Aging skin sees the light: LED phototherapy smooths wrinkles, increases collagen without pain, heat, risk.(Special report: lasers)

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Dallas -- New clinical data shows that light-emitting diode (LED) phototherapy is a simple, safe treatment that can offer a robust appearance to damaged facial skin. The light-based therapy, which uses exposures calculated to be less than a 25-watt incandescent light bulb, bears similarity to photosynthesis. Unlike lasers and intense pulsed light devices that use heat, the LED technology is a non-thermal, non-ablative narrow band of light that focuses beneath the skin to energize cells in much the same way that the sun's energy stimulates a plant.

"Skin can be smoothed without using heat, without pain, and without risk," said Robert A. Weiss, M.D., Baltimore, Md. "It's a new way to induce collagen formation without heating the skin ... it's the closest thing to a laser without being a laser." As lead investigator of a 12-month, multi-site clinical trial, Dr. Weiss presented his findings at the American Society for Laser Medicine and Surgery meeting. Dr. Weiss and his researchers set out to evaluate the efficacy of the Light BioScience, LLC Gentle-Waves Low Intensity Light Therapy (LILT) for treating facial rhytides in the periorbital and/or perioral facial regions.

In theory, photomodulation suggests that very low-intensity light photons of the proper parameters interact with sub-cellular chromophores to increase ATP production in mitochondria. Dr. Weiss said earlier tissue culture studies of human fibroblasts showed increased procollagen and collagen production in fibroblasts from an older patient with much less effect on the same patient's cells from a skin biopsy taken 10 years earlier. Other tests have shown little effects on younger, healthy fibroblast cells. In addition, melanoma cells in tissue culture have shown no increased growth using this LED device.

Ninety patients were studied for patient satisfaction, success rates, and adverse events, as well as wrinkle improvement, over a one-year period at two, four, six, and 12 months. Facial skin to be treated was cleansed of all makeup and sunscreen, and dried. Subjects placed their chins in a chin cup that was fastened on a small table. Small, opaque external eye protectors were placed over the subject's eyes, although no one else in the room needed them. The subject's entire face was illuminated simultaneously, with light exposure times totaling 25 seconds. The light irradiance ranged from 1.2 to 3.0 milliwatt/[cm.sup.2] (30 to 75 millijoules/[cm.sup.2]) of yellow visible 590nm LED light. Unless a skin biopsy was performed, the subjects did not require any special skincare. Researchers performed eight treatments at intervals of two to five days.

Proteins such as Collagen I increased, while undesirable enzymes, such as collagenase/MMPs, decreased. Dr. Weiss' team also noted a close connection between in vivo and in vitro findings. Patterns of cell signaling and gene expression were both directly associated with clinical observations of the photo-aged facial skin on his patient subjects. Also, 85 percent of patients registered at least one grade improvement in the Fitzpatrick scale

of periorbital wrinkles. Additionally Dr. Weiss said use of a low-voltage, visible yellow LED light source device operated at a verylow-density output resulted in zero adverse effects.
"Non-thermal LED phototherapy can modulate the activity of certain genes in human fibroblasts," Dr. Weiss said. "[This can] result in a net increase in collagen formation and extracellular matrix proteins that are responsible for improved skin tone and texture, reduced pore size, and fewer lines and wrinkles."
Treatment cost ranges from $1,000 to $1,500 for a series, though the LED device has not yet received FDA clearance to make medical claims.
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