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Red reflex variations in black patients

<https://doi.org/10.1515/jom-2021-0110>

Received April 9, 2021; accepted August 26, 2021;
published online September 16, 2021

To the Editor:

In the medical field, it is important to be cognizant of various objective presentations that can be encountered. Different skin tones may result in different test outcomes. A 2020 article in the *New England Journal of Medicine* [1] reviewed the different outcomes between black and white skin colors when adult inpatient pulse oximetry measurements were compared to their arterial oxygen saturation in arterial blood gas. When compared to white patients, Black patients had nearly three times the frequency of occult hypoxemia that was not detected by their paired pulse oximetry [1]. For example, this variance might be critical when caring for a Black COVID-19 patient or a sickle cell patient. Atopic dermatitis, especially in the setting of post-inflammatory hyperpigmentation, might be more difficult for physicians to diagnose in Black patients [2]. Lester et al. conducted a systematic review of articles describing cutaneous findings of COVID-19 and determined that there were no published photos of COVID-19 cutaneous symptoms for darker skin tones [3]. This deficit in the literature contributes to physicians' lack of confidence and diagnosing difficulties [3, 4]. As explained below, the red reflex test, often used as part of an osteopathic structural exam, might also be difficult to evaluate in Black patients when a medical student or a physician lacks experience.

In osteopathic medicine, Tissue texture changes, Asymmetry, Restriction of motion, and Tenderness (TART) are criteria used to assess and diagnose a somatic dysfunction, or a change in the normal functioning of the musculoskeletal system. TART can be observed and palpated [5]. The *red reflex* is an erythematous biochemical

reaction of the skin, a type of tissue texture change, that has been stimulated by mechanical friction. The *red reflex* or *erythema test* reveals segmental sympatheticotonia or vascular spasm commonly observed in the paraspinal area. To conduct this test, the physician places the pads of the second and third digits paraspinally and in two to three strokes, rubs the patient's skin in a superior to inferior direction. Normally, the skin blanches initially, then reddens before slowly fading back to normal skin color. An acute segmental facilitation is characterized by greater initial reactive hyperemia with prolonged duration of redness. At times, the red reflex in the setting of an acute segmental facilitation might skip the initial blanching. In chronic segmental facilitation, the skin might remain pale, or the red reflex fades rapidly [6, 7].

On lighter skin tones, the red reflex test can be performed and interpreted easily. However, on darker skin tones, the red reflex could be harder to see. The physician would need to observe more carefully for the subtler skin color changes in Black patients. Chromameters are instruments that may be used to measure or quantify skin color. Clarys et al. [8] measured skin color using a chromameter and narrow-band simple reflectance meters. These instruments were also able to distinguish small skin color differences due to various reactions [8]. An exhaustive literature search revealed that no studies have been conducted to evaluate red reflexes using chromameters.

At times, a physician might not be able to rely on the observation for the red reflex as part of the evaluation for segmental viscerosomatic changes in a Black patient. Palpation for tissue texture changes such as asymmetry, restriction of motion, rigidity, increased boggy, and temperature changes would offer more reliable, objective structural exam findings for the physician caring for Black patients [3].

Whether it be pulse oximeter variations, differences in dermatologic presentations of rashes, or red reflex skin reactions, it is important to mention these differences when teaching students. Utilizing resources such as *Mind the Gap: A Handbook of Clinical Signs in Black and Brown Skin* [9] can help facilitate teaching, while encouraging inclusivity and optimal patient care in the future. Besides clinical exposure, research using chromameter measurements could help facilitate training for diagnosing TART changes.

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Research funding: None reported.

Author contributions: Both authors provided substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; both authors drafted the article or revised it critically for important intellectual content; both authors gave final approval of the version of the article to be published; and both authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Competing interests: None reported.

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