in each side of the face, and modified Melasma Area and Severity Index scores (Supplemental Fig 1).

These results suggest that at a 20-cm distance, a maximized use of a high-intensity computer screen for 8 hours per day during a 5-day period does not worsen melasma lesions. Although it is very unlikely that similar exposure during a longer period would start to affect melasma lesions, such a possibility cannot be ruled out.

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Table I. Comparison of intensity of light emitted by devices and by the sun

Source	Intensity, μW/cm^2	Intensity, mW/cm^2	Ratio between the intensity of the sun/intensity of the device
Sun	7700	7.7	—
TV LED (Philips 55POS9002)	78	0.078	99
Laptop LED 1, Inspiron 17 (Dell)	7.2	0.0072	1069
Laptop LED 2, Inspiron 24 (Dell)	15	0.015	513
Computer screen, Samsung P2270H	22	0.022	350
Cellular telephone (at 10 cm), Samsung SG7	11	0.011	700

Intensity of light between 420 and 490 nm was measured for several devices and compared with sun intensity in the same wavelengths. The sensor of the spectroradiometer was placed at 20 cm from the screen (except for the cellular telephone).
LED, Light-emitting diode.

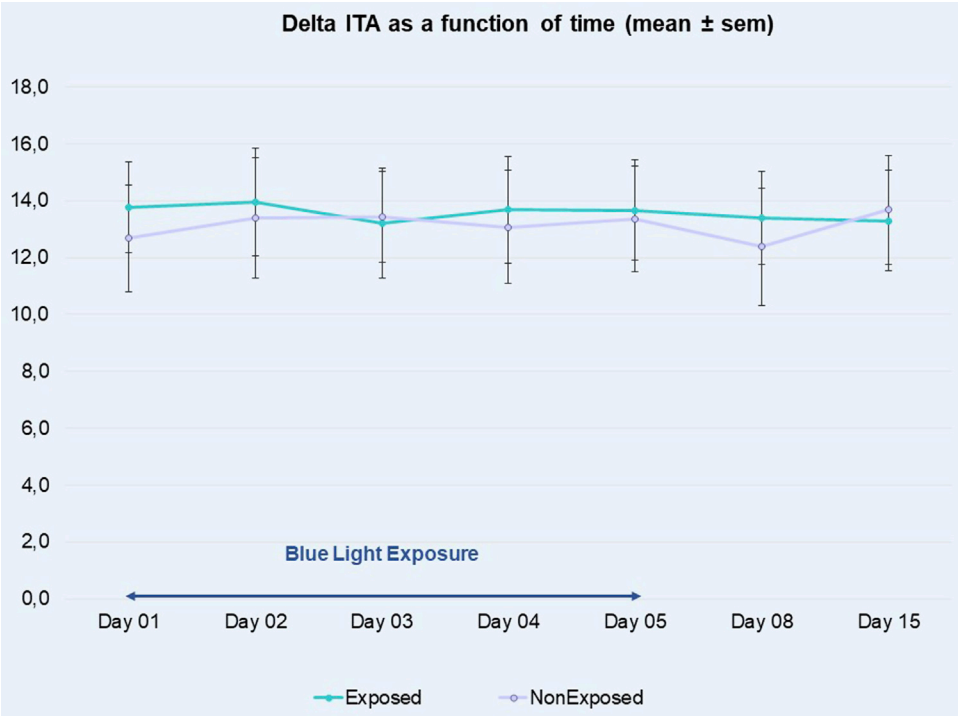

Fig 1. Δ Individual topology angle evolution. Individual topology angle is the colorimetry parameter inversely correlated to pigmentation. The measure of the individual topology angle during the 5 days of exposure and after 1 and 2 weeks showed no significant variation compared with baseline individual topology angle and no significant differences between the exposed and nonexposed half of the face. *ITA*, Individual topology angle; *SEM*, standard error of the mean.

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Histologic features of graft-versus-host disease-associated angiomatosis: Insights into pathophysiology and treatment

To the Editor: Graft-versus-host disease (GVHD)—associated angiomatosis (GVHD-AA) can cause significant morbidity in patients with chronic cutaneous GVHD, and there is no clear treatment.[1] Research is needed to elucidate disease pathobiology and inform treatment options but is hampered by the rarity of the disease. We analyzed 16 GVHD-AA, sclerotic GVHD—non-AA, and healthy