

# New Trends in Pain Management and Tissue Rehabilitation

Class IV Laser Therapy:  
a Non-Pharmaceutical, Natural Solution



Available at

**Natterjacks Vet**



*Because we're family!*

**K·LASER**<sup>TM</sup> USA

# Agenda



- Clinical Uses of K-Laser
- Bio-stimulation Science
  - Cellular Effects
  - Clinical Effects
- Necessities of Power and Multiple Wavelengths
- Protocols
- LLLT Studies
- Implementation

# LASER

**L**ight

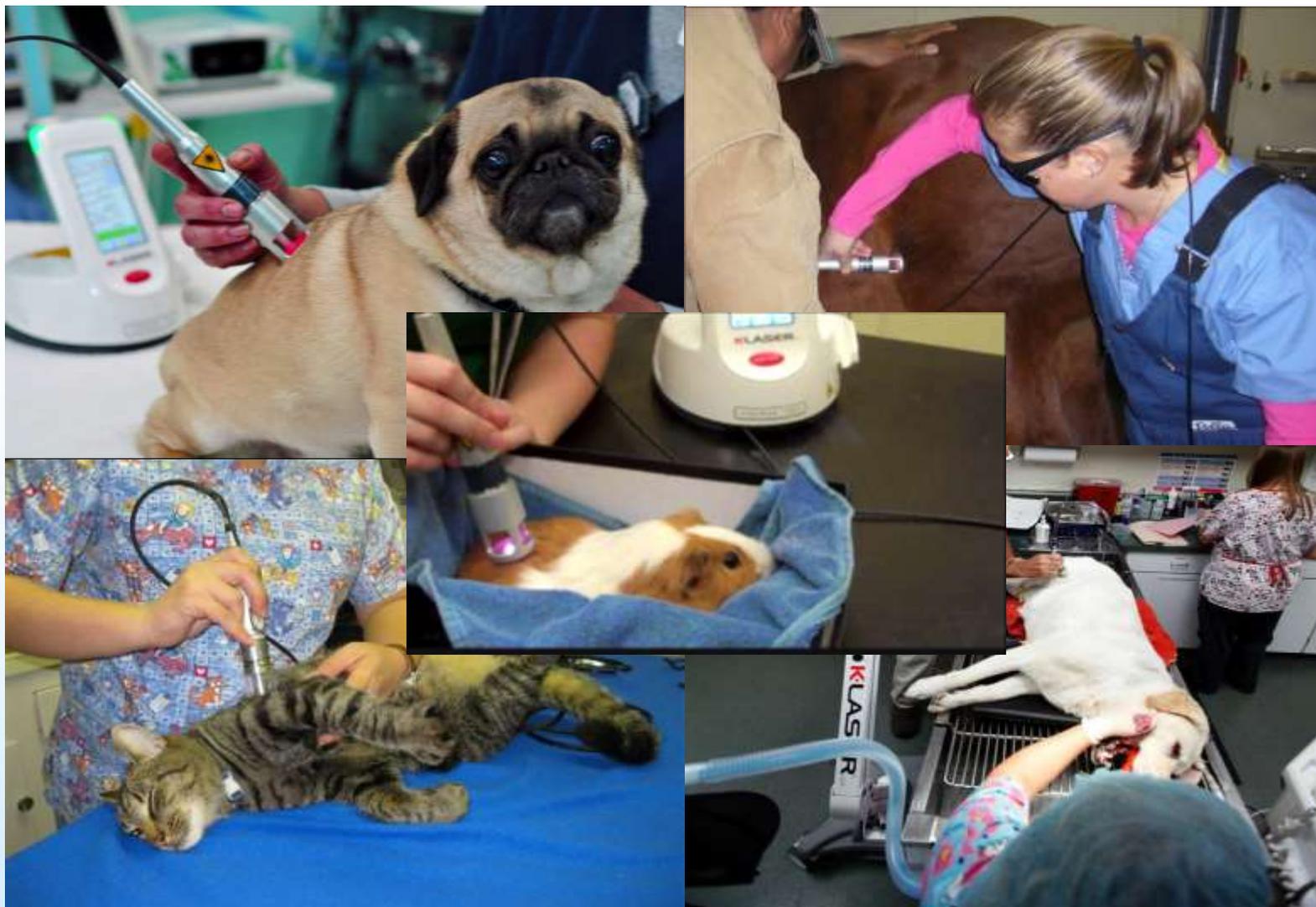
**A**mplification by

**S**timulated

**E**mission of

**R**adiation

# Domestic Pets





# Exotics Species

# Used by Sports Professionals

**KLASER<sup>®</sup> USA**

**US WOMENS SOCCER GOLD MEDAL TEAM USES K-LASER<sup>®</sup>**

**KLASER<sup>®</sup>**  
The Solution For Practices  
Going For **GOLD!**

**LONDON 2012**

**actualidad** El tenista se recupera de su lesión de rodilla.

**Rafa Nadal**

**Una pareja supercómica**

**Colombiano** *Se enfrentó a un jugador de tenis en el estadio de la Universidad de los Andes.*

**Acabamos de salir de vacaciones y nos encontramos en la ciudad.**

**TERMINOS** *El jugador de tenis se recuperó de su lesión de rodilla.*

## TENISTA VIAJERO

**RAFA NADAL (ES)**

Mientras Rafa se recupera de su lesión, su chica le acompaña durante su rehabilitación.

**T**odos sabemos que a Rafa Nadal realmente le va mal de su lesión en la rodilla izquierda y cuando en las pistas, pero cuando está en grupo, todavía tiene algunas molestias. Es por eso que hace unos días fue a la Ciudad Condal con su novia, María Parella (CA), al club de tenis de Barcelona y aprovechó para ver a los especialistas que le están tratando.

**Una relación larga y consolidada**

Tras pasar por Barcelona, la pareja tomó un avión para volver a casa en Palma de Mallorca y seguir trabajando. Son pocas las ocasiones que les venimos juntos, y muchos meses los que nos separan (aunque de momento y a veces la cantidad de tiempo que tienen juntos... ¡los sabemos a ver pasar por el altar! ¿Será la boda del año!)

**PESE AL DOLOR SIGUE JUGANDO**  
Este jugador de tenis que se recuperó de su lesión de rodilla sigue jugando en el tenis. **RAFA NADAL (ES)**

**KLASER**

# Veterinary Practice Opportunities

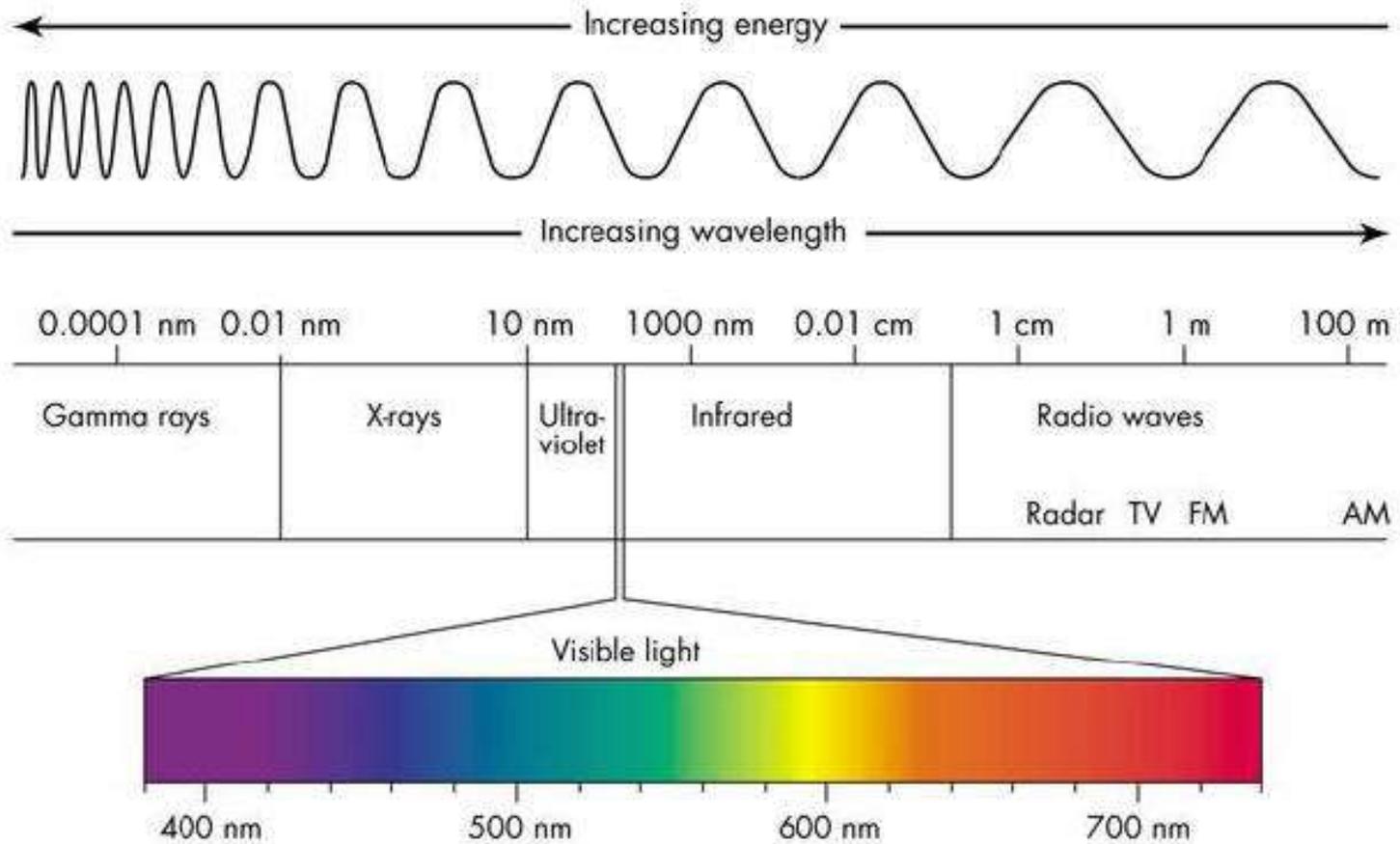


- Osteoarthritis and DJD
- Pre/Post Surgical
  - Soft Tissue
  - Orthopedic
- Feline Pain Management
- Acute Injuries and Lameness
- Post Dental Treatment and Gingivitis
- Wound Management
- Extend Quality of Life

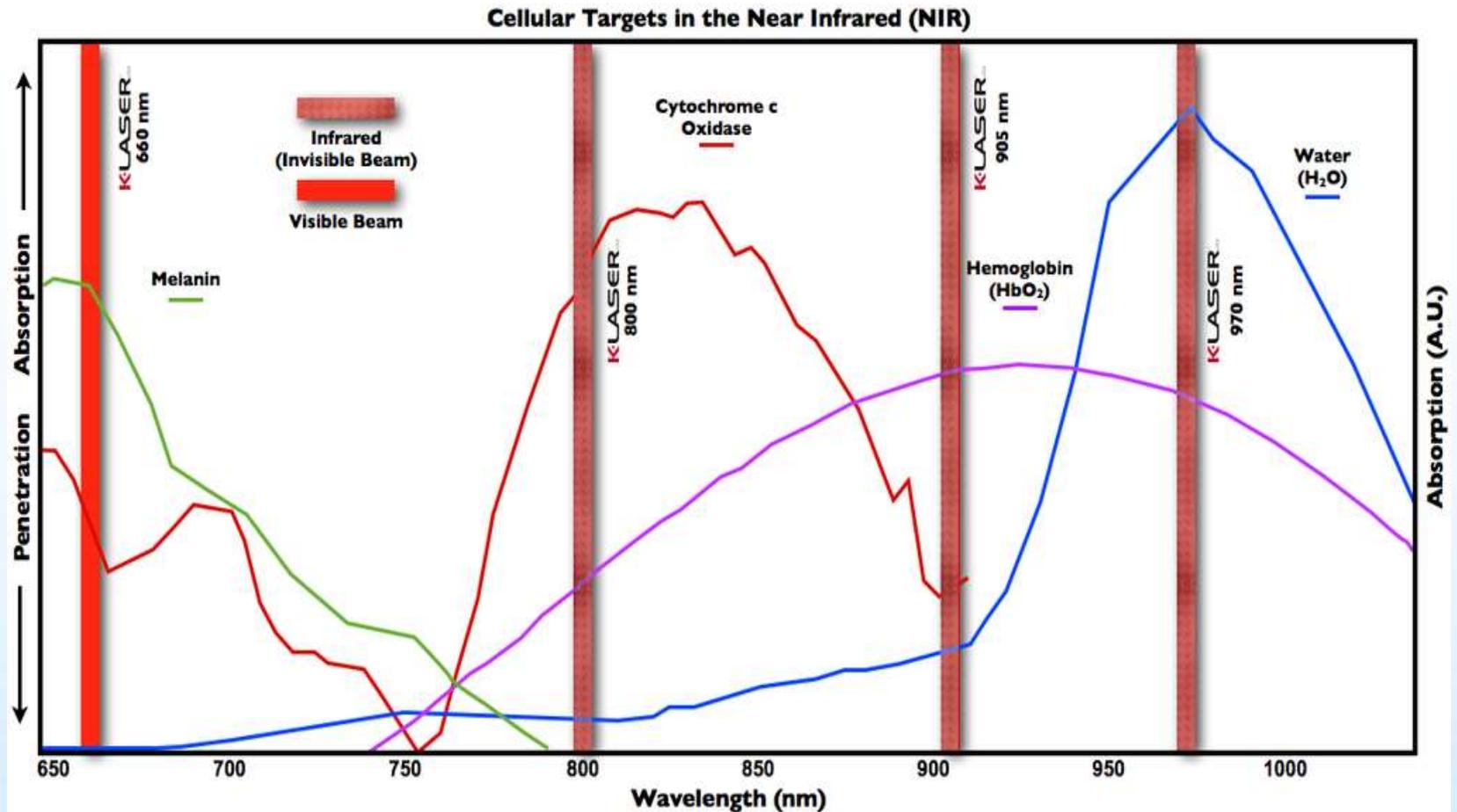
# Science Behind Low Level Light Therapy



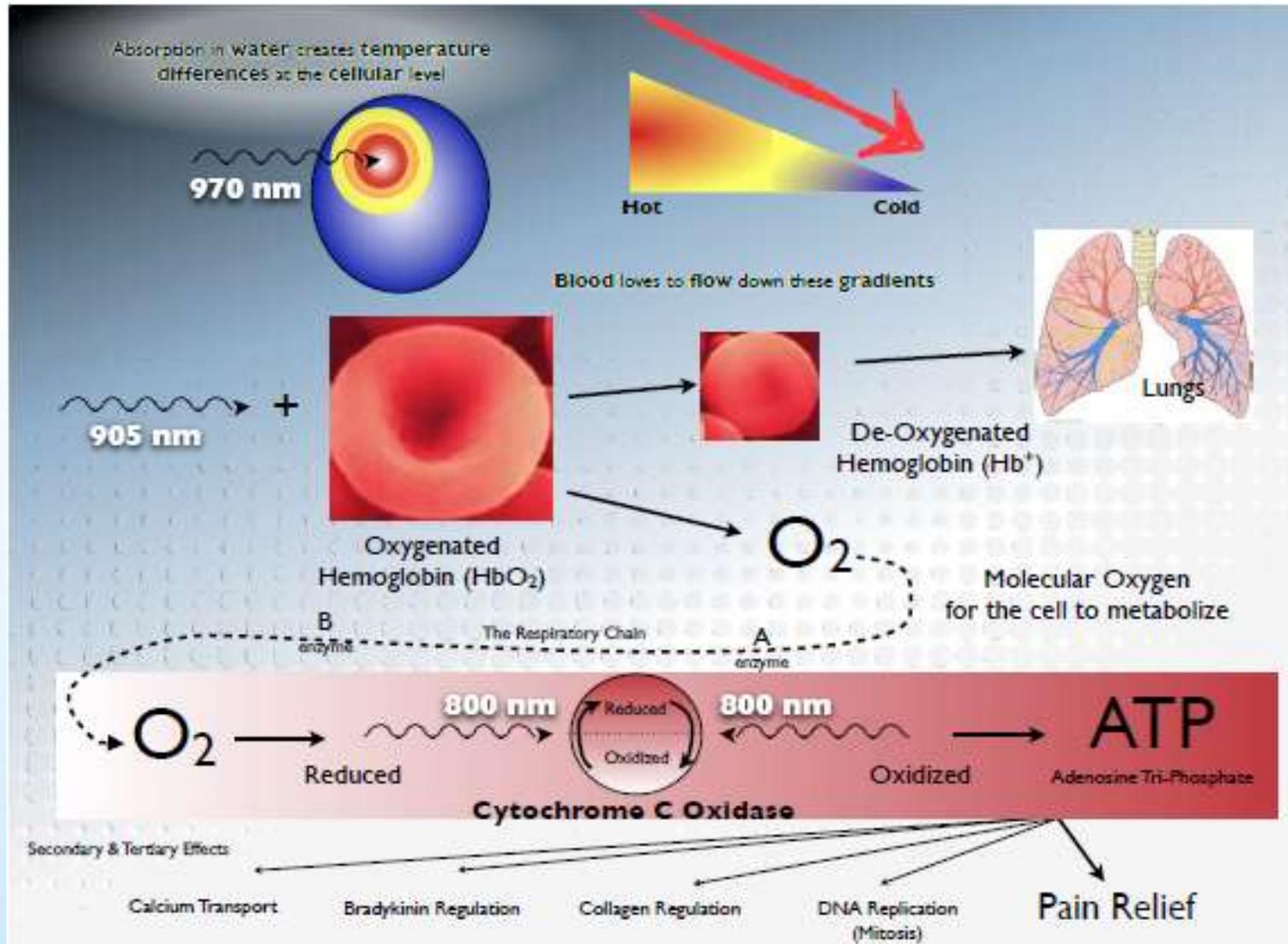
# Wavelength of Light



# Therapeutic Spectrum



# Photo-Biostimulation Cellular Effect



# Physiological Effect – Pain Management & Anti-inflammatory

- The proton gradient across the cell membrane is positively influenced by the photon energy absorbed by trans-membrane proteins, influencing the concentration of electrolytes
- Reduction in inflammatory markers (PGE<sub>2</sub>, IL-1 $\beta$ , TNF $\alpha$ ).
- Selective reduction in pain modulation through the A $\delta$  and C-fibre pathways has been recorded:
  - Axonal disruption of neuronal flow
  - Inhibition of neuronal enzymes

# Physiological Effects – Overall

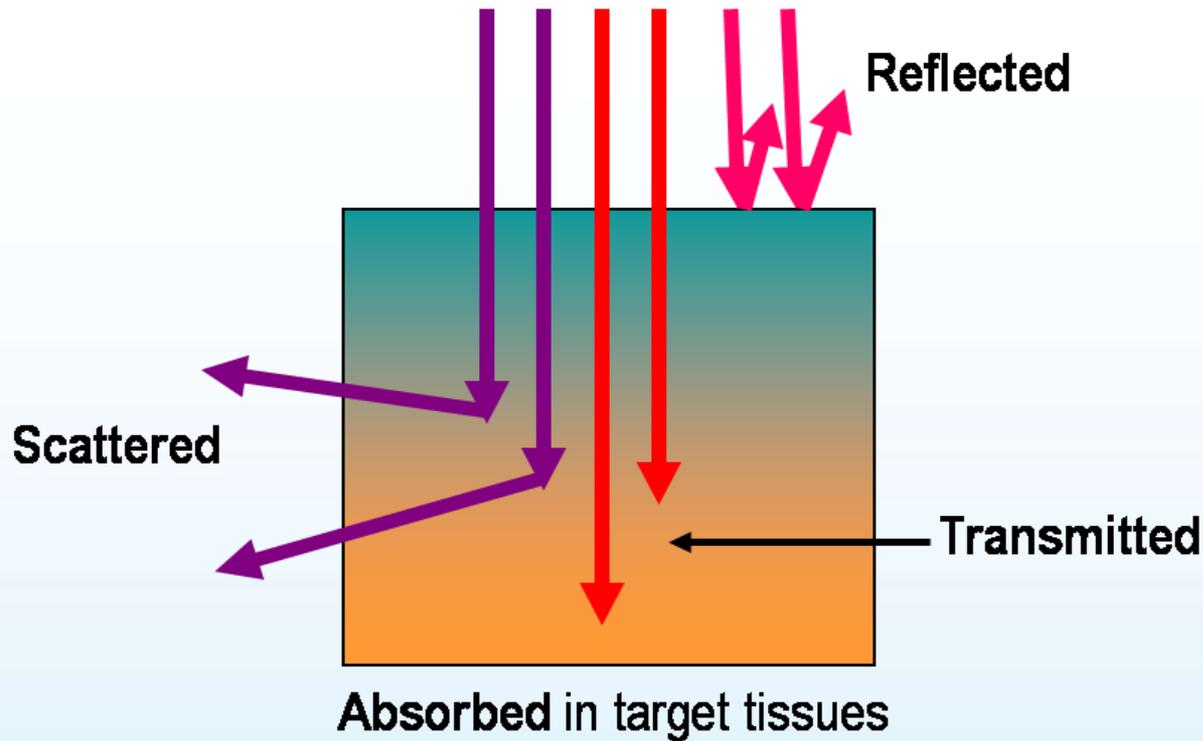
- There is an absolute increase in micro-circulation, higher levels of ATP, RNA & DNA synthesis, and better tissue oxygenation.
- Additional anti-inflammatory, analgesic and anti-oedematous effect on tissues via gated C pathways.
- Increased absorption of interstitial tissue fluid, better tissue regeneration and stimulation of analgesic effect.

# Is Power a Factor?

*Power and wavelength of light enhances the speed for penetrating tissues.*

- Class I - DVD writer (enclosed)
- Class II - Check-out counter (exposed)
- Class III - Pen pointer max. 0.5 W (superficial tissues)
- Class IV - Greater than 0.5 W (deeper tissues)
  - Industrial Lasers & Surgical Cutting Lasers
  - Therapeutic Bio-stimulator Lasers

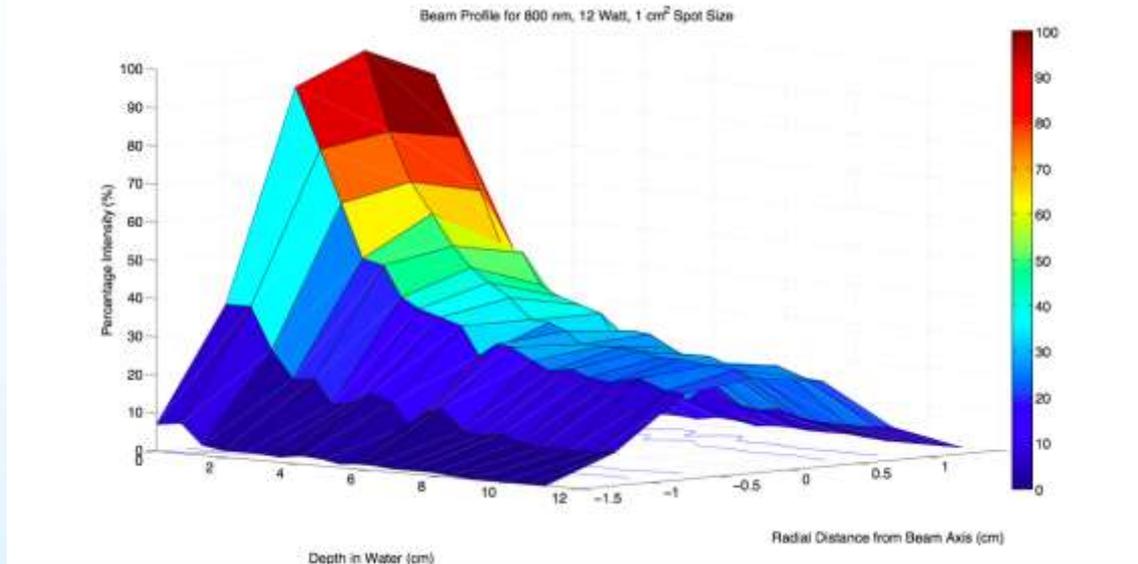
# Laser Tissue Interaction



Biological tissue is a highly **turbid** medium; that is, it **strongly** (exponentially) **attenuates** radiation through a combination of **scattering** and **absorption**.

# Necessity of Higher Power

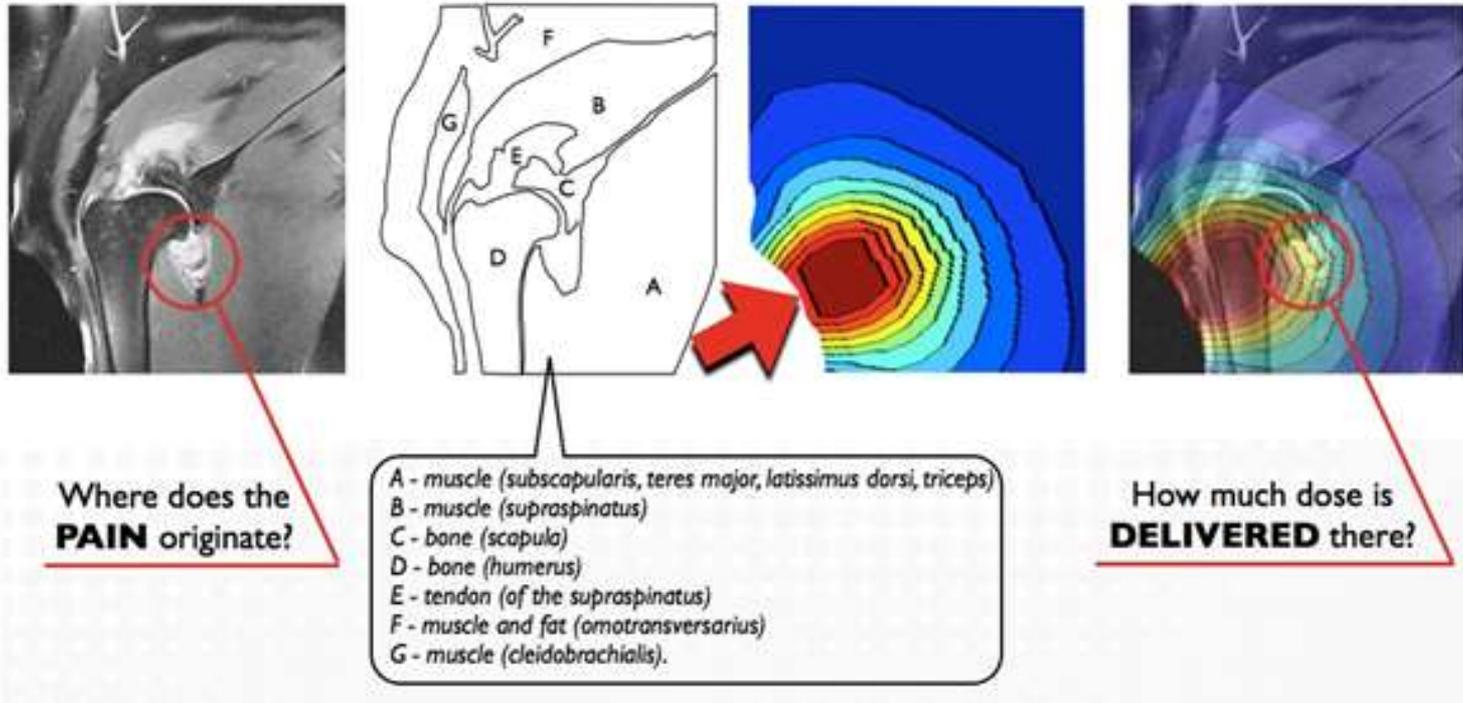
**Surface** dose is **not** the end of the story. The **important** quantity is **dose at depth**. *In vitro* studies tell us how much dose is needed to get a **biological response**. Our protocols work **backward** from there to calculate how much **power** we need to **start** with at the **surface**.



We are the **only** company in the industry who has **compiled** this data and **accounts** for tissue attenuation in its **protocols**. Combine this analysis with **average power densities** and **treatment times** to get **dose at depth**.

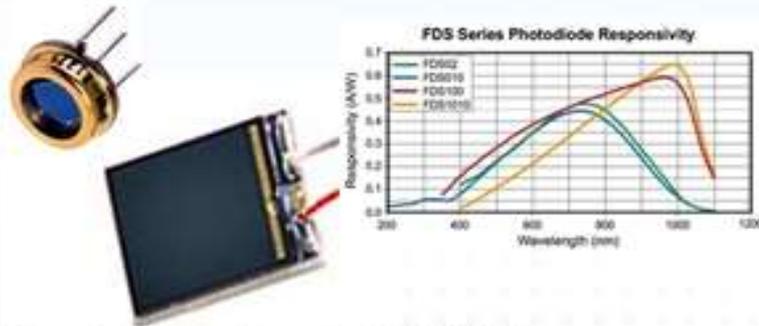
# Necessity of Higher Power

## 2<sup>nd</sup>-order Approximation: MRI-Monte Carlo Stimulation



# Necessity of Higher Power

## 3rd-order Approximation: Ex vivo Measurement



# Depth of Penetration

In-vivo receptors -  
test for Photon Density at Depth



# NAAALT Published Paper

## INTRODUCTION

Inherent dosimetry of laser therapy is far less often performed or "generalized," but it is vital information for the design of treatment protocols and prediction of biological efficacy. In vitro studies have given us a general idea of the range of photochemical doses, but their results do not and should not be directly extrapolated to form conclusions in vivo.

The science of dosimetry has been extensively developed in other wavelength ranges of the electromagnetic spectrum to different degrees of precision based on the danger of exposure of each. Though we do not need the sub-millimeter accuracy of the radiation oncologist who delivers varying radiation that can destroy individual cells, the techniques that have developed offer a terrific guide to understanding the photon transport in biological tissue. Here we employ some of these tools as we aim to bridge this gap and understand exactly how dose is distributed at depth in the body.

## MATERIALS and METHODS

Wavelengths investigated were 800 nm and 970 nm at powers ranging from 0.1 - 12 Watts using the K-1200 (K-Laser/USA, Franklin, TN). First-order predictions were made from power measurements on instrumental depths in water and tissue phantoms. Second-order estimates were established by Monte Carlo photon transport simulation on actual MRI data with literature-referenced values of scatter, absorption, and reflection coefficients. Finally, the most robust data came from an x-ray photodiode detector measurement on six canine cadavers in a variety of anatomical positions.

### 3.1 First-Order Approximation

Power meter employed was the PULS (LakePoint, Vineland, NJ) using the "L27" calibration setting (used by the manufacturer as appropriate for the 800-900 nm range, no significant differences in sensitivity were noted for the 970 nm wavelength).

The meter was placed face-up on a stand to maintain ambient airflow through the heat sink fan. On top was placed a 2 mm thick plate of aluminum with a 1 cm diameter hole punched through that served as an aperture so that spatial independence of the detector head could be verified and radial scattering could be measured. On top of this was placed a shot plastic beaker whose illumination was minimal (transmission loss of 2% was measured) and all the data corrected accordingly. The laser's handpiece was two centimeters to and at a distance of 12 cm from the beaker/beaker interface and irradiation was carried out. In the beaker, layers of water from 0.5 - 10 cm in 0.5 cm increments were added, and the power transmission measured. As each depth of water the detector was moved relative to the central axis of the beam. Clear handprint position kept constant to measure transmission values at distances of 0 - 1.5 cm in 0.5 cm increments from the central axis.

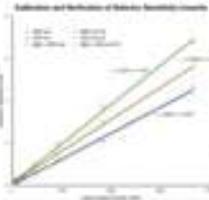


Figure 1: Measurement of Geometry of Aperture in Output Power for the PDS-10-0-00, at each Wavelength

### 3.2 Second-Order Approximation

Combining techniques from radiation oncology and neurology simulations can be performed to give the most detailed prediction of dose deposition. Radiation oncology pre-plan their irradiations with full 3-dimensional simulation including scatterer head motion and collimator leaf motion and create dose parameters on computed tomography images of the patient to ensure highly localized dose distributions. In fact, most linear accelerators on the market come equipped with software capable of performing such simulations, for quality assurance as well as to verify margins. The restriction of varying radiation with biological matter is substantially different from infrared radiation, however, and as the core interactions can not be modeled the same way. Neurologists started using radiation in the near-infrared (NIR) to map the expression of brain tumor cells and white brain matter have distinct signatures in the NIR. To do this and there have been several algorithms developed in each NIR photon imager's user area was the Monte Carlo software (MCX) [5].

Combine these resources has led to the first Monte-Carlo simulation in laser therapy. The rapid assessment

### 3.3 Third-Order Approximation

Using a cadaver model and a narrow photon scatterer system, a full 3D dose distribution profile can be established. Resecting various layers of dermis, fat, muscle, and connective tissue, the detector was placed at a variety of depths and the power density delivered to each depth was compared to the surface ion exposure. Normalizing these curves an accurate model can be formulated to develop pre-planned treatment protocols and quantify the dose dependence of biological effects. post-irradiation. Used were two S-essays (PDS-100-CAL and PDS-1010-CAL, Thorlabs, Inc., Newton, NJ) whose calibration is NOT traceable, but a power-invariant and wavelength-dependence calibration was performed on each. Figure 1 shows the measured photoacoustic to exposed power for the full range of experimental values and their fit to a linear model.

Raw Beam Profile: Intensity vs Radial Distance from Central Axis

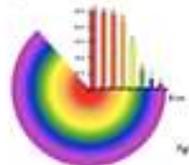


Figure 2: 2-Dimensional Beam Intensity Profile

The same aluminum aperture setup was used to test the spatial sensitivity differences on different parts of the detector which with no significant differences found. This setup was also used to measure the 2-dimensional beam intensity profile, shown in Figure 1 which is clearly not uniform throughout the entire cross-section.

## RESULTS

### 3.1 First-Order Approximation

So you can see from the full three-dimensional dose profile in Figure 3 that even in a simple water phantom at the most transparent wavelength (relative to the rest of the NIR) radiation intensity is strongly attenuated with depth. The attenuation factor at this wavelength is water is about 0.8 which means that 80% of the scattering is directed in the forward hemisphere. The counteracts the absorption being somewhat, but as you can see the attenuation is still quite steep.

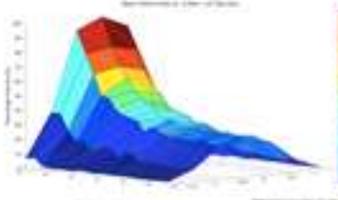


Figure 3: Measured 3-Dimensional Beam Profile in Water Phantom

### 3.2 Second-Order Approximation

Figure 4 shows the progression of stages in the simulation process. First, the anatomical positions of different tissue types need to be extrapolated from the MRI to a traced radiological or surgical. From there, the relevant literature was searched for optical properties of such tissue type at the given wavelength [2-6]. These parameters are overlaid on a colour map extracted from the MRI so that each voxel contains the absorption coefficients, scattering coefficients, anisotropy factor, and refractive index of the corresponding tissue type at the given wavelength. This particular simulation then instead one billion photons each of which with the linear direction indicated by the red arrow and initial position distributed according to the measured 2-dimensional cross-sectional beam profile measured in Figure 2. The simulation then ran for fifty 0.1 nanosecond times steps (remember reflection moves at the speed of light and as of the energy gets deposited very quickly) and recorded the absorbed dose in each voxel. Plotted are the values only in the plane of the MRI image, based in 10% increments and normalized to 100% at the surface.

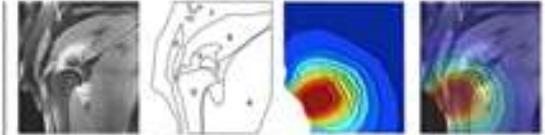


Figure 4: Stages of the Monte Carlo Simulation. The different laser types were identified as follows: A - muscle subcutaneous, and high intensity dermis; B - muscle subcutaneous; C - bone subcutaneous; D - donor of the subcutaneous; E - muscle and fat subcutaneous; F - muscle subcutaneous.

As you can see from Figure 4, these measurements included several combinations of scatterer, fat, muscle, tendon/ligaments, and bone to compare a full dosimetric profile. Also, several beam paths were evaluated to acquire optimal penetration angles.

### Example

The depth from the surface to the center of the joint where the detector was placed was measured (by digital caliper) to be 2.4 cm. From the curve in Figure 1, and assuming this digit to be a simple tank of water, we would predict the beam to transmit about 50% of its intensity to this depth. From an MRI-Plasma Carlo simulation of this anisotropic configuration, and including the approximate attenuation of fat, bone, fat, muscle, and joint tendons, we predict transmission of something more like only 3% from the 5 photodiode measurement, we find that only about 2% of the beam is transmitted to the center of the joint.

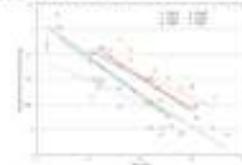


Figure 5: Normalized Transmission Data for Eight Cadaver Outlets

## DISCUSSION and CONCLUSIONS

As expected, the first order experiment under-estimated the beam attenuation, but Monte Carlo results proved as an accurate predictor of in vivo observation. Dose delivered at therapeutic depths are up to 1 and 3 orders of magnitude less than those delivered to the surface. With enough data using a variety of skin, tissue, and bone thicknesses, this type of analysis will yield a full dosimetric profile.

Much more work remains to be done in quantitative internal dosimetry of laser therapy. This study however is a necessary step in the right direction on the path of understanding the orders of magnitude involved. Once further enlightened, we will be able to review both existing and future studies to better understand the biological effects of the delivered dose that came from the reported treatment prescriptions, all eventually converge on the optimal treatment parameters for clinical studies.



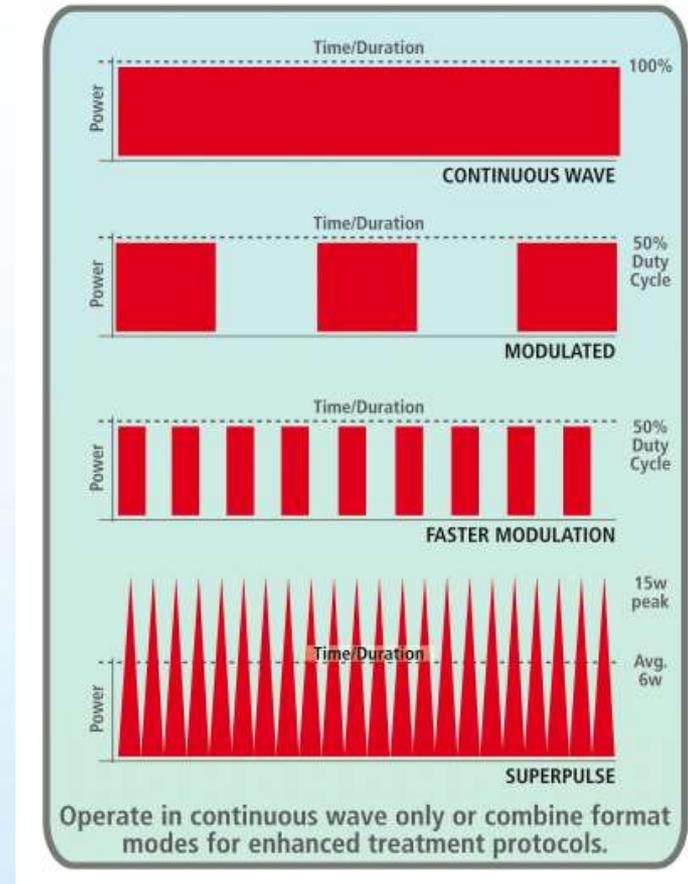
Figure 6: Registered Example of Historical Orientation of Devices in Cadaver

## REFERENCES

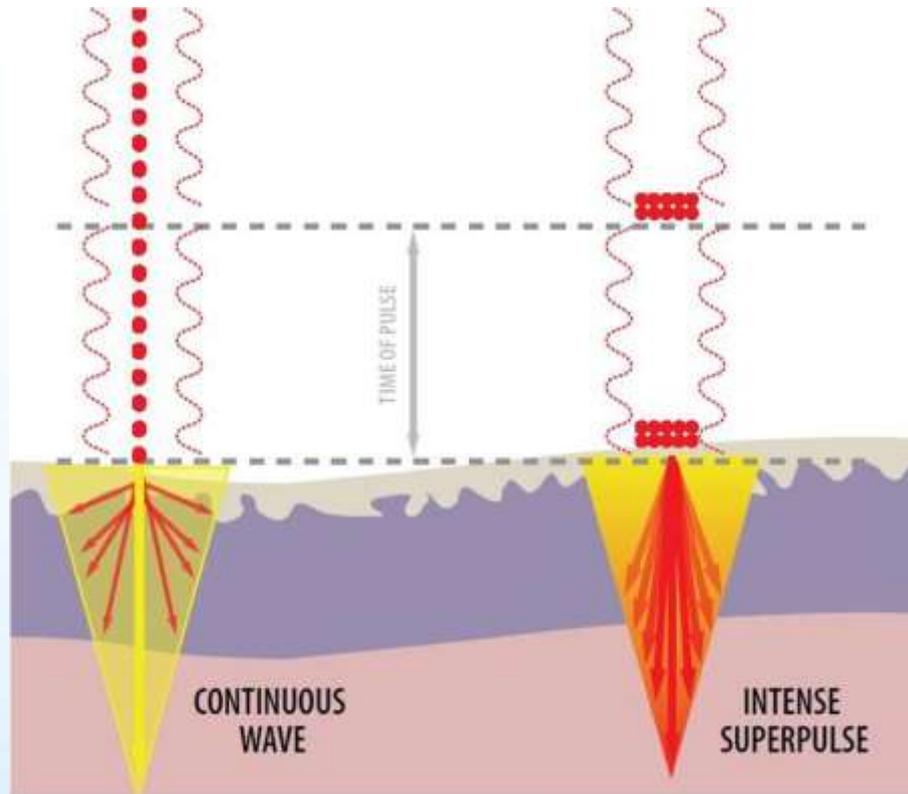
[1] W. Cheong, S.A. Park, and A.J. Welch, A Review of the Optical Properties of Bi-optical Tissue, IEEE Journal of Quantum Electronics, 26(12):2188-2185, 1990.  
 [2] Q. Fang and D.A. Brack, Monte Carlo simulation of photon migration in 3D turbid media accelerated by graphics hardware, Optics Express, 17(22):20119 - 20130, 2009.

# Frequency Modes

- Continuous Wave (CW)
  - 0.1 to 15 Watts
- Frequency Modulation
  - 1 – 20,000 Hz
- Intense SuperPulse
  - 20 Watt Peak Power
  - Average up to 15 Watts



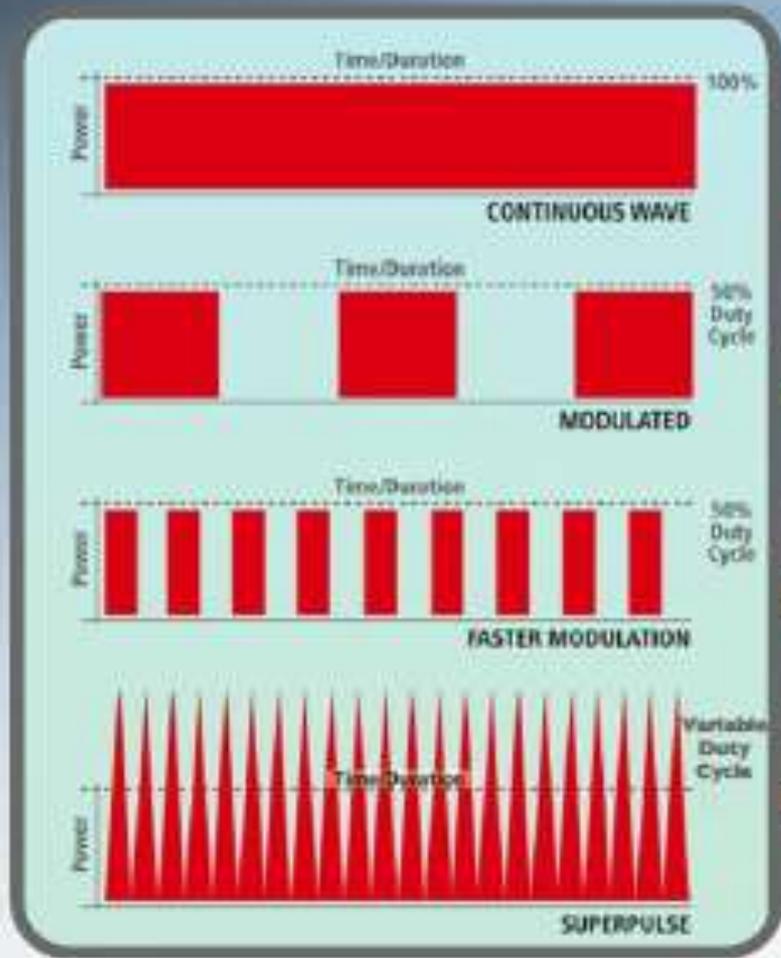
# Frequency Modes



Intense SuperPulse

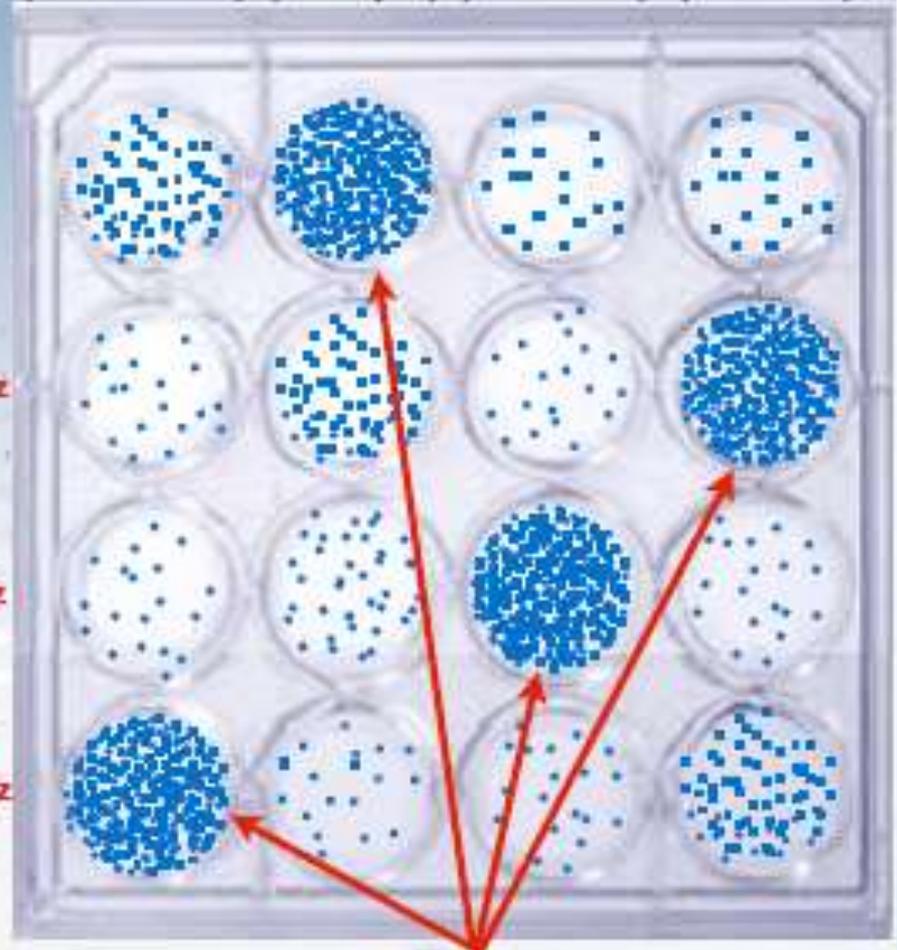
# DELIVERY MODE

Continuous Wave (CW), Frequency Modulated, or SuperPulse



Cell Line 1 (Smooth Muscle)    Cell Line 2 (Leukocytes)    Cell Line 3 (Endothelium)    Cell Line 4 (Osteoblasts)

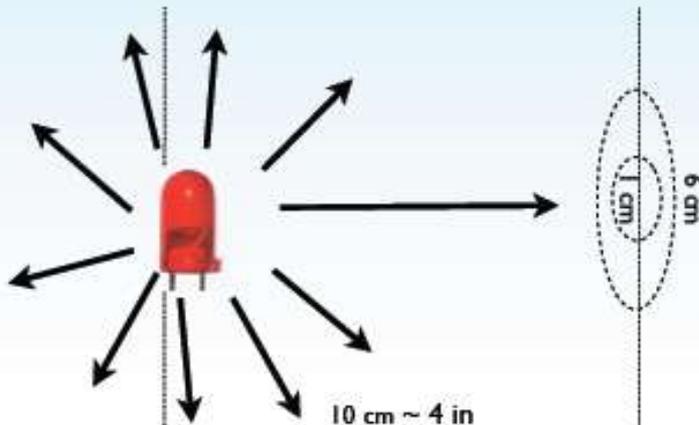
CW  
Low Hz  
Mid Hz  
High Hz



! Different Tissue Types Respond to Different Frequencies !

# Starting Point

12 Watt LED



# Final Power

through  
1 cm diameter spot  
Area = .785 cm<sup>2</sup>

through  
6 cm diameter spot  
Area = 28 cm<sup>2</sup>

# Power Density

(at 12 Watt Output)

**0.08 Watts**

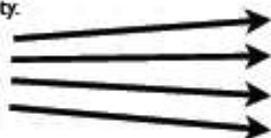
**0.49 Watts**

**0.01-.10 W/cm<sup>2</sup>**  
(depends on distance to target)

10 cm ~ 4 in

12 Watt LASER  
w/ "FIXED" SPOT SIZE

"Fixed" means slightly divergent, so pulling away from the surface increases spot size and decreases power density.



**0.33 Watts**

**12 Watts**

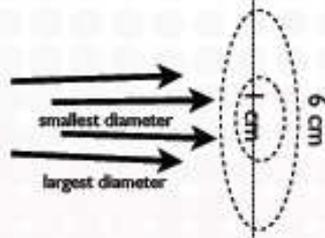
**0.43 W/cm<sup>2</sup>**  
(fixed)

10 cm ~ 4 in

12 Watt  
ZOOMABLE  
LASER



Also slightly divergent, but can adjust spot size to keep consistent power density.



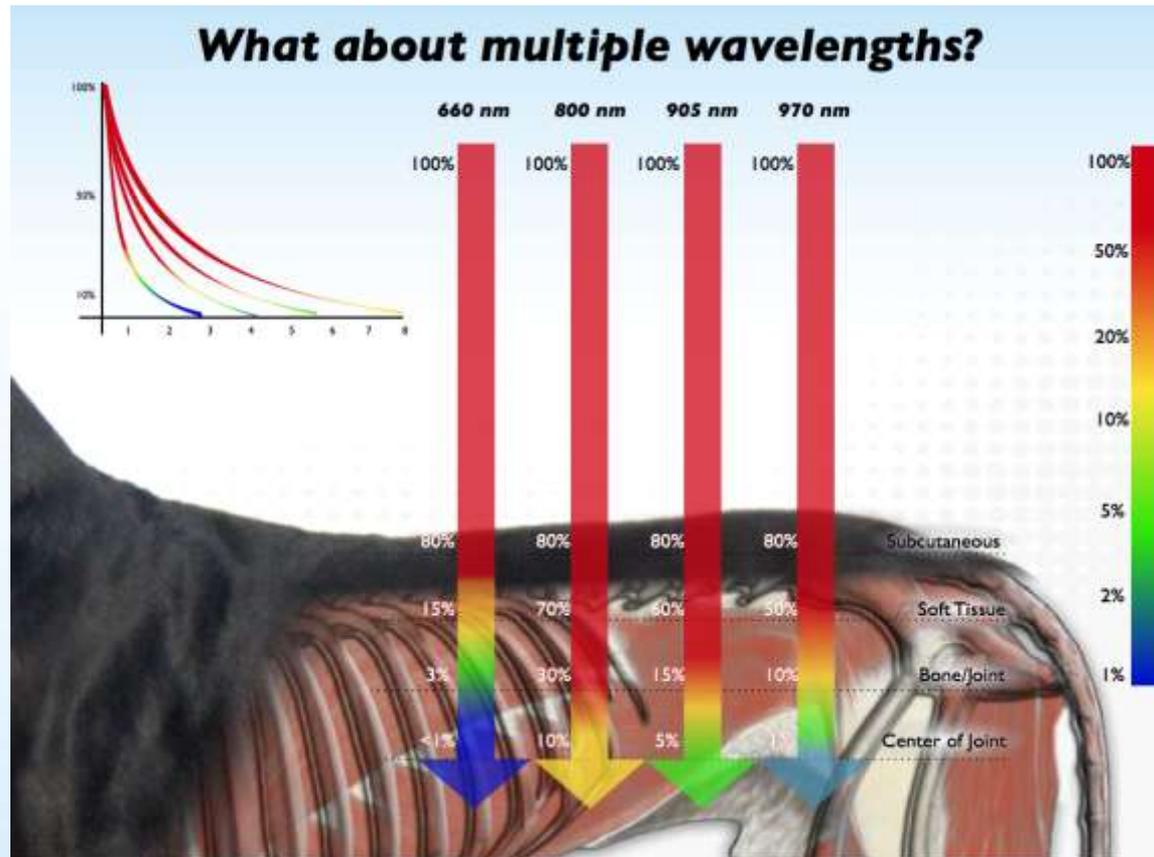
**12 Watts**

**12 Watts**

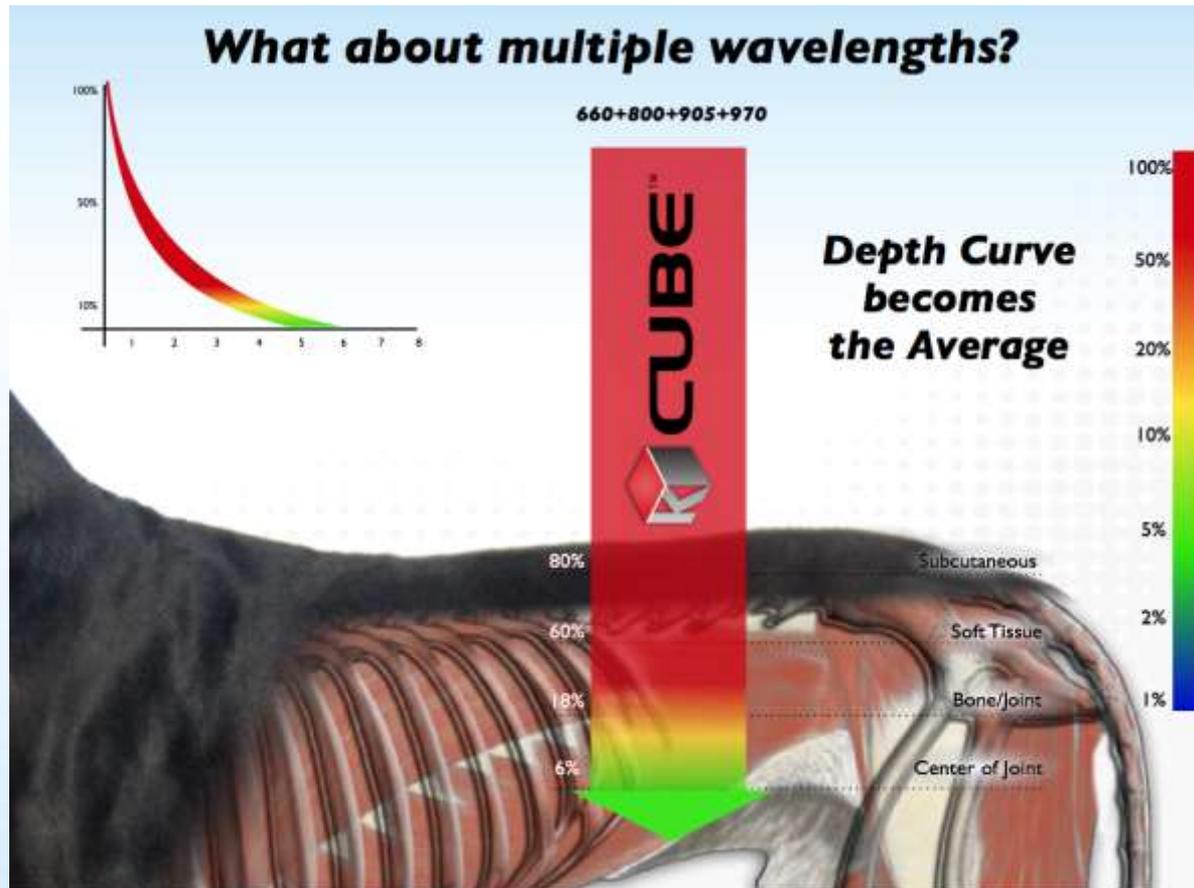
**0.43-15 W/cm<sup>2</sup>**  
(adjustable with zoom-handpiece)

**K.LASER**<sup>™</sup> USA

# Multiple Wavelengths



# Multiple Wavelengths

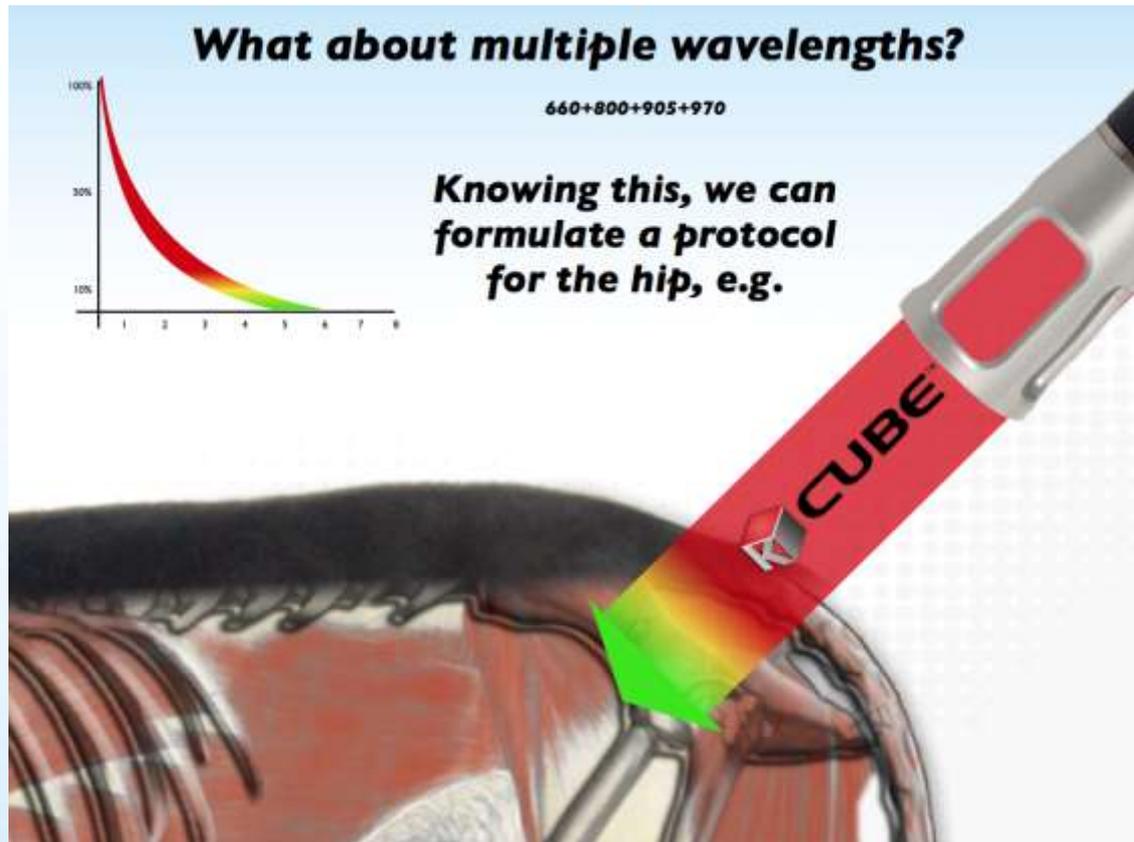


# Multiple Wavelengths

**What about multiple wavelengths?**

660+800+905+970

**Knowing this, we can formulate a protocol for the hip, e.g.**



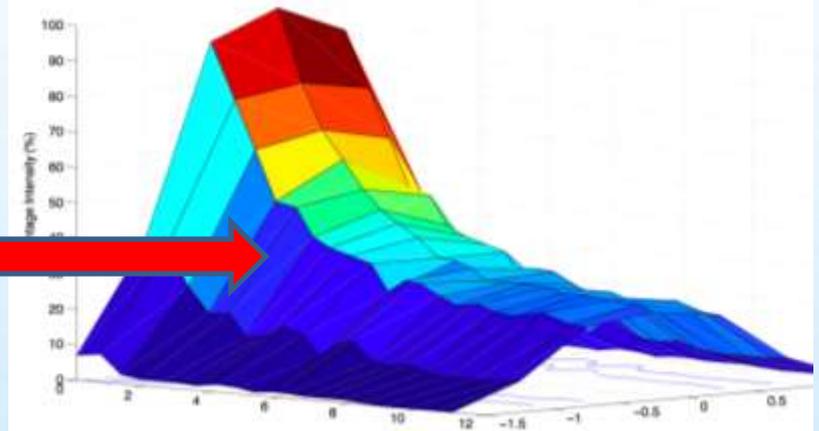
The diagram illustrates the application of multiple wavelengths of laser light to a horse's hip. A red laser device, labeled 'K-CUBE', is shown emitting a beam that transitions through a rainbow spectrum of colors (red, orange, yellow, green, blue, purple) as it passes through a medium. The beam is directed at the hip joint of a horse. In the top left corner, a graph shows the intensity of the beam decreasing as it passes through a medium, with the y-axis labeled 100%, 30%, and 10%, and the x-axis labeled 1 through 8.

# Class III versus Class IV Lasers



Lumbar Pain (Chronic)	
Biostimulatory Dose	6 J/cm <sup>2</sup>
Tx Area	150 cm <sup>2</sup>
Energy Desired AT TARGET	900 J
Depth of Target	6 cm
% Intensity Delivered at Target Depth	29%
Energy Necessary at Surface	3220 J

Treatment Time	Class IIIb (ej 200 mW)	K-Laser (12,000 mW)
Seconds	16,100	268
Minutes	268	<b>4.5</b>
Hours	4.5!!!	0.07



# Musculoskeletal Injury, Osteoarthritis and Pain Management



- Improves and Promotes Healing
- Relieves Pain and Reduces Spasm
- Increases Joint Flexibility
- Improves Peripheral Microcirculation
- Anti-inflammatory Action

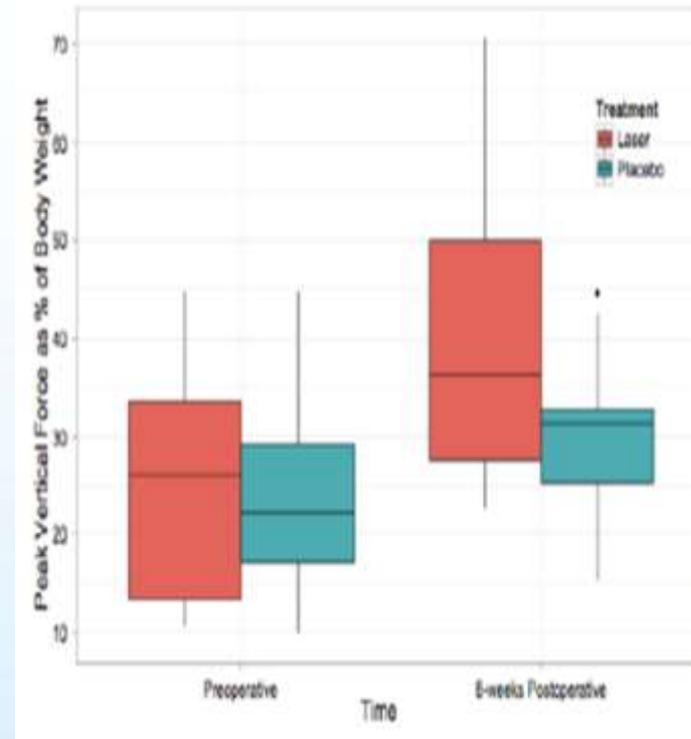
# K-Laser Trial - OSU



- 27 dogs with Cranial Cruciate Ligament Injury
- Half = K-Laser pre-TPLO surgery; Half = Placebos
- Blinded, placebo-controlled trial - no post operative laser
- Both groups received the same treatment protocols after the initial laser session: post-op Carprofen, Tramadol and Cryotherapy
- Same team of boarded surgeons and radiographers reviewed the dogs' lameness (force plate analysis) and radiographs at pre-operative and 8-weeks post-operative intervals

# Force Plate Analysis

- Pre-op Peak Force (%BW)
  - 23.8% +/- 3.6% Control
  - 26.3% +/- 3.7% Lasered
- 8 Weeks Post-Op
  - 28.9% +/-2.6% Control
  - 39.6% +/- 4.7% Lasered
- $P < 0.01$  Laser Treatment
- 26% improvement in Control
- 51% improvement in Lasered



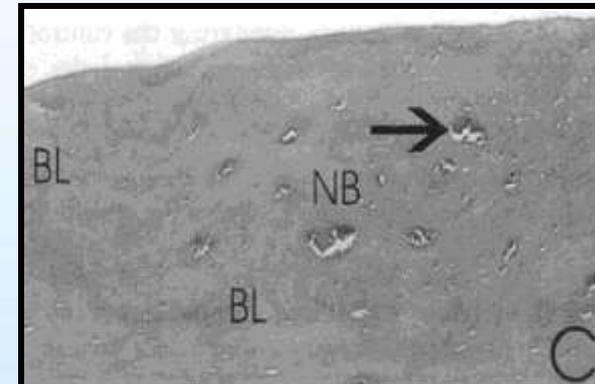
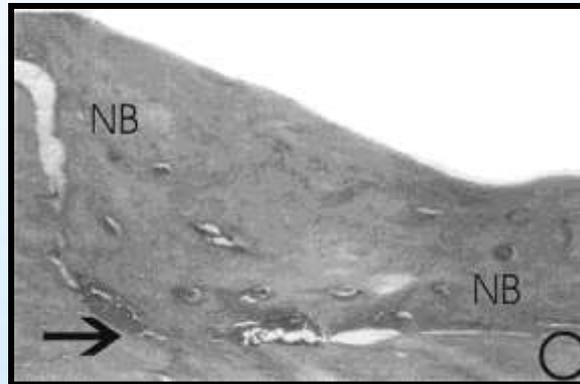
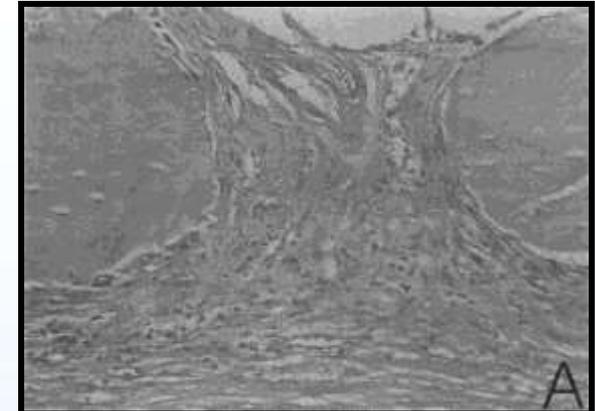
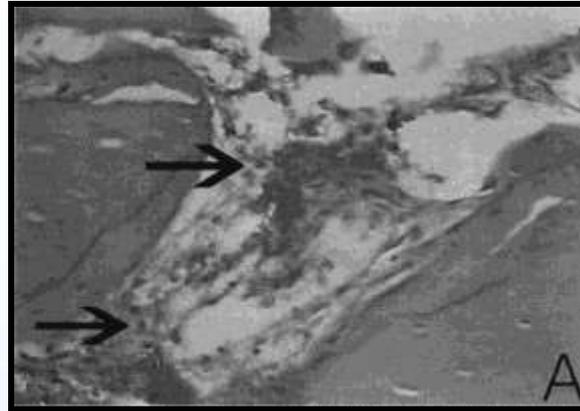
# More Than Pain Relief – Improved Healing in Bone Tissue

**Control**

**Laser**

Results indicate that bone irradiated with infra-red wavelengths show increased osteoblastic proliferation, collagen deposition and bone re-formation when compared to non-irradiated bone.

Further the effect of laser therapy is more effective if the treatment is carried out at early stages when high cellular proliferation occurs.



*“Effect of Low-Level Laser Therapy on Bone Repair: Histological Study in Rats” - Pretel, Lizarelli, Ramalho*

# Non-Union Fracture – Greg Hayes, DVM



- Patient / Condition
  - Ursa, Rotweiler
  - Non-healing fracture (48 days)
- K-Laser Treatment
  - Fracture Bone Setting
  - 2 treatments over 3 days
- Outcomes (see images)

*"...the laser was used over a non-healing fractured metatarsal on an older Rottweiler. At seven weeks we were facing a malunion at which time we used the laser on a bone setting of 4 watts. Nineteen days later, as our staff and board certified radiologist evaluated the radiograph, there was simply a feeling of disbelief. I hesitate to overstate this, but I have seen enough malunions to know what was accomplished here. The fracture site was healed." Greg Hayes, DVM*

# Osteoarthritis Case – Rocky Richardson

**Patient:** Rocky Richardson, Black and Tan, German Shepherd Dog  
10 years 5 month old, Male neutered, 41.50kg

**Practice:** Wingrave Vets in Epsom referred to Molesey Veterinary Centre

**History:** Skin, gastrointestinal and osteo-arthritic disorders  
Damaged Left Elbow March 2009  
Sudden onset lameness Left Hind leg July 2010  
Became more irritated and aggressive as osteoarthritis progressed

**Therapy:** Combination of Seraquin, Tramadol, Metacam, Steroids, and Hydrotherapy



**K-Laser:** 12.11.2011 started using K-Laser - Right Hip, Lumbosacral area and both Elbows protocols  
17.11.2011 owner reported that the dog was much brighter and happier demeanour.  
19.11.2011 after 2<sup>nd</sup> K-Laser Rocky jumped into the back of the car for the first time in years.  
24.11.2011 staff at the stables commented on how much livelier and happier Rocky appeared.  
He started playing around in the grass and with other people.  
26.11.2011 Rocky was able to run around pain-free and jump into the back of the car easily.

**Prognosis:** Rocky Richardson now has regular 3-4 month sessions at Molesey Veterinary Centre under the care of the rehabilitation Molesey nurses and continues to improve.

# Elbow Dysplasia – Taylor Brux

**Patient:** Taylor Brux, American Bulldog Cross, Battersea Dogs  
2 years old, Male neutered, 38kg

**Practice:** Clerkenwell Veterinary Hospital in London

**History:** Diagnosed Bilateral Elbow dysplasia  
Constant pain medication, lead rest, diet and supplements  
Lameness despite multi-modal therapy  
29.07.2011 Subtotal choroidectomy on left elbow

**Therapy:** Surgery, Tramadol, Metacam and Seraquin and lead rest

**K-Laser:** Despite successful surgery owner felt dog showed little improvement  
8 weeks post op of Metacam – unable to wean off NSAIDs as lameness got worse  
17.10.2011 Both elbows were given light coat elbow setting on K-Laser: 3 1<sup>st</sup> week, and twice per week for the following two weeks  
After three weeks of K-Laser Taylor came off Metacam and Tramadol altogether  
Maintained on every other week K-Laser session without any further medication

**Prognosis:** Taylor's owner seen that K-laser has improved Taylor's quality of life, and she is now, for the first time, comfortable moving about on both of her elbows. Has 15 minutes once every 2 weeks, owner happy that her dog is happy and comfortable without relying on pain medication.



# Veterinary Testimonials - UK

“We have had a large number of successes that can only be put down to the influence of the K-laser. They include: a rapid resolution of a difficult infected, non-union plated forelimb fracture referred from another practice, improved recovery times after TPLO surgery, significant pain reduction and improvements in lameness of animals with elbow arthritis or degenerative joint disease where NSAIDS have ceased to be effective..”

**Mark Lindfield MRCVS, Director** - Clerkenwell Veterinary Hospital

“Not only from a post-surgical pain/inflammation viewpoint, but also from animals which have been struggling with osteoarthritis for a long while. The most successful case so far is a 5 year old Lab which has been struggling with OA due to bilateral elbow dysplasia since only a few months old... it's had every form of treatment to date, with only mildly satisfactory results. Since starting laser therapy, the dog is now able to get up without difficulty, exercise well, and bound around like it's wanted to do for years”

**Shaun Smith BVetMed, Cert SAS, MRCVS** – Northlands Vet Hospital

# Repair on Partial Calcaneous Tendon Tissue Injury

## Methodology:

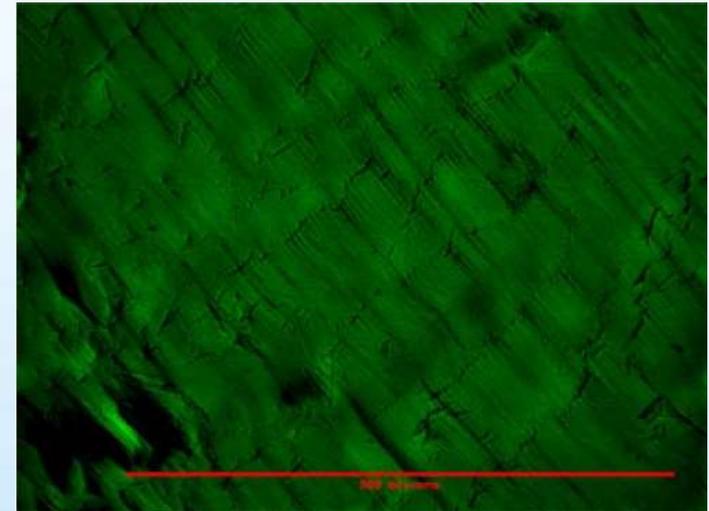
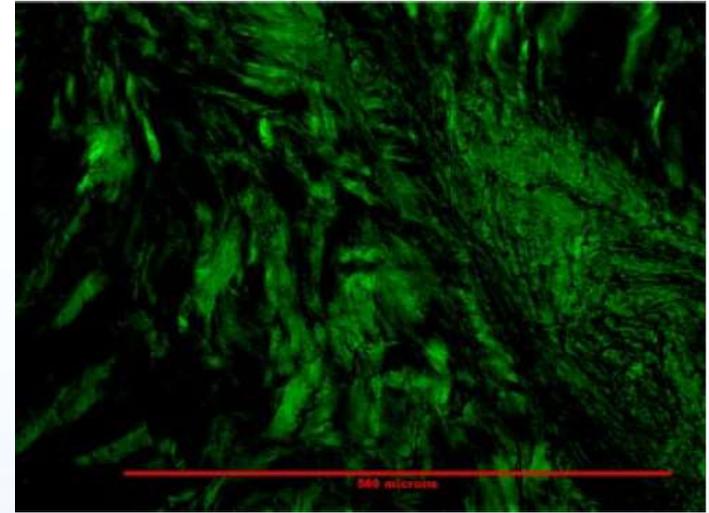
- Controlled, randomised, blinded study, 8 day study
- 12 control, 42 study rats with systematic Achilles tendon damage
- Group 1 = control; Group 2= no laser;
- Group 3, 4 and 5 had 3, 5 and 7 day of consecutive laser therapy respectively
- Day 8 sacrificed and collagen microscopic analysis

## Results:

- Significant difference between Group II and IV
- No significant difference between Group I and Group IV ( $p < 0.999$ )
- No significant difference between all three laser rat groups in healing of the tendon

## Conclusion:

- LLLT was effective in the improvement of collagen fibres organisation of calcaneous tendon after undergoing a partial lesion.



# Torn Achilles Tendon – George McKay, DVM

- **Patient/Condition**

- Dooley, English Mastiff
- 55kg Male Neuter
- Non-weight bearing R hindlimb
  - Torn Achilles tendon
  - Laxity in tarso-crural joint
- Ligament surgery recommended by previous veterinary surgeon after ultrasound of injured ligament



- **K-Laser Treatment - Mobile Vet Service**

- Stifle Protocol
- 6 treatments over 3 weeks
- Robert Jones Splint until treatment 5
- Introduction of controlled walking and hill work
- 4 weeks, no lameness and no tear



# Wound Management



- Improves and Promotes Healing
- Relieves Pain
- Improves Flap Survivability
- Improves Peripheral Microcirculation
- Reduces infection
- Anti-inflammatory Action

# RTA – Shay O. (8 year old spayed female)

April  
27<sup>th</sup>  
2011



## **Veterinary Surgical Center Initial Presentation**

March 29<sup>th</sup> 2011 – Exploratory for suspected right side abdominal muscular hernia

April 15<sup>th</sup> 2011 – Skin sloughing & surgical debridement

Wet-to-dry bandages

Limited improvement

4 Hour Post  
Treatment

May 5<sup>th</sup> 2011



## **Kindness Small Animal Hospital**

Dr. Aaron Neeman owner of K-Laser

## **K-Laser 1<sup>st</sup> Treatment – April 27<sup>th</sup> of 2011**

Contaminated Wound Protocol (5W, 2 cycles, 1125J)

1 week, 4 treatments in one week



**Shay O. – May 11<sup>th</sup> 2011 Pet Owner Comments**

“Thank you Dr. Neeman for all of your help, and saving Shay. We were on the verge of euthanizing her because we were being told she needed \$5000 -7000 of skin grafts, and we just couldn't afford that. Now, not only is her skin almost completely healed in such a short amount of time, but she's doing great on her leg! All thanks to you and your laser.”

# Snake Bite Wound



3 days - 0 Laser Treatments



5 days - 0 Laser Treatments



6 days - 0 Laser Treatments



6 days - 1 Laser Treatment



8 days  
2 Laser  
Treatments



# Snake Bite Wound



12 Days - 3 Laser Treatments

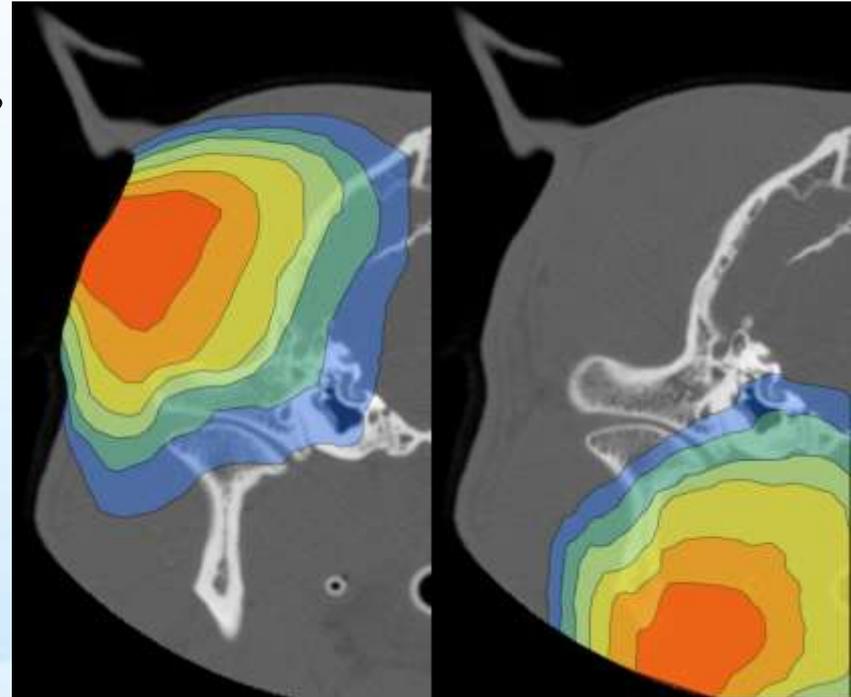
**6 days after 1st Treatment**

# UK Veterinary Testimonials

**Mark Lindfield MRCVS,**  
owner of Clerkenwell Veterinary Hospital, London.

“We have had a large number of successes that can only be put down to the influence of the K-laser. ....impressive wound healing where significant skin loss occurred after a dog attack meant that a large area of secondary intention healing needed to take place.”

“In addition a post-TECA operation; non-healing, bullar inflammation seen using our CT scanner and causing a persistent head tilt that no medication seemed to be able to improve. After a few sessions with the K-Laser the dog was cured, the abscess was gone and no further head tilt occurred.”



# K-Laser – Plasmacytic Stomatitis

## History:

Lymphocytic Stomatitis in an American DSH.  
Excessive drooling and non-responsive to NSAIDs.  
FIV positive

## Vet Surgery:

Alamo Feline Health Centre, San Antonio, Texas.

## K-Laser Protocols:

6 treatments begun on the 28<sup>th</sup> of May 2008 (see photo 1)

Oedema and Congestion on initial therapy, followed by Contaminated Wound setting

## Results:

Patient ceased drooling after initial treatment. Returned to normal appetite and lesions receded. (see photo 2 18<sup>th</sup> of June 2008)



# K-Laser Typical Protocol



- **Chronic Musculoskeletal**
  - 6 Treatments
  - 3, 2, 1 or 2,2, 2 over 3 weeks
- **Acute Injuries**
  - 3 - 6 Treatments
  - 3, 2, 1 or 2, 2, 2 over 3 weeks
- **Pre/Post Surgery**
  - 2 – 6 Treatments
  - Consultation day & Pre-operation
  - Anaesthetic recovery (Incision only)
  - Discharge day & Suture Removal day
- **Wounds**
  - Can be given daily

# K-Laser Coverage by Pet Insurance

- **ONLY Therapeutic Laser covered by ALL top UK Pet Insurance Companies for Vet treatment coverage**
- **One UK Pet Insurance Company Director bought a vet practice our Cube 4 Laser for her local practice she was so impressed with the results**



# Any Questions?



Visit the website:

[www.myklaserpet.com](http://www.myklaserpet.com)