


FEATURE
Light Emitting Diodes Bring Relief to Young Cancer Patients
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A nurse holds a strange-looking device, moving it slowly toward a young patient's face. The note-card-sized device is covered with glowing red lights, but as it comes closer, the youngster shows no fear. He's hopeful this painless procedure using an array of lights will help ease or prevent some of the pain and discomfort associated with cancer treatment.

The youngster is participating in clinical trials for this light healing device. Earlier tests by Medical College of Wisconsin researchers at Children's Hospital of Wisconsin in Milwaukee, were so encouraging that doctors have expanded the trials to several U.S. and foreign hospitals.

"We've already seen how using LEDs can improve a bone marrow transplant patient's quality of life," said Dr. Harry Whelan, professor of neurology, and hyperbaric medicine at the Medical College of Wisconsin in Milwaukee. "These trials will help us take the next steps to provide this as a standard of care for this ailment."

The "LEDs" mentioned by Whelan are light emitting diodes, a type of electronic component we've seen and used. They're found in hundreds of applications, from electronic clock displays to jukebox screens.

But a special type of LED was developed for growing plants on NASA's Space Shuttle and the Space Station as part of commercial experiments sponsored by industry. The effort is managed by NASA Space Product Development Program at the Marshall Space Flight Center in Huntsville, Ala. Researchers discovered that the diodes also had many promising medical applications, prompting research to be funded by a NASA Small Business Innovation Research contract.

Biologists have found that cells exposed to near-infrared light -- that is, energy just outside the visible range -- from LEDs grow 150 to 200 percent faster than those cells not stimulated by such light. The form of light increases energy inside cells which results in speeding up the healing process.

Many times young bone marrow transplant recipients contract a condition called oral mucositis, which produces ulcerations in the mouth and throat, severe pain, and in some cases, inflammation of the gastro-intestinal tract. Swelling and bleeding occur, and chewing and swallowing become difficult -- affecting a child's overall health because of reduced drinking and eating.

"Our first study was very encouraging, and using the LED device greatly reduced or prevented the mucositis problem, which is so painful and devastating to these children," said Whelan. "But we need to learn more. We're conducting further clinical trials with larger groups and expanded control groups required by the U.S. Food and Drug Administration, before the device can be approved and available for widespread use."

The treatment device was a 3-by-5-inch portable, flat array of light-emitting diodes. It was held against the outside of a patient's left cheek for just over a minute each day. The process was repeated on the patient's right cheek, but with foil placed between the LED array and the patient to provide a shield.



Light emitting diodes can ease pain and promote wound healing in bone marrow transplant patients. (NASA/MSFC/Barry Himelholz/Medical Center Graphics Inc.)

treatment for comparison. There wasn't any treatment of the throat area, which provided the control for the first study.

Just 53 percent of the treated patients in the bone marrow transplant group developed mucositis considerably less than the usual rate of 70-90 percent, and any mucositis which did occur was milder. Patients also reported a 48% pain reduction in their mouths when compared to untreated patients seven days following bone marrow transplant.

Quantum Devices of Barneveld, Wis., makes the wound-healing LED device. The company specializes in the manufacture of silicon photodiodes -- semiconductor devices used for light detection -- and emitting diodes for commercial, industrial and medical applications.

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Contacts:

Jerry Berg, Marshall Space Flight Center
256.544.0034



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Editor: Alex Pline
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