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Overview

A Department of Defense Information Analysis Center (DoDIAC) representative to the U.S. Special Operations Command (USSOCOM) requested information regarding the use of laser technologies for pain management and wound healing for use by special operations forces and special operations K-9s.

Findings

HDIAC found several studies concerning the use of laser technologies, including low-level laser therapy (LLLT) and high-intensity laser therapy (HILT), for pain management and wound healing. These studies are discussed below.

Cedars-Sinai Medical Center

Researchers at Cedars-Sinai Medical Center conducted a systematic review on the use of electroanalgesia, LLLT, and HILT as alternatives to opioids for acute and chronic pain management [1]. While LLLT proved an effective pain management technique for some cases, it is ideally suited for pain management and wound healing in less traumatic injuries and over a longer period. Alternatively, these researchers found that HILT produced an immediate, profound, and sustained beneficial effect for acute and chronic musculoskeletal pain of a severe nature [1]. As certain applications of HILT can relieve pain comparable to certain opioids, their use would be ideal in battlefield contexts.

University of Bergen (Norway)

Researchers at the University of Bergen conducted a systematic review of LLLT treatments for relief from tendon pain, swelling, and impaired function. They found that LLLT reduced pain and accelerated improvement “when used as monotherapy, add-on therapy to exercise or in a physiotherapy treatment regimen [2].” This research effort further confirms the usefulness of LLLT for use in long-term pain management and wound healing regimens.

Washington State University

Researchers at Washington State University’s College of Veterinary Medicine examined the efficacy of LLLT used to treat synovial inflammation and signs of pain in dogs with spontaneous cranial cruciate ligament rupture (CCLR). Their research found that LLLT treatments demonstrated no significant beneficial effects on signs of pain and pelvic limb function [3], and they recommended additional testing of LLLT treatments implemented on canines.

Florida Institute of Technology

HDIAC Subject Matter Experts (SMEs) at Florida Institute of Technology (FIT) developed a technical solution for the development of a mobile/compact LLLT delivery system for the repair and/or regeneration of acutely injured tissues in a battlefield scenario [4]. Because muscle repair and regeneration contributes to reducing musculoskeletal pain following injury, this project has high applicability to USSOCOM’s needs. Further development of this concept could allow for its implementation into a battlefield context as part of a comprehensive pain management and wound healing strategy [4].

Conclusion

HDIAC identified several studies exploring the efficacy of laser and electroanalgesia therapies to treat pain, inflammation, and similar symptoms associated with musculoskeletal injuries. Recent research indicates that HILT is a very promising alternative to opioids for pain relief, while LLLT can serve as a viable treatment for long-term pain management and wound healing. A more comprehensive analysis of laser therapies for pain management and wound healing is available through an HDIAC Core Analysis Task (CAT). Such a task would research optimal laser parameters (power and wavelength) for various pain management applications (shoulder pain, back pain, arthritis, etc). Additionally, a CAT could allow for the development of FIT’s mobile LLLT delivery system for battlefield pain management and wound healing.

We request your feedback on this Inquiry: <https://www.hdiac.org/new-inquiry-assessment-form/>

References

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