REAL-TIME MELANIN MEASUREMENTS TO OPTIMIZE TREATMENT SETTINGS AND AVOID COMPLICATIONS

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Background: Eyeball assessment of background epidermal melanin content is inconsistent and often inaccurate. Overestimation leads to unnecessarily conservative settings and disappointing results; underestimation leads to excessive settings that can result in vesiculation and even scarring. We evaluated the predictive value of real-time Melanin Index (MI) measurements for determining appropriate intense pulsed light (IPL) treatment settings across 5 treatment centers. The goal was to identify a starting point fluence setting that was at or just below the optimal treatment settings. Since skin tolerance is predicted to be related to melanin content, then real-time measurement of melanin should make it possible to accurately predict appropriate treatment settings.

Study: Pulse width and fluence settings (selected based on eyeball assessment of experienced operators) collected during patient treatments were compared to MI-determined presets that were derived from maximum tolerated fluence measured on over 100 patients. A 3-wavelength, backscattering reflectometer was used for MI values which transmitted settings to the base which then provided preset fluence values based upon selection of pulse width (Icon system and Skintel™ Melanin Reader, Palomar Medical, MA). Additionally, in over 30 patients, test spots were performed in affected areas at the MI determined presets as well as fluences 2 J/cm2 below and above the preset. The spots were evaluated 1 hour after irradiation for optimized visual endpoints (darkening of pigmented lesions and vessel clearing).

Results: 70 to 90% of the patient treatment settings (n = 85) were at or just above (0–4 J/cm2) the suggested starting test spot fluence setting as predicted based upon MI measured within the treatment area. Only 4% of the cases had the starting point settings above the treatment settings (all within 4 J/cm2). Test spots in affected skin likewise showed that across the range of reflectometer guided settings, no settings were determined to be unsafe; moreover the settings were within 20% of settings the provider would have chosen without reflectometer guidance. Individuals of different Fitzpartick Skin Type, but with similar melanin content were found to have similar skin tolerance to IPL treatment. Setting guidance using an objective measure was found to direct settings that were without complications in all cases and in many instances led to better optimization of settings.

Conclusion: Real-time measurement of skin's melanin content was found to accurately guide selection of appropriate and safe photodermatologic treatment settings. Used appropriately, MI-based guidance has the potential to reduce risk of complications, particularly in less experienced operators.