

regenerative laser therapy

## Treatment Guide



a VCA ANTECH company







# Relief. Regenerate. Remodel.

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To deliver innovative customer driven diagnostic imaging, therapy and information management solutions that simplify and advance medical workflow, promote better patient care, and help veterinary practices thrive.



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distance, the veterinary industry's number one Digital Imaging and PACS Company, with uncontested leadership positions in Ultrasound, Digital Radiography, Imaging Education, Regenerative Laser Therapy, and PACS Solutions. Sound-Eklin<sup>™</sup> is the exclusive provider of GE Ultrasound equipment for the veterinary market in North America. Founded in 1996, Sound Technologies acquired Eklin in July 2009. Sound-Eklin is a Division of VCA Antech (NASD: WOOF), and is dedicated to the field of veterinary imaging and technician training. VCA Antech also owns, operates

VCA Antech also owns, operates and manages the largest network of freestanding veterinary hospitals and veterinary-exclusive clinical laboratories in the country and employs approximately 4,800 professionals throughout North America. For more information, visit the VCA Antech website at www.vcaantech.com.

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### **A New Generation of Therapy...**



## **Relief. Regenerate. Remodel.**

Once considered career ending injuries are being met with renewed confidence and optimism around the globe.

Sound-Eklin<sup>®</sup> brings the groundbreaking RLT Vet™ Regenerative Laser Therapy to equine medicine. With RLT Vet™, lame and injured horses have shown improved outcomes with lower incidents of injury recurrence. Over ten years of research and development yield consistent rehabilitation and healing results using the multi-patented RLT Vet<sup>™</sup> system from the largest laser manufacturer in the world – El.En. Group.

#### **RESULTS DEMONSTRATE**

- Repair of ligament and tendon lesions • Reduction of scar tissue
- Normalization of muscle fibers and function
- Analgesia
- Anti-Inflammatory processes Collagen production • Cell proliferation

### **HIGH INTENSITY** LASER THERAPY

the energy carrier in the cell and photo acoustic effects.



- within and around tendons

- The RLT Vet<sup>™</sup> is a HILT<sup>1</sup> (High Intensity Laser Therapy) that delivers photons into the tissue, which radically increases circulation, reduces pain
- and inflammation while stimulating
- an endorphin release which excites
- (the ATP). RLT Vet<sup>™</sup> can produce
- photomechanical, photo thermal,

#### **MECHANISMS OF ACTION**

#### Relief

- Analgesic effect
- Stimulate lymphatic drainage
- Reduction of inflammation

#### Regenerate

- Cell cycle restoration
- Conversion of fibrocytes to fibroblasts
- Stimulate production of extracellular matrix
- Stimulate production of collagen fibers and elastin
- Recovery of elasticity

#### Remodel

- Myorelaxation
- Neoangiogenesis
- Physiological cell differentiation
- Physiological spatial collagen realignment
- Recovery of firmness and strength
- Restoration of tissue to original condition

<sup>1</sup>Jan Tuner & Lars Hode, The Laser Therapy Handbook, Page 54

# Light Amplification by Stimulated Emission of Radiation

## Laser Therapy Defined

**How it Works** 

#### What is a Laser?

A laser is a device that controls the way energized atoms release their energy. "Laser" is an acronym for *Light Amplification by Stimulated Emission of Radiation*. This describes exactly how the laser works. There are many types of lasers. All of them have certain essential features. The lasing medium is pumped into an excited state. Harnessing this energy allows various uses of lasers.

Lasers are classified into four broad areas depending on the potential for causing biological effect. When you see a laser, it should be labeled with one of these four class designations:

#### Class I

These lasers cannot emit laser radiation at known hazard levels.

#### Class Ia

This is a special designation that applies only to lasers that are "not intended for viewing," such as a supermarket laser scanner. The upper power limit of Class I.A. is 4.0 mW.

#### Class II

These are low-power visible lasers that emit above Class I levels but at a radiant power not above 1 mW. The concept is that the human aversion reaction to bright light will protect a person.

#### Class IIIa

These are intermediate-power lasers (cw: 1-5 mW), which are hazardous only for intrabeam viewing. Most pen-like pointing lasers are in this class.

#### Class IIIb

These are moderate-power lasers. These are the so called "cold lasers". They have limited penetration ability into the body. There are more superficial applications for this class laser.

#### **Class IV**

These are high-power lasers. They are the class of lasers that have many therapeutic applications in medicine. They are used in surgery for cutting tissue and ablating tissue. They also have application to reach deep into the body through intact skin to stimulate the body to achieve highly beneficial results.

#### Laser Therapy

The laser therapy radically increases circulation, which reduces pain and inflammation by stimulating an endorphin release

### Laser Therapy Defined continued

and radically excites the energy carrier in the cell (the ATP) to heal the cells in one-third to one-half the normal healing time.

Laser treatments are cumulative and one builds upon another. Generally, one treats a person, pet, or horse with a series of treatments for the best effect. A therapy laser treats any inflammation, pain or acute trauma and any chronic conditions which cause pain, stiffness and resulting loss of mobility. You may see radical improvement after one treatment but generally several treatments are required to gain the maximum effects especially for chronic conditions.

#### Who typically uses the laser in a clinical setting?

Primarily used by veterinarians, chiropractors, concierge MDs, sports teams, physical therapists, horse trainers and horse owners and an emerging population of Orthopedics. Its use among professional athletes and jockeys has garnered worldwide attention.

This service is extremely costeffective and best utilized when in the hands of a trained technician.

#### What is Class IV Laser therapy?

Class IV laser therapy is the use of an intense beam of laser light directed into tissues to reduce pain, reduce inflammation and accelerate healing. Laser therapy is the result of electromagnetic energy interacting chemically and biologically with tissue causing "photobiostimulation" or "photobiomodulation." The involvement of electromagnetic energy in biological processes is not a novel concept - it fills our environment as photosynthesis occurs in plants and literally surrounds us as Vitamin D is formed in our skin cells.

The idea of light producing healthful tissue effects is as old as science itself, noted, but not understood, by early Greek physicians. Medical use of light in the modern era predates the development of lasers, which have transformed light therapy. Lasers allow light therapy to be targeted, specific and quick. Lasers produce a single wavelength (monochromatic) beam of light, collimated as it is generated. Laser light has the property of being coherent, or in phase, which in simple terms means it is uniform and very orderly light. Class IV laser therapy uses a simple beam of light - monochromatic, coherent, collimated light - to penetrate deeply into tissues and produce positive tissue changes.

#### What does the term "Class IV" mean?

Lasers are classified as Class I, II, IIIa, IIIb and IV as listed above, based on their ability to do harm if used improperly. Class I and II lasers are very low power devices used in CD players, laser printers, grocery store scanners and bar code readers. Class III lasers are higher in power, but do not exceed 500 milliwatts (0.5 watt). Laser pointers are Class III, as are some medical devices. Some therapy lasers are Class IIIb.

Under 500 mw in power, they are referred to as "low power", "LLLT" (Low Power Laser Therapy) devices. They are applicable for treatment of superficial lesions and wounds only. Class IV lasers - those over 500mw in power - are used in medicine and surgery, as well as in military and industrial applications.

#### So, what is a 'HILT' laser?

HILT is a Class IV that reaches extremely high peak powers with an Nd:YAG pulsed source. The high intensity obtained (up to 20,000 W/cm2), unreachable by other currently available laser techniques, makes it possible to cure also deep chronic injuries efficiently.

A fundamental distinguishing characteristic of the HILT® impulse is its ability to produce a high thermal gradient with a photo mechanical effect. In fact, the entity of these effects is directly proportional to the laser emission intensity and inversely proportional to impulse.

Thanks to the short impulse length and the very high intensity, HILT possesses the ideal characteristics to generate this phenomenon, which can produce important therapeutic effects.

It is well-known that these kinds of stimuli trigger a series of biological signals that contribute to the tissue mending and regeneration processes; moreover, it activates lymphatic drainage and microcirculation.

#### What equipment is used for Class IV laser therapy?

Class IV therapy lasers are usually diode lasers emitting light in the 790 - 980 nanometer wavelength range. ND:Yag lasers are typically the 1064 wavelength.

Most Class IV therapy lasers have moved well beyond the low power of Class III therapy lasers. The better quality and more effective Class IV devices now have power capabilities of 6 to 12 watts with wavelengths in the far end of the diode laser spectrum.

#### Why am I just now hearing about Class IV laser therapy?

Class IV laser therapy is a new technology in the United States. Although therapy laser devices have been used outside of the United States for many years, Class III therapy lasers were FDA cleared in the United States in 2002. Because of their low power, use of Class III therapy lasers has been limited.

After the FDA approved Class IV therapy lasers in 2005, the science of laser therapy really began emerging in this country. Acceptance has been rapid on the human side in rehabilitation, wound care and sports medicine programs. In the veterinary profession Class IV laser therapy has rapidly developed, with practitioners leading the way in beta testing, protocol development, case reporting and dissemination of information about the technology.

### What does Class IV laser therapy accomplish? Laser therapy reduces pain,

#### How does it reduce pain?

Through its effect on nerve cells and nociceptors, increased stimulation thresholds, reduced neuronal impulses, and increased release of tissue endorphins, pain perception is decreased. The key is production of ATP (adenosine triphosphate).

inflammation and accelerates healing.

#### How does it reduce inflammation?

Inflammation is reduced by decreasing release of prostaglandins and inflammatory mediators, by increasing macrophage activity and leukocytic phagocytosis, and, by reducing edema through dilation of lymphatics.

#### How does it accelerate healing?

Healing is accelerated by increased blood flow from vasodilation, by increased angiogenesis and capillary production, by increased release of cytokines, and by stimulation of fibroblast activity and collagen production.

#### How do photons produce such dramatic biological changes?

The list of documented mechanisms and effects in laser treated tissue is extensive. Electrical, temperature and pressure gradients are created as coherent laser light is absorbed by the mixed density of tissue. Chromophores – photon absorbing chemicals and structures in tissue, cells, and sub-cellular organelles – absorb the electromagnetic energy. Electron chain transport mechanisms in mitochondria, cell membranes and epithelial tissues are stimulated. ATP production increases, and DNA and RNA synthesis is increased. Enzymes (such as the cytochrome oxidases) are directly stimulated. With further research, a more complete understanding of this exciting technology will emerge.

### Laser Therapy Defined continued

### What patients can I treat with Class IV laser therapy?

Patients presenting with pain, inflammation or healing tissue are candidates for Class IV laser therapy. Incorporation of Class IV laser therapy into routine pain control protocols is appropriate. As an adjunct to medical protocols, laser therapy is helpful in reducing pain and inflammation and accelerating healing after surgery and dental procedures.

Patients with a wide variety of acute problems benefit from Class IV laser therapy. Common to these problems are the components of pain, inflammation and tissue healing. These conditions may be treated only once, or, multiple times over several days or weeks. A few examples include wounds, fractures, abscesses, anal sacculitis, acute otitis, hematomas, sprains, strains, muscle discomfort, cystitis, urethritis, injection site soreness, pyotraumatic dermatitis, venomous bites and pododermatitis. (See page 11.)

Chronic conditions involving pain, inflammation and healing may also be helped, although treatment has to extend over a longer time, and frequently will be followed by on-going treatment to maintain effect. Osteoarthritis, elbow hygromas, lick granulomas and neuropathies are examples.

#### How do I treat patients with Class IV laser therapy?

Treatments are delivered by the clinician or technician, using the laser handpiece in either a scanning or a contact mode. Protocols for treatment are presented in menu format in the laser device. Treatments can be administered during an outpatient visit and normally take 3-10 minutes for each affected area.

Patients tolerate treatments well, experiencing a gentle and pleasant warming sensation in the tissue.

#### Are there contraindications and safety concerns with Class IV laser therapy?

As with any laser device, eye protection is critical when using a therapy laser. All persons in the treatment area should wear appropriate safety glasses and pay strict attention to avoiding direct exposure of the patient's eyes. Darkly pigmented hair and skin more readily absorb diode laser light. To avoid overheating pigmented tissue scanning treatment technique is used.

Most contraindications for laser therapy are based on prudence rather than clinical data. Treatment of malignancy, thymus and thyroid glands, epiphysitis, testicles, pregnancy, and active hemorrhage are historical contraindications. Treatment after administration of photosensitizing medications is a definitive contraindication.

## **Biological Effects of Laser Therapy**



#### ACCELERATED TISSUE REPAIR AND CELL GROWTH

Photons of light from lasers penetrate deeply into tissue and accelerate cellular reproduction and growth. The laser light increases the energy available to the cell so that the cell can take on nutrients faster and get rid of waste products. As a result of exposure to laser light, the cells of tendons, ligaments and muscles are repaired faster.

#### **FASTER WOUND HEALING**

Laser light stimulates fibroblast development (fibroblasts are the building blocks of collagen, which is predominant in wound healing) in damaged tissue. Collagen is the essential protein required to replace old tissue or to repair tissue injuries. As a result, LT is effective on open wounds, scars, and burns.

#### REDUCED FIBROUS TISSUE FORMATION

Laser therapy reduces the formation of scar tissue following tissue damage from cuts, scratches, burns or surgery. Scar tissue is the primary source of chronic pain.

#### **ANTI-INFLAMMATION**

Laser light has an anti-edemic effect as it causes vasodilation, but also because it activates the lymphatic drainage system (drains swollen areas). As a result, there is a reduction in swelling caused by bruising or inflammation.

### **ANTI-PAIN (ANALGESIC)**

Laser therapy has a high beneficial effect on nerve cells which block pain transmitted by these cells to the brain and which decreases nerve sensitivity. Also, due to less inflammation, there is less edema and less pain. Another pain blocking mechanism involves the production of high levels of pain killing chemicals such as endorphins and enkephalins from the brain and adrenal gland.

#### **IMPROVED VASCULAR ACTIVITY**

Laser light will significantly increase the formation of new capillaries in damaged tissue that speeds up the healing process, closes wounds quickly and reduces scar tissue.

Additional benefits include acceleration of angiogenesis, which causes temporary vasodilatation, an increase in the diameter of blood vessels. More blood flow equals faster healing and less pain.

#### **INCREASED METABOLIC ACTIVITY**

Laser therapy creates higher outputs of specific enzymes, greater

### **Biological Effects of Laser Therapy** continued

oxygen and food particle loads for blood cells. The damaged cells can repair and regenerate faster.

#### **IMPROVED NERVE FUNCTION**

Slow recovery of nerve functions in damaged tissue can result in numbness and impaired limbs. Laser light will speed up the process of nerve cell reconnection and

increase the amplitude of action potentials to optimize muscle action. Reduce nerve pain.

#### **IMMUNOREGULATION**

Photons are absorbed by chromophores (molecule enzymes) that react to laser light. The enzyme is activated and starts the production of ATP, which is the major carrier of

cell energy and the energy source for all chemical healing reactions in the cells. Long lasting pain relief occurs.

#### **TRIGGER POINTS AND ACUPUNCTURE POINTS**

Laser therapy stimulates muscle trigger points (knots) and acupuncture points on a non-invasive basis providing musculoskeletal pain relief.

### **RLT Vet**<sup>TM</sup> as Adjunctive with Other Therapies

Stem Cell – At least 4 weeks of RLT Vet<sup>™</sup> therapy is recommended prior to stem cell injection in order to prepare tissue environment and make easier cell viability. 90 days post stem cell stabilization, RLT Vet<sup>™</sup> treatment can be useful to promote physiological healing of tissue (correct alignment of collagen fibers, correct kind of collagen fibers, correct physiological chemical composition of extracellular matrix.)

PRP — Platelet-Rich Plasma — RLT Vet<sup>™</sup> is recommended for use for approximately 2 weeks prior to PRP injection, typically used adjunctively with acute injuries, all tissue types. RLT Vet<sup>™</sup> should be administered while bone marrow is being cultured and before injection at the 30 day mark. With RLT Vet<sup>™</sup>, the fibrocyte, an element of the blood, is able to transform to a tissue-based fibroblast. The fibroblast, unlike the fibrocyte, is sensitive to stimulation by the RLT Vet<sup>™</sup>, which results in expression of growth factors and improved healing.

Current research suggests, the effect of RLT Vet<sup>™</sup> is to reactivate a chronic lesion with result of increasing fibroblast migration to the injury site and enhanced healing. RLT Vet<sup>™</sup> allows the chronic lesion to revert to a more acute stage making PRP injection more effective. RLT Vet<sup>™</sup> treatment can resume at approximately 30 days post PRP injection.

#### IRAP© – Interleukin-1 Receptor Antagonist Protein –

RLT Vet<sup>™</sup> treatment is recommended for daily use for 7 to 10 days prior to IRAP injection to reduce inflammation causing the IRAP therapy to be more affective on more severe osteoarthritis. RLT Vet™ treatment can be applied immediately following IRAP to promote healing.

**Tildren**<sup>®</sup> – RLT Vet<sup>™</sup> treatment is approved for use with Tildren injection therapy. The rationale is laser improves the viability of the drug and increases blood supply and microcirculation of the bone, reducing risk of ischemic

**Shockwave** – RLT Vet<sup>™</sup> is recommended for use 7-10 days post Shockwave. The rationale is to improve the environment where fibroblasts are present (PH balance, temperature, decrease Free Radicals, possible reduction of toxicity within the cells when present.) This process allows tissue regeneration through fibroblast differentiation.

**Corticosteroids** – Contraindicated for use with RLT Vet<sup>™</sup> treatment. RLT Vet<sup>™</sup> treatment can start post 90 days after injection of corticosteroids.

NSAIDS - Non-Steroidal Anti-**Inflammatory Drug** – Approved for use with RLT Vet<sup>™</sup> treatment.

Supplements – It is recommended to only use basic nutritional level. This will aid in keeping horse more calm.

Aspirin – When treating with RLT Vet<sup>™</sup>, it is recommended to give 4-6 grams of aspirin per day orally at least one hour prior to treatment.



### Indications Acute and chronic pain, inflammation, scar tissue, lameness.

## **Applications**

- Arthritis
- Bone Spavin
- · Bowed Tendons
- Bucked Shins
- Capped Hocks
- Carpitis
- Cervical Musculature
  - DDFT
  - Desmitis
- Epiphysitis
- Fractures
- · Hydroma of the elbow
- Laminitis
- Myositis
- Navicular Syndrome
- Osselets



regenerative laser therapy

- Exertional Rhabdomyolysis
- Inferior Check Ligament Desmitis
- Neck, Back and Vertebral Column

- Ringbone
- SDFT
- Sesamoiditis
- Sesamoids
- Splints
- Stifle Disorders
- Stringhalt
- Subchondral Bone Cysts
- Subluxations of the Sacroiliac Joint
- Superior Check Ligament Strain
- Suspensory Disorders
- Suspensory Ligaments
- Tarsal Plantar Desmitis (Curb)
- Tarsitis
- Tendonitis
- Tendosynovitis
- Thoracolumbar Musculature
- Thoroughpin
- Trochanteric Busitis

## **Contraindications**

#### **CONTRAINDICATIONS**

- Do not apply over a gravid uterus.
- Do not apply over the Epiphyseal lines (joints) of children.
- Do not apply over an implanted device, i.e. a pacemaker. (Pet screws, micro chips and plates are okay.)
- Do not apply over the thyroid gland, ovaries or testicles.
- Do not apply to horses who are taking photosensitive medications.
- Do not treat over any cancer/malignancy.
- Do not treat over an actively hemorrhaging area.
- Do not treat horses within 90 days of a corticosteroid injection

## Laser Safety Environment

- Familiarity with safety shutoff devices on laser
- Eye protection, specifically supplied goggles
- Patient- goggles and/or eye shields
- · Attending therapists within 3 feet of application
- Others such as pet owners, spouse, etc, within 3 feet
- · Consideration of therapy in a safe laser environment

#### RADIATION

In physics, radiation is a process in which energetic particles or energy or waves travel through a medium or space. There are two distinct types of radiation; ionizing and non-ionizing. Infrared light is non-ionizing, electromagnetic radiation. Unlike Gamma or X-ray.

**SAFETY WARNING SIGNS** 

warning signs for the safe

Lasers require the use of specific

operations of each laser system.

treatment is being performed.

Warning signs must meet

ANSI recommendations.

Warning signs must be in view outside

and inside the room where the laser

#### **NOTES**

 Consider power dosage when treating over tattoos; use caution, as well with dark skin and/ or dark hair. CW tends to cause more of a thermal effect at the surface, causing discomfort. Consider using pulsing.

## **Laser Safety**

Laser therapy is extremely safe when basic protocols are followed by the laser operator and support staff. As with all therapeutic procedures, some element of risk is present through negligenceor accident. These hazards are easily prevented or reduced with safety protocols foreach application. Every clinic using a laser should have an individual trained in safe operation of laser therapy and regularly use a safety checklist. This individual (often the doctor), is the Laser Safety Officer (LSO).

#### EYE PROTECTION



Class IV Therapy Lasers emit both visible and invisible radiation. Protective eyewear is necessary for both Class III and Class IV lasers where irradiation of the eye is possible.

#### **Required Users**

- Administrator of the laser therapy treatment
- Patient
- Any other individuals in the room

#### Safety Goggles

Not all Safety Goggles are the same. The protective eyewear that came with your laser is manufactured specifically for

the wavelengths emitted by the laser. Do not use protective evewear from other manufacturers as they may not provide the appropriate level of protection.

#### Technical Specifications For Proper Usage Include:

- Wavelength Specific

#### Using Safety Goggle Correctly

Laser safety glasses are vital for eye protection in the presence of laser radiation. Since accidental laser radiation exposure can cause irreversible damage to the human eye, protective measures must not be taken lightly. Ensure that the eyewear has appropriate optical density for the wavelength of operation. Remove all reflective objects (such as rings, metal watchbands, and jewelry) prior to treatment with the laser. Indirect or direct eye contact with the laser beam or with scattered laser light from any reflective surfaces will cause serious damage, irreparable corneal and/or retinal damage, and possible blindness to one or both eyes. Do not allow any reflective object to fall into, or obstruct the path of the laser beam. Always wear protective eyewear. Any person present during the laser operation must wear protective evewear. • Never look directly into the end



• Blocks 1064nm + 630-650 aiming • Meets ANSI Safety Standards

of any therapy hand piece.

- Never direct the laser light directly into the eyes, or direct the laser beam at anything other than the area to be treated with or without the correct Safety Goggles.
- Do not remove the Safety Goggles until the administrator of the laser has turned off the laser or notified the patient that it is safe to remove them.

#### LASER SAFETY CHECKLIST

Checklist for the Laser **Operator and Laser** Safety Officer

 Appropriate warning signs posted



- Visually inspect and clean all optical connectors for dirt, debris, etc.
- Inspect laser for proper function
- Visually inspect and clean all Safety Goggles
- Safety Goggles available for all persons in Nominal Hazard Zone
- Extra Safety Goggles placed outside treatment room if necessary
- Sources of potential laser beam reflection and scatter controlled
- Treatment protocol established for patient
- Laser injury management protocol in place for accidental injury
- Document laser treatment and post-treatment outcome

## **Specifications**

Specifications	
Туре	Value
Class IV	HILT
Nd:Yag	Neodymium-doped yttrium aluminum garnet
1064nm	
Spot Size:	5mm or 10mm
Peak Power:	up to 16.6kW
Energy:	100mJ to 2000mJ
Average Power:	20W max
Modulation:	30Hz max
Selectable Hz:	10hz, 15hz, 20hz 25hz, 30hz
Aiming beam:	635 or 650nm

#### **General Specifications**

Туре	
Mains voltage	230 V~
Mains frequency	50 ÷ 60 Hz
Absorbed electrical power	2760 VA (max)
Dimensions	33x75x95 (LxWxH) cm
Weight	approx. 80 Kg
External connections	Footswitch Remote interlock
Cooling circuit	Sealed with a liquid/air heat exchanger
Electrical protection type	1
Employment modality	Intermittent: use for 15min, pause for 5min
Operating temperature	from 10°C to 30°C
Storage temperature	from 5°C to 50°C
Laser class	4

### **Nd:YAG Laser Source** Wavelength 1064nm (1,06µm) Laser beam delivery method 1000µm optical fiber and handpiece Maximum output energy 2000mJ Output mode | Multimode circular Pulse length 130µs max Diameter of laser beam (spot size) 5 mm, 10 mm, 8,2 mm\* Divergence output of handpiece 40 (5mm spot size) full angle) [mrad] 60 (10mm spot size) 240 (10mm spot size w/ "OCT") Nominal Ocular Hazard Distance (NOHD) 209m

#### **Specifications**

Finger Switch
Foot pedal
Fiber Optic Cable
Water Cooled
Efficient Cooling Fans
Color Touch Screen
1 Year "Gold" Warranty
Disposables: Optical Tips, flashlamps (3mm pulses average)
Several patents pending

### Glossary

#### Coherence

The photons within a laser beam are extremely well organized and directional. This means that all of the photons (energy) have waves that travel in unison - they are highly parallel with a specific wavelength. true laser systems focus all of their energy in one direction in a very concentrated line. a super-luminous diode, on the other hand, diffuses its energy in all directions with only a small percentage of the energy travelling in the direction of the treatment. a true laser system will deliver 90% more power to the treatment area than a super-luminous diode system of exactly the same power rating.

#### Collimation

A property of light commonly associated with lasers and accomplished with focusing lenses where all the photons are traveling in the same direction.

#### Continuous Wave (CW)

A laser with a continuous output of laser radiation for a duration that is greater than or equal to 0.25 seconds.

#### Dose

The term dose is an estimate of a therapy which produces a desired therapeutic action without harmful side effects. The therapeutic dose (safe and effective) range is defined by clinical evaluation of the response of a sufficient number of patients, generally 50 percent who improve without toxicity. The most important parameter in laser therapy is always the dose, often referred to as "fluence". By dose

#### Dosing

most common dosing technique in laser therapy is the energy density delivered to the surface of the tissue which is typically expressed in J/cm2.

#### Duty Cycle

Relates to the amount of time the light source is active, usually from 10% to 100%, a laser operating in continuous wave is running at 100% duty cycle.

#### **Energy Density**

The energy density expresses the total amount of energy delivered per unit area, in joules per square centimeter, j/cm2. The energy is measured in joules, and is calculated by multiplying the power output of the laser times the amount of time elapsed during the laser treatment. (energy = power x time, and the units are joules = watts x seconds.) a 4 watt continuous wave laser would deliver 240 joules in one minute. (4 watts x 60 seconds = 240 joules) then simply divide the total energy by the area to arrive at the energy density in joules per centimeter squared.

#### Extracellular Matrix (ECM)

is the extracellular part of animal tissue that usually provides structural support to the animal cells in addition to performing various other important functions. The extracellular matrix is the defining feature of connective tissue in animals.

(d) is meant the energy (e) of the light directed at a given unit of area (a) during a given session of therapy. The energy is measured in joules (j), the area in cm2 and consequently, the dose in j/cm2.

Extracellular matrix includes the interstitial matrix and the basement membrane. Interstitial matrix is present between various animal cells (i.e., in the intercellular spaces). Gels of polysaccharides and fibrous proteins fill theinterstitial space and act as a compression buffer against the stress placed on the ECM

#### Fluence

a measure of instantaneous power output from the laser typically measured in watts

#### Frequency

The frequency of light is inversely proportional to its wavelength, and is dependent upon the energy value of the individual photons being emitted. The higher the frequency, the higher the energy, and the shorter the wavelength.

#### Heat shock proteins (HSP)

are a group of proteins induced by heat shock, the most prominent members of this group are a class of functionally related proteins involved in the folding and unfolding of other proteins. Their expression is increased when cells are exposed to elevated temperatures or other stress. This increase in expression is transcriptionally regulated. The dramatic upregulation of the heat shock proteins is a key part of the heat shock response and is induced primarily by heat shock factor (HSF). HSPs are found in virtually all living organisms, from bacteria to humans.

#### Infrared Radiation (IR)

This is invisible radiation of wavelengths from 700nm - 1mm. this part of the electromagnetic spectrum

#### Glossary continued

is broken down into 3 bands: near infrared (IR-A) 700nm -1400nm, mid infrared (IR-B) 1400nm - 3,000nm, and far infrared (IR-C) 3,000nm - 1mm.

#### Irradiance

The power per unit area expressed in watts per square centimeter (w/ cm2). It is also referred to as power density and applies to cw lasers.

#### Laser Diode

A semiconducting device which emits monochromatic non-ionizing radiation by a process of stimulated emission. a laser beam has a number of unique properties, such as coherence, polarization and directionality. Beams emitted by laser diodes are not, as is often stated, 'straight' and/ or 'parallel'. Unless manipulated with additional optical devices such as lenses, a laser diode's beam is broadly divergent along one plane and narrowly divergent along the perpendicular plane, producing an elliptical cross-section.

#### Laser Safety Officer (LSO)

The LSO is responsible for monitoring the control of laser use and implementing the laser safety program.

#### Laser

Light amplification by stimulated emission of radiation; refers to the specific qualities and methods by which lasers produce light.

Originally theorized and defined by Albert Einstein in 1917, it was not produced until the 1950s. Laser light is coherent, has a monochromatic wavelength, is collimated, and polarized. These

four characteristics differentiate lasers from LED&SLD light sources.

#### Light

Is a small spectrum of electromagnetic energy with wavelengths between 380 nanometers (nm) and 760nm in length. This spectrum of energy is visible to the naked eye.

Maximum Permissible Exposure (MPE): The maximum level of laser radiation to which a human can be exposed without harmful effects to the eye or skin.MPE values for eye exposure to direct beam viewing can be found in table 5 of ANSI Z136.1 Standard.

#### Monochromatic

Contains one specific wavelength of light (one specific color). It is an exclusive property of laser light, setting them apart from all other light sources. Because the wavelength of laser light determines its effect on tissue, the monochromatic property of laser light allows energy to be delivered to specific tissues in specific ways. Non-laser therapies such as LED's (light emitting diodes) are sufficient for superficial treatment (wounds), but are questionable on penetration for musculoskeletal

conditions. Lasers penetrate deeper.

#### Nominal Hazard Zone (NHZ)

An area where the MPE is exceeded for the laser radiation emitted.

#### **Optical Density (OD)**

is the base ten logarithm of the reciprocal of the transmittance. The OD is calculated for protective eyewear to reduce the transmission density to the safe MPE level.

#### Penetration

Refers to the distance an energy wave travels into the tissue before it is absorbed and dissipated as heat or molecular vibration. Penetration is a physical and thermal phenomenon, not a therapeutic phenomenon. Penetration of laser light is dependent on the wavelength of the light. Lower wavelengths are absorbed by hemoglobin and melanin, and higher wavelengths are absorbed by water in the tissues.

#### Photobiomodulation

When biomodulation occurs from a photon transferring its energy to a chromophore it is referred to as photobiomodulation.

#### Physiological Dose of Therapy

A physiological dose of any therapy is designed to stimulate production of, or provide to the body what it needs to normalize and heal itself through biomodulation. The symptomatic response to a physiological dose of therapy is dependent of the capacity of the patient's body to respond to the therapy. The physiological dose of any treatment has specific advantages. A physiological dose represents the body's own response to a stimulus. A physiological dose generally improves the patient's health.

#### Power Density

Is amount of power delivered per unit area. Power density indicates the degree of concentration of the laser output. it is expressed in watts per square centimeter, or milliwatts per square centimeter, w/cm2 or mw/ cm2. Some studies have concluded that the power density may be of even greater significance than the dose. Example: a laser's output is 4 watts, and it is illuminating a circle of 3 centimeter diameter. first find the area of the circle,  $3.14 \times 1.5 \times 1.5$ = 7 cm2. Then divide the power by the area,  $4w / 7cm^2 = 0.6 w/cm^2$ .

Power = energy / time 1 watt = 1 joule / second. It is important not to confuse power and energy, although they are closely related. Power is the rate at which energy is delivered, not an amount of energy itself.

#### Pulsed (Simulated)

In most modern therapeutic lasers, the pulsing is simulated by mechanically or electronically interrupting the output of a continuous beam laser. The pulse

rate may be adjusted up or down without significantly affecting treatment time. This is accomplished by modulating pulse duration and/ or the space between pulses.

#### Pulsed Laser

A laser that delivers energy in single or multiple pulses which are less than or equal to 0.25 seconds in duration.

### Radiant Exposure

radiant energy per unit area expressed in joules per square centimeter (j/cm2). Radiant exposure applies to pulsed lasers.

### Ultraviolet Radiation (UV) Invisible radiation that has 3 regions; near ultraviolet (UV-

wavelengths from 180nm - 400nm. UV radiation is broken down into A)-315nm - 400nm, mid ultraviolet (UV-B)-280nm - 315nm, and far ultraviolet (UV-C)-100nm - 280nm. Visible Radiation

Is radiation that is visible to the human eye. The wavelengths are from 400nm - 700nm. At these wavelengths the eye can focus the light onto the retina increasing the radiant exposure by 100,000 times.

#### Wavelength

the property that differentiates different spectrums of energy within the electromagnetic spectrum of

energy is wavelength. The wavelength of light is measured in billionths of a meter, or nanometers (nm). The energy of a wave is inversely proportional to its wavelength. In other words, the greater the energy, the shorter (smaller) the wavelength. Light of shorter wavelength carries greater the energy of the light. As wavelength becomes longer, the energy carried is less. Some wavelengths work better than others for therapy.

Wavelength is the prime determinant of tissue penetration. The wavelength is very specific for cell absorption. In the infrared (IR) spectrum, the longer wavelengths penetrate deeper and a greater percentage of the laser light will be transmitted in a forward direction. This means less scatter and better results. Each photon contains energy and just as energy of the ocean comes to shore in waves of high and low energy, the same is true of photons. Only with photons the energy is not measured by the height of the wave but the number of waves the photon carries. These waves are measured in two ways, the number of wayes that will pass a given point in one second, or wavelength, the distance between one wave and the next.

### **Technical Terminology**

#### **ABBREVIATIONS**

		NUMERUEAIURE
Α	Amperes	Bioregulating Laser
AC	Alternating Current	<b>Biostimulation Laser</b>
cm	Centimeter	Class III Laser Therapy
CW	Continuous Wave	Class IV Laser Therapy
Hz	Hertz	Cold Laser Therapy
J	Joule	DTL: Deep Tissue Laser
μm	Micrometers	HILT: High Intensity Laser TI
μs	Microsecond	HPLT: High Power Laser The
mA	Milliamp	Light Emitting Diode Therap
mm	Millimeter	LILT: Low-intensity Laser Th
mS	Millisecond	LLLT: Low-level Laser Thera
mW	milliWatts	Low Energy Photon Therapy
nm	Nanometer	Low Power Laser Therapy
°C	Degrees Celsius	Low Reactive Laser Therapy
PW	Pulsed Wave	Medical Laser
S	Second	Photobiomodulation Therap
SP	Super Pulsed	Phototherapy
W	Watts	Soft Laser Therapy
		Therapeutic Laser

**Equine Anatomy Directional Terms** 

Ventral

Caudal

Cranial

Cranial

#### NOMENCI ATURE

herapy erapy οу nerapy ару ŊУ

Caudal

Dorsal

Proximal

Distal

Rostral

Dorsal

Cranial

Dorsal

Ventral

American National Standards Institute, ANSI Z136.1 "Safe Use Of Lasers". This standard establishes occupational exposure limits and laser safety practices in the United States.

Caudal

Plantar Dorsal Palmar

### **RLT Vet<sup>TM</sup> Qualification and Patient Selection**

#### **ENROLLMENT QUALIFICATION** AND PATIENT SELECTION

Horses referred for treatment with the RLT Vet<sup>™</sup> laser must be thoroughly evaluated and vetted to avoid over or under treating. Since it is common for lameness, limb soreness and soft tissue injuries to be caused by asymmetrical weight bearing due to pain from the cervical vertebrae, back pelvis, diagonal or contralateral limb abnormalities, etc., a remote cause for any injury should be ruled out.

Thorough clinical examinations are necessary and other diagnostic modalities, especially scintigraphy should be used if a remote cause for the injury is suspected. Treating a distal extremity injury with the laser that is initiated by a remote cause is unproductive since the injury will most likely recur if the primary problem is not found and also treated.

In addition to signalment (age, sex, breed) the use of the horse needs to be considered. The time of injury onset and degree of lameness should be recorded. The amount of pain on palpation and response to any limb flexion needs to be noted. Treatment settings are adjusted for the level of pain and whether or not the image is recent or chronic.

Ancillary treatment with a game ready device or icing to help remove/reduce swelling is indicated. Icing prior to RLT Vet<sup>™</sup> treatment allows constriction of blood flow and collection of fluids. This causes deeper photon penetration due to less accumulation of subcutaneous fluids/edema. Horses with corticosteroids on board is contraindicated and must wait 90 days before commencement of RLT Vet™.

So, case selection is critical. We recommend a waiting period of approximately six months for horses that have been treated with everything therapeutic such as shockwave, PRP, stem cell, etc.

# Get Started

## **Tools that will Support RLT Vet<sup>™</sup> Treatment**

#### **CLOTHS**

To wipe contact tips as well as to remove gel from horse post treatment.



#### ULTRASOUND AND ACOUSTIC COUPLING GEL



#### WIRELESS DIGITAL XRAY

HOOF JACK

**CONDENSED AIR** 

### THICK KNEELING PAD













### **RLT Vet**<sup>TM</sup> — Delivery and Techniques of Application

**CONTACT THERAPY AND NON CONTACT — SCANNING THERAPY** 



### **FIRST PHASE**

#### **REBALANCING & CLEANING**

- Fluids drainage
- Analgesic effect
- Decongestion



#### **SECOND PHASE** REGENERATION **OR SEEDING**

Cell massage at the deep tissue target (cartilage, tendon, ligament etc.)



### **RLT Vet<sup>™</sup> Delivery Phases**



#### **FIRST PHASE**

• Delivery should cover several cm beyond the pathology / lesion

#### **REBALANCING & CLEANING**

- Fluids drainage
- Analgesic effect
- Decongestion

#### **SECOND PHASE**

- Delivery should be applied directly over pathology / lesion • Contact mode is light pressure

#### **REGENERATION OR SEEDING**

Cell massage at the deep tissue target (cartilage, tendon, ligament etc.)

#### **THIRD PHASE**

• Delivery should cover several cm beyond the pathology / lesion

#### **REHABILITATION FEEDING**

- Vasodilation
- Decontraction
- Myrelaxation

### **Tendon and Suspensory Branches Treatment**

#### **BEFORE TREATMENT**

- Clean treatment area with soap and water
- Frog: clean with soap and water and remove excess horny tissue of the sole with knife.
- Clip treatment area with 10 blade. This is not necessary for face, neck, back or for sale horses/show horses.
- Consider color of hair as well as skin for proper settings.
- It is recommended to provide 4 grams of aspirin daily.
- Sedation is recommended for thoroughbreds and/or fractious horses.
- Apply clear gel liberally over treatment area and beyond for all phases. Reapply as needed.
- White horses/white skin: recommended injection of Riboflavin prior to RLT Vet<sup>™</sup> therapy one time each week for greater photon absorption.
- Take video of horse for documentation.
- Game ready device or icing is indicated for use when inflammation is present for 20 minutes and to remove 10 minutes prior to RLT Vet<sup>™</sup> treatment.

#### **AFTER TREATMENT**

#### Suspensory Branches

Kinesio taping a suspensory ligament and providing tendon support is recommended after each treatment.

- Handwalk for 5-10 minutes
- Physical Therapy
- Pool/Hydrotherapy
- Chiropractic
- Standing bandage

#### **SCANNING PROTOCOLS**

Lesion documentation should be performed initially to determine if the injury is treatable with the RLT Vet<sup>M</sup>.

This should include all necessary imaging modalities to accurately document the injury. After therapy, a recheck with the same modalities should be repeated. Because tissues will continue to remodel after the therapy. Images should be repeated after one month of handwalking.

#### Tendons

The areas of interest should be clipped closely. Both superficial digital flexor tendons should be scanned with ultrasound and compared. Scans should include the medial and lateral branches of the SDF in the pastern level if indicated. The Images should be marked right or left, fore or hind and the level of the image should be marked with the "zone" method 1A, 1B, 2A, etc. or the distance from the accessory carpal bone (DACB) or tuber calcaneous (DTC) in centimeters. The cross-sectional area (CSA) of the tendons should be determined for each level. Images should be made in cross section and long axis. If there is a focal lesion, multiple long axis images should be made of the lesion and adjacent tendon to evaluate fiber alignment. Video clips should be stored to perform 3D evaluation of the fiber pattern and extended views (e.g. GE Logig view) of the tendon should be made if this technology is available. Cross beam imaging should be turned off when video clips are saved for 3D evaluation. Lateral or medial tendon lesions should also be imaged directly from the medial and lateral aspects over the lesion in sagittal and cross section planes. This is important to evaluate any adhesions that may be formed to adjacent structures, especially the inferior check ligament.

Off axis views of the tendon should be performed to document intratendonous fibrosis. This is done by directing the sound beam at an angle either proximally or distally which causes parallel fibers to appear echolucent and random fibrosis and/or fiber misalignment to appear echogenic compared to the parallel fibers. If core lesions are present, the intact tendon CSA should be measured and compared to the contralateral tendon at the same level or to average reported normal values if both tendons are affected. Since the size of the hematoma in the tendon core is variable, its CSA doesn't need to be measured. Hind SDF tendon images should be labeled starting with Z1A and B in the plantar tarsus area. Zone 2A is at the level of the suspensory ligament origin

This basic method can be used for deep digital flexor tendon injuries.

#### Suspensory Ligaments

Both suspensory ligaments should be examined sonographically. They are labeled the same as the tendon distally to the bifurcation (Zone 3A); Off axis scans to define both lobes of origin should be made. Off axis scans of the ligament body should be made to document the fibrosis and/or misaligned fibers. Fluid within the ligament will be echolucent regardless of beam direction.

The branches need to be scanned individually from medial and lateral approaches. They should be labeled Proximal (at the distal splint) level; mid and distal including long axis and cross section views. Long axis views of the branch insertions on the abaxial sesamoid bone surfaces should be made. Measuring the branches can be done in two ways: Cross sectional area (CSA) or 2 diameters; proximal to distal and abaxial to axial at 90 degrees to each other. Branches with chronic injury are often elliptical in shape. Off axis scans are important for branch injuries to document intraligamentous and periligamentous fibrosis. Areas of fibrosis will remain echogenic in off axis. They can be done weight bearing by directing the beam off axis distally or proximally Hind suspensory ligament origins should be labeled Zone 2A. Distal zones should be labeled Zones 2B, 3A, etc. ending with Zone 4A at the bifurcation. The suspensory branches should be labeled the same as the forelimb.

#### Miscellaneous Soft Tissue Injuries

The above methods of labeling the anatomy are standard. Other anatomic areas of injury that are scanned should be properly labeled as to allow interpretation by other reviewers. For example, "RF fetlock lateral coll ligament". Unlabeled images are confusing and do not allow accurate assessment.

#### Alternative Imaging Modalities

Other imaging modalities, including MRI, scintigraphy, X-Ray, CT, thermography, etc. should be used to document injuries to accurately assess the degree and location of injury.

### **RLT Vet<sup>TM</sup> Treatment Protocols**

#### **BEFORE TREATMENT**

- · Clean treatment area with soap and water
- Frog: clean with soap and water and remove excess horny tissue of the sole with knife.
- Clip treatment area with 10 blade. This is not necessary for face, neck, back or for sale horses/show horses.
- Consider color of hair as well as skin for proper settings.
- It is recommended to provide 4 grams of aspirin daily.
- Sedation is recommended for thoroughbreds and/or fractious horses.
- Apply clear gel liberally over treatment area and beyond for all phases. Reapply as needed.
- White horses/white skin: recommended injection of Riboflavin prior to RLT Vet<sup>™</sup> therapy one time each week for greater photon absorption.
- Take video of horse
- · Game ready device or icing is indicated for use when inflammation is present for 20 minutes and to remove 10 minutes prior to RLT Vet<sup>™</sup> treatment.

#### **DURING TREATMENT**

If treatment is not well tolerated, start over, reduce energy setting by 20%, evaluate. Then ramp back up each week for four weeks.

\* For Suspensory Ligament Applications -Branch, Body, Original, Proximal

Please read pages 26 and 27 which address specific treatment protocols for these applications. Additional treatment notes are found on the individual treatment application pages.

### How to Use This Guide



The image on the right is the skeletal or venous view of the horse to identifying specific underlying areas of treatment

				wee	KS 5 -	10		
Dhac		Fnergy	Hz	Dose	sec	Energy	Hz	Dose
Fingle		200	30	1200	3			
Siligie		400	25	1600	3	400	25	1600
Triple	U	400	10	1100	2	1100	10	1650
	2	1100	10	1100	2	100	25	140
	B	400	25	1400	2	100	20	

C. Laword

Medium - Dark Colored								10
		weeks 1- 4				wee	KS D -	Deco
Dhas	<u>م</u>	Energy	Hz	Dose	sec	Energy	HZ	Dose
Cinalo	-	200	30	1300	4			-
Single	U	200	25	1750	3	400	25	1750
	0	400	25	1750	5	4400	10	2000
Triple	2	1100	10	1300	2	1100	10	2000
		400	25	1550	3	400	25	1550
	6	400	25	1550	-			

Large – Dark Colored										
i	Luigo		wee		wee	ks 5 -	10 Doco			
Π	Phase	e	Energy	Hz	Dose	sec	Energy	Hz	Dose	
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Î		riple 🛛	400	10	1550	2	1100	10	2400	
			1100	10	1550	2	400	25	1700	
		B	400	25	1700	3	400	23		
	NOT									
	NOIE	:5:								

#### **TRIPLE PHASE**

Chronic, usually includes both contact and non-contact phases

#### SIZE

< 2 cm Small: Medium: 3-5 cm Large: 6-10 cm Can also be described in cm<sup>2</sup>.

#### DARK SKIN AND/OR HAIR

Microcirculation is increased with black (melanin) horses, thus causing increased thermal buildup.

#### ΗZ

Hz or pulse rate; stimulates mechanical massage and allows cells time to relax between pulses

Bone 7 Hz Nerve 2 Hz Cartilage 10 Hz Ligaments/ Tendons 10 Hz Fibroblasts 10 Hz Inflammation 25-30 Hz Myorelaxation 25-30 Hz





		we			
Phas	e	Energy	Hz	Dose	min
Single	0	300	30	1500	3
Triple	0	600	25	2000	2
	2	1000	10	1600	3
	B	600	25	1400	2

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Treat from lateral, medial, cranial angles.



#### **Dark Colored**

Phas	e	Energy	Hz	Dose	min
Single	0	200	30	1200	3
Triple	0	500	25	1800	2
	2	1000	10	1400	2
	ß	500	25	1300	2

#### **NOTES:**

After four weeks, evaluate. Add treatment weeks as needed. If lesion is 'degenerative' add 20% increase to settings





#### Light to Medium Colored

		we	eks 1	- 4		wee	ks 5	- 10	
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	m
Single	0	300	30	1500	3				
	0	600	25	2000	2	700	25	2200	1
Triple	2	1000	10	1000	2	1100	10	1100	1
	B	600	25	1400	2	700	25	1500	•

#### **IMPORTANT:**

Apply **all** phases in contact mode.

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Second phase must be carried out with joint in flexion. Use wood block, hoof jack, etc.

First and Third Phases can be done with horse weight bearing.



#### **Dark Colored**

		we	eks 1	- 4		wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1200	3				
	0	500	25	1600	2	600	25	1900	2
Triple	2	900	10	900	2	1000	10	1100	2
	ß	500	25	1100	1	600	25	1300	1

#### NOTES:





		we	eks 1	- 4	
Phas	e	Energy	Hz	Dose	min
Single	0	300	30	1500	3
	0	800	25	2000	2
Triple	2	1400	7	1000	2
	B	800	25	1500	1

#### **IMPORTANT:**

Apply all phases in contact mode.

#### **PROTOCOLS:**

Triple Phase: Treat EOD for approximately four weeks. Add additional weeks as needed if acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Region of Interest:

A - Atlas occipital joint to C2/C3

B-C2 to C4

 $\rm C-C4$  to C7

Settings are calibrated for one of the above segments.



#### Dark Colored

		we	- 4		
Phas	e	Energy	Hz	Dose	mir
Single	0	300	30	1500	3
	0	800	25	2000	2
Triple	2	1400	7	1000	2
	B	800	25	1500	1

#### NOTES:

Length of lesion in cm: Small: < 2 cm Medium: 3-5 cm Large: 6-10 cm

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.





#### Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10				
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min	
	0	500	25	1500	2	600	25	1700	2	
Triple	2	1200	10	1000	1	1800	10	1100	1	
	₿	500	25	1000	1	600	25	1100	1	

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Make sure to treat 180° around coronet band

#### **Dark Colored**

weeks 1- 4						wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
	0	500	25	1400	2	500	25	1500	2
Triple	2	1200	10	900	1	1800	10	1000	1
	ß	500	25	900	1	500	25	1100	1

#### NOTES:

Treat 180°.







#### Small – Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10				
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min	
Single	0	300	30	1500	3					
	0	800	25	3500	3	900	25	4200	3	
Triple	2	1200	10	1000	1	1400	10	1200	1	
	ß	800	25	2200	2	900	25	2900	2	

#### Medium – Light to Medium Colored

		we	eks 1	- 4		wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	1800	3				
	0	800	25	4200	4	900	25	5050	4
Triple	2	1200	10	1500	2	1400	10	1800	2
	ß	800	25	2650	2	900	25	3500	3

#### Large — Light to Medium Colored

		we	eks 1	- 4		wee	- 10		
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	2150	4				
	0	800	25	5050	4	900	25	6050	4
Triple	2	1200	10	2250	3	1400	10	2700	3
	ß	800	25	3200	3	900	25	4200	3

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD. Page 34 Treatment Protocols



#### Small – Dark Colored

		we	eks 1	- 4		wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1200	3				
	0	600	25	2800	3	700	25	3600	3
Triple	2	1100	10	900	1	1300	10	1100	1
	B	600	25	1800	2	700	25	2300	2

#### Medium – Dark Colored

		we	eks 1	- 4		wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1450	4				
	0	600	25	3350	4	700	25	4300	4
Triple	2	1100	10	1350	2	1300	10	1650	2
	ß	600	25	2150	2	700	25	2750	3

#### Large – Dark Colored

		we	eks 1	- 4		wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1750	5				
	0	600	25	4000	4	700	25	5150	5
Triple	2	1100	10	2050	3	1300	10	2500	3
	ß	600	25	2600	3	700	25	3300	3

#### NOTES:

This treatment is divided into three segments: Canon bone area, pastern, and frog. (See also heels, bulbs and frog settings.)

Length of lesion in cm:

Small: < 2 cm Medium: 3-5 cm Large: 6-10 cm

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.



#### Light to Medium Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	1500	3				
	0	600	25	3000	3	700	25	3600	3
Triple	2	1200	10	1600	2	1400	10	1900	2
	₿	600	25	2100	2	700	25	2500	2

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

This treatment includes desmitis within the fetlock joint (medial, lateral, intersesamoid ligaments) and in the pastern region (straight, oblique, and collateral ligaments) as well as carpal, tarsal, stifle, elbow joints.

#### Dark Colored

		weeks 1- 4				wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1200	3				
Triple	0	500	25	2400	3	700	25	3100	3
	2	1100	10	1400	2	1300	10	1700	2
	ß	500	25	1700	2	600	25	2200	2

#### NOTES:





#### Medium – Light to Medium Colored

		we			
Phase		Energy	Hz	Dose	min
Single	0	300	30	1600	3
	0	400	25	2200	4
Triple	2	1000	5	1400	5
	B	400	25	1500	3

#### Large — Light to Medium Colored

		•						
		we	weeks 1-4					
Phas	e	Energy	Hz	Dose	min			
Single	0	300	30	1800	3			
	0	400	25	2400	4			
Triple	2	1000	5	1700	6			
	B	400	25	1700	3			

#### **IMPORTANT:**

Apply all phases in contact mode.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately 4 weeks. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD. This treatment may include lesions from neck to withers to tail for regenerative purposes. Please use Single Phase for pain management of entire spinal ligament.

When treating near the mane, use an oblique direction to target ligament.



#### Medium - Dark Colored

		we			
Phas	e	Energy	Hz	Dose	min
Single	0	200	30	1300	4
	0	300	25	700	4
Triple	2	900	5	1300	5
	B	300	25	1200	3

#### Large - Dark Colored

					_
		we	eks 1	- 4	
Phas	e	Energy	Hz	Dose	min
Single	0	200	30	1400	4
	0	300	25	1900	4
Triple	2	900	5	1500	6
	B	300	25	1300	3

#### NOTES:

Length of lesion in cm: Medium: 5 x 45 cm Large: 5 x 80 cm

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.





#### Light to Medium Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	1500	3				
	0	600	25	2000	2	700	25	2200	2
Triple	2	1000	10	800	1	1200	10	900	1
	B	600	25	1400	2	700	25	1500	1

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Second Phase must be carried out with joint in flexion. First and Third Phases can be done with horse weight bearing.

#### Dark Colored

		weeks 1- 4				wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1200	3				
	0	500	25	1600	2	600	25	1900	2
Triple	2	900	10	700	1	1100	10	800	1
	ß	500	25	1100	1	600	25	1300	1

#### NOTES:







	we	eks 1	- 4		weeks 5 - 10			
Phase	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single 🕦	1600	10	2100	2	2000	10	3000	3

#### PREP:

Clean the lateral grooves area with knife. Wash with soap and water. Use extra gel and plastic contact tip, **not glass**. Do not use same plastic contact tip more than 15 times.

#### **PROTOCOLS:**

Single Phase: Treat in contact mode using gel. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

This treatment is associated with Deep Digital Flexor Tendon settings and Heels and Bulbs.

#### Dark Colored

	we	eks 1	- 4		wee			
Phase	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single 🕕	1800	10	1800	2	2000	10	2700	2

#### **NOTES:**

If not well tolerated, reduce Hz down to 7 or even less. Decreasing energy setting here, reduces depth of penetration to target tissue.

It is recommended to give 4-6 grams of aspirin per day orally at least one hour prior to treatment.





#### Small - Light to Medium Colored

		we	weeks 1- 4				
Phas	e	Energy	Hz	Dose	min		
Single	0	300	30	1500	3		
	0	600	30	1500	1		
Triple	2	1400	10	1500	2		
	B	600	30	1000	1		

#### Medium – Light to Medium Colored

		5			
		we	eks 1	- 4	
Phas	e	Energy	Hz	Dose	min
Single	0	300	30	2000	4
	0	600	30	2000	3
Triple	2	1400	10	3000	4
	ß	600	30	2100	2

#### Large — Light to Medium Colored

		we	weeks 1- 4				
Phase		Energy	Hz	Dose	min		
Single	0	300	30	2500	5		
	0	600	30	4500	4		
Triple	2	1400	10	4500	5		
	ß	600	30	3100	3		

#### **IMPORTANT:**

Apply all phases in contact mode.

#### PROTOCOLS:

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately four weeks. Add additional weeks as needed. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

These settings are for one side.

#### Small – Dark Colored

		we			
Phas	e	Energy	Hz	Dose	min
Single	0	300	30	1200	2
	0	500	25	1200	2
Triple	2	1400	10	1400	2
	ß	500	25	800	1

#### Medium - Dark Colored

		we			
Phas	e	Energy	Hz	Dose	min
Single	0	300	30	1500	3
	0	500	25	2400	3
Triple	2	1400	10	2400	3
	₿	500	25	1600	2

#### Large – Dark Colored

		we			
Phas	e	Energy	Hz	Dose	min
Single	0	300	30	2000	4
	0	500	25	3600	5
Triple	2	1400	10	3600	4
	B	500	25	2500	3

#### **NOTES:**

Length of lesion in cm:

Small 5 x 10 cm; Medium 5 x 20 cm; Large 5 x 30 cm.

If lesion is 'degenerative' add 20% increase to settings.

#### **RECOMMENDED:**

Trigger Point therapy prior to this protocol. This will assist in muscle relaxation.After four weeks, evaluate. Add treatment weeks as needed.







		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
	0	500	25	1500	2	600	25	1700	2
Triple	2	1200	10	1000	1	1800	10	1100	1
	3	500	25	1000	1	600	25	1100	1

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Make sure to treat  $180^\circ$  around coronet band

#### Dark Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
	0	500	25	1400	2	500	25	1500	2
Triple	2	1200	10	900	1	1800	10	1000	1
	ß	500	25	900	1	500	25	1100	1

#### NOTES:

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.





#### Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	m
	0	600	25	2000	2	800	25	2200	2
Triple	2	1000	10	1000	2	1100	10	1100	2
	ß	600	25	1400	2	800	25	2000	2

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Second Phase must be carried out with joint in flexion. First and Third Phases can be done with horse weight bearing.

#### **RECOMMENDED:**

Use of hoof jack or elevation of hoof for low ringbone lesions affecting coffin bone, (See Hoof settings.)

#### Dark Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
	0	500	25	1600	2	600	25	1900	2
Triple	2	900	10	900	2	1000	10	1100	2
	ß	500	25	1100	1	600	25	1300	1

#### **NOTES:**







#### Small – Light to Medium Colored

		we	eks 1	- 4		wee			
Phas	е	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	1500	3				
	0	800	25	3500	3	900	25	4200	3
Triple	2	1200	10	1000	1	1400	10	1200	1
	B	800	25	2200	2	900	25	2900	2

#### Medium – Light to Medium Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	1650	3				
	0	800	25	3800	3	900	25	4600	3
Triple	2	1200	10	1200	2	1400	10	1400	2
	B	800	25	2500	2	900	25	3200	2

#### Large — Light to Medium Colored

		we	eks 1	- 4		wee	eks 5	- 10	
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	1800	3				
	0	800	25	4200	4	900	25	5000	4
Triple	2	1200	10	1400	2	1400	10	1700	2
	B	800	25	2700	2	900	25	3600	3

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

#### Small – Dark Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1200	3				
	0	600	25	2800	3	700	25	3600	3
Triple	2	1100	10	900	1	1300	10	1100	1
	B	600	25	1800	2	700	25	2300	2

#### Medium — Dark Colored

		we	eks 1	- 4		wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1300	4				
-	0	600	25	3100	3	700	25	3900	4
Triple	2	1100	10	1100	2	1300	10	1300	2
	ß	600	25	2000	2	700	25	2500	2

#### Large - Dark Colored

		we	eks 1	- 4		wee	eks 5	- 10	
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1450	4				
	0	600	25	3400	4	700	25	4300	4
Triple	2	1100	10	1300	2	1300	10	1500	2
	ß	600	25	2200	2	700	25	2800	3

#### NOTES:

Length of lesion in cm: Small: < 2 cm Medium: 3-5 cm Large: 6-10 cm

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.





#### Light to Medium Colored

		we			
Phas	e	Energy	Hz	Dose	min
Single	0	300	30	1500	3
	0	400	25	1400	2
Triple	2	800	10	600	1
	B	400	25	900	2

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

After 4 weeks, evaluate. Add treatment weeks as needed.

This protocol covers several joints including: Fetlock Joint, P1, P2, P3, Carpal, Tarsal.



#### Dark Colored

		we			
Phas	e	Energy	Hz	Dose	min
Single	0	200	30	1200	3
	0	300	25	1100	2
Triple	2	700	10	500	1
	ß	300	25	800	2

#### **NOTES:**







		we			
Phase		Energy	Hz	Dose	min
Single	0	600	30	2000	2
Triple	2	1200	2	1000	7
Triple	₿	1200	2	1000	7

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Use Single Phase for one week, non contact. Then Triple Phase contact mode only for 2-3 additional weeks.

#### Dark Colored

		we	eks 1	- 4	
Phas	e	Energy	Hz	Dose	mir
Single	0	500	30	1600	2
Triple	2	1200	2	800	6
inple	ß	1200	2	800	6

#### **NOTES:**

Aim down into laminae, around coronet band from dorsal angle. Flexion of fetlock could benefit.

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.





#### Small - Light to Medium Colored

		we			
Phas	e	Energy	Hz	Dose	min
Single	0	600	30	2000	2
Triple	0	1200	10	1500	2

#### Medium – Light to Medium Colored

		we	weeks 1- 4				
Phas	e	Energy	Hz	Dose	min		
Single	0	600	30	3000	3		
Triple	0	1200	10	3000	4		

#### Large — Light to Medium Colored

		we	weeks 1- 4			
Phas	e	Energy	Hz	Dose	min	
Single	0	600	30	4500	4	
Triple	0	1200	10	4500	6	

#### **IMPORTANT:**

Apply all phases in contact mode.

#### **PROTOCOLS**:

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately four weeks. Add additional weeks as needed. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.



#### Small – Dark Colored

		we	weeks 1- 4				
Phas	e	Energy	Hz	Dose	min		
Single	0	500	30	1600	2		
Triple	0	1200	10	1400	2		

#### Medium – Dark Colored

		weeks 1- 4				
Phas	e	Energy	Hz	Dose	min	
Single	0	500	30	2400	3	
Triple	0	1200	10	2400	3	

#### Large – Dark Colored

		weeks 1- 4				
Phas	e	Energy	Hz	Dose	min	
Single	0	500	30	3600	4	
Triple	0	1200	10	3600	5	

#### NOTES:

Length of lesion in cm:

Light to Medium Colored: Small 5 x 10 cm; Medium 5 x 20 cm; Large 5 x 30 cm. Dark Colored: Small 100 cm2; Medium 225 cm2; Large 400 cm2.

If lesion is 'degenerative' add 20% increase to settings.

#### **RECOMMENDED:**

Trigger Point therapy prior to this protocol. This will assist in muscle relaxation.







		weeks 1- 4			
Phase		Energy	Hz	Dose	min
Single	0	300	30	1500	3
	0	800	25	2500	2
Triple	2	1600	2	1000	5
	B	800	25	1700	1

#### **IMPORTANT:**

Apply **all** phases in contact mode.

#### **PROTOCOLS**:

Single phase: Treat daily for 7-14 days, then evaluate. Triple phase: Treat EOD for approximately 4 weeks. Add additional weeks as needed. If acute inflammation is present, then treat everyday

for three days until resolved. Then treat EOD.

Both applications are in contact mode only.

#### Dark Colored

		we			
Phase		Energy	Hz	Dose	min
Single	0	200	30	1200	3
	0	700	25	2300	2
Triple	2	1600	2	900	5
	ß	700	25	1600	2

#### **NOTES:**

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.





#### Small — Light to Medium Colored

			weeks 1- 4			
Phas	e	Energy	Hz	Dose	min	
	0	800	25	3500	3	
Triple	2	1400	7	2500	4	
	8	800	25	2400	2	

#### Medium – Light to Medium Colored

		we			
Phas	e	Energy	Hz	Dose	min
	0	800	25	3800	3
Triple	2	1400	7	3000	5
	ß	800	25	2700	2

#### Large — Light to Medium Colored

		we			
Phase		Energy	Hz	Dose	min
	0	800	25	4200	4
Triple	2	1400	7	3600	6
	ß	800	25	2900	2

#### **IMPORTANT:**

Apply all phases in contact mode.

#### **PROTOCOLS**:

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately four weeks. Add additional weeks as needed. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Use contact tip for all three phases of this treatment. For acute conditions, please see Sore Backs.



#### Small – Dark Colored

		we						
Phase		Energy	Hz	Dose	min			
	0	800	25	2800	2			
Triple	2	1400	7	2000	3			
	₿	800	25	2000	2			

#### Medium - Dark Colored

	weeks 1- 4				
Phase		Energy	Hz	Dose	min
	0	800	25	3100	3
Triple	2	1400	7	2400	4
	₿	800	25	2200	2

#### Large – Dark Colored

		we			
Phase		Energy	Hz	Dose	min
	0	800	25	3400	3
Triple	2	1400	7	2900	5
	ß	800	25	2400	2

#### **NOTES:**

Small 100 cm2; Medium 225 cm2; Large 400 cm2.







		we	eks 1	- 4		weeks 5 - 10			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	1500	3				
	0	600	25	1800	2	700	25	2200	2
Triple	2	1000	7	1000	2	1200	7	1200	2
	ß	600	25	1500	2	700	25	1540	1

#### **PROTOCOLS**:

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

#### **Dark Colored**

		we	eks 1	- 4		weeks 5 - 10			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1200	3				
	0	500	25	1400	2	600	25	1700	2
Triple	2	900	7	900	2	1100	7	1100	2
	ß	500	25	1200	2	600	25	1400	2

#### **NOTES:**

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.

#### Medium – Light to Medium Colored

	we	eks 1	- 4	
Phase	Energy	Hz	Dose	min
Single 🕕	400	30	4900	7

#### Large — Light to Medium Colored

	we	eks 1	- 4	
Phase	Energy	Hz	Dose	min
Single 🕕	400	30	5400	8

#### **IMPORTANT:**

Apply in contact mode.

#### **PROTOCOLS**:

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately four weeks. Add additional weeks as needed. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

This treatment is single phase contact only.

#### Medium – Dark Colored

		weeks 1- 4						
Phase	En	nergy	Hz	Dose	min			
Single 🕻		400	25	3900	7			

#### Large - Dark Colored

	we	eks 1	- 4	
Phase	Energy	Hz	Dose	min
Single 🕕	400	25	4300	7

#### NOTES:

Length of lesion in cm: Medium 5 x 45 cm Large 5 x 80 cm

If lesion is 'degenerative' add 20% increase to settings.

#### **RECOMMENDED:**

Trigger Point therapy prior to this protocol. This will assist in muscle relaxation.

After 4 weeks, evaluate. Add treatment weeks as needed.





	weeks 1- 4					weeks 5 - 10					
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min		
Single	0	300	30	1500	3						
	0	0	600	25	2600	3	700	25	2900	3	
Triple	2	1200	10	1300	2	1400	10	1400	2		
	ß	600	25	1800	2	700	25	2000	2		

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Treat from lateral, medial, cranial angles.



#### **Dark Colored**

		we	eks 1	- 4		wee	- 10		
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1200	3				
Triple	0	500	25	2100	3	600	25	2500	3
	2	1100	10	1200	2	1300	10	1300	2
	ß	500	25	1500	2	600	25	1800	2

#### NOTES:

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.





#### Small - Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10				
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	mi	
Single	0	300	30	1500	3					
	0	600	25	2500	3	600	25	3000	3	
Triple	2	1000	10	800	1	1200	10	1000	1	
	ß	600	25	1700	2	600	25	2100	2	

#### Medium – Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10					
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	m		
Single	0	300	30	1800	3						
	0	600	25	3000	3	600	25	3600	4		
Triple	2	1000	10	1200	2	1200	10	1500	2		
	ß	600	25	2100	2	600	25	2500	3		

#### Large - Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10				
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	mi	
Single	0	300	30	2150	4					
Triple	0	600	25	3600	4	600	25	4300	5	
	2	1000	10	1800	3	1200	10	2250	3	
	B	600	25	2500	3	600	25	3000	3	

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

#### Small – Dark Colored

			we	eks 1	- 4		wee			
	Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
	Single	0	200	30	1100	3				
ľ		0	500	25	2000	3	500	25	2600	3
	Triple	2	900	10	700	1	1100	10	800	1
		ß	500	25	1400	2	500	25	1800	2

#### Medium – Dark Colored

			we	eks 1	- 4		wee			
	Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
S	ingle	0	200	30	1300	4				
		0	500	25	2400	3	500	25	3100	4
Т	Triple	2	900	10	1050	2	1100	10	1200	2
		₿	500	25	1700	2	500	25	2100	3

#### Large - Dark Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1550	4				
	0	500	25	2900	4	500	25	3700	5
Triple	2	900	10	1600	3	1100	10	1800	3
	₿	500	25	2000	3	500	25	2600	3

#### NOTES:

Length of lesion in cm:

Small: < 2 cm Medium: 3-5 cm Large: 6-10 cm

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings. These settings also apply to tendon sheath.







#### Small - Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10					
Phas	е	Energy	Hz	Dose	min	Energy	Hz	Dose	min		
Single	0	300	25	1500	3						
	0	600	25	2500	3	700	25	3000	3		
Triple	2	1200	10	1000	1	1400	10	1200	1		
	B	600	25	1700	2	700	25	2100	2		

#### Medium – Light to Medium Colored

		we	eks 1	- 4		wee				
Phas	е	Energy	Hz	Dose	min	Energy	Hz	Dose	min	
Single	0	300	30	1650	3					
	0	600	25	2700	3	700	25	3300	3	
Triple	2	1200	10	1200	2	1400	10	1400	2	
	ß	600	25	1900	2	700	25	2300	2	

#### Large — Light to Medium Colored

	weeks 1- 4					wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	1800	3				
	0	600	25	3000	3	700	25	3600	3
Triple	2	1200	10	1400	2	1400	10	1700	2
	B	600	25	2100	2	700	25	2500	2

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

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#### Small – Dark Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1200	3				
Single	0	500	25	2000	3	600	25	2600	3
Triple	2	1100	10	900	1	1300	10	1100	1
	ß	500	25	1400	2	600	25	1800	2

#### Medium – Dark Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1300	4				
Single	0	500	25	2200	3	600	25	2800	3
Triple	2	1100	10	1100	2	1300	10	1300	2
	₿	500	25	1500	2	600	25	2000	2

#### Large – Dark Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1450	4				
Triple	0	500	25	2400	3	600	25	3100	3
	2	1100	10	1300	2	1300	10	1500	2
	ß	500	25	1700	2	600	25	2200	2

If lesion affects bone in addition to ligament, then use 7 Hz instead of 10 hz for contact phase for 30 days.

#### NOTES:

Length of lesion in cm:

Small: < 2 cm Medium: 3-5 cm Large: 6-10 cm

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.

These settings also apply to tendon sheath.





#### Small - Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10				
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	m	
Single	0	300	30	1500	3					
	0	500	25	1400	2	600	25	1700	1	
Triple	2	1000	10	800	1	1200	10	1000	•	
	ß	500	25	900	1	600	25	1100	•	

#### Medium – Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10					
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	m		
Single	0	300	30	1650	3						
	0	500	25	1500	2	600	25	1800	2		
Triple	2	1000	10	900	2	1200	10	1200	2		
	B	500	25	1100	1	600	25	1300	1		

#### Large - Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10				
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	mi	
Single	0	300	30	1800	3					
	0	500	25	1700	2	600	25	2200	2	
Triple	2	1000	10	1100	2	1200	10	1400	2	
	3	500	25	1200	2	600	25	1400	2	

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.



#### Small – Dark Colored

		we	eks 1	- 4		weeks 5 - 10				
Phas	е	Energy	Hz	Dose	min	Energy	Hz	Dose	min	
Single	0	200	30	1200	3					
	0	400	25	1100	2	500	25	1400	2	
Triple	2	900	10	700	1	1100	10	800	1	
	B	400	25	800	1	500	25	1000	1	

#### Medium – Dark Colored

			we	eks 1	- 4		wee			
	Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
	Single	0	200	30	1300	4				
ľ	Triple	0	400	25	1200	2	500	25	1500	2
		2	900	10	800	2	1100	10	900	1
		8	400	25	900	2	500	25	1100	1

#### Large - Dark Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1450	4				
	0	400	25	1300	2	500	25	1700	2
Triple	2	900	10	1000	2	1100	10	1100	2
8		400	25	1000	2	500	25	1200	2

#### NOTES:

This treatment includes medial, lateral, and extensor branches.

Length of lesion in cm:

```
Small: < 2 cm Medium: 3-5 cm Large: 6-10 cm
```

# **Suspensory Ligament Origin / Proximal**



#### Small - Light to Medium Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	1500	3				
	0	800	25	2500	2	800	25	3000	3
Triple	2	1400	10	1000	1	1700	10	1200	1
	ß	800	25	1700	1	1000	25	2100	1

#### Medium – Light to Medium Colored

		we	eks 1	- 4		weeks 5 - 10				
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min	
Single	0	300	30	1650	3					
	0	800	25	2700	2	1000	25	3300	2	
Triple	2	1400	10	1200	1	1700	10	1400	1	
	B	800	25	1900	2	1000	25	2300	2	

#### Large — Light to Medium Colored

		we	eks 1	- 4		wee			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	300	30	1800	3				
	0	800	25	3000	3	1000	25	3600	2
Triple	2	1400	10	1400	2	1700	10	1700	2
	ß	800	25	2100	2	1000	25	2500	2

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks. If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD. Page 54 Treatment Protocols

Small – Dark Colore
---------------------

		weeks 1- 4				wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1200	3				
	0	600	25	2000	2	800	25	2600	2
Triple	2	1300	10	900	1	1500	10	1100	1
	B	600	25	1400	2	800	25	1800	2

#### Medium - Dark Colored

		we	weeks 1- 4			wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1300	4				
	0	600	25	2200	2	800	25	2800	2
Triple	2	1300	10	1100	1	1500	10	1300	1
	ß	600	25	1500	2	800	25	2000	2

#### Large – Dark Colored

		we	weeks 1- 4			wee			
Phas	е	Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1450	4				
	0	600	25	2400	3	800	25	3100	3
Triple	2	1300	10	1300	2	1500	10	1500	2
	ß	600	25	1700	2	800	25	2200	2

If treatment is not well tolerated, reduce second phase Hz from 10hz to 7hz or less. This will keep depth of penetration to Origin.

If lesion affects bone in addition to ligament, then use 7 Hz instead of 10 hz for contact phase for 30 days.

#### NOTES:

Length of lesion in cm:

Small: < 2 cm Medium: 3-5 cm Large: 6-10 cm For second phase, direction of probe should point from medial to lateral while scanning proximal to distal. If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.



#### Light to Medium Colored

		we	weeks 1- 4			weeks 5 - 10			
Phas	e	Energy	Hz	Dose	min	Energy	Hz	Dose	m
Single	0	300	30	1500	3				
	0	600	25	2000	2	700	25	2200	1
Triple	2	1000	10	1000	2	1100	10	1100	1
	B	600	25	1400	2	700	25	1500	•

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

Second phase must be carried out with joint in flexion.

First and Third Phases can be done with horse weight bearing.



#### **Dark Colored**

		we	weeks 1- 4			wee			
Phase		Energy	Hz	Dose	min	Energy	Hz	Dose	min
Single	0	200	30	1200	3				
	0	500	25	1600	2	600	25	1900	2
Triple	2	900	10	900	2	1000	10	1100	2
	B	500	25	1100	1	600	25	1300	1

#### NOTES:







		we			
Phase		Energy	Hz	Dose	sec
Single	0	200	25	200	40
	0	400	20	300	30
Triple	2	600	10	150	30
	ß	400	20	200	30

#### **IMPORTANT**:

Warning! You must cover the horses eyes when treating. Use opaque blinders, hood or black towel.

Apply all phases in contact mode.

#### **PROTOCOLS**:

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately four weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

#### Dark Colored

		we	weeks 1- 4				
Phase		Energy	Hz	Dose	sec		
Single	0	200	25	200	40		
	0	300	20	200	30		
Triple	2	500	10	100	20		
	B	300	20	200	30		

#### **NOTES:**

If lesion is 'degenerative' add 20% increase to 'energy' and 'dose' settings.



#### Small -5 x 5 cm

	we			
Phase	Energy	Hz	Dose	min
Single 🕕	200	30	500	1

#### Medium - 10 x 10 cm

	we	weeks 1- 4				
Phase	Energy	Hz	Dose	min		
Single 🕕	200	30	2000	6		

#### Large – 10 x 20 cm

		we			
Phas	e	Energy	Hz	Dose	min
Single	0	200	30	4000	11



#### **IMPORTANT:**

Do not use gel over wounds. It is recommended to use Vetericyn® Wound and Skin Care spray after each RLT Vet™ treatment.

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate.

Three-quarters of treatment time should be directly over lesion, while one-quarter time should extend 2-3 cm beyond lesion.

If lesion is 'degenerative' add 20% increase to settings.

#### NOTES:

During Tx: If not well tolerated, start over, reduce energy setting by 20%, evaluate. Then ramp back up each week for four weeks.





	we	eks 1			
Phase	Energy	Hz	Dose		seconds
Single 🌒	100	15	100	5	x 5 times

#### **PROTOCOLS:**

Single Phase: Treat daily for 7-14 days, then evaluate. Triple Phase: Treat EOD for approximately ten weeks.

If acute inflammation is present, then treat everyday for three days until resolved. Then treat EOD.

This treatment is in contact mode only for all phases.

#### **NOTES:**

Initially you must palpate the trigger point area to locate the node, then place handpiece in contact mode.

Activate laser delivery at five seconds ON and five seconds OFF for duration. So, depress the button, count for five beeps, then remove finger from fingerswitch and count five seconds

While laser is paused, and so forth. Do this a total of five times for each point.

If treatment is not well tolerated, then reduce time to three seconds. If still not tolerated, then reduce time to three seconds and Hz to 15.

Trigger points range in size typical of a pea to a peanut.



#### **TRIGGER POINTS:**

1 M. Rectus Capitis Ventralis

- 2 M. Multifdus Cervicis
- 3. M. Brachiocephalicus
- 4. M. Rhombiodeus Cervicis
- 5. M. Rhombiodeus Thoracis
- 6. M. Trapezius
- 7. M. Supraspinatua
- 8. M. Infraspinatus
- 9. Triceps Brachi Upper Portion
- 10. Triceps Brachi Lower Portion
- 11. M. Longissimus Throacis ET. Lumborum
- 12. M. Longissimus Throacis ET. Lumborum



- 13. M. Gluteus Medius
- 14. M. Biceps Femoris, Insertion
- 15 M. Semitendinsus
- 16. M. Semimembranosus
- 17. M. Biceps Femoris
- 18. M. Politea Fossa (Knee Pit)
- 19. M. Gluteus Superficialis
- 20. M. Iliocostalis Lumborum
- 21. M. Obliquus Exernus Abdominis
- 22. M. Obliquus Exernus Abdominis
- 23. M. Pectoralis Ascendens (caudal Superficial Pectoral)





		weeks 1- 4			
Phase		Energy	Hz	Dose	min
	0	800	25	5000	4
Triple	2	1600	10	2500	3
	3	800	25	3000	3

#### Light to Medium Colored

		weeks 1- 4			
Phas	e	Energy	Hz	Dose	min
	0	800	25	5000	4
Triple	2	2000	10	3500	3
	3	800	25	3000	3

#### **IMPORTANT:**

Clip treatment area at least one time each week. Use settings based on skin color.

#### **PROTOCOLS:**

Four weeks, daily, to accelerate the resorption process. Ultrasound check at one month, from the start of treatment. Looking for even a slight improvement. If you see improvement, it makes sense to continue the therapy for at least another month, if not it is better to stop treatment with RLT Vet<sup>™</sup>. In any case, recheck it again at two months from the start of therapy. You could have some positive unexpected results.

#### Dark Colored

		weeks 1- 4			
Phase		Energy	Hz	Dose	min
Triple	0	600	25	4000	4
	2	1200	10	2500	3
	B	500	25	3000	4

#### Dark Colored

		weeks 1- 4			
Phas	e	Energy	Hz	Dose	min
	0	700	25	4500	4
Triple	2	1600	10	3000	3
	₿	700	25	4000	4

### **Rehabilitative Home Care Instructions**

#### FIRST 30 DAYS POST-RLT VET<sup>™</sup> — DAILY CARE

- Bandage/wrap for support and warming
- Quiet walking 30 minutes
- Spray area with hose using cold water
- Standing bandage

#### 60 DAYS POST-RLT VET<sup>™</sup> — DAILY CARE

- Bandage
- Walk 5 minutes
- Trot 5-10 minutes
- Walk 5-10 minutes
- Spray area with hose using cold water
- Standing bandage
- \* you may use variations of trotting/walking times



\* If at any time a patient shows signs of lameness, heat, or swelling in and around pathology, stop exercising at that level and go back to level where those signs aren't present. This can be done up to six days - then resume next months therapy.

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#### 90 DAYS POST-RLT VET<sup>™</sup> — DAILY CARE

- Bandage
- Walk 5 minutes
- Trot 5 minutes
- Canter 5 minutes
- Trot 5 minutes
- Walk 5 minutes
- Spray area with hose using cold water
- Standing bandage
- \* you may use variations of trot/walk/canter times

## **Troubleshooting RLT Vet**<sup>™</sup>

### **RLT VET<sup>™</sup> RESOURCES AND ACCESSORIES**

#### Accessories

- 1. Handswitch
- 2. Footswitch
- 3. Water reservoir
- 4. Fiber
- 5. Protective eyewear

#### **SYSTEM FAULTS**

#### System Startup Fault

System not connected to mains
Correct switch position
CPU Board Fuse blown

#### **LCD FAULT**

White LCD Screen

- 1. CPU Flat cable not connected
- 2. LCD\Keyboard replacement
- 3. CPU Board Fuse blown
- 4. EPROM Replacement

#### Black LCD Screen

CPU Flat cable not connected
CPU Board fuse blown
LCD Board replacement

#### **INTERLOCK FAULT**

1. Interlock connector replacement. Also refer to RLT Vet<sup>™</sup> Service Manual

#### **TEMPERATURE FAULT**

- 1. Room temperature too high
- 2. Side air filters need cleaning
- 3. Heat exchanger fans not functioning
- 4. Thermostat not connected to CPU board
- 5. Thermostat incorrectly set
- 6. Thermostat connection to Temperature probe

#### **FLOW FAULT**

- 1. Low fluid level in reservoir
- 2. Leak in flow system
- 3. Water pump needs replacement
- 4. Connection between flowswitch and CPU Board

#### FIBER FAULT

- 1. Fiber not fully engaged
- 2. Fiber holder incorrectly positioned
- 3. Rx component replaced
- 4. Tx component replaced

#### **EC SHUTTER FAULT**

Low voltage level on CPU board
F3 fuse blown on CPU board
Voltage on "ShutEC" options incorrect
Connection between CPU board and ECShutter
EC Shutter unable to move

#### **IC SHUTTER FAULT**

Footswitch disconnected
F3 fuse is blown on CPU board
Connection between CPU board and solenoid
Shutter does not move
IC shutter position detection board

#### **SERVICE FAULT**

F3 fuse on CPU board
F1/F2 fuses on HVPS
Trigger transfer wire connection
Voltage between L+ and L- on HVPS
Flashlamp replacement
HVPS replacement

#### **SIMMER ALARM**

- 1. Low voltage on system
- 2. Flashlamp replacement
- 3. Voltage calibration

#### LOW ENERGY FAULT

- 1. Laser and dichroic mirror replacement
- 2. Peltier power meter calibration
- 3. Correct power output
- 4. Fiber alignment

#### **HIGAIMING BEAMR. FAULT**

1. Peltier power meter calibration

#### **EEPROM FAULT**

1. EEPROM replacement

## **RLT Vet<sup>™</sup> Care and Maintenance**

#### **IMPORTANT**

- Important: before turning laser off with ignition key, turn to "STANDBY" mode first.
- Keep RLT Vet<sup>™</sup> as dust-free as possible.
- Avoid bouncing RLT Vet<sup>™</sup>
- Check number of pulses: It is recommended to check every two weeks by pushing and holding the third button from the left/top of your screen. Number of pulses will display on screen.



- \* Flashlamps need to be replaced between three million and five million pulses. Call Sound-Eklin<sup>®</sup> Technical Support, 800.819.5538, to schedule your flashlamp change when you see the "3 million pulses" alert on your RLT Vet<sup>™</sup> screen.
- \* To order additional RLT Vet<sup>™</sup> parts and accessories, please log into the RLT Vet<sup>™</sup> Toolbox/User Portal website.

#### **CARE AND MAINTENANCE**

#### Handpiece

- Handpiece should be handled carefully. Avoid bumping and dropping.
- After each use, check window for any debris.
- Use condensed air can to spray away any loose debris.
- Use Q-Tip dampened in water or ethanol to remove debris.
- Use dry Q-Tip to remove any moisture.
- After each use of Optical Contact Glass or Plastic Tips, wipe thoroughly with cloth, especially proximal end.

#### To Change Handpiece Window

- Change in a sterile environment.
- Use rectangle metal window key provided.
- Insert into notches and turn gently counterclockwise.
- Remove metal plate and window.
- Use medical/latex gloves when touching and seating new window.
- Seat metal plate and use window key by turning clockwise.

#### Fiber Optic Cable

- When inserting proximal cable into laser use utmost caution so to avoid hitting end.
- Do not kink or bend too tightly the cable.
- Keep up and out of the way to avoid tripping or stepping on.
- Fiber Test: this should be performed every other day and up to at least once per week.
- Remove any tips, Insert fiber into fiber test port.
- On screen, toggle "Laser On", then "Operation", then "Fiber Test".
- When prompted, depress foot pedal and hold until test is complete.

### **RLT Vet<sup>™</sup> Care and Maintenance** continued

#### **Deionized Water and Reservoir**

- The white water cooling reservoir should remain one half to three quarters full at all times
- To check water levels remove right side panel to view reservoir.

#### Deionized Water and Reservoir is Low

- Only use deionized water
- Turn RLT Vet<sup>™</sup> off.
- With panel off, remove black cap and small white cap
- Use provided funnel and fill water to three-quarters full.
- Next, turn key quickly on then off three times to flush bubbles in system.
- Next, turn on RLT Vet<sup>™</sup> and let run for two to five minutes to allow water to flush through.
- Now, turn off RLT Vet<sup>™</sup> and see where water level is.
- Repeat as necessary until water level remains at about three-quarters full
- Keep RLT Vet<sup>™</sup> running while replacing black cap, turning until snug.
- Finally, replace white cap, twisting until snug.
- For future: if you receive "Flow" errors, try relieving pressure by slowly releasing small white cap.

#### Air Filter

- Check side panel air filers monthly.
- You may remove filters and wash with water when dirty.
- Two replacement filters are provided.

#### Electrical

It is recommended to use a multimeter to test your electrical supply every three months. The range needs to be between 220 volts and 240 volts consistently. Some generators for ambulatory use will need a line conditioner to avoid power surges. Generators should also be tested for amperage and voltage every three months or less.

#### SOUND-EKLIN<sup>®</sup> TECHNICAL SUPPORT

telephone 800.819.5538, United States only international 760.444.8618, 760.607.2489 fax 800.477.5572 fax TechSupport@soundeklin.com email

### **RLT Vet<sup>™</sup> Service**

**CHAPTER** 

#### I.1. DECLINE OF RESPONSIBILITY

El.En. is liable for effects resulting from safety, reliability and performance only if:

- operative manual (concerning either safety precautions or use of the system);
- are made by personnel having proper authorization and qualification;
- regulations.

**RLT-VET LASER SYSTEM.** 

### THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS LASER RADIATION **EXPOSURE.**

## SERVICE THE RLT-VET SYSTEM.

### SAFETY

□ the equipment is used according to all the instructions contained either in this manual or in the

□ installation, assembly, additions, changes, modifications, repairs and maintenance procedures

□ the electrical system in the area designated for the system conforms to IEC and local

### READ ALSO CAREFULLY THE OPERATOR'S MANUAL BEFORE USING THE

USE OF CONTROLS OR PERFORMANCE OF PROCEDURES OTHER THAN

ONLY HIGHLY QUALIFIED PERSONNEL TRAINED BY EL.EN. S.P.A. CAN

For more complete service information, refer to the RLT Vet<sup>™</sup> Service Manual which was provided with RLT Vet<sup>™</sup>.

### CHAPTER VII

### SERVICE MODE AND MENU

The firmware of the RLT-Vet system includes an "hidden service menu". *This menu must be entered only by service personnel.* 

#### SERVICE MENU FEATURES:

the fiber fault is IGNORED in order to let the personnel of the technical assistance to remove the fiber and measure the output power at the fiber input during the service.
For the user mode, removing the fiber makes the system switch off the laser source and display the FAULT menu until the fiber is properly connected..
This is a potential hazard.

 IT IS RECOMMENDED TO WEAR SAFETY GOGGLES WHEN THE YAG SOURCE IS SWITCHED ON.

<sup>(2)</sup> the service menu allows to change the reference voltage for all the energy levels in order to make the real output power level match the expected power level - see paragraph VI.4. -.

DO NOT CHANGE FACTORY-PRESET VALUES IF NOT REQUIRED.

③ the service menu allows to calibrate either the internal or the external power meter provided on the system.

### **RLT Vet<sup>™</sup> Service** continued

#### **VIII.4. INTERLOCK FAULT**

The INTERLOCK fault is stated if the contacts 1 and 2 of the INTERLOCK connector are open. *If there is an external interlock network*, check the external event under control, check the external network itself and check if the interlock connector was properly inserted into the apposite socket. *If there is no external interlock network*, the INTERLOCK socket can't be left not connected: insert the apposite interlock connector provided with the accessories or check that the connector is properly inserted.

![](_page_35_Figure_13.jpeg)

Fig. VIII.1 - Interlock fault

For more complete service information, refer to the RLT Vet<sup>m</sup> Service Manual which was provided with RLT Vet<sup>m</sup>. For more complete service information, refer to the RLT Vet  $^{\rm TM}$  Service Manual which was provided with RLT Vet  $^{\rm TM}$ .

#### **VIII.5. TEMPERATURE FAULT**

This fault is stated if the water thermostat - (H) in Fig. V.1, 15 in Fig. II.1 - detects overheating of the fluid which cools the laser source.

First of all, verify if the air filters on the grids located on the left and right panels of the system are clean and eventually clean them.

Then verify that the temperature of the room where the system is installed is lower than 28°C.

![](_page_36_Figure_5.jpeg)

Fig. VIII.2 - Temperature fault

For more complete service information, refer to the RLT Vet<sup>m</sup> Service Manual which was provided with RLT Vet<sup>m</sup>.

### **RLT Vet<sup>™</sup> Service** continued

#### VIII.6. FLOW FAULT

This fault is stated if the flow switch - (E) in Fig. which cools the laser source.

![](_page_36_Figure_11.jpeg)

Fig. VIII.3 - Flow fault

#### This fault is stated if the flow switch - (E) in Fig. V.1, 3 in Fig. II.1 - detects poor flow rate for the fluid

For more complete service information, refer to the RLT Vet<sup>m</sup>. Service Manual which was provided with RLT Vet<sup>m</sup>.

#### **VIII.7. FIBER FAULT**

This fault is stated if the optical fiber isn't connected at all or isn't properly connected to its apposite SMA connector.

![](_page_37_Figure_3.jpeg)

Fig. VIII.4 - Fiber fault

For more complete service information, refer to the RLT Vet™ Service Manual which was provided with RLT Vet™.

### **RLT Vet<sup>™</sup> Service** continued

#### **VIII.10. SERVICE FAULT**

This fault is stated if the flashlamp cannot be switched on during the LASER ON procedure.

![](_page_37_Figure_9.jpeg)

Fig. VIII.6 - Service fault

For more complete service information, refer to the RLT Vet<sup>™</sup> Service Manual which was provided with RLT Vet™.

#### continued **RLT Vet** Service

#### VIII.12. LOWenergy FAULT

level and the expected energy level match and the real output energy level is too low. This fault is stated if the automatic calibration procedure is not able to make the real output energy

![](_page_38_Figure_3.jpeg)

This fault is stated if the flashlamp switches off while the Nd: YAC source status is ON.

![](_page_38_Figure_5.jpeg)

Fig. VIII - 8.IIIV - Bill

Service Manual which was provided with RLT Vet<sup>TM</sup>. For more complete service information, refer to the RLT Vet  $^{\mbox{\tiny TM}}$ 

#### continued RLT Vet Service

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Service Manual which was provided with RLT Vet<sup>TM</sup>. For more complete service information, refer to the RLT Vet  $^{\mbox{\tiny TM}}$ 

#### VIII.13. HIGAiming beamr. FAULT

This fault is stated if the automatic calibration procedure is not able to make the real output energy level and the expected energy level match and the real output energy level is too high.

![](_page_39_Figure_3.jpeg)

Fig. VIII.9 - HIGAiming beamr. fault

For more complete service information, refer to the RLT Vet  $^{\rm m}$  Service Manual which was provided with RLT Vet  $^{\rm m}$ .

#### VIII.14. EEPROM FAULT

This fault condition is stated if the internal EEPROM doesn't work properly. It can be stated at the start up of the system, once the energy test is completed or when the SAVE/RESET options of the service menu are selected. Turn off the system, remove the left panel - see Chapter II - and replace the EEPROM on the CPU board - N20 -. Remember that if you replace the EEprom the pulse counter software and reference voltages will be lost.

Call the technical assistance service of the Manufacturer if the fault persists.

For more complete service information, refer to the RLT Vet<sup>m</sup> Service Manual which was provided with RLT Vet<sup>m</sup>.

![](_page_40_Picture_0.jpeg)

![](_page_40_Picture_2.jpeg)

### **Clinical Studies**

The following studies delineate the therapeutic effects observed in clinical applications derived from laser activity at cell and tissue level. RLT-Vet<sup>®</sup>, invented and patented by El.En, thanks to its characteristics, is able to decrease pain. This is due to the results of two mechanisms: the action on pain symptomatology and on inflammation at the site affected by disease. The method is safe, effective and is free of significant side effects, as evidenced by the results obtained treating a large number of patients.

AUTHORS: Viliani T, Carabba C, Mangone G, Pasquetti P

**INSTITUTIONS:** Agency for Recovery and Rehabilitation, AOU Careggi, Florence, Italy

**YEAR:** 2012

#### High Intensity Pulsed Nd:YAG Laser in painful knee osteoarthritis: the biostimulating protocol.

**JOURNAL:** Energy for Health; 9:18-22

**ABSTRACT:** Laser therapy is a widely used instrumental methodology in the physiotherapy treatment of osteoarthritis pain. High Intensity Laser Therapy (HILT, Nd:YAG laser) in last years proved to be effective in painful Knee Osteoarthritis (KO), due to its high intensity and to the depth reached by the laser ray. Several HILT protocols are available to treat this condition, in relation to the phase of the disease and to the clinical data of the patient.

Aim of this study was to analyze the clinical efficacy and the safety of HILT, using a biostimulating protocol in patients with symptomatic KO. 34 out-patients with symptomatic KO (IIIII Kellgren-Lowrence Scale stage) were enrolled and randomized to treatment (16 patients, Group A) or to waiting list (18 patients, Group B). The study is an open-label, before and after study. The treatment consisted in HILT biostimulating treatment (10 sessions, three time a week) for Group A and no treatment for Group B. The patients were assessed by WOMAC Scale, before treatment (t0), after treatment (t1) and after 4 months (t2). At the same time intervals were assessed the patients in the waiting list. HILT-treated patients showed a highly statistically significant improvement between t0 and t1 in WOMAC scale, and the improvement was maintained at follow-up (t2), while the patients in the waiting list showed a worsening tendency.

No side effect was found in the treated group. The HILT treated patients showed good clinical results, in pain and functional items. We conclude that this HILT protocol seems a good medical instrument for pain control in KO and for improvement of patient's quality of life.

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**YEAR**: 2011

### An in Vitro Study on Tissue Repair: Impact of Unloading on Cells Involved in the Remodelling Phase

JOURNAL: Microgravity Science and Technology; 23(4):391-401

ABSTRACT: The number of astronauts involved in long lasting missions and extra-vehicular activities is going to increase in the future. Consequently, the chance of injury due to traumatic events or unexpected emergency surgery will also increase and medical evacuation times to earth will be prolonged. Hence, the need to address requirements for surgery and trauma care in non terrestrial environments will be a priority. Tissue repair in weightlessness should therefore be regarded as a major issue not enough studied to date. Wound healing is a complex multi-step process, crucial to the survival of the organism. It starts with an inflammatory phase followed by a remodelling phase. During repair, the extracellular matrix (ECM) is sequentially remodeled by the concerted action of different cell types, in order to rebuild a functional tissue.

The available literature concerning wound healing with mechanical unloading presents controversial results. However, many studies indicate impairment of the healing processes. Here we present a study on the behavior of cells involved in the remodelling phase of repair, e.g. fibroblasts and endothelial cells, in response to microgravity (µg). In particular, their adhesion/migration, cytoskeleton organization, production of ECM molecules and receptors have been investigated.

Cell response to pulsed Nd:YAG laser irradiation has also been investigated in order to evaluate the possibility to use laser irradiation for counteracting the effect of µg on wound healing. In µg, we observed alterations in production/assembling of ECM molecules. Increased fibronectin (FN) and laminin (LM) could be the cause for impaired ECM rebuilding and altered cell adhesion/migration. Treatment with Nd:YAG laser pulses induced organized fibrillogenesis and favoured endothelial cell spreading and monolayer formation. These findings open the way for a better understanding of tissue repair mechanisms in space and future clinical applications on earth.

AG

![](_page_41_Picture_20.jpeg)

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YEAR: 2011

#### Short-term effects of high-intensity laser therapy versus ultrasound therapy in the treatment of low back pain: a randomized controlled trial

JOURNAL: Eur J Phys Rehabil Med; 47(3):367-73

**BACKGROUND:** Low back pain (LBP) is a common musculoskeletal disorder that is highly prevalent in the general population. Management of this pathology includes numerous interventions depending on pain severity: analgesic, nonsteroidal anti-inflammatory drugs, steroid injections. However, the effect size and duration of symptom relief are limited. Physical therapy (ultrasound [US], laser therapy, manual therapy, interferential current therapy, Back School, aerobic work, therapeutic aquatic exercise acupuncture) have been reported often with mixed results. Aim. To evaluate the short-term effectiveness of high-intensity laser therapy (HILT) versus ultrasound (US) therapy in the treatment of LBP.

**DESIGN:** Randomized clinical trial.

SETTING: University hospital.

ASH

**POPULATIONS:** Thirty patients with LBP were randomly assigned to a HILT group or a US therapy group.

**METHODS:** Study participants received fifteen treatment sessions of HILT or US therapy over a period of three consecutive weeks (five days/week).

**RESULTS:** For the 30 study participants there were no between-group differences at baseline in Visual Ana¬logic Scale (VAS) and Oswestry Low Back Pain Disability Questionnaire (OLBPDQ) scores. At the end of the 3-week intervention, participants in the HILT group showed a significantly greater decrease in pain (measured by the VAS) and an improvement of related disability (measured by the OLBPDQ) compared with the group treated with US therapy.

**CONCLUSION:** Our findings obtained after 15 treatment sessions with the experimental protocol suggested greater effectiveness of HILT than of US therapy in the treatment of LBP, proposing HILT as a promising new therapeutic option into the rehabilitation of LBP.

AUTHORS: Viliani T, Pasquetti P

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YEAR: 2011

## High intensity laser-therapy in hand osteoarthritis: a mixed protocol's proposal

JOURNAL: Energy for Health; 8:8-11

**ABSTRACT:** Hand osteoarthritis (HOA) is a common chronic condition involving one or more joints of the thumb and fingers. Therapeutic approach in hand osteoarthritis must consider local interventions which are useful along the course of the pathology. Laser-therapy (Low Level Laser Therapy-LLLT-) is a possible useful instrumental therapy. High Intensity Laser Therapy (HILT) seems to be more effective than LLLT in pain and disability management of some forms of osteoarthritis, due to its higher intensity and to the depth reached by the laser ray. HILT may be used also in laser-acupuncture.

The aim of this study was to analyze the efficacy of HILT in patients with symptomatic HOA, using a mixed protocol, analgesic anti-inflammatory protocol plus laser-acupuncture. 18 out-patients with symptomatic HOA (II-III Kellgren-Lawrence Grading Index) were enrolled and evaluated by Australian Canadian Osteoarthritis Hand Index (AUSCAN) and Visual-Analogue Scale (VAS), before treatment (t0), after treatment (t1) and after 3 months (t2). The patients were treated with a mixed HILT protocol, analgesic plus laseracupuncture treatment (4 sessions, once a week).

The patients showed a mean statistically significant improvement between t0 and t1 in AUSCAN Index and VAS, and improvement was found in 83% of the subjects (15/18). The improvement was mostly maintained at follow-up. The mixed HILT protocol showed good results in a great percentage of HOA patients, with only 4 treatment sessions.

We conclude that this kind of HILT protocol could be a good proposal for pain control and for improvement of patient's quality of life.

![](_page_42_Picture_25.jpeg)

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**YEAR:** 2011

## Effect of pulsed high intensity Nd:YAG laser in treatment of chronic diabetic foot ulcer

JOURNAL: Energy for Health; 7:25-30

**ABSTRACT:** Delayed wound healing specially in diabetic ulcer is continuing challenge in rehabilitation medicine despite some recent advances in understanding of its basic principles and problems in wound healing that continue to cause significant morbidity and mortality. The aim of this study was to determine the effect of Pulsed High Intensity Nd:YAG Laser in the treatment of chronic diabetic foot ulcer (Deep Ulcer grade 2) and suggest laser protocol far wound healing. Forty patients suffering far chronic diabetic foot ulcer as a complication of diabetes mellitus, aged 40-70 years (mean age 58.17±9.83), were included. Patients were randomized far treatment in two groups.

In the group A (HILT group), twenty patients received 24 session of pulsed high intensity Nd:YAG laser according to designed protocol, 3 times per week in addition to standard medical treatment which is given far diabetic foot patients. In the group B (Standard Medical Therapy Group), twenty patients received standard medical treatment for 24 sessions, three times per week. The result of this study revealed that there was statistical significant reduction in wound surface area far group (A) after 12 and 24 sessions. The results have demonstrated the objective effect of pulsed high intensity Nd:YAG laser in treatment of chronic diabetic foot ulcer.

Therefore, pulsed high intensity Nd:YAG laser is effective, innovative, non invasive, non expensive and can be used as a new trend physical therapy modality in the treatment of chronic diabetic foot ulcer.

![](_page_43_Picture_32.jpeg)

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**YEAR:** 2002

#### Cytoproliferative activity of the HILT: in vitro survey

JOURNAL: Laser in Medical Science; 17(4):A22

ABSTRACT: nowadays Nd:YAG is used efficaciously in anti-inflammatory and pain therapies. The aim of this study is mainly to assess the possibility of its use also in reparative therapy, and far this reason we have assayed the cytoproliferative effect. Only one study exists in the bibliography that demonstrates the capac¬ity of Nd: YAG laser to increase the mitotic index. The majority of the works only indicate for this laser the parameters inhibiting cellular proliferation. The objec-tive of this study is that of determining the parameters of a pulsed Nd:YAG laser (PW: pulsed wave) capable of inducing the increase in the mitotic index on two cellular lines: the continuous line of "VERO" kidney and the human HCT-8 ileocecal adenocarcinoma. Fol-lowing we carried out cytometabolic assessments. For this purpose cellular cultures of HCT-8 cells were exposed to single 7.69 J/cm2 (12 sec) doses of irradiation. The assessment of the cellular proliferation was carried out by means of spectrophotometry, immu¬nohistochemical tests (IHC) and direct counts. The values that resulted in increasing the cellular prolifer-ation of the HCT-8 line were then applied to the VERO line in order to verify its efficacy. The average values, obtained from the 450 nm spectrophotometric readings of the wells treated with doses of 2.7 Watt and 15 Hz for 12", indicated an increase in the optical density equal to 0.0075 O.D. in the treated cells compared to the controls (greater cell density and thickness of the monostratum). This proliferative increase was also observed immunohistochemically as a mean increase for the microscopic field (400X) of nuclei expressing the antigens Ki67 and PCNA in the treated cells compared to the controls, together with a greater expression of Insulin Like Growth Factor 1 (ILGF-1) and Cyclin D1. The variation in these parameters did not provide any significant increases. The application of these parameters to the VERO cells did not induce constant values in relation to the proliferative response. Lastly, by treating the monostrata with 50µl dose of 400 uMol solution of the isoflavone, genisteine, which resulted in having an oncosuppression effect on several neoplastic cellular lines, blocking the tyrosin-kinasic metabolic path, there was an arrest in the cellular cycle of the HCT-8 cells, by-passable via an additional exposition of the monostratum to irradiation with Nd:YAG PW. The results indicate that irradiation with Nd:YAG 1064 nm PW induces the proliferation of HCT-8 cells in vitro with specific parameters, and there is a direct specificity between the dosimeter and the cellular line; in fact the same parameters that stimulate the HCT-8 line are not as effective in favouring the multiplication of the VERO line.

AUTHORS: Basile B<sup>1</sup>, Romano G<sup>1</sup>, Fusi F<sup>1</sup>, Monici M<sup>2</sup>

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**YEAR:** 2008

## **Comparison Between the Effects of Hypergravity and Photomechanical Stress on Cells Producing ECM**

JOURNAL: Microgravity Science and Technology; 21(1-2): 151-157

**ABSTRACT:** In the body, connective tissues have a major function in sustaining mechanical stresses. On the other hand, mechanical forces are important factors for connective tissue homeostasis. Connective tissues dynamically interact with mechanical and gravitational stimuli, changing their mechanical properties through the continuous modification of their composition, and thus improving their function. In connective tissues, mechanical forces are major regulators of extracellular matrix turnover, strongly affecting the production of extracellular matrix proteins.

On the contrary, unloading conditions, such as bed rest or space flight, have a negative effect on these tissues, with loss of mass and impairment of mechanical properties. Here we describe the effect of photomechanical stress, supplied by a pulsed Nd:YAG laser, on extracellular matrix production by fibroblasts and chondrocytes, and compare it with the effect produced by hypergravity conditions.

Cell morphology and structure, extracellular matrix production, cell adhesion, cell energy metabolism have been studied in treated human fibroblasts and chondrocytes by using immunocytochemistry, fluorescence and autofluorescence microscopy.

The results show that photomechanical stress induce cytoskeleton remodelling, redistribution of membrane integrins, increase in production of ECM molecules, changes in cell energy metabolism. The effects are similar to those observed in the same cells exposed to cyclic hypergravitational stress ( $10 \times g$ ).

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![](_page_44_Picture_20.jpeg)

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![](_page_46_Picture_6.jpeg)