Seeing the Light

The Next Generation of Phototherapy Devices

BY DOUGLAS JOHNSON

Not long ago, the athletic training community was first introduced to phototherapy as a treatment alternative for pain management. Nearly four years have passed since the first low-level lasers appeared in health care facilities around the United States. Though many were skeptical at first, phototherapy is now gaining wider support from both clinicians and researchers across the country.

Early on, the market was dominated by continuous-wave (CW) low-powered laser therapy devices, or LED units. These devices, though effective for some types of treatment, are now being replaced by a new generation of higher-powered diodes. Offering more power and greater energy density, these second-generation devices have proven highly effective in treating injured muscle tissue. They're also more efficient, requiring less treatment time to provide the same level of therapy.

However, there is a limit to how much a CW laser's power output can be increased. Above roughly 500mW (the output of higher-end of Class IIIb units and all of Class IV), the potential for tissue damage from excess heat becomes too great. As a result, phototherapy companies have begun shifting their focus to other types of laser technology.

"Super pulsed" lasers, relatively new to the U.S., use a Gallium Arsenide (GaAs) diode that can administer extremely powerful pulses—up to a hundred watts—without the thermal side effect of CW lasers. When a laser is super pulsed, light intensity fluctuates repeatedly between peak output power and zero, with each pulse lasting only between 100 and 200 nanoseconds (one nanosecond is one billionth of a second).

With high-intensity pulses coming in rapid succession, the result is an increased likelihood of what experts call "multi-photon effects." Essentially, this means muscle tissue receives the therapeutic benefits of the laser, with all the energy concentrated on the target site and virtually no thermal side effects. The very intense pulses of GaAs lasers penetrate more deeply than continuous-wave lasers emitting the same amount of power—in fact, testing has shown the depth of penetration of super pulsed lasers to be as great as 30 to 50 millimeters, depending on the type of tissue.

Because of these benefits, GaAs lasers are finding greater and greater acceptance in sports medicine settings. Highly targeted, deeply penetrating energy can be delivered in a short period of time, making laser therapy more attractive than ever. GaAs multi-probes are now being used to boost healing and reduce treatment times for all sorts of soft-tissue injuries, and many clinicians and athletic trainers have been impressed with the results.

Jan Turner and Lars Hode, noted experts in the field of phototherapy, explain it this way: "The GaAs laser is most effective in the treatment of pain, inflammation, and functional disorders in muscles, tendons, and joints (such as epicondylitis, tendonitis, myofascial pain, gonarthrosis, etc.) and for deep-lying disorders in general."

Recent advancements in laser therapy continue to improve clinical outcomes and demonstrate the effectiveness of phototherapy as a treatment protocol. In light of these advances, it's no surprise that many companies are now looking toward super pulsing technology for their newest laser-therapy devices. ■

Douglas Johnson, ATC, is a Certified Laser Specialist and co-owner of Sports and Industrial Rehab, a rehabilitation facility based in Taylor, Mich.