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Veterinary Lasers
Better Science.
Better Outcomes.
50W OF PEAK SUPER PULSED LASER POWER
300% MORE TOTAL POWER THAN ORIGINAL ACTIVET
900% INCREASE IN BLUE INFECTION FIGHTING WAVELENGTH
MOST ADVANCED LASER THERAPY
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• Safest, Easiest to Use
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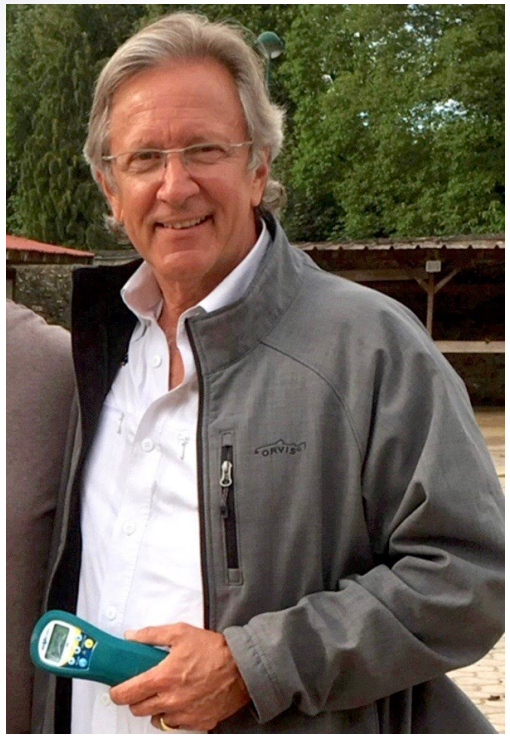
Multi Radiance

Super Pulsed Lasers

The global leader in the world's safest and most effective laser therapy for Veterinary



J. Mark Strong
Multi Radiance Medical

J. Mark Strong Global Director, Business Development – 10 years developing and operating MRI/multi modality diagnostic centers gave me a deep appreciation for diagnostic innovations that helped Dr's more accurately determine what and how severe an injury might be. But, not even the best MRI could facilitate tissue repair where Laser therapy can, at the cellular level and without side effects.

Since starting the veterinary division in 2010 we have steadily expanded our capabilities to deliver the precise light wavelengths and frequencies to target tissues to accelerate repair and recovery.

From the launch of Multi Radiance Super Pulsed Lasers at the 2010 World Equestrian Games and every WEG since, we have recognized and worked most closely with veterinarians as vital for providing an accurate diagnosis. Then, the team responsible for helping vets as equipment vendors can best do their job to provide peer reviewed published evidence of efficacy in the safest most portable format that's cost effective to compliment their skills.

Today, we proudly support thousands of vets with dozens of species from falcons to dolphins to elephants on nearly every continent and in the most remote places with long lasting batteries and a reliable truly portable device that's very effective for pain management, reducing inflammation and wound healing.

Collaborations with Universities & Vet Specialists

Home - Writtle University College

North Carolinea State University: College of Veterinary Medicine, Centennial Biomedical Campus | NC State University (ncsu.edu)

Aeres University of Applied Sciences (aeresuas.de)

Universitat Autònoma de Barcelona - UAB Barcelona

https://health.ucdavis.edu

e power, portability and great results we see with our five MR4 ACTIVet & TQ Solo veterinary lasers makes them a key modality we use everyday.
···· Chad Davis, DVM ····
Owner/Equine Sports Medicine Vet.Davis Equine

Multi Radiance Medical adds a safe effective new therapy for my patients. I use it for a wide range of conditions, especially arthritis.
···· Stacey Huber, DVM ····
Owner, Animal Oasis Veterinary Hospita

We are very impressed with the MR4 ACTIVet Lasers for equine physiotherapy. ···· Kent Allen, DVM ····
Virginia Equine Imaging, The Plains, Va. Founder ISELP, Veterinary Services Director, World Equestrian Games, Lexington, Ky 2010

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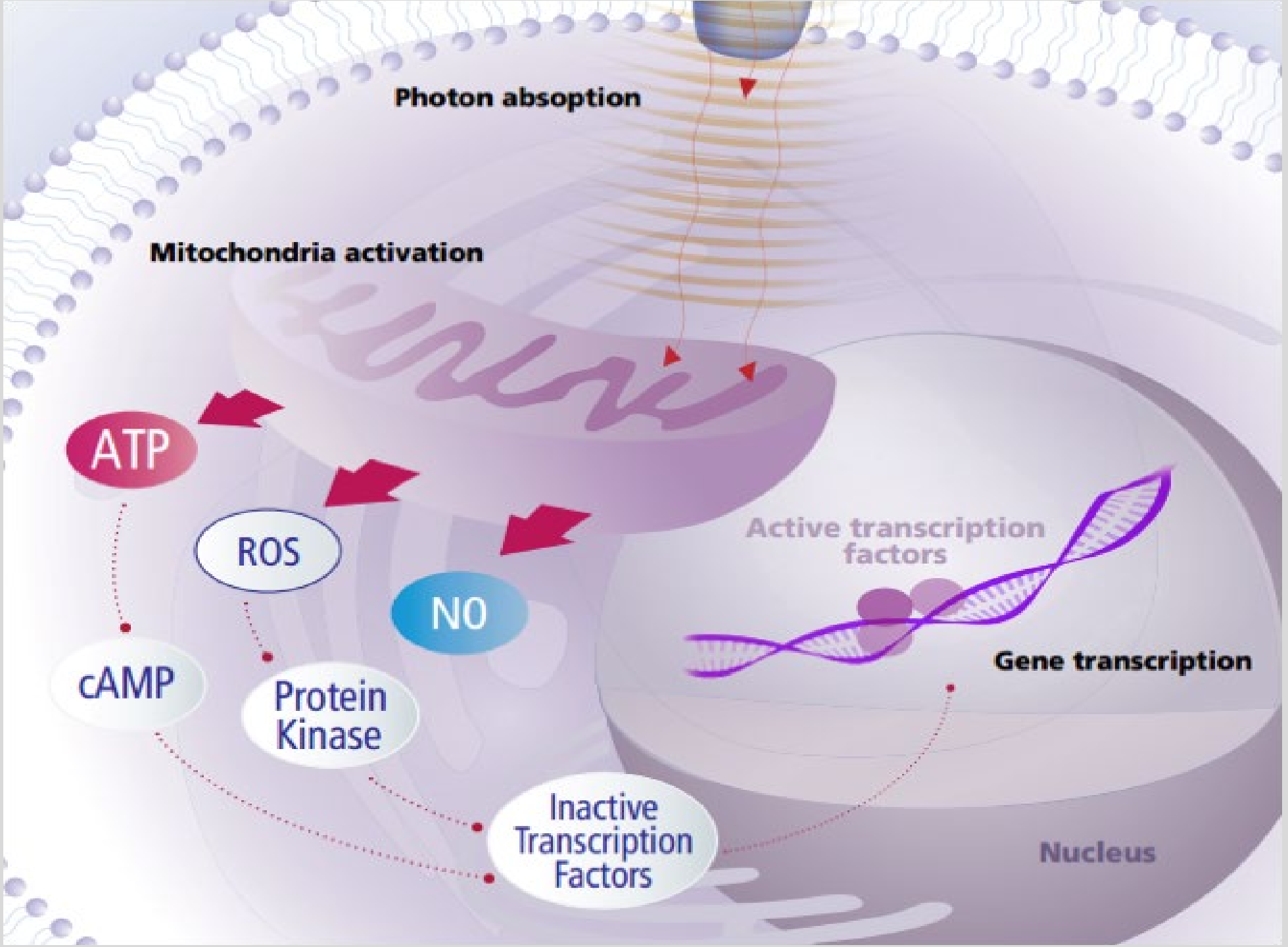
Evolution of Therapeutic Lasers

- **Low Level Laser Therapy, LLLT**, was discovered in 1967 by Endre Mester at the Semmelweis Medical University in Hungary. Mester was investigating use of lasers for cancer with a laser that possessed a fraction of the power used in previous research. He observed a faster rate of hair growth and better wound healing in the rats in which he had surgically implanted tumors. This was the first indication that low-level laser light (rather than high power thermal lasers) could have its own beneficial applications in medicine.

- **Low-level** was considered a subjective term and nobody knew exactly what the term “low” actually meant, the fact that both inhibition as well as stimulation of biological processes could be therapeutically useful, the decision was made to change the name to “**photobiomodulation** (therapy)” .

- Tina Karu in Russia was instrumental in putting the mechanism on a sound footing by identifying cytochrome coxidase in the **mitochondrial respiratory chain** as a primary chromophore, and it introduced the concept of “retrograde mitochondrial signaling” to explain how a single relatively brief exposure to light could have effects on the organism that lasted for hours, days or even weeks.

- Fast forward to **NASA and Russia** efforts to optimize best wavelength combinations to grow plants in space and observing that researcher’s hands appeared to heal faster from scratches and abrasions. The fact that gallium arsenide is now the second most most studied semiconductor for generating ultra fast high peak energy pulses with zero potential for thermally overload tissue created the safety profile required to make it suitable for use in space for **astronauts** and **cosmonauts**.
- **Multi Radiance started in 2012 with Proof of Concept (POC) validating its combined multi wavelength and static magnetics LaserLED device, the MR4**



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Super Pulsed Laser Therapy

- Improve blood circulation
- Anti-Inflammatory
- Anti-Edematous
- Improvement of Microcirculation
- Regenerates Damaged Tissue
- Enhances wound repair
- Improved Immune Response
- Analgesic Effect

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Why are lasers classed 1-4? Classification by level of hazard

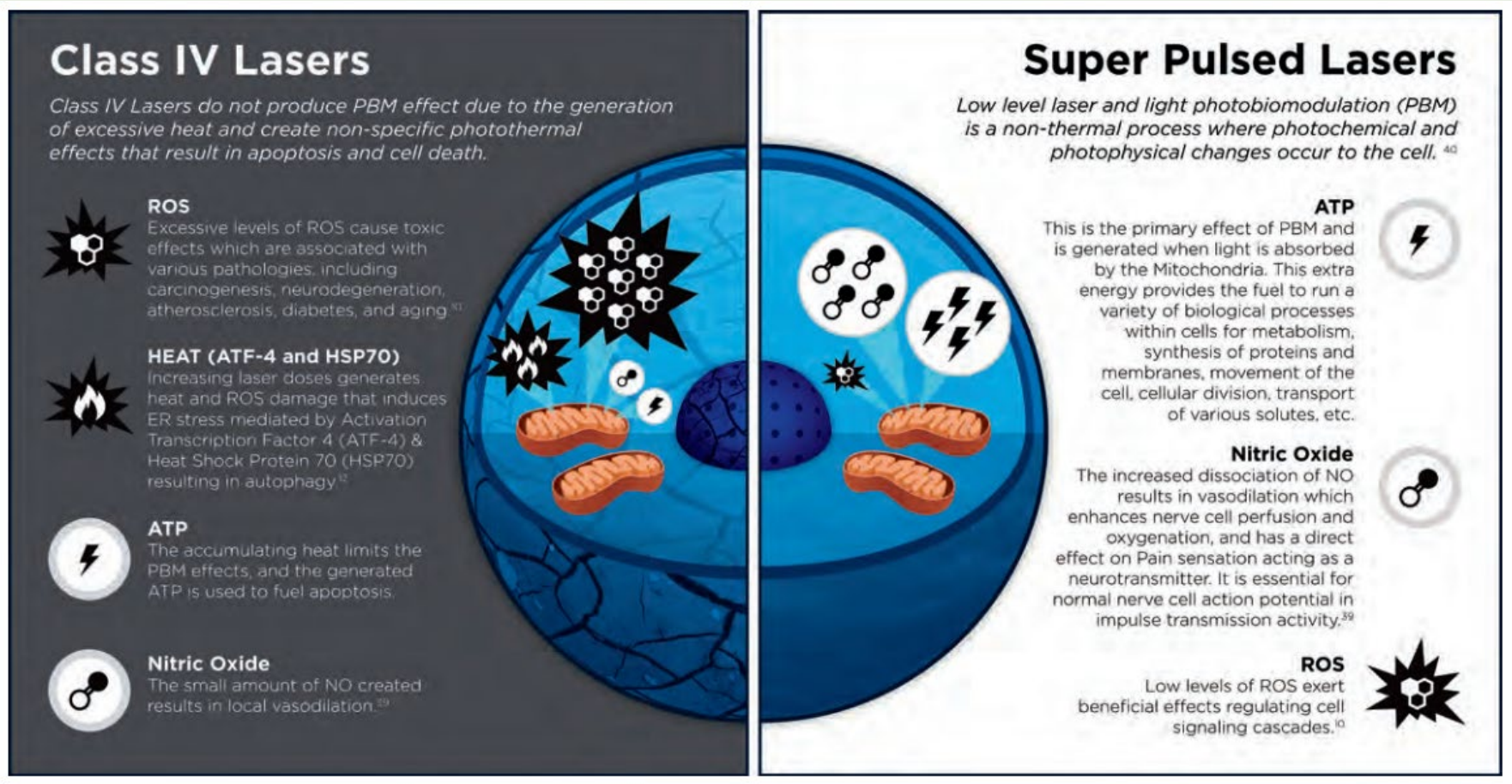
Class	Risk & Security
Class 1	**Safe under reasonably foreseeable conditions of operation. Cleared for over the counter use and rentals.**
1m	As Class 1 but not safe when viewed with optical aids such as eye loupes or binoculars, use with special precautions.
1c	Safe without viewing aids, lasers are designed explicitly for contact applications to the skin or non-ocular tissue, use with special precautions.
2	(visible beams only) the eye is protected by the aversion responses, including the blink reflex and head movement, use with special precautions.
2m	As Class 2 but not safe when viewed with optical aids such as eye loupes or binoculars, use with special precautions.
3r	As Class 2 but not safe when viewed with optical aids such as eye loupes or binoculars, use with special precautions.
3b	**Eye damage likely to occur if the beam is viewed directly or from shiny reflections, use only admitted in closed rooms with special precautions.**
Class 4	**Eye and skin damage likely from the laser beam and reflected beams. Use only in dedicated rooms with blacked out windows, entry alarms, warning signs and goggles on everyone in the room.**

TREATABLE CONDITIONS

Some conditions improve w/ 1 or 2 visits, such as post-surgery acute pain, while others require treatments over a few weeks.

- *Lick granulomas*
- *Otitis*
- *Pododermatitis*
- *Bursitis*
- *Tendonitis*
- *Gingivitis*
- *Stomatitis*
- *Tooth extractions*
- *Rodent ulcers*
- *Feline acne*
- *Dermatitis*
- Cystitis
- Feline asthma
- Rhinitis
- Sinusitis
- Trauma
- Hip dysplasia
- Bowel Disease
- Dermatomyositis
- Tail fractures
- Acupuncture

Class IV Lasers vs Class 1 Safe Super Pulsed Lasers



Six examples have been identified that are scientifically provable, but challenge currently held beliefs:

1) Class 4 lasers are NOT the most advanced devices currently available.

2) More (potentially hazardous) power DOES NOT equate

to better outcomes.

3) The resulting heat from high powered laser is NOT beneficial.

4) Larger doses are NOT necessary to derive clinical benefits.

5) Heat is not required for effective photo biomodulation.

6) Clinical and laboratory research DOES NOT mandate the use of high-powered lasers in therapy.

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FLAGSHIP PRODUCTS
SPECIFICATIONS

Multi Radiance
Super Pulsed Lasers

ACTIVET PRO LaserShower

- 200W SLP Power
- 500mW MOP
- 30cm2 aperture
- Blue Light

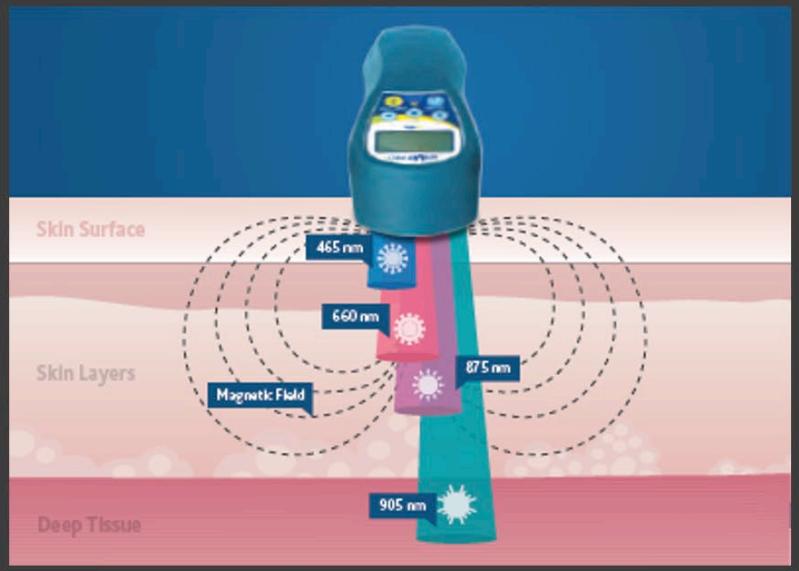
ACTIVET PRO

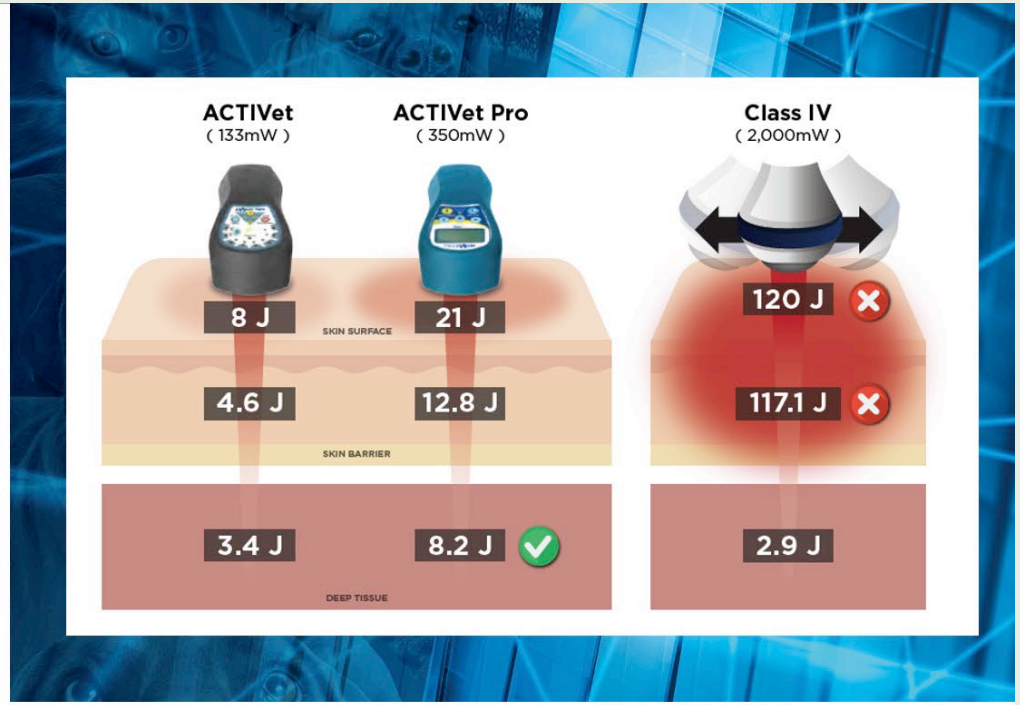
- 50W SLP Power
- 450mW MOP
- 4cm2 aperture
- Blue Light

My Pet Laser 2.0

- 25W SLP Power
- 200mW MOP
- 4cm2 aperture

Is More Power Always Better?





Leal, et al found when a Super Pulsed Laser is combined with LED light sources, there is a 100% increase in the available light below the skin without any additional thermal influence on the tissue

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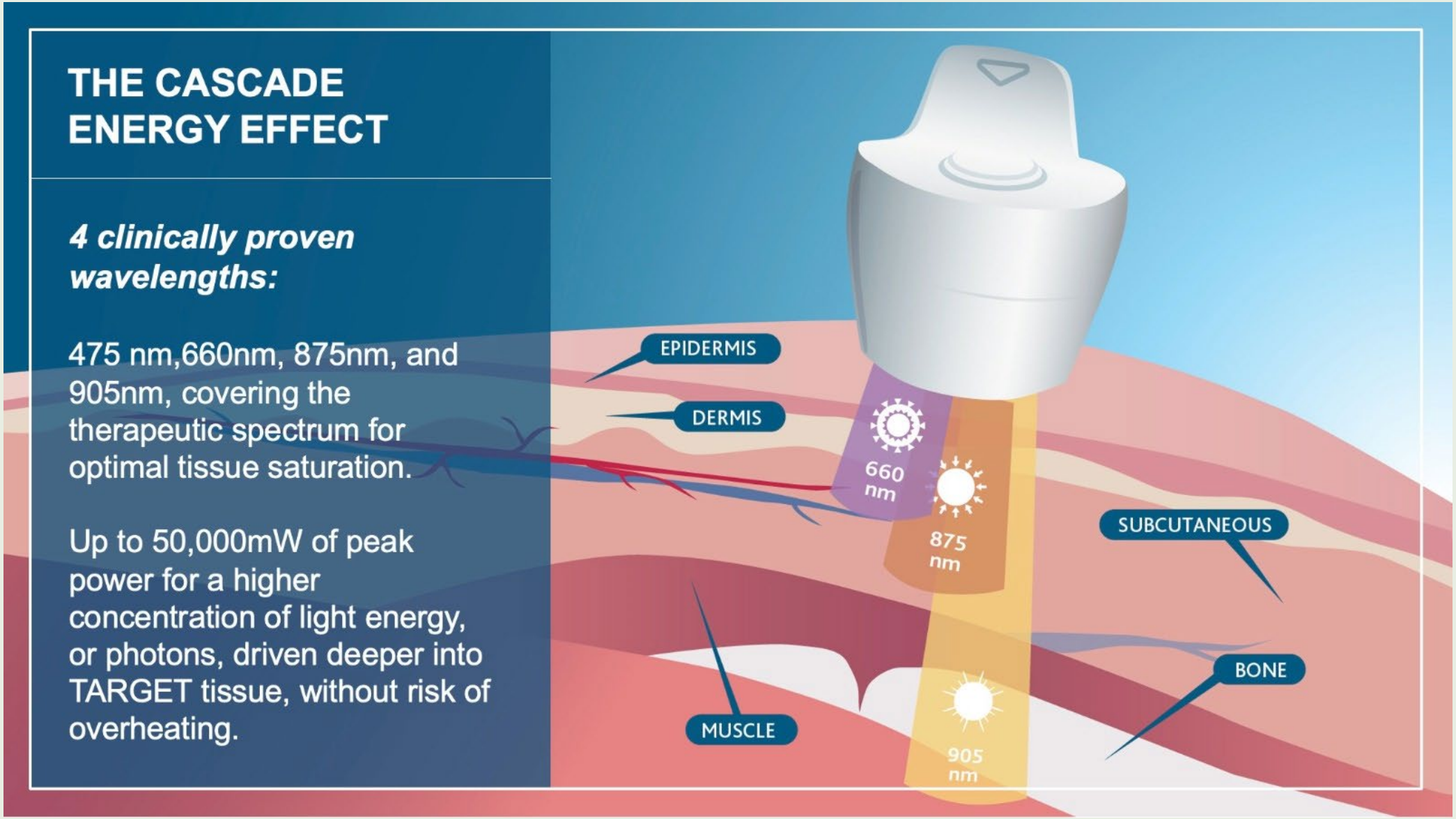
Cascading effect



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THE CASCADE ENERGY EFFECT

(True) Super Pulsed Laser (905nm)

produce high powered impulses of infrared light, but for very brief durations registering the lowest thermal impact on tissues. The technology operates like a camera flash, a very large burst of light, delivered in a very short amount of time, tens or hundreds of NANOSECONDS.

Biological Effect: Super-pulsed infrared lasers exert powerful stimulating influences upon blood circulation, cellular membrane metabolism and nerve function.

Pulsed Broadband Infrared (860nm)

emit non-coherent infrared light and while it may penetrate less deeply into the body than the infrared super pulsed laser, it's a unique biological response. While laser light is monochromatic (single color), the IREDs contain broadband diodes. This creates the ability to "shift" bandwidth plus or minus up to 100nm! This varying and constantly changing stimuli reduces biological adaption to light stimuli and further fills in "gaps" of the Therapeutic Window.

Biological Effect: 860nm light provides many of the same effects as infrared laser, however photophysical changes also occur at cell membranes. This improves circulation and cell membrane permeability and reinforces the laser's penetration into target tissues

Pulsed Non-coherent Narrowband Red (660nm)

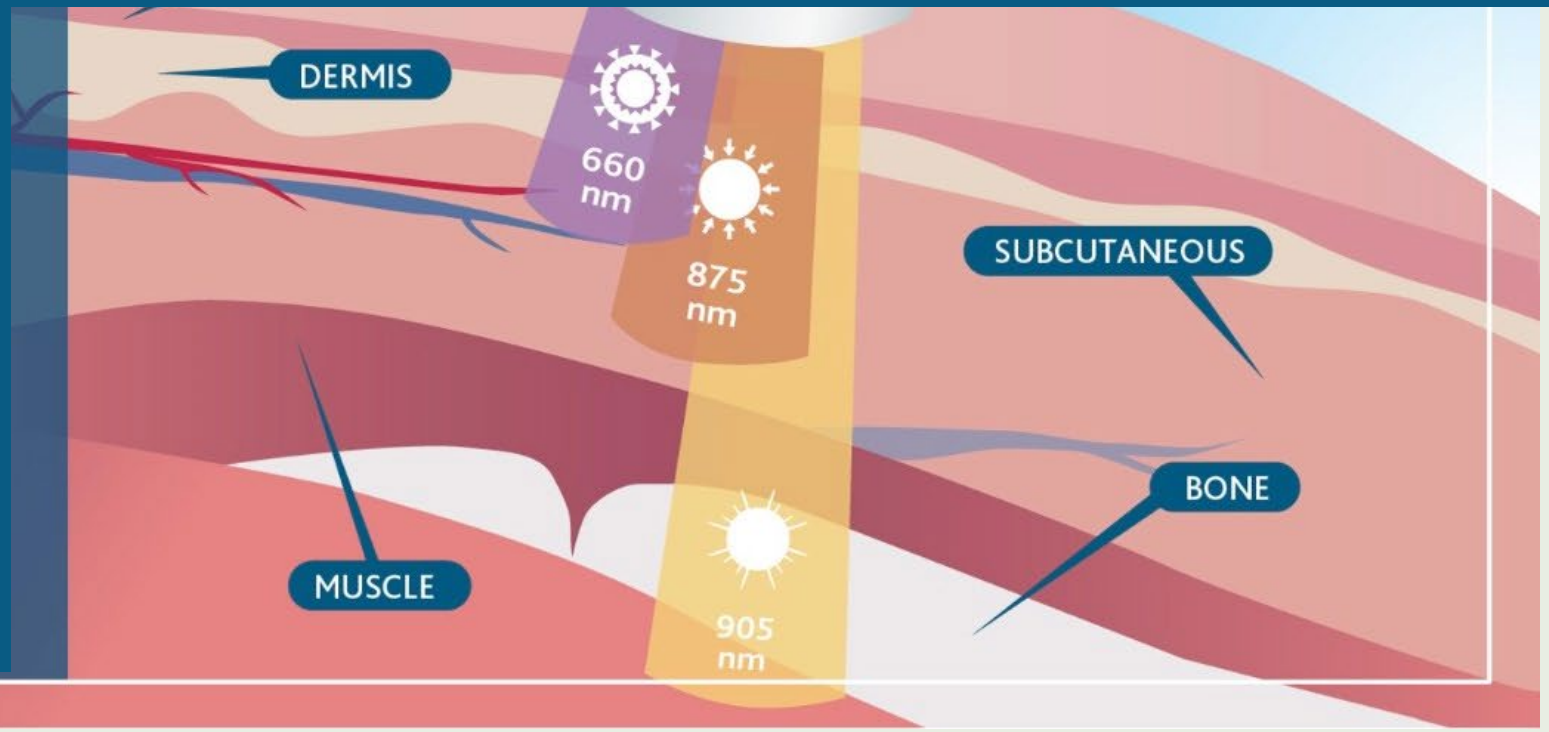
All red light photons, regardless of their source (laser, IREDs, LEDs, etc), are significantly absorbed by cytochrome c oxidase. And, they carry higher amounts of energy than infrared photons. Therefore, the amount of energy necessary to stimulate photochemical processes with red light is far less than those for infrared. However, pulsing non-coherent red light penetrates only superficially (about 1-2 cm) due to absorption in melanin. So, while depth is limited, red light is ideally suited for superficial conditions. Red light exerts very favorable therapeutic effects on the inflammatory process especially in tissues saturated with porous connective tissues. The 660nm wavelength is used to saturate superficial tissue layers, and to enhance the depth of penetration and photon distribution of other wavelengths used.

Biological Effect: Heavily absorbed by cytochrome c oxidase, red light is ideal for localized pain relief, improvement of microcirculation and reduction of inflammation.

Pulsing Non-coherent Narrowband Blue Light (465nm)

penetrates rather poorly, due to the almost complete absorption superficially. A photolytic release of NO from nitrosated proteins is observed indicating that they are light acceptors and signal transducers.

Biological Effect: Blue light therapies have shown promise in treating MRSA and inflammatory skin conditions. , in addition they causes oxidative stress to bacteria. Unlike with drugs, they cannot mutate their way around it.



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Cascading effect – study example 1

Lasers Surg Med
2014 Jan

In vitro and in vivo optimization of infrared laser treatment for injured peripheral nerves *(Companion Class IV laser)*

Juanita J Anders [1], Helina Moges, Xingjia Wu, Isaac D Erbele, Stephanie L Alberico, Edward K Saidu, Jason T Smith, Brian A Pryor

Results: In vitro, 980 nm wavelength light at 10 mW/cm(2) significantly improved neurite elongation at energy densities between 2 and 200 mJ/cm(2) . **In vivo penetration of the infrared light measured in anesthetized rabbits showed that on average, 2.45% of the light applied to the skin reached the depth of the peroneal nerve.** The in vivo pilot study data revealed that the 4 W parameters inhibited nerve regeneration while the 2 W parameters significantly improved axonal regrowth. For the final set of experiments, the irradiated group performed significantly better in the toe spread reflex test compared to the control group from week 7 post-injury, and the average length of motor endplates returned to uninjured levels.

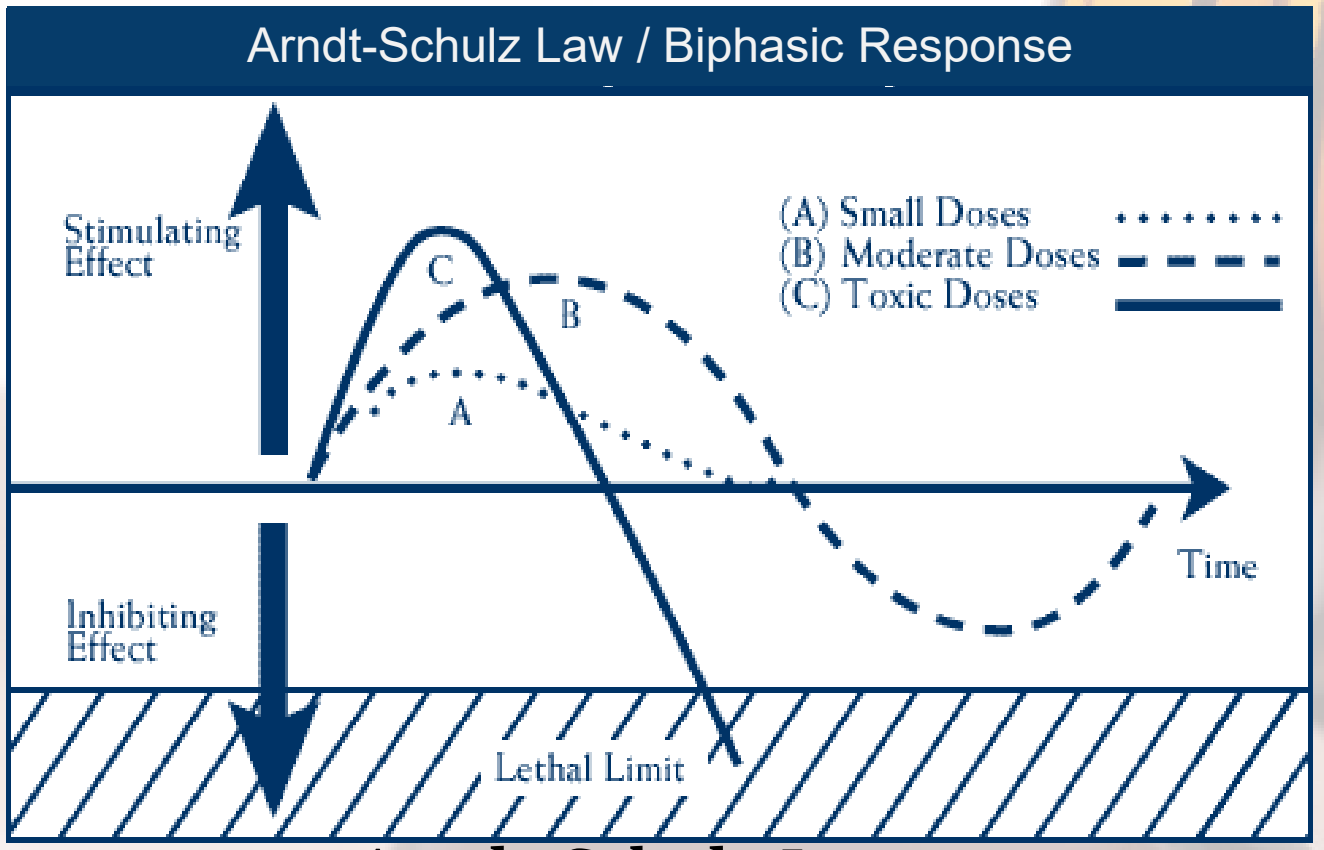
Cascade Effect – Study Example 2

Penetration of Light Into Living Tissue

by Lars Hode, Physicist, author of New Laser Therapy Handbook

The first barrier for the light is usually the skin. Transmission through skin has been investigated in several studies. **Jan Bjordal** and colleagues have summarised skin transmission with different lasers.
A systematic review of low level laser therapy with location-specific doses for pain from joint disorders. Bjordal JM, Couppé C, Chow RT, Tunér J and Ljunggren AE (2003). Australian Journal of Physiotherapy 49: 107-116 "Energy loss due to the skin barrier for continuous HeNe (632nm) laser is 90%, for **continuous GaAlAs** (820 nm) and Nd:YAG (1064 nm) IR lasers, **80%.**
For GaAs (904 nm) infrared pulse laser, 50%."
The most surprising part of this is that the GaAs differs so much from the other. **What is so special with that wavelength – 904 nm? Nothing! It is not the wavelength; it is the extreme pulsing (super pulsing).** Today it is possible to find **GaAlAs-lasers with the 904 nm wavelength** and then the energy loss due to the skin barrier is **about 80%.**
Bjordal states further:
"In vivo trials with **904 nm pulse lasers, have demonstrated that these lasers achieve similar effects on collagen production with far lower doses on the animal´s skin than lasers with continuous wave output** (Enwemeka 1991a; van der Veen and Lievens 2000).
This effect can be attributed to the photobleaching phenomenon, where the first strong pulse bleaches the opaque barrier of tissue, letting the second pulse pass through the tissue barrier with less loss of energy (Kusnetzow et al. 2001), (Fig. 7)."
This coincides fairly well with the shown spectral transmission of a hand. In both cases we are using continuous (or switched) light. **Conventional pulsing does not influence penetration. (It uses a gate – so on 50%, off 50% of the time. True Super Pulsing requires Gallium Arsenide semiconductor with 904nm laser diodes.**

Dose: The amount of energy needed to stimulate a photobiological response



Arndt-Schulz Law

Note: The dose can be either a **stimulatory** or **inhibitory** response depending upon the amount of light being delivered and the rate with which it is being delivered

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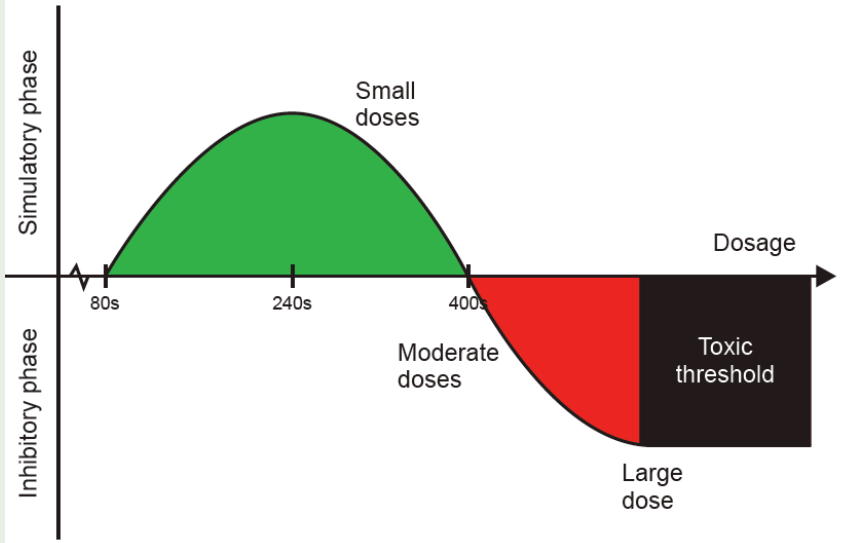
Vet Pillars Paper – PoC and Review

Vet Pillars Paper

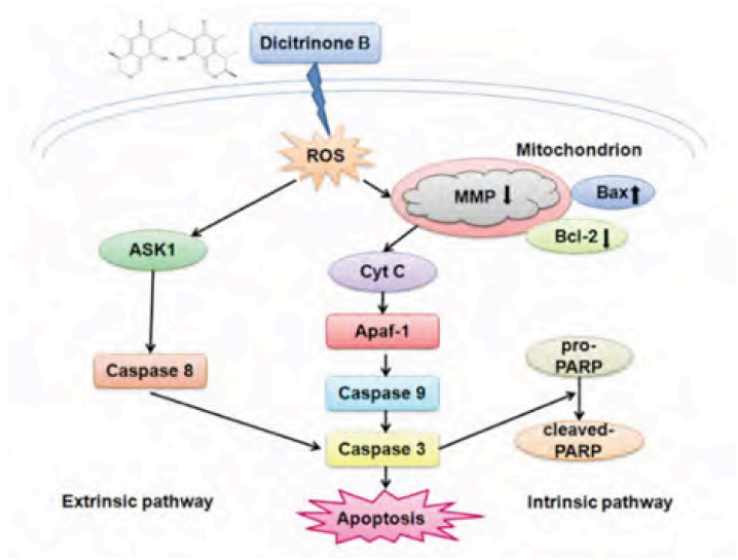
Appendix A

Validation of Technology and Dosimetry with Cellular Effects

Proof of Concept and Review of the Pillars Paper and Comparative Pillars Paper



Leal-Junior et al. validated the dosimetry curve of a Multi Radiance LS50 LaserShower at 250 Hz. For the first 80s, there is no response. From 80s to 400s the response is stimulatory until after 400s when it becomes inhibitory. It is important to note that the LS50 cannnot achieve the Toxic Threshold of Photocytotoxicity, but Khan et al. determined that Class IV lasers can and do as part of the ATF4 apoptosis pathway. The authors found "we noted that surface temperature (45 °C) and treatment time (30 sec) correlated with significant skin irrespective of skin color and conventional laser treatment parameters namely, damage irradiance and fluence."



Isman et al., found evidence that the use of 980nm Diode laser caused increased expression of TRPM4 and TRPM7 which are responsible for stimulation of apoptotic pathways of cell death. Khan et al., observed that the larger doses provided by Class IV lasers generates heat and ROS damage induced ER stress-mediated by Activation Transcription Factor 4 (ATF-4) and Heat Shock Protein 70 (HSP70) resulting in autophagy. These observations suggest Laser-generated heat (upstream) inactivates ROS scavengers that act along with dose-dependent ROS (effector) generation to result in phototoxic tissue damage.

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Ernesto Cesar Pinto Leal-Junior *,[1]
Fernanda Colella Antonialli,[1]
Thiago De Marchi,[2]
Shaiane Silva Tomazoni,[3]
Vanessa dos Santos Grandinetti,[1]
Adriane Aver Vanin [1]

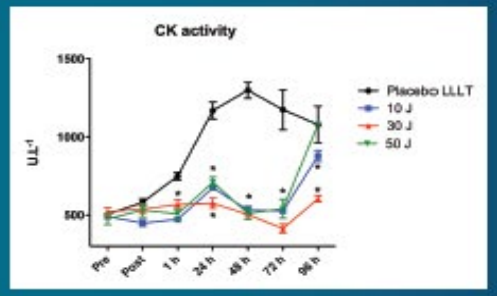
Phototherapy in Skeletal Muscle Performance and Recovery After Exercise:

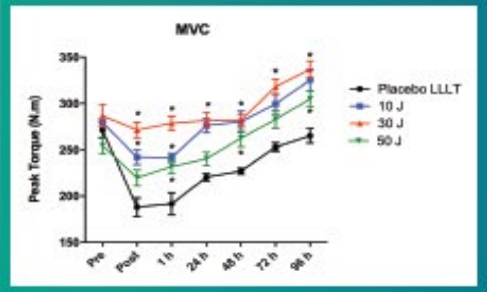
Effect of Different Light Sources in Combination

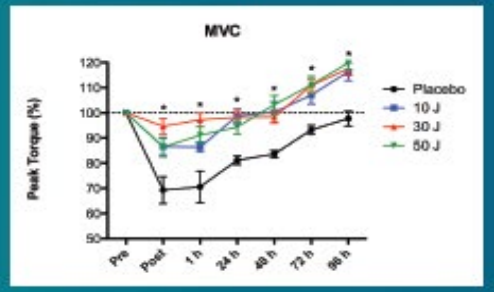
1–Nove de Julho University, Sao Paulo – Brazil. 2–University of Caxias do Sul, Caxias do Sul – Brazil. 3–University of Sao Paulo, Sao Paulo – Brazil.

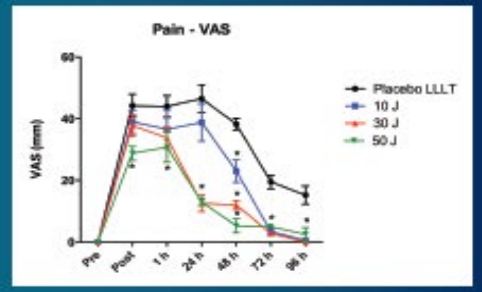
Purpose: Recent studies with phototherapy have shown positive results in enhancement of performance and improvement of recovery when applied before exercise. However, several factors still remain unknown such as: optimal doses, optimal treatment parameters, and effects of combination of different light sources (lasers and LEDs). With this perspective in mind in this study we aimed to evaluate the effects of phototherapy with the combination of different light sources on skeletal muscle performance and post-exercise recovery and to establish the optimal dose.

Methods: It was performed a randomized, double-blinded, placebo-controlled trial with participation of 40 male healthy untrained volunteers. A single phototherapy intervention was performed immediately after pre-exercise (baseline) MVC with a cluster of 12 diodes (4 of 905 nm lasers, 4 of 875 nm LEDs and 4 of 670 nm LEDs), and dose of 10, 30, 50 J or placebo in six sites of quadriceps. It was analyzed maximum voluntary contraction (MVC), delayed onset muscle soreness (DOMS), and creatine kinase (CK) activity. The assessments were performed before, 1 minute, 1, 24, 48, 72 and 96 hours after eccentric exercise protocol employed to induce fatigue.









Results: Phototherapy increased ($p<0.05$) MVC compared to placebo from immediately after to 96 hours after exercise with 10 J or 30 J doses (better results with 30 J dose). DOMS was significantly decreased compared to placebo ($p<0.05$) with 30 J dose from 24 to 96 hours after exercise, and with 50 J dose from immediately after to 96 hours after exercise. CK activity was significantly decreased ($p<0.05$) compared to placebo with all phototherapy doses from 1 to 96 hours after exercise (except for 50 J dose at 96 hours).

Conclusions: Pre-exercise phototherapy with combination of low-level laser and LED, mainly with 30 J dose, significantly increases performance and improves biochemical marker related to skeletal muscle damage.

Multi Radiance Medical

This study was supported by Multi Radiance Medical® (Solon, OH - EUA) and by Brazilian National Council of Research - CNPq (472062/2013-1).

LASER THERAPY U UNIVERSITY

In vitro and in vivo optimization of infrared laser treatment for injured peripheral nerves.

The parameters were 1 W output power, power density of 10 mW/cm^2, and energy densities of 0.01, 0.1, 0.5, 2, 10, 50, 200, 1,000, and 5,000 mJ/cm^2

Penetration measurements of 980 nm wavelength light to the level of the peroneal nerve in the living anesthetized rabbit revealed that approximately 2.45% (average of the 4.0 and 1.0 W measurements) of 980 nm wavelength light penetrated to the level of the nerve

Lasers in Surgery and Medicine 46:34–45 (2014)

In Vitro and In Vivo Optimization of Infrared Laser Treatment for Injured Peripheral Nerves

Juanita J. Anders, PhD,[1]* Helina Moges, BS,[1] Xingjia Wu, BS,[1] Isaac D. Erbele, MD,[1] Stephanie L. Alberico, BS,[1] Edward K. Saidu, BS,[1] Jason T. Smith, PhD,[2] and Brian A. Pryor, PhD[2]
[1]Department of Anatomy, Physiology and Genetics, Uniformed Services University of the Health Sciences, 4301 Jones Bridge Road, Bethesda, Maryland 20814
[2]LiteCure LLC, 250 Corporate Blvd, STE B, Newark, Delaware 19702

Background and Objective: Repair of peripheral nerve injuries remains a major challenge in restorative medicine. Effective therapies that can be used in conjunction with surgical nerve repair to improve nerve regeneration and functional recovery are being actively investigated. It has been demonstrated by a number of peer reviewed publications that photobiomodulation (PBM) supports nerve regeneration, reinnervation of the denervated muscle, and functional recovery after peripheral nerve injury. However, a key issue in the use of PBM as a treatment for peripheral nerve injury is the lack of parameter optimization for any *given* wavelength. The objective of this study was to demonstrate that for a selected wavelength effective *in vitro* dosing parameters could be translated to effective *in vivo* parameters.

Materials and Methods: Comparison of infra-red (810 and 980 nm wavelengths) laser treatment parameters for injured peripheral nerves was done beginning with a series of *in vitro* experiments using primary human fibroblasts and primary rat cortical neurons. The primary rat cortical neurons were used for further optimization of energy density for 980 nm wavelength light using measurement of total neurite length as the bioassay. For these experiments, the parameters included a 1 W output power, power density of 10 mW/cm^2, and energy densities of 0.01, 0.1, 0.5, 2, 10, 50, 200, 1,000, and 5,000 mJ/cm^2. For translation of the *in vitro* data for use *in vivo* it was necessary to determine the transcutaneous penetration of 980 nm wavelength light to the level of the peroneal nerve. Two anesthetized, male White New Zealand rabbits were used for these experiments. The output power of the laser was set at 1.0 or 4.0 W. Power density measurements were taken at the surface of the skin, sub-dermally, and at the level of the nerve. Laser parameters used in the *in vivo* studies were calculated based on data from the *in vitro* studies and the light penetration measurements. For the *in vivo* experiments, a total of 22 White New Zealand rabbits (2.34–2.89 kg) ... slated dosing parameters were refined in ... sing a transection model of the peroneal ... s. Output powers of 2 and 4 W were tested. ... set of *in vivo* experiments, the same ... rve injury model was used. An energy ... W/cm^2 at the level of the peroneal nerve was selected and the laser parameters were further refined. The dosing parameters used were: 1.5 W output power, 43 seconds exposure, 8 cm^2 area and a total energy of 65 J.

Results: In vitro, 980 nm wavelength light at 10 mW/cm^2 significantly improved neurite elongation at energy densities between 2 and 200 mJ/cm^2. In vivo penetration of the infrared light measured in anesthetized rabbits showed that on average, 2.45% of the light applied to the skin reached the depth of the peroneal nerve. The *in vivo* pilot study data revealed that the 4 W parameters inhibited nerve regeneration while the 2 W parameters significantly improved axonal regrowth. For the final set of experiments, the irradiated group performed significantly better in the toe spread reflex test compared to the control group from week 7 post-injury, and the average length of motor endplates returned to uninjured levels.

Conclusion: The results of this study demonstrate that treatment parameters can be determined initially using *in vitro* models and then translated to *in vivo* research and clinical practice. Furthermore, this study establishes that infrared light with optimized parameters promotes accelerated nerve regeneration and improved functional recovery in a surgically repaired peripheral nerve. Lasers Surg. Med. 46:34–45, 2014. © 2013 Wiley Periodicals, Inc.

Key words: immunolabeling; light therapy; motor end plates; peripheral nerve injury; photobiomodulation; regeneration; re-innervation; toe spread reflex

...riodicals, Inc.

"Conflict of Interest Disclosures: All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported."

Contract grant sponsor: Comprehensive National Neuroscience Program; Contract grant number: #G1704T.

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What Exactly is Super Pulsed?

Super Pulsed Laser and Heat:

- Operates like a camera flash
- Very large "burst" of light between 100-200 nanoseconds in duration
- Shorter pulse width, the greater peak power can be applied
- Average power like low level CW lasers while creating powerful energy densities
- Thermal effects are registered to the actual target site, and do not spread to surrounding tissue

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Veterinary Lasers

World Equestrian Games

2010 Lexington Kentucky
2014 Normandy France
2018 Tryon North Carolina

Show Jumping Championships

Herning Denmark

Olympic Games

London
Tokyo
Paris* 2024

Priority Principle – Based What the Target Tissue Needs

Priority Principle Methods are the combination of a dose or dose rate and one or more techniques

- Unwind = General pain/anxiety, scan along the spinal nerves
- Rescue = Injuries <48 hrs, repeat every hour, at injury
- Swelling = Proximal to distal at lymph sites, scanning
- Inflammation = Do not overtreat, treat at site of inflammation
- Muscle Spasm = Trigger Point Probe
- Pain = Mild, Moderate and Severe at site of injury
- Tissue Repair = Do not overtreat, once per day
- Blood Flow = Proximal arterial pulsation, increase BF and O2
- ROM = Utility Probe, multiple projections of the joint line
- Strength = Before exercise to the muscle belly

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Holistic Approach

Holistic Approach – Methods for preparation of treatment like unwind and Ohshiro's Method

Clients are more informed than ever about new technologies in the media and word of mouth. They want evidence-based alternatives to drug side effects. Unwind protocol provides systemic release of endorphins to assure comfort.

Unwind Method: Relaxation

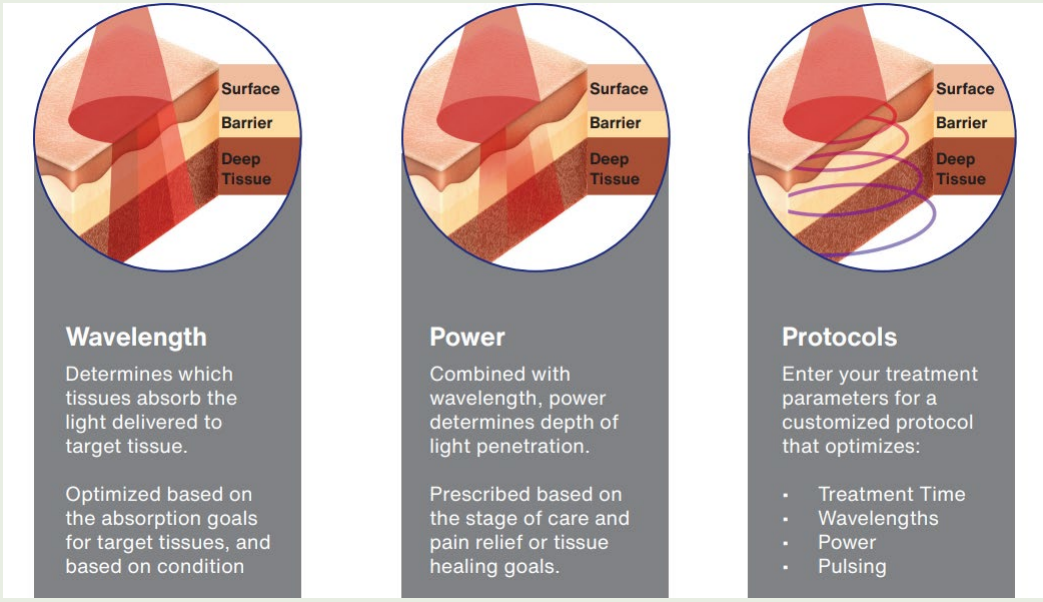
The Unwind protocol is a safe and very effective way to reduce anxiety and acclimate the patient that may never have experienced laser therapy. Since MRM lasers are all super pulsed, eliminating any pain provocation from heat, it can be used, scanning at 1cm/sec from base of skull to tail start**, horses, withers to tail start.** Typically, it takes less than 5 min to treat.

Swelling caused by interstitial fluid can be reduced with Ohshiro's Method

- Utilize the press release repeat Woodpecker technique with lymphatic system and proximal lymph node to facilitate drainage of interstitial fluid.

Continuity of Care (CoC) with stress free comfort @home

- More complete healing is assured with continuity of treatments. Vet prescribed stress free home (or barn) use of our lasers reduces stress, gives target tissue what they need and provides scalable income for vet practices.



Optimized as they determine the depth of penetration. Different nanometer wavelengths are selectively absorbed by water, fat, hemoglobin, melanin, etc.

Super pulsing = safety.. Photobiomodulation optimized high density of photons, not heat for photochemical and photophysical effects

Multi Radiance
Veterinary Lasers

ANYTIME…ANYWHERE

Safety means delegating to your techs without worry. Portability means taking it anywhere!

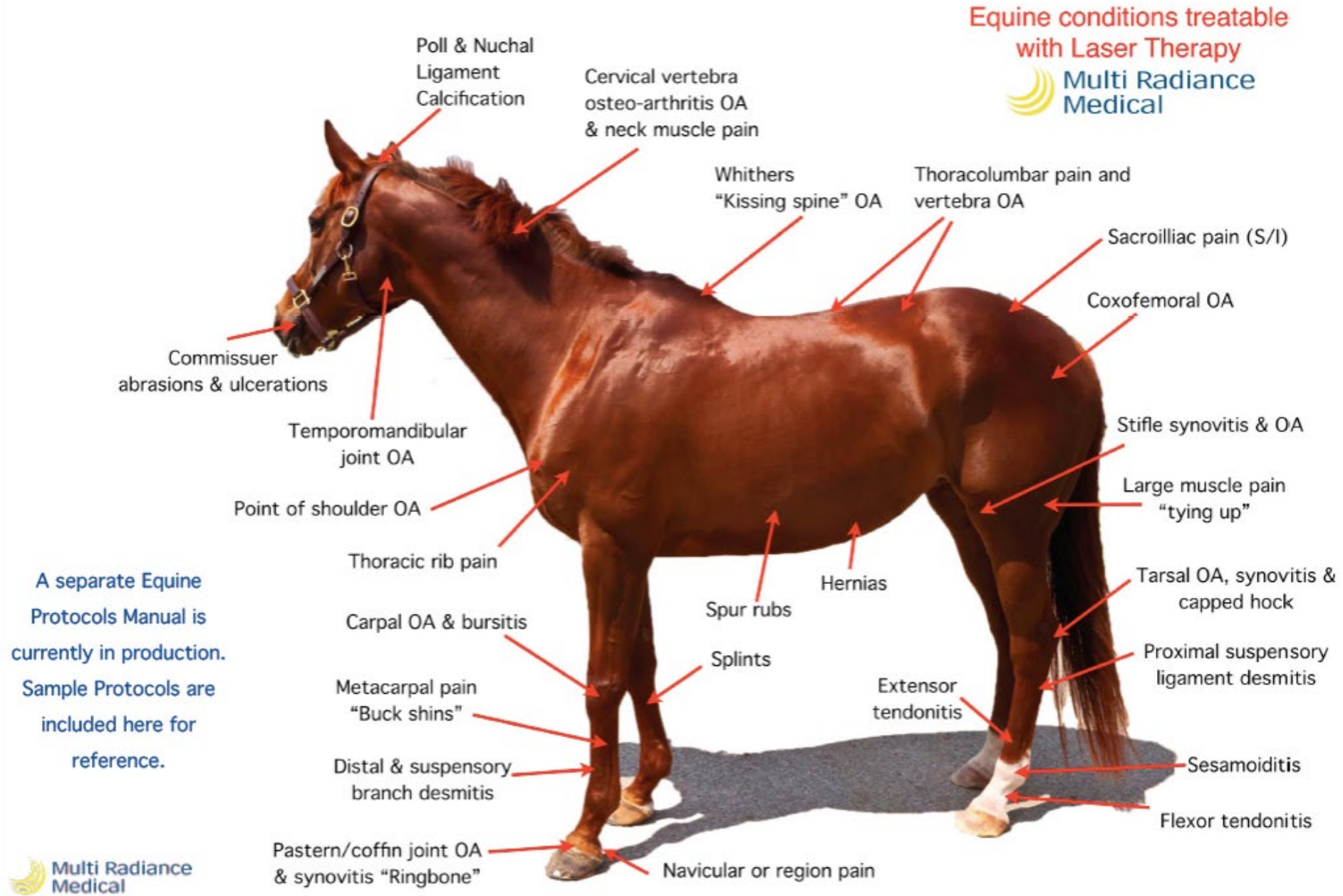
At Elephant Nature Park in Thailand:

3 ACTIVets for 70+ elephants, 10 horses, hundreds of cats and dogs. ENP has 1000+ animals in total

" I used it on my own dog who had a terrible skin sloughing wound and it healed beautifully! Also used on a lot of elephant cases".

Erica Ward, DVM

Equine Conditions: Joint, muscle, tendon injuries



A separate Equine Protocols Manual is currently in production. Sample Protocols are included here for reference.

Multi Radiance Medical

Antimicrobial Therapy

Targets black-pigmented bacteria responsible for onset periodontal disease and gingivitis

TheEducationCenter A RESOURCE FOR THE ASTUTE PRACTITIONER

A special advertising section

Enhancing pet dental care with blue light technology

By J. Mark Strong
For The Education Center

Medical technology evolves rapidly, and veterinarians are constantly looking for new tools that can offer better outcomes to patients. As more studies are published every month, super-pulsed laser therapy is being established as part of the gold standard treatment for acute painful inflammatory conditions, such as otitis, pyotraumatic dermatitis, wounds, abscesses and postoperative procedures, to help decrease pain and speed incisional healing. Initially used mainly in rehabilitation settings, super-pulsed laser therapy is now being adopted for new and emerging disease states and conditions seen in general veterinary practice. One new area of particular interest is blue light therapy's effectiveness in killing harmful bacteria that cause gingivitis and periodontal disease, helping restore the oral biome to a healthy, balanced state.

Advances in lasers and light-emitting diodes (LEDs) allow for the addition of new features to make devices more powerful and efficient. Multi Radiance Super Pulsed Laser Therapy includes a blue wavelength, 465 nm in the ACTIVet PRO and 470 nm in the ACTIVet PRO LaserShower, which increases photon density to kill pathogens and is especially powerful for dental conditions in veterinary medicine.

Backed by research

Researchers at the Harvard University School of Dental Medicine-affiliated Forsyth Institute discovered by accident that blue light kills bacteria that are the prime cause of periodontal disease. J. Max Goodson, the institute's clinical director, reported in *Harvard Magazine*, "Much to our surprise, rather than an irritating effect, we actually found a diminution of inflammation."[1]

Several species of bacteria that cause periodontal disease—known as black-pigmented bacteria (BPB)—transport hemoglobin into their bodies as an iron source (this is thought to be why they make gums bleed, by using enzymes that weaken blood vessels), and store the hemoglobin's dark-colored, photosensitive porphyrin. Light directed at these bacteria is absorbed by the porphyrin and, through a chemical reaction, produces substances that are toxic within the bacterial cell.

Nikolaos S. Soukos, director of the Forsyth Institute's applied molecular photomedicine lab, tested the finding using the blue light alone. His results, reported in *Antimicrobial Agents and Chemotherapy*, showed that in the mouths of control group members who were told they were receiving light therapy, black-pigmented bacteria constituted six percent of all oral bacteria. In the mouths of people who received the blue-light treatment, just one percent of the bacteria were black-pigmented.

The researcher's goal was not to banish all bacteria from the mouth, but to get rid of the most harmful types and restoring "balance and harmony in dental plaque." Goodson and Soukos also experimented with other colors of light and found that blue worked best.[2] Further, of the 700 species of bacteria that live in human mouths around the world, blue light in the range of 380 to 520 nm works only on the black-pigmented group—those responsible for onset gingivitis leading to periodontal disease.[3]

BPB is common to both canines and humans, as cited in Pigmented Anaerobic Bacteria Associated with Canine Periodontitis, Hardham J, Dreier K, Wong J, Sfintescu C, Evans RT. Porphyromonas gingivalis, a black-pigmented anaerobic bacteria (BPAB), has been implicated as the primary periopathogen. It has been demonstrated that BPAB are also found in companion animal periodontal pockets. *Porphyromonas salivosa*, *Porphyromonas denticanis* (a new species), and *Porphyromonas gulae* were found to be the most frequently isolated BPAB associated with canine periodontitis.

Research shows blue light therapy is effective against black-pigmented bacteria in animals, making it ideal for gingivitis and periodontal disease.

What this means for veterinarians

This research has significant implications for veterinarians, since by two years of age, 80 percent of dogs and 70 percent of cats have some form of periodontal disease according to *Today's Veterinary Practice*.

Many veterinarians use broad-spectrum antibiotics in their dental care, but they are running out of effective weapons to counter drug-resistant bacteria. This is exacerbated by pet owners' failures to finish entire prescriptions due to side effects or forgetfulness, which allows surviving bacteria to grow in number and in strength, leading to more resistance.

It is highly unlikely BPB will develop resistance to blue light. The antimicrobial effect of the blue light is a photochemical reaction that produces cytotoxic events within the bacteria. Blue light with the right wavelengths is shown to produce phototoxicity and oxidative stress selectively to BPB, significantly reducing the load with short duration treatments of one to three minutes following dentals or other oral interventions. Hermann von Tappeiner et al.[4] reported the observed toxic effect in the presence of the light was not attributed to heat.

Implementing blue light in your treatment regimen can result in increased visits. This therapy is best applied on a regular basis depending on severity at time of diagnosis and as a prophylactic to help prevent occurrence and recurrence. This also lessens dependency on drug-resistant and side effect producing drugs.

Adding blue light therapy to your practice

Veterinarians are making blue light therapy a part of their regular dental care regimen with a novel modality: Super Pulsed Laser Therapy from Multi Radiance Medical.

Developed and improved over the last 40 years, laser therapy reached its current status as a fundamental modality in veterinary practices only in the last five years. In contrast to delivering wavelengths designed to promote healing, attention turned to those that can selectively destroy bacteria.

In addition to providing pain-relieving laser therapy, Multi Radiance devices also include high-intensity blue LEDs for effective blue light

Multi Radiance Laser Therapy devices use 465-nm to 470-nm blue light wavelength to safely kill bacteria that cause common dental conditions.

Multi Radiance Laser Therapy is FDA-cleared as Class 1M safe, meaning no risk of thermal damage to tissue.

Bactericidal Blue Answer to Drug Resistance

- First of its kind innovation
- Anti-microbial blue light therapy
- Delivers 15 J per minute
- 62.5 mW/cm^2
- Power is set to 100% and Continuous Wave

Blue Light Therapy: Another Tool For Battling MRSA

BY DOUGLAS JOHNSON, ATC, EES, CLS

Light therapy devices are being used to treat an array of orthopedic, neurological, and wound care applications. With over 4,000 published studies on red and infrared light, the photo-chemical effects of light in medicine are well known. It is no longer a question of whether photo therapy works, but rather what the necessary parameters for optional outcomes are.

Recent advances in light technology have allowed for increased power of continuous wave (laser) diodes, the introduction of super-pulsed lasers, and the development of new colors of light emitting diodes. This has allowed for the investigation of wavelengths (colors) outside the traditional therapeutic window of 632.5 to 1,000 nanometers (nm). Some recent research suggests blue light therapy may be effective in other conditions, such as Staphylococcus aureus (staph), Methicillin-Resistant Staphylococcus aureus (MRSA), acne, and some hyperproliferative skin conditions.

It is already known that ultraviolet (UV) light kills bacteria. It has been used for sterilization in hospitals for its microbe-killing abilities. Exposure to blue light in the 450 to 470 nm range has been used primarily as a treatment for neonatal jaundice. (Blue light is absorbed by bilirubin and thus undergoes photo-chemical change in this instance.) However, the bactericidal effects of UV may not be unique since recent studies indicate that blue light produces a somewhat similar effect.

In 2006, Guffey and Wilborn found in vitro bactericidal effects on two bacteria: staph and Pseudomonas aeruginosa, with the use of a blue light emitting 405 and 470 nm. The effects of the blue light produced dose-dependent bactericidal effects on both bacteria. The researchers also found that appropriate phototherapy doses of 405 and 880 nm combined can kill staph and Pseudomonas aeruginosa in vitro, suggesting that a similar effect may be produced in clinical cases of bacterial infection.

In 2009, Enwemeka and colleagues concluded that relatively low doses of blue light using an LED device that emits blue light--about 100 seconds worth--killed off about 30 percent of MRSA in vitro. Longer doses were more effective, however it took nearly 10 times the exposure length to eliminate 80 percent of the MRSA in culture dishes.

Data from recent studies indicates that blue light therapies have also shown promise in treating acne, and the FDA has cleared narrow-band, high-intensity blue light therapy for treatment. Now widely advertised, this is probably the best-known light therapy for acne. In 2006, Papageorgiou and colleagues found that combining blue light with red light is even more effective for acne light therapy as it repaired skin cells, reduced acne scars, and healed skin faster.

> Studies and clinical work have shown that blue light therapy can help treat bacterial infections, such as MRSA.

Experiments have demonstrated that blue light irradiation of up to 453 nm photolytically generates nitric oxide from nitrosated proteins. Hyperproliferative skin conditions, such as psoriasis, benefit from the fact that blue light penetrates rather poorly due to the almost complete absorption superficially, thereby reducing proliferation dose dependently by up to 50 percent. This can be attributed to differentiation induction as shown by an increase of differentiation markers. A photolytic release of nitric oxide from nitrosated proteins is observed indicating that they are light acceptors and signal transducers up to a wavelength of 453 nm.

Some potential considerations of prolonged exposure to blue light therapy should be taken into account. Symptoms can include jitteriness, headache, nausea, skin irritation, eye irritation, and poor vision. Very infrequently, a patient will find that blue light therapy will make them overactive, restless, and irritable, causing difficulty in sleeping. More often, patients will experience a visual glare, which is caused by short wavelength blue light. To correct this effect, there are specially designed lenses that counteract the intensity of the light.

The blue light treatment does not harm the skin tissues at all. Kleinpenning and colleagues evaluated the clinical and histological effects of blue light on normal skin in 2010. They concluded that visible blue light does not cause deoxyribonucleic acid damage or early photo-aging. Also last year, Liebmann and colleagues found that light at 453 nm is only toxic beyond a fluence of 500 joules per square centimeter.

While blue light therapy may not replace red light as it has in the case of the DVD, blue light has shown some promise in the lab, as well as clinically, for its use for treatment of bacterial infections. Further studies of single wavelengths and combinations of wavelengths may yield additional treatment options.

Douglas Johnson, ATC, EES, CLS, is a certified athletic trainer with more than 11 years of clinical/industrial experience. He has worked extensively in occupational medicine as the assistant regional physical therapy director of Concentra Medical Center's Michigan Operations and as the therapy director of Prime-Care Medical Centers before co-founding a practice in 1996. He is co-owner of Sports and Industrial Rehab and founder of the Laser Center of Michigan. He can be reached at: djohnsonatc@sportsandindustrialrehab.com.

TWO BENEFITS WITH ONE TREATMENT

"Blue light therapy has the capability of wound care pain relief plus the application for antimicrobial treatment," explains Glenn Streeter, exercise physiologist and CEO of Mountain's Edge Fitness clinic in Boulder, Colorado. "There really is no downside to this type of protocol for athletes who have open-skin wounds."

There are two types of lasers: stimulating lasers and resonating lasers. The type of laser to utilize in treating MRSA-related situations is the resonating type—a cold laser. "The technology of laser therapy for treating open wounds, bacterial infections and even acne is 30 years old, but it's just starting to take hold in the U.S.," adds Streeter.

REFERENCES

Photomedicine and Laser Surgery, Volume 24, Number 6, 2006, © Mary Ann Liebert, Inc., Pp. 684–688, DOI: 10.1089/PHO.2006.1029, 684.
Effects of Combined 405-nm and 880-nm Light on Staphylococcus aureus and Pseudomonas aeruginosa in Vitro; J. Stephen Guffey, Ed.D., and Jay Wilborn, M.Ed.; *Photomedicine and Laser Surgery*, Volume 24, Number 6, 2006, © Mary Ann Liebert, Inc., Pp. 680–683; DOI: 10.1089/PHO.2006.1028, 680.
Chukuka S. Enwemeka, Deborah Williams, Sombiri K. Enwemeka, Steve Hollosi, David Yens. *Photomedicine and Laser Surgery*. April 2009, 27(2): 221-226. DOI:10.1089/PHO.2008.2413.
Papageorgiou, Katsambas and Chu, *Photomedicine and Laser Surgery*, Volume 24, Number 6, 2006, © Mary Ann Liebert, Inc.
J Invest Dermatol. 2010 Jan. 130(1): 259-69.
Photomed. 2010 Feb. 26(1): 16-21.
J Invest Dermatol. 2010 Jan. 130(1): 259-69.

Cats are a very important constituent that suffers from inadequate vet care

Vet prescribed home rentals are a true stress free game changer

Trigger Points and Spasms

- Application of therapeutic laser to acupoints on the body, ear, or hand. An effective, non-invasive approach that has been shown to be a dependable pain management tool.
- Aka: laserpuncture, laser acupuncture, photo puncture.

Multi Radiance
Veterinary Lasers

Acupuncture & Muscle Trigger Point Probes

Photo Probes attach to the MR5 50W ACTIVet PRO, adding even more versatility

Probes complement needles and enable Laserpuncture and quick release of trigger points, using sedate or tonify settings

Acupuncture has been used for thousands of years as an essential element of Traditional Chinese Medicine TCM

But, Western practitioners needed to understand how and why it works from an anatomy perspective.

Dr. Allen Schoen DVM, MS, PhD (Hon)
Cornell Vet School literally wrote the book on Veterinary Acupuncture.

This paper provides Mechanism of Action details

THE LIQUID CRYSTALLINE COLLAGEN CONTINUUM THEORY OF ACUPUNCTURE AND THE CLINICAL APPLICATIONS IN VETERINARY ACUPUNCTURE PRACTICE

Allen Schoen, MS, DVM, PhD (hon.), CVA
Center for Integrative Animal Health
Saltspring Island, B.C., Canada

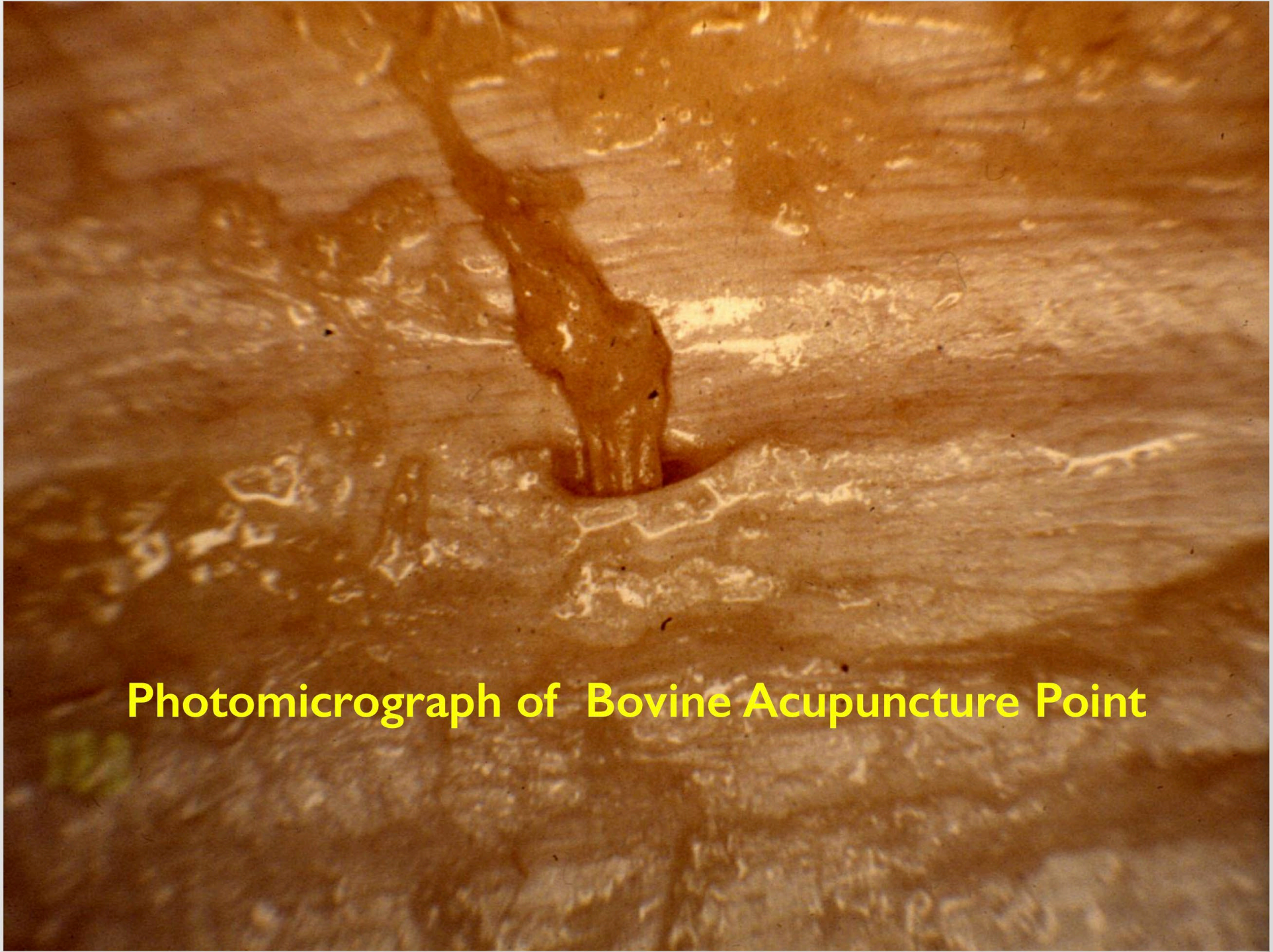
INTRODUCTION

There is an increasing interest in veterinary acupuncture, both by the veterinary medical community and the public. With this increased awareness, there has been an increased interest in having a better understanding of the physiologic basis and its clinical applications. The understanding of Traditional Chinese Medical (TCM) and Traditional Asian Medicine (TAM) theory offers veterinarians a wealth of appreciation and knowledge of how acupuncture works based on a long history of evidence based medicine in Asia through nature and naturally occurring phenomenon. Yet, as both western, conventional human and veterinary medicine emphasize the need for a western medical understanding and “scientific” proof of how acupuncture works as well as the anatomy of acupuncture points and pathways, we need to be continuing to pursue research and understanding based on western neurophysiologic and anatomic studies as well.

During the past few decades of research pursuing an understanding of the physiologic and anatomic basis, a number of theories have been proposed to explain all the varied effects of acupuncture. Yet, each proposed theory only explained a limited number of the effects of acupuncture. When reviewing all the different theories in order to update my lectures on the scientific basis in the

For all those needle phobic cats dogs exotics other animals and people, there’s now Laserpuncture.

Simply place Multi Radiance Laser Emitter over the acupuncture point for quick easy compliance for effective treatments


Photomicrograph of Bovine Acupuncture Point

Benefits of Vet-prescribed Continuum of Care

- Frees up clinic staff to provide other in-clinic care and services
- Reach new patient populations that are underserved
- Reduce anxiety about transporting pets to and from clinical appointments
- Reduce the overall number of visits to the office
- Improve compliance with your treatment plan
- Let’s the Owner be part of the Caregiving Team by administering the therapy
- Generates passive income

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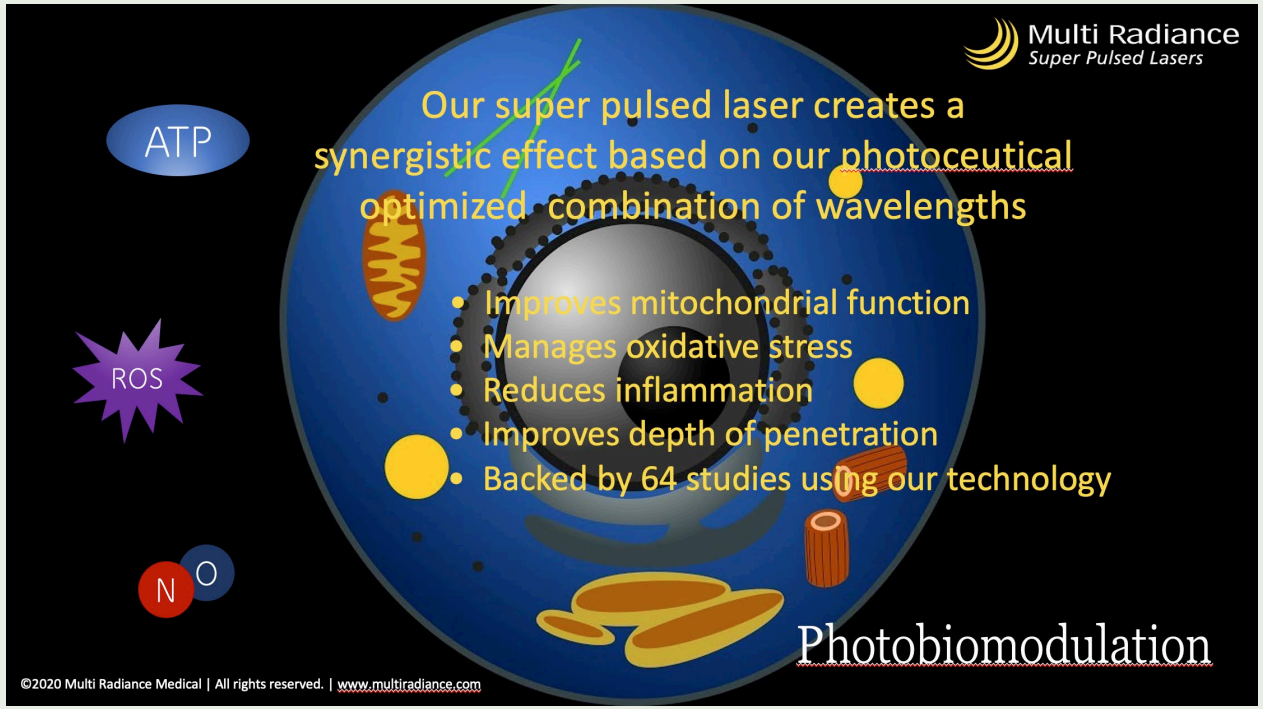
Summary of Advantages



Multi Radiance makes the safest, most versatile lasers in the world

- Super Pulsed Laser Therapy is a safe, effective means of providing PBM therapy in your practice.
- Treatment Protocols backed by evidence – Exclusive Priority Principle shows exactly how to treat hundreds of conditions based on the symptoms presented and what the individual's target tissues need.
- Holistic applications: zero drug side effects for arthritis, injuries, all together can be treated in one session.
- All Multi Radiance lasers FDA cleared, validated for efficacy and dosimetry.
- FEI Approved: Multi Radiance lasers are approved for same day use at FEI events.
- Anti-microbial blue light therapy.
- Almost no contraindications (cancer and pregnancy).
- Easy to learn safe to use, powerful super pulsed and still class 1 safety!
- Stress-free home rental lasers.
- Cordless with long battery life for up to a week.

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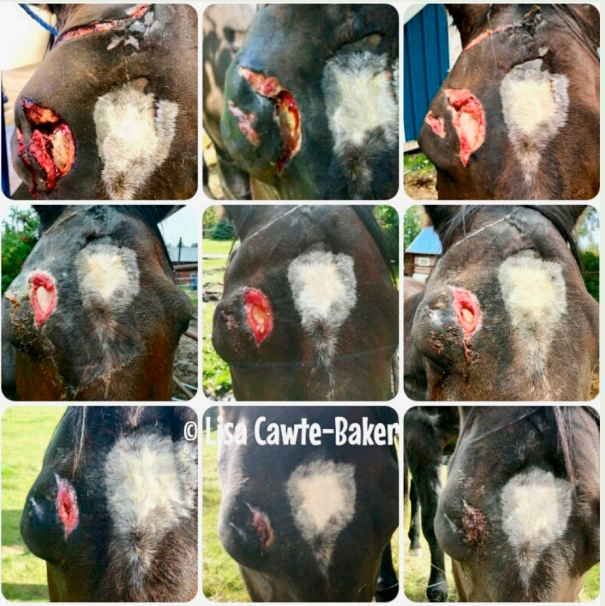

Predator attack Canadian mountainous terrain, likely bear or cougar

Protocol – Infections (open wounds)

Challenge

A complication with wounds can be infection, especially with the increasing threat of antibiotic resistant bacteria. Veterinarians needed a new weapon and Multi Radiance followed the science by adding a 4th synergistic wavelength, blue. It not only causes oxidative stress to kill these bacteria, but bacteria also can't mutate around it as they do with drugs.

1. Holistic Approach – Preparation for treatment

Start with the Unwind protocol as a safe and very effective way to reduce anxiety, Inhibit pain, and acclimate the patient that may never have experienced laser therapy. Since MRM lasers are all super pulsed, eliminating any possibility of thermally overloading tissue, it can even be used very effectively with burn wounds Use Scan technique, 1000Hz, 1cm/sec from withers to tail start. Typically, it takes less than 5 min to complete this protocol.

Treatment utilizing Priority Principal: If there's inflammation, Select ACTIVet Pro, then 50Hz with dose time depending upon size of wound. Typically, 1-3 min. Press Select once more to see blue mode, toggle 'on'. Always have Large Dome Probe attached for wounds and hover over the wound area (2cm's) working around the periphery to ensure proper granulation from the outside in. **For severe infection potential, you can even select continuous wave blue 100% full power.**

1-2 Tx daily, but **do not over treat**. Wounds heal best with minimized proud flesh with smaller doses of light photoceutical. Best to treat in between dressing changes as light cannot penetrate well through multiple gauze wrappings.

Next, transition to **Tissue Repair**, 250Hz, include blue until wound is closed, dry and more protected from infection. Same dose time, typically 1-3 min. Inflammatory Setting 50Hz and Tissue Repair 250Hz can be used sequentially in the same session because both are stimulatory to cellular metabolism, as they are below 500Hz

Follow up – Maintain continuity of treatments for optimal healing. Multi Radiance safety makes possible Vet prescribed protocols with stress free rental version, My Pet Laser 2.0. Less power, so slightly longer treatment times, no blue, but very effective for post op and rehabilitation cases like ligaments and tendons.

- Program #2 and # 1 for tissue repair.
- Program #1 for functional strength. -> the bigger the muscle groups are the higher the scanning time should be.

Protocol – Emergency Surgery

Challenge

A complication with wounds can be infection, especially with the increasing threat of antibiotic resistant bacteria. Veterinarians needed a new weapon and Multi Radiance followed the science by adding a 4th synergistic wavelength, blue. It not only causes oxidative stress to kill these bacteria, but bacteria also can't mutate around it as they do with drugs.

1. How soon can our Laser therapy be started?

Pasco Veterinary Medical Center. Rambo, 8 yr old neutered male, caught his foot in a fence, panicked, ripping skin and dislocating left front P5 toe at P2-P3. Owner tried treating at home, but after 48 hours infection was severe, patient was brought to Dr. Marlene Siegel. Day of surgery, observed that patient's P2-P3 was detached. Wound was treated with Multi Radiance Laser as alternative to antibiotics. Patient also given silver hydrosol, ozone rectally and as wound rinse. My Pet Laser sent home to stimulate granulation. Post Op Result: Rambo weight bearing 24 hrs after toe amputation. Blue wavelength used right after surgery, 1-250Hz 30 min later. Blue wavelength controlled infection instead of antibiotics. Rambo fully recovered!

1-2 Tx daily, but **do not over treat**. Wounds heal best with minimized proud flesh with smaller doses of light photoceutical. Best to treat in between dressing changes as light cannot penetrate well through multiple gauze wrappings.

Follow up – Maintain continuity of treatments for optimal healing. Multi Radiance safety makes possible Vet prescribed protocols with stress free rental version, My Pet Laser 2.0. Less power, so slightly longer treatment times, no blue, but very effective for post op and rehabilitation cases like ligaments and tendons.

- **Program #2 and # 1 for tissue repair.**
- **Program #1 for functional strength. -> the bigger the muscle groups are the higher the scanning time should be**

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Treatment Protocol – Exotics Post Op

Challenge

A complication with wounds can be infection, especially with the increasing threat of antibiotic resistant bacteria. Veterinarians needed a new weapon and Multi Radiance followed the science by adding a 4th synergistic wavelength, blue. It not only causes oxidative stress to kill these bacteria, but bacteria also can't mutate around it as they do with drugs.

1. Holistic Approach – Preparation for treatment

Treatment utilizing Priority Principal: Control infection. Select ACTIVet Pro, then right arrow for Blue Mode. Select and use the default CW 100%. Next 50Hz for reducing inflammation. Typically, 1-3 min. Use the Utility Probe attached for reaching inside the oral cavity and apply all around the extraction site. **For severe infection potential, always select continuous wave CW blue 100% full power.**

1-2 Tx daily, but **do not over treat**. Wounds heal best with smaller doses of light photoceutical.

Next, transition to **Tissue Repair**, 250Hz, include blue until threat of infection has passed. Continue with Inflammatory Setting 50Hz and Tissue Repair 250Hz used sequentially in the same session because both are stimulatory to cellular metabolism, as they are below 500Hz

Follow up – Maintain continuity of treatments for optimal healing.

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Ex. Treatment Protocol – Suspensory Ligament

Challenge

Distal limbs are characterized by poor blood flow. Healing is greatly benefitted by consistent use of Multi Radiance laser therapy including **Photohemotherapy** which promotes vasodilation allowing more blood with oxygen and nutrients to reach the lesion and stimulate growth of well aligned collagen fibers which helps preserve their tensile strength. Vet prescribed MRM rental lasers help clients feel like part of the team!

1. Holistic Approach – Preparation for the treatment (Unwind Protocol)

The Unwind protocol is a safe and very effective way to reduce anxiety and acclimate the patient that may never have experienced laser therapy. Since MRM lasers are all super pulsed, eliminating any pain provocation from heat, it can be used, scanning slowly from withers to tail start. Typically, it takes less than 5 min to apply.

Unwind Protocol: Scan along the spinal nerve roots, using the large Dome Probe, from withers to tail start at 1000 Hz with a speed of 1cm/sec for 2-3 minutes.

2. Treatment according to Priority Principal – Reduce Swelling / Edema and inflammation

- Swelling / Edema: Open pathways for drainage using Ohshiro's method. Treatment Protocol: 1000-3000 Hz, 1 min
- Inflammation: Improving blood flow through vasodilation reduces tissue inflammation; key to promoting and accelerating tissue repair. Treatment Protocol**:** 50Hz for 1-2 minutes on, above and below the lesion. Always treat bilaterally for compensation issues
- Two sessions daily for first week is best, same time each day (separated by 4 hrs.) for an initial loading dose of light photoceutical.

3. Rehab & Recovery - Assessment –

Ultrasound shows progress of filling in the hole caused by the lesion. Continuity of laser therapy makes a big difference in the time and the completeness of healing before the horse resumes full work.

- **Follow up –** Maintain continuity of treatments for optimal healing:
- Programm #2 and # 1 for tissue repair.
- Programm #4 for range of motion – 1 min each Ah Shi Point.
- Programm#1 for functional strength. -> the bigger the muscle groups are the higher the scanning time should be

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Ex. Treatment Protocol – Strains and Sprains

Challenge Strains and Sprains

30% of racing or competition horses suffer from tendon injuries or complications

- Affected structures include the superficial and deep digital flexor tendons, and suspensory ligament.
- Poor blood supply to the equine limb is a major reason for slow healing.
- High rate of recurrence.

1. Holistic Approach – Preparation for the treatment (Unwind Protocol)

The Unwind protocol is a safe and very effective way to reduce anxiety and acclimate the patient that may never have experienced laser therapy. Since MRM lasers are all super pulsed, eliminating any pain provocation from heat, it can be used, scanning at 1cm/sec from withers to tail start. Typically, it takes less than 5 min to apply.

Unwind Protocol: Scan along the spine, using the large Dome Probe, from withers to tail start at 1000 Hz with a speed of 1cm/sec for 2-3 minutes.

2. Treatment according to Priority Principal – Reduce Swelling / Edema and inflammation

- Swelling / Edema: Open pathways for drainage using Ohshiro's method. Treatment Protocol: 1000-3000 Hz, 1 min
- Inflammation: Improving blood flow through vasodilation reduces tissue inflammation; key to promoting and initiating tissue repair. Treatment Protocol**:** 50 Hz with red light only for 1-2 minutes.
- Muscle Spasm: Find and concentrate on core trigger points: 1000 Hz, 1-2 min.
- Pain: Scan along nerves, roots or trunks, adjust the dose to pain. 1000 – 5000 Hz with 1 to 4 min.
- One to two sessions, same time each day (separated by 4 hrs) during 5 days for an initial loading dose of photoceutical.

3. Rehab & recovery – Follow up – Maintain continuity of treatments for optimal healing:

- Programm #2 and # 1 for tissue repair.
- Programm #4 for range of motion – 1 min each Ah Shi Point.
- Programm#1 for functional strength. -> the bigger the muscle groups are the higher the scanning time should be

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Veterinary Lasers

Ex. Treatment Protocol – Quarter cracks

Challenge

Quarter cracks are typically seen on the medial and/or lateral aspects of the hoof wall, descending distally from the coronary band. They are caused by excessive force being placed on the hoof wall, usually secondary to improper shoeing. The most common clinical sign associated with quarter cracks is pain, causing lameness. Lameness will vary depending on the size of the crack and whether infection is present.

The best resolution for quarter cracks is by stimulating keratin formation along the coronary band. Treatment of quarter cracks typically also includes proper trimming/shoeing of the hoof, debridement, and drying and treatment of any moisture or infection.

1. Holistic Approach – Preparation for the treatment (Unwind Protocol)

The Unwind protocol is a safe and very effective way to reduce anxiety and acclimate the patient that may never have experienced laser therapy. It causes a systemic release of endorphins. Since MRM lasers are all super pulsed, eliminating any pain provocation from heat, it can be used, scanning at a slow 1cm/sec from withers to tail start. Typically, it takes less than 5 min to apply.

Unwind Protocol: Scan along the spinal nerve roots, using the large Dome Probe, from withers to tail start at 1000 Hz with a speed of 1cm/sec for 5 minutes.

2. Treatment according to Priority Principal – 50Hz 2 min scanning slowly along coronary band. And vertically on the hoof wall. In case of infection: select the BLUE only light 100% for 5 minutes along the crack. The combined wavelengths will penetrate the hoof and laminae which will encourage healing while suppressing the growth of dangerous bacteria. Within two weeks, there should be significant new growth. If pain is severe, use 3000Hz on the three nerve branches descending into the hoof.

- Once any infection is resolved, continue stimulation of blood flow with 50Hz 2-3 min along coronary band and hoof wall. Add photohemotherapy by use of 50Hz 2 min on proximal artery.

3. Rehab & Recovery - Follow up – Maintain continuity of treatments for optimal healing with My Pet Laser 2.0.

- Program #2 and # 1 for increasing blood flow to stimulate new hoof growth.

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Veterinary Lasers

Class IV Lasers vs Class 1 Safe Super Pulsed Lasers

Therapeutic Super Pulsed Lasers (class I)

- Safe - no dedicated room$ needed for treatments per regulations
- Safe for home-use, no goggles, no potential for harming animals),
- More affordable; MRM is approximately one-half the price of Class IV lasers
- Minimal Heating Of Tissue
- Ability to deliver less than 500 mW or more (MOP)
- Photobiomodulation by definition is Photo-chemical, Photo-physical NOT photothermal. Result is more effective therapeutic outcomes
- Continuous, Pulsed, Super Pulsed

High Intensity Lasers (class IV)

- Required safety control, dedicated room$ for treatments. Vet practice space is precious!
- Thermal overload = Apoptosis
- 500 mW Mean Output Of Power (MOP) – must be turned down to be therapeutic
- Vaporizes, Coagulates And Cut
- Surgical
- Photothermal
- Continuous Wave, Pulsed

Multi Radiance
Veterinary Lasers

PROVEN ADVANTAGES:

THE COMPARATIVE STUDY

Concluded that Super Pulsed laser (MR4) light demonstrated better results in all outcomes measured when compared with placebo, and high-powered continuous laser had no effects on any outcome measured.

Phototherapy for Improvement of Performance and Exercise Recovery: Comparison of 3 Commercially Available Devices

Thiago De Marchi, MSc, PT*; Vinicius Mazzochi Schmitt†; Carla Danúbia da Silva Fabro*; Larissa Lopes da Silva*; Juliane Sene*; Olga Tairova, PhD†; Mirian Salvador, PhD*

*Postgraduate Program in Biotechnology, Oxidative Stress and Antioxidant Laboratory, and †Sports Medicine Institute, University of Caxias do Sul, Brazil

Context: Recent studies suggest the prophylactic use of low-powered laser/light has ergogenic effects on athletic performance and postactivity recovery. Manufacturers of high-powered lasers/light devices claim that these can produce the same clinical benefits with increased power and decreased irradiation time; however, research with high-powered lasers is lacking.

Objective: To evaluate the magnitude of observed phototherapeutic effects with 3 commercially available devices.

Design: Randomized double-blind placebo-controlled study.

Setting: Laboratory.

Patients or Other Participants: Forty healthy untrained male participants.

Intervention(s): Participants were randomized into 4 groups: placebo, high-powered continuous laser/light, low-powered continuous laser/light, or low-powered pulsed laser/light (comprising both lasers and light-emitting diodes). A single dose of 180 J or placebo was applied to the quadriceps.

Main Outcome Measure(s): Maximum voluntary contraction, delayed-onset muscle soreness (DOMS), and creatine kinase (CK) activity from baseline to 96 hours after the eccentric exercise protocol.

Results: Maximum voluntary contraction was maintained in the low-powered pulsed laser/light group compared with placebo and high-powered continuous laser/light groups in all time points ($P < .05$). Low-powered pulsed laser/light demonstrated less DOMS than all groups at all time points ($P < .05$). High-powered continuous laser/light did not demonstrate any positive effects on maximum voluntary contraction, CK activity, or DOMS compared with any group at any time point. Creatine kinase activity was decreased in low-powered pulsed laser/light compared with placebo ($P < .05$) and high-powered continuous laser/light ($P < .05$) at all time points. High-powered continuous laser/light resulted in increased CK activity compared with placebo from 1 to 24 hours ($P < .05$).

Conclusions: Low-powered pulsed laser/light demonstrated better results than either low-powered continuous laser/light or high-powered continuous laser/light in all outcome measures when compared with placebo. The increase in CK activity using the high-powered continuous laser/light compared with placebo warrants further research to investigate its effect on other factors related to muscle damage.

Key Words: skeletal muscle performance, low-level laser therapy, light-emitting diode therapy, high-intensity laser therapy, photobiomodulation therapy

Key Points

- Phototherapy (or photobiomodulation therapy) had ergogenic and protective effects on skeletal muscles only if applied with the correct settings.
- The combination of low-powered pulsed laser and red and infrared light-emitting diodes was more effective than low-powered continuous infrared laser or high-powered continuous infrared laser.
- Increased power did not result in increased efficacy.

Achieving optimal athletic performance is the desire of all athletes from the recreational to the professional. Performance is influenced by a combination of physiological, psychological, and sociocultural factors. *Fatigue* is described as a failure to maintain the expected force, or the inability to maintain a given exercise intensity or power output level.[1] It results when muscle activity exceeds tissue substrate and oxygenation capacity. Previous researchers[2,3] have also shown that injury rates increase with the accumulation of fatigue, and fatigue has been identified as a limiting factor in performance in almost every individual in every sport. Fatigued participants demonstrated reduced voluntary force production in fatigued muscles (measured with concentric, eccentric, and isometric contractions).[4,5]

The positive evidence for the role of phototherapy or photobiomodulation (PBM) in improving exercise performance and markers related to exercise recovery has expanded its potential for widespread use to address fatigue-related injuries. Recent systematic reviews[6,7] demonstrated the ergogenic effects of phototherapy using lasers and/or light-emitting diodes (LEDs) administered immedi-

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enetration Profiles of a Class IV Therapeutic Laser a
hotobiomodulation Therapy Device in Equine Skin

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ABSTRACT

Photobiomodulation therapy (PBMT) effects depend on the energy settings and laser penetration. We investigated the penetration time profiles of two different light therapy devices, at the dark and light skin regions in horses. Six light skin and six dark skin adult clinically healthy Arab and Quarter horses were used. A cutometer was used to measure the width of the skin fold from both sides of the cervical area, followed by three measurements of the thickness of the same skin fold by transversal and longitudinal ultrasonography (US). The depth of light penetration was compared based on the percentage of penetration versus power, between a portable PBMT device versus a class IV laser device. The laser mean power output was measured with an optical power meter system for 120 seconds after penetrating the skin. Skin width and laser penetration were compared among equipment by paired "t" test. There was no difference in the width of the skin fold between measurements acquired by the cutometer against either longitudinal or transversal US or between the US measurements at cervical versus metacarpus area. Light penetration was greater in both kinds of skins in the PBMT (0.01303 ± 0.00778) versus class IV laser (0.00122 ± SD 0.00070) ($P < .001$). The PBMT device provided a greater energy penetration than the class IV laser in unclipped light and dark skin, suggesting that the former may produce a better therapeutic effect. The color of the skin changes penetration profiles of PBMT.

Introduction

Photobiomodulation therapy (PBMT) is currently used for tissue
ury repair [1,2]. Several beneficial effects have been attributed to
MT such as an acceleration of nerve regeneration and function
[1] and modulation of the synthesis and organization of collagen in skeletal muscles and tendons [2].

Most studies investigating penetration of PBMT (using laser and/or LED light) are performed in vitro on skin flaps, by measuring immediate penetration depth and energy loss [3,4]. Data in vitro are not necessarily reproducible in vivo as absorption and
scattering coefficients are apparently smaller in vivo th

Tendinitis and desmitis are some of the mai
disorders [6] leading to decreased performa
horses [7]. PBMT is indicated to treat tendi
effects are dependent on the energy setting
tendinopathy [8,9]; therefore, it is ess
optimal settings to achieve a beneficial t

Considering the plethora of light ther
market, an important matter is to se
equipment to guarantee sufficient pene
in situ. Although both a class I PBMT
therapeutic laser may be used for tissu
comparing light penetration betwee

nimal welfare/ethical statement: The authors certify that legal and ethical re-
rements have been met with regard to the humane treatment of animals ac-
ding to the legislation of the Brazilian Council of Control in Animal
perimentation (http://www.mctic.gov.br/mctic/opencms/institucional/concea/
ex.html). The study was approved by the Animal Research Ethical Committee
m the School of Veterinary Medicine and Animal Science, University of São Paulo
te, under the protocol number 0103/2018.

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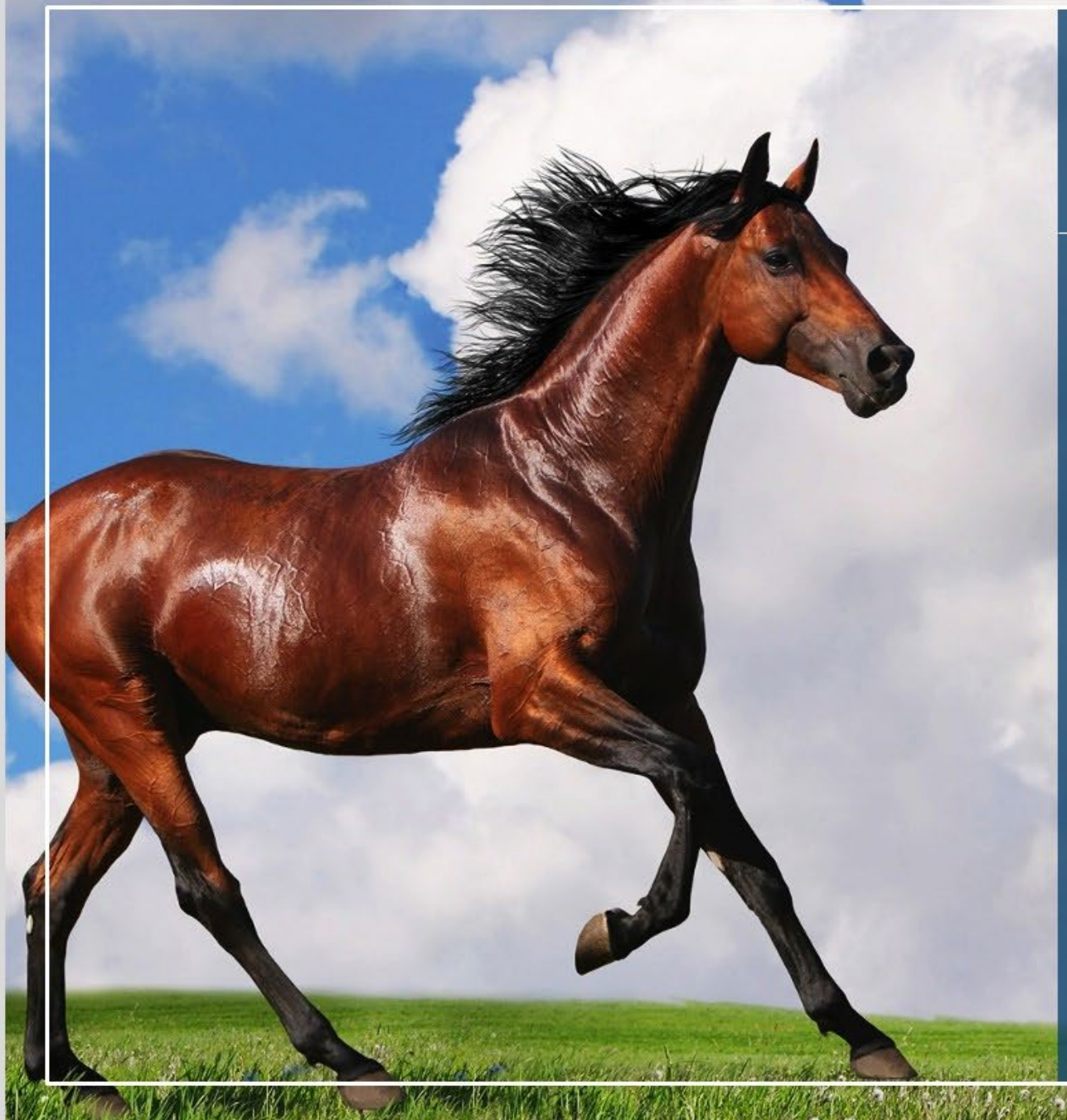

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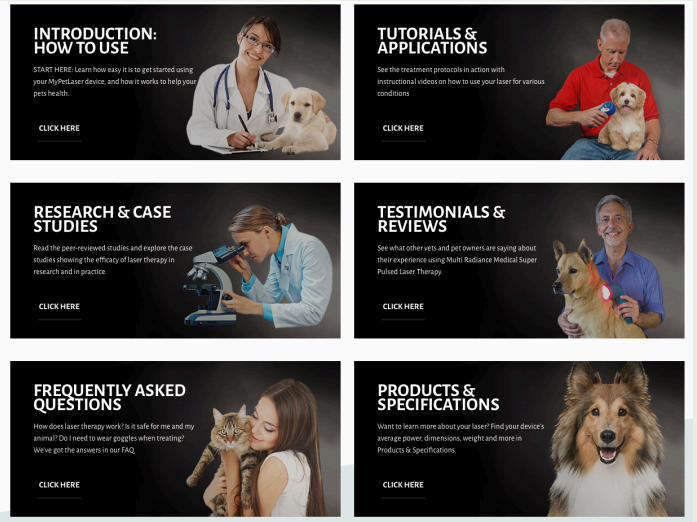

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