New Trends in Pain Management and Tissue Rehabilitation

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

Available at

Natterjacks Vet

Because we've family!

K·LASER 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

Amplification by

Stimulated

Emission of

Radiation

Domestic Pets

Exotics Species

Used by Sports Professionals


actualidad

El tenista se recupera de su lesión de rodilla.

Rafa Nadal

Una pareja superunida

Cuidándole

Tortolitos

Acabamos de salir de hacernos una limpieza bucal. Mirad.

RAFA NADAL (26)

@RafaelNadal

TENISTA VIAJERO

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

Todos deseamos ver a Rafa Nadal totalmente recuperado de su lesión en la rodilla ...

Una relación larga y consolidada

Tras pasar por Barcelona, la parejita ... ¿Sería la boda del año?

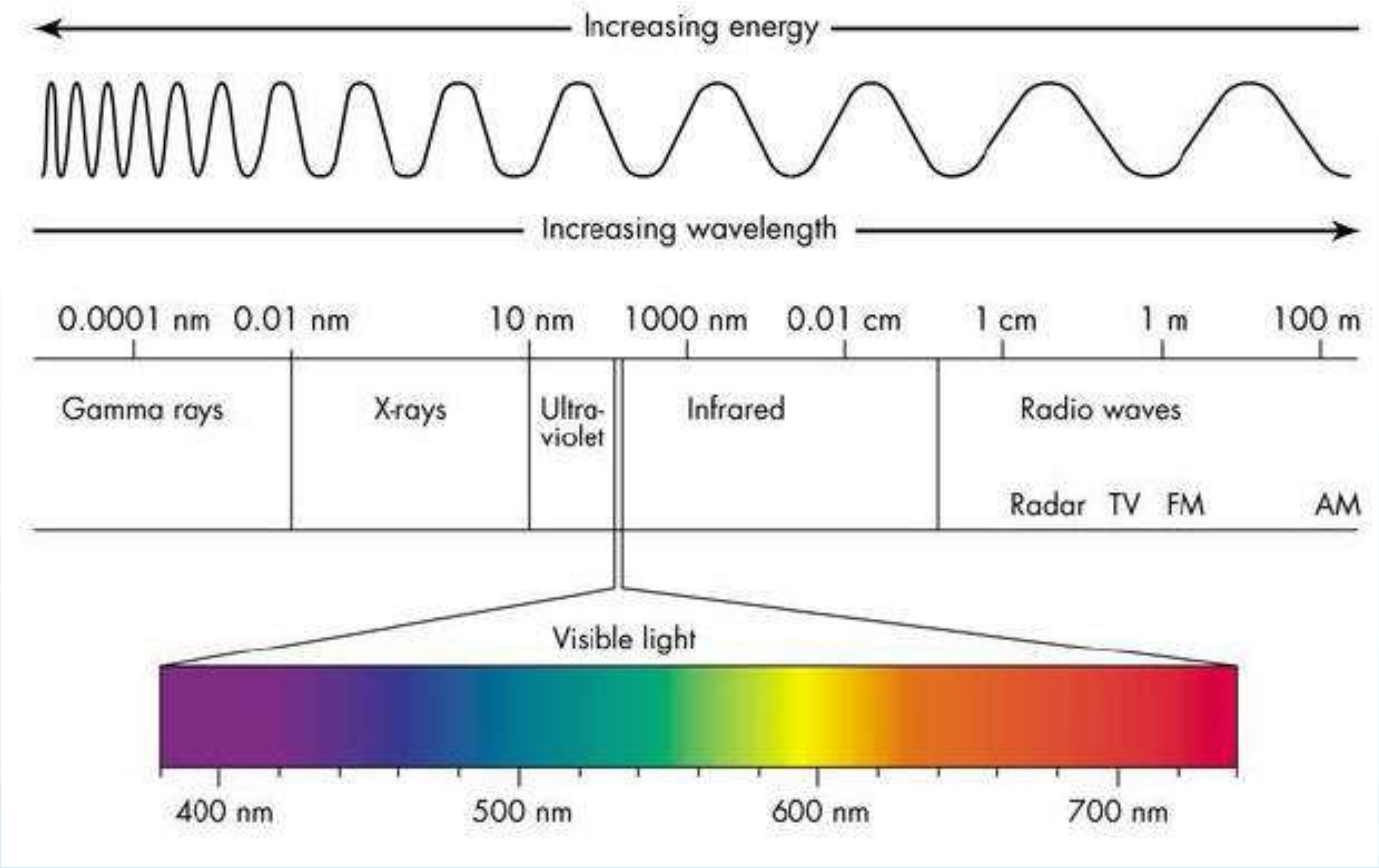
PESE AL DOLOR SIGUE JUGANDO

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

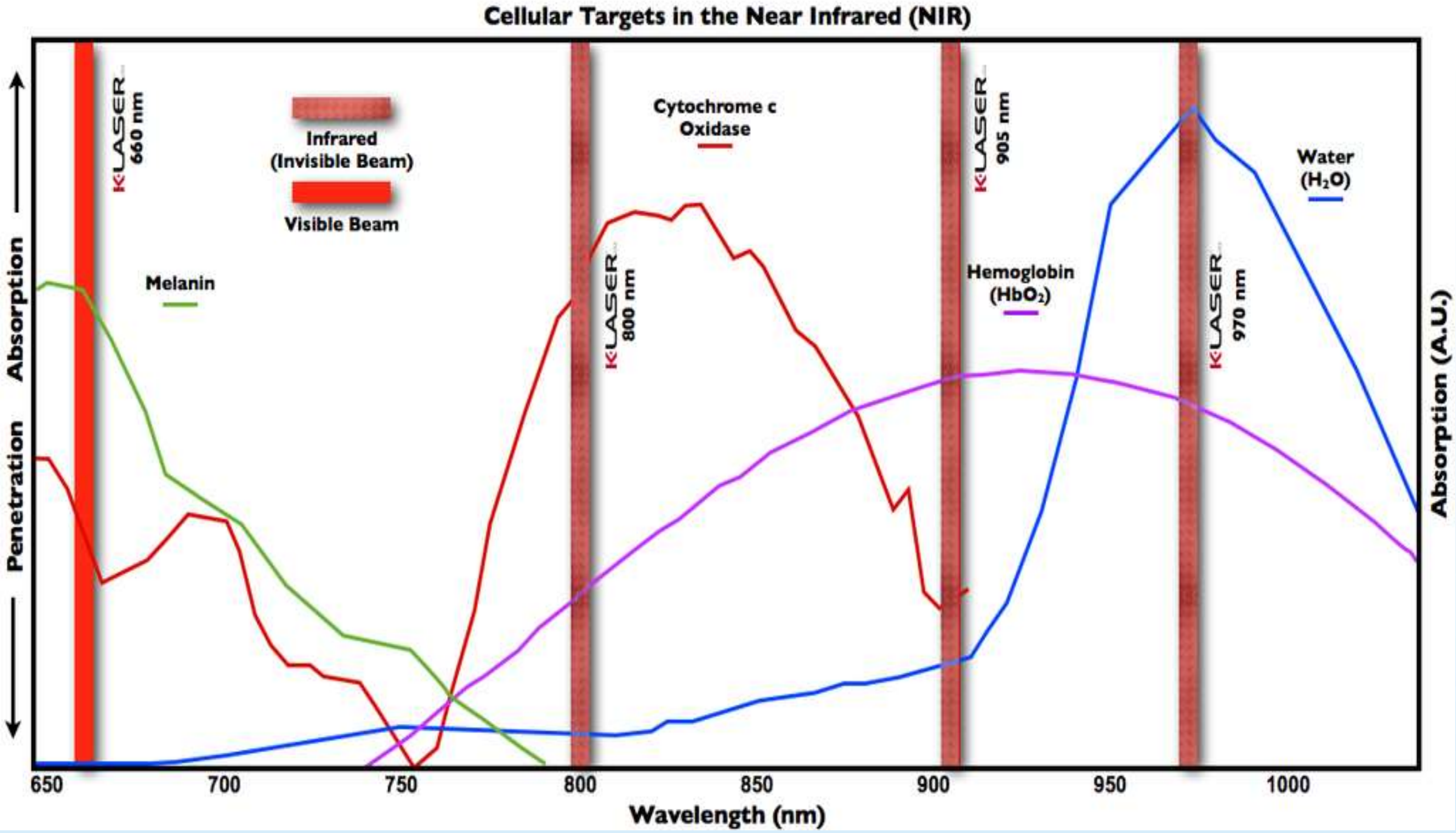
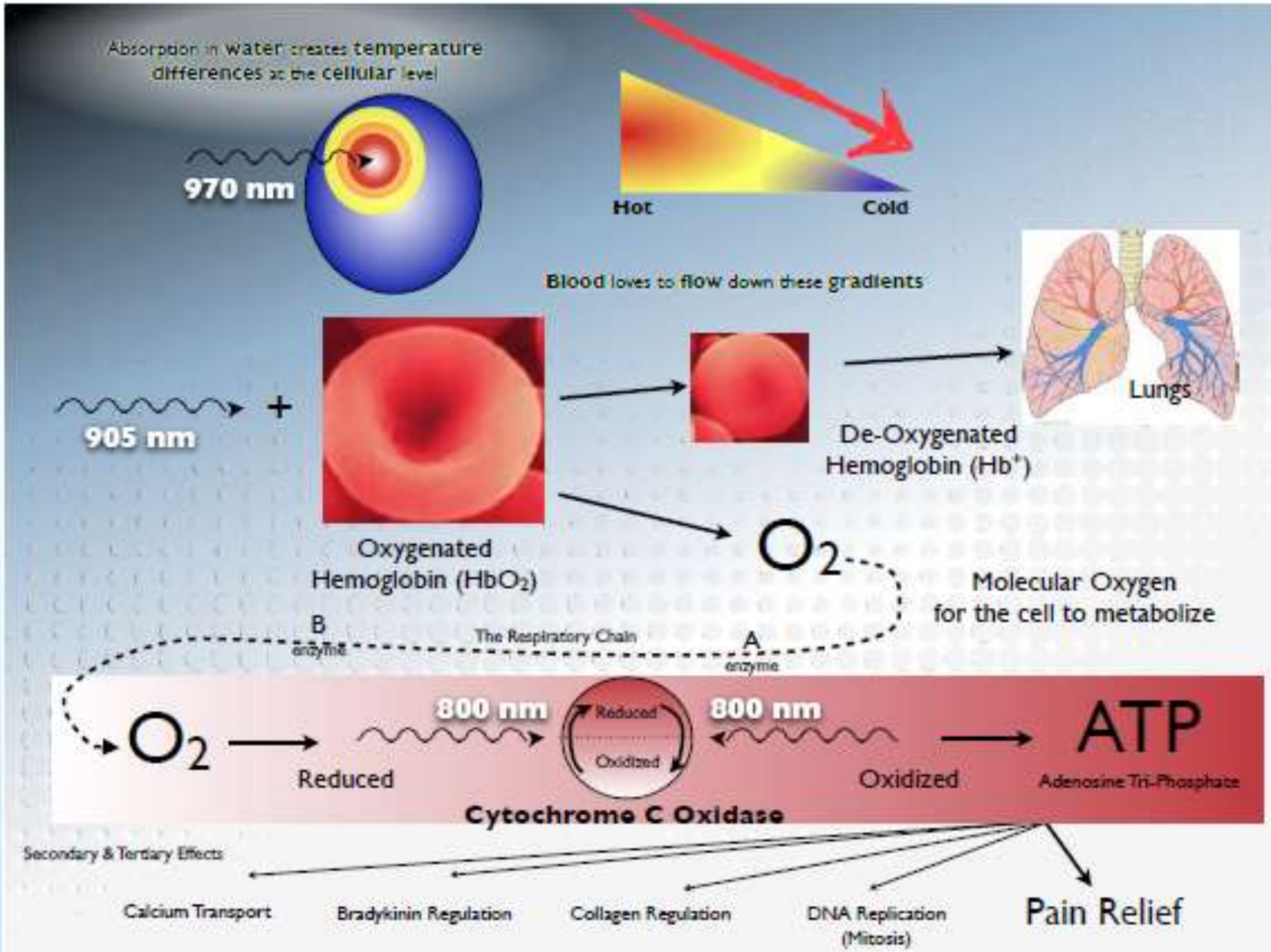


Photo-Biostimulation Cellular Effect



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_2, IL-1β, TNFα).
- Selective reduction in pain modulation through the Aδ and C-fibre pathways has been recorded:
  - Axonal disruption of neuronal flow
  - Inhibition of neuronal enzymes

Chow R.T. et al. (2009) Lancet

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.

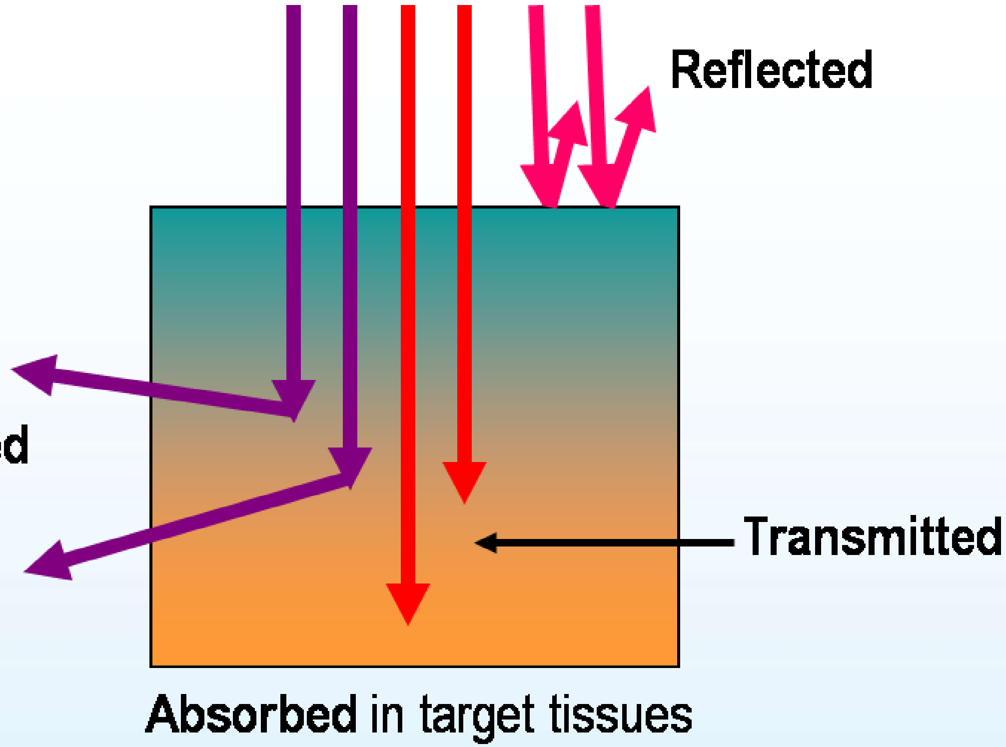
Takac and Stojanovic 1998

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

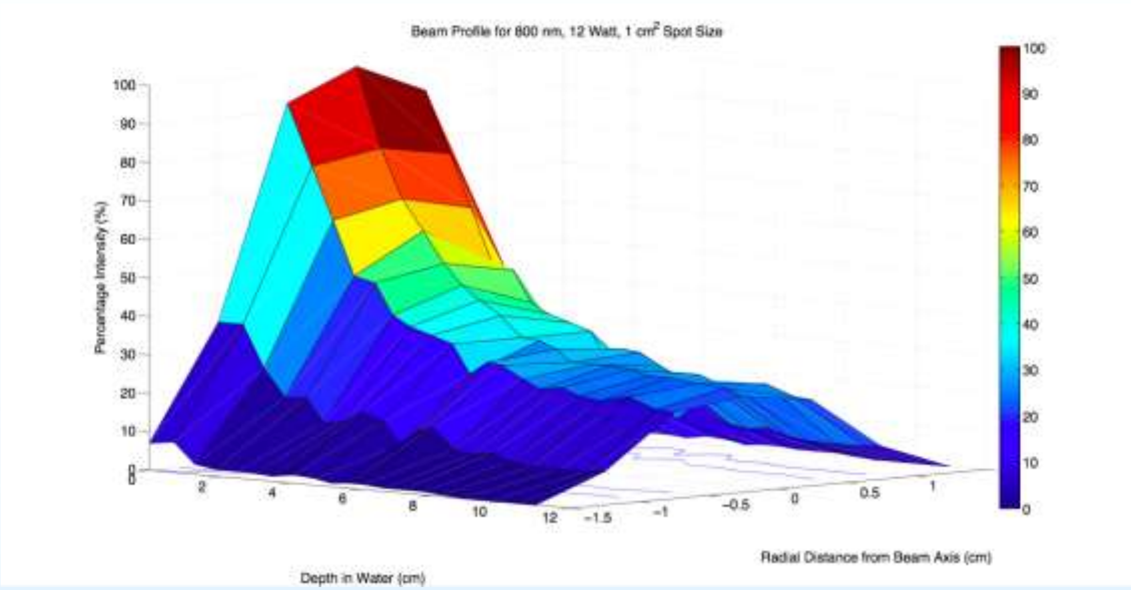
Laser Tissue Interaction

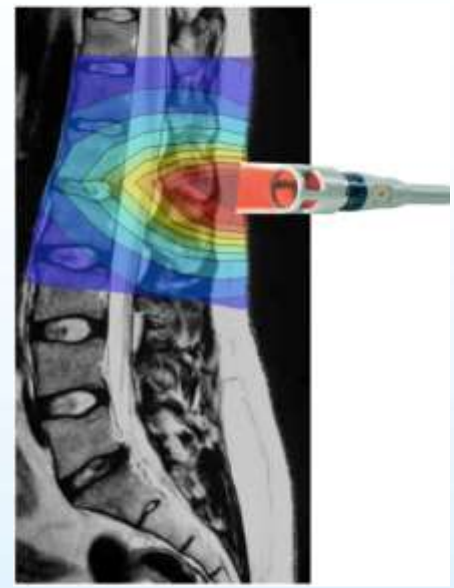


Biological tissue is a highly **turbid** medium; that is, it **strongly** (exponentially) **attenuates** radiation through a combination of **scattering** and **absorption**.

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**.

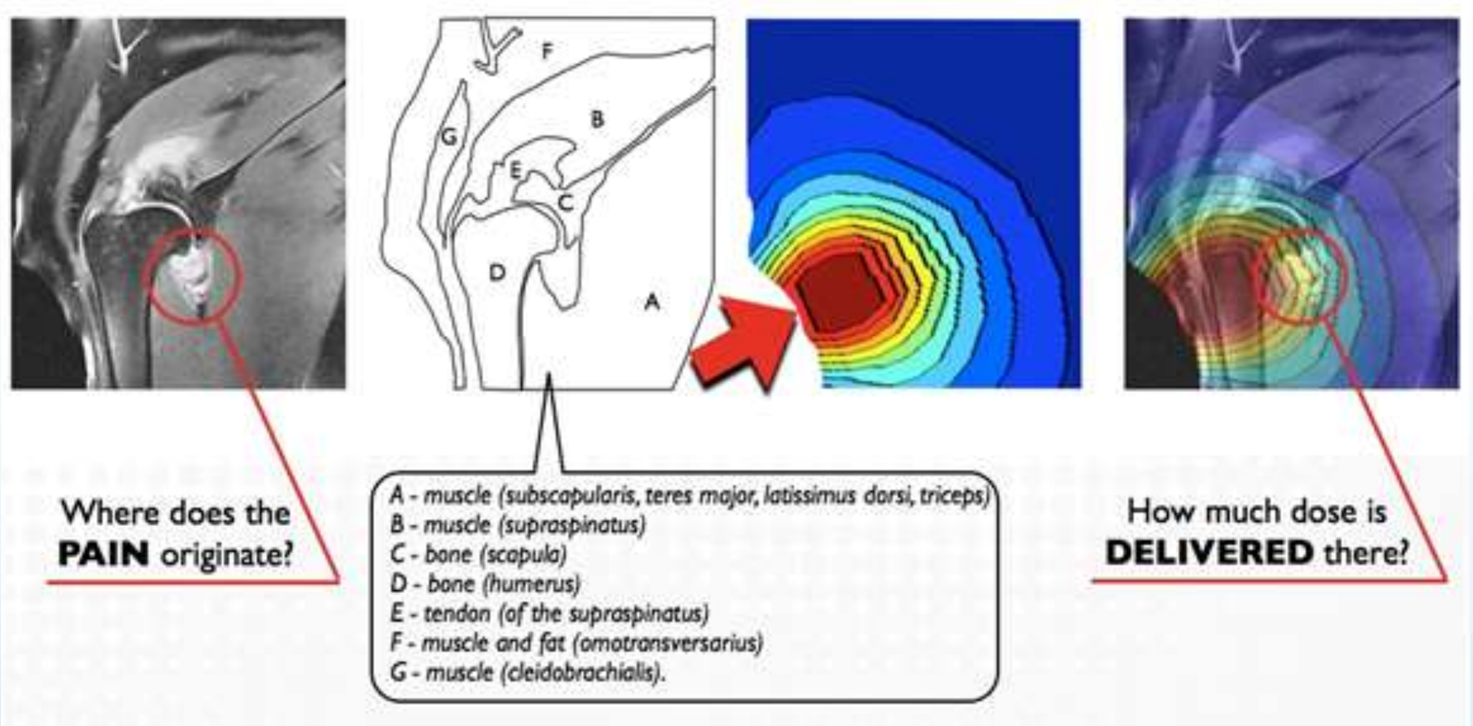




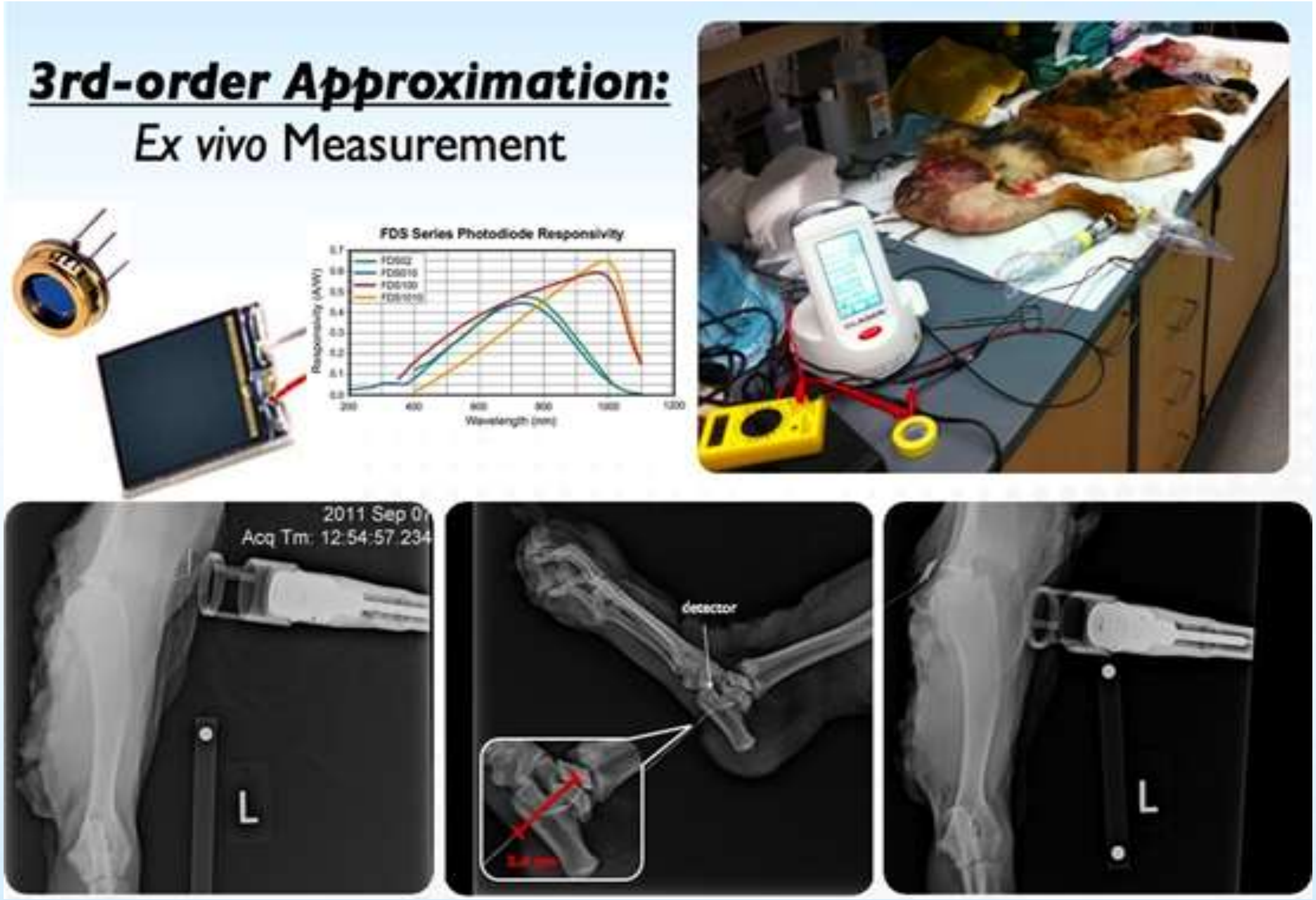
We are the **only** company in the industry who has **compiled** this data and **accounts** for tissue attenuation in its **protocols**. Combine this analysis with **average power densities** and **treatment times** to get **dose** at depth.

Necessity of Higher Power

2nd-order Approximation: MRI-Monte Carlo Stimulation



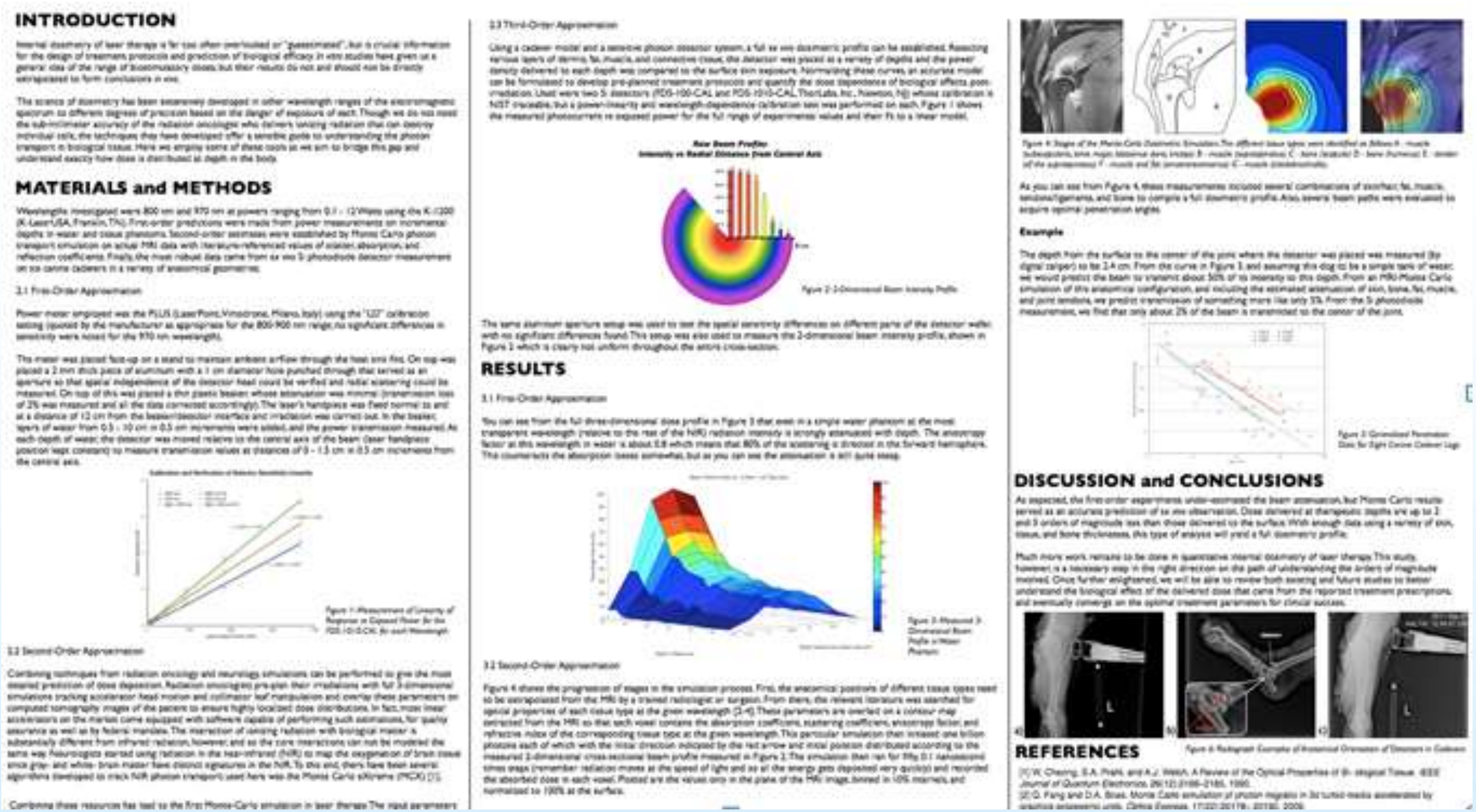
Necessity of Higher Power



Depth of Penetration

In-vivo receptors -
test for Photon Density at Depth

NAALT Published Paper


INTRODUCTION

MATERIALS and METHODS

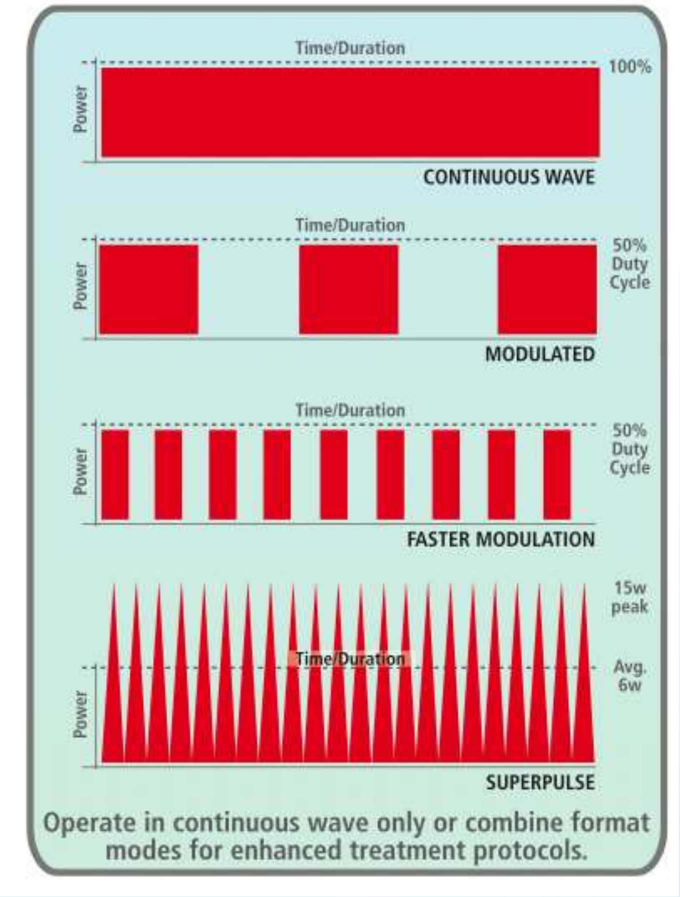
RESULTS

DISCUSSION and CONCLUSIONS

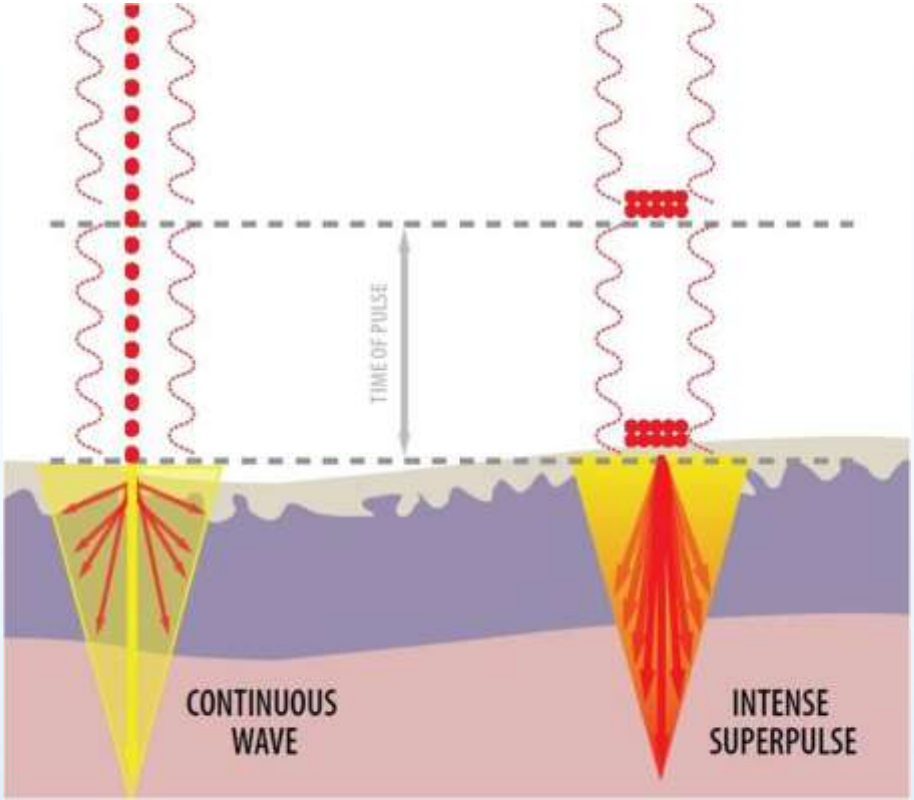
REFERENCES

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



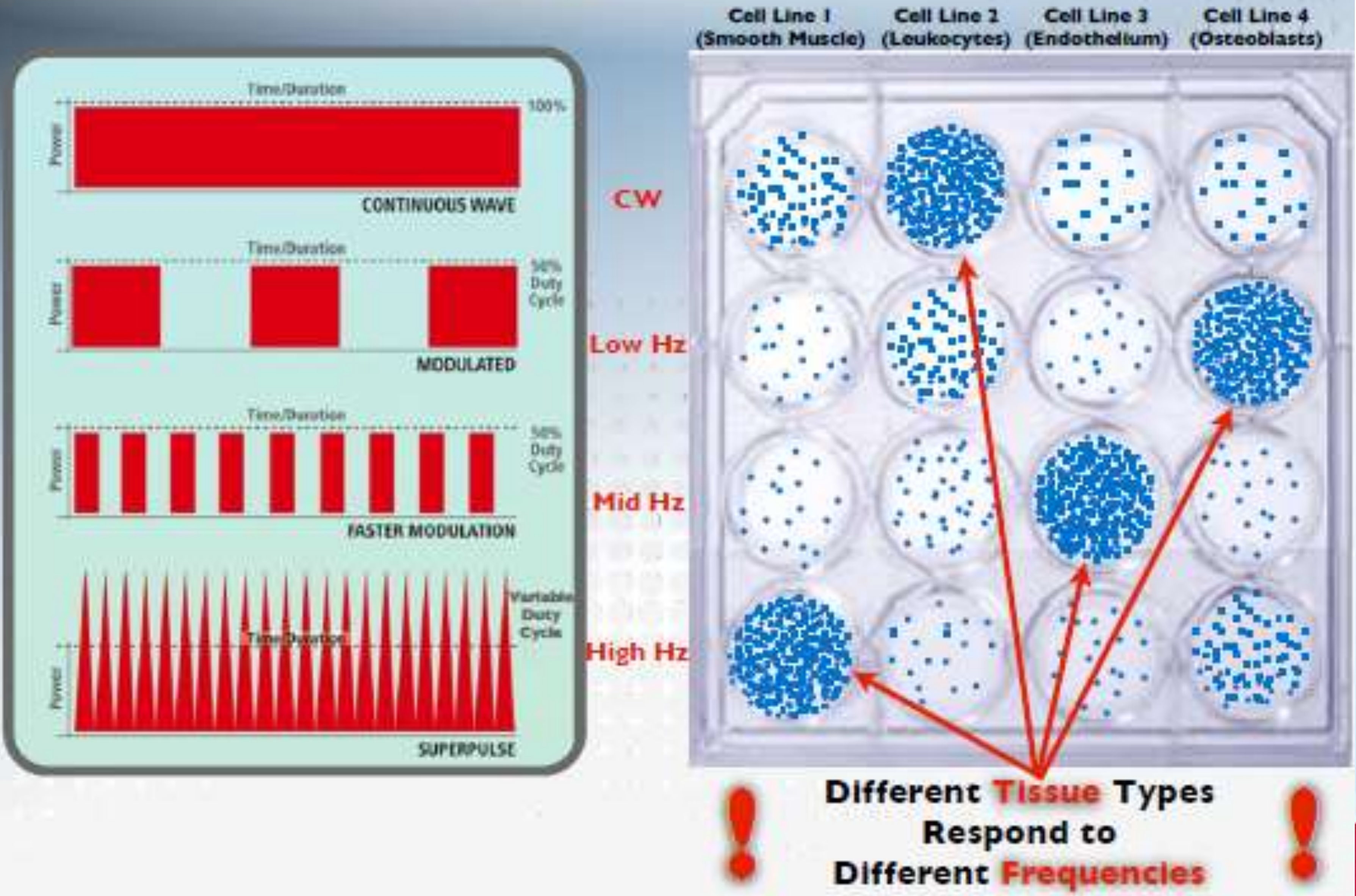
Frequency Modes



Intense SuperPulse

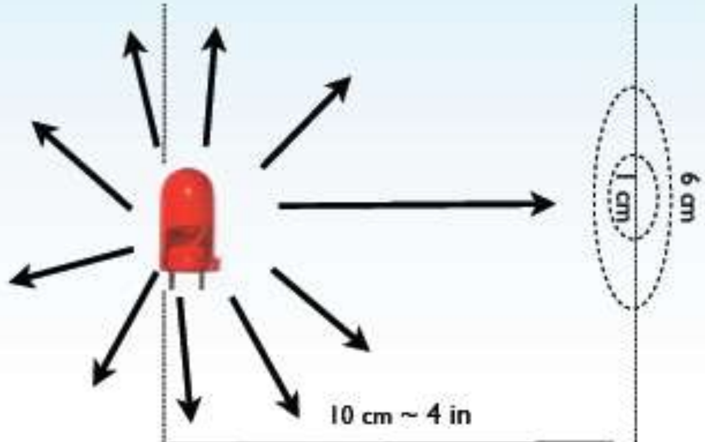
DELIVERY MODE

Continuous Wave (CW), Frequency Modulated, or SuperPulse



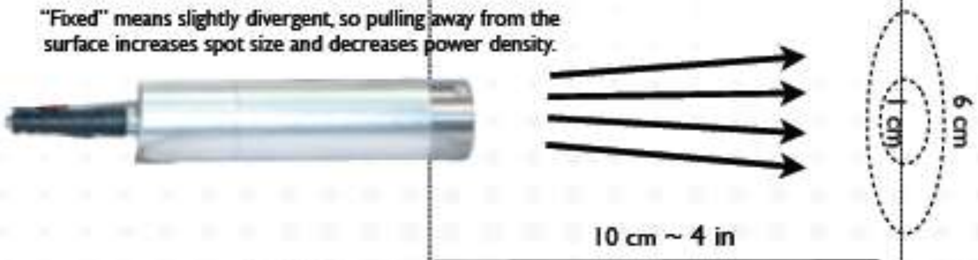
Starting Point	Final Power through 1 cm diameter spot Area = .785 cm²	Final Power through 6 cm diameter spot Area = 28 cm²	Power Density (at 12 Watt Output)
12 Watt **LED**	**0.08** Watts	**0.49** Watts	**0.01-.10** W/cm² (depends on distance to target)
12 Watt **LASER** w/ **"FIXED" SPOT SIZE**	**0.33** Watts	**12** Watts	**0.43** W/cm² (fixed)
12 Watt **ZOOMABLE LASER**	**12** Watts	**12** Watts	**0.43-15** W/cm² (adjustable with zoom-handpiece)

12 Watt **LED**



12 Watt **LASER**
w/ **"FIXED" SPOT SIZE**

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



12 Watt
ZOOMABLE
LASER

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

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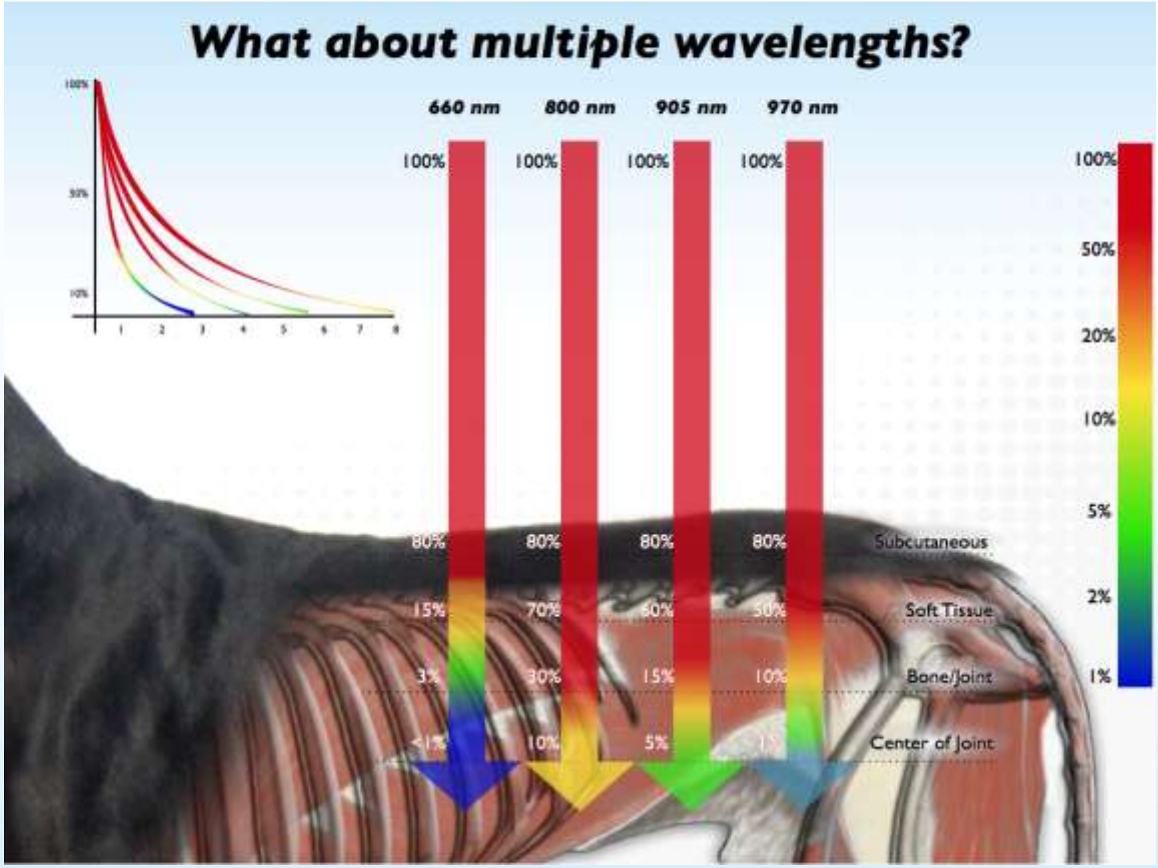
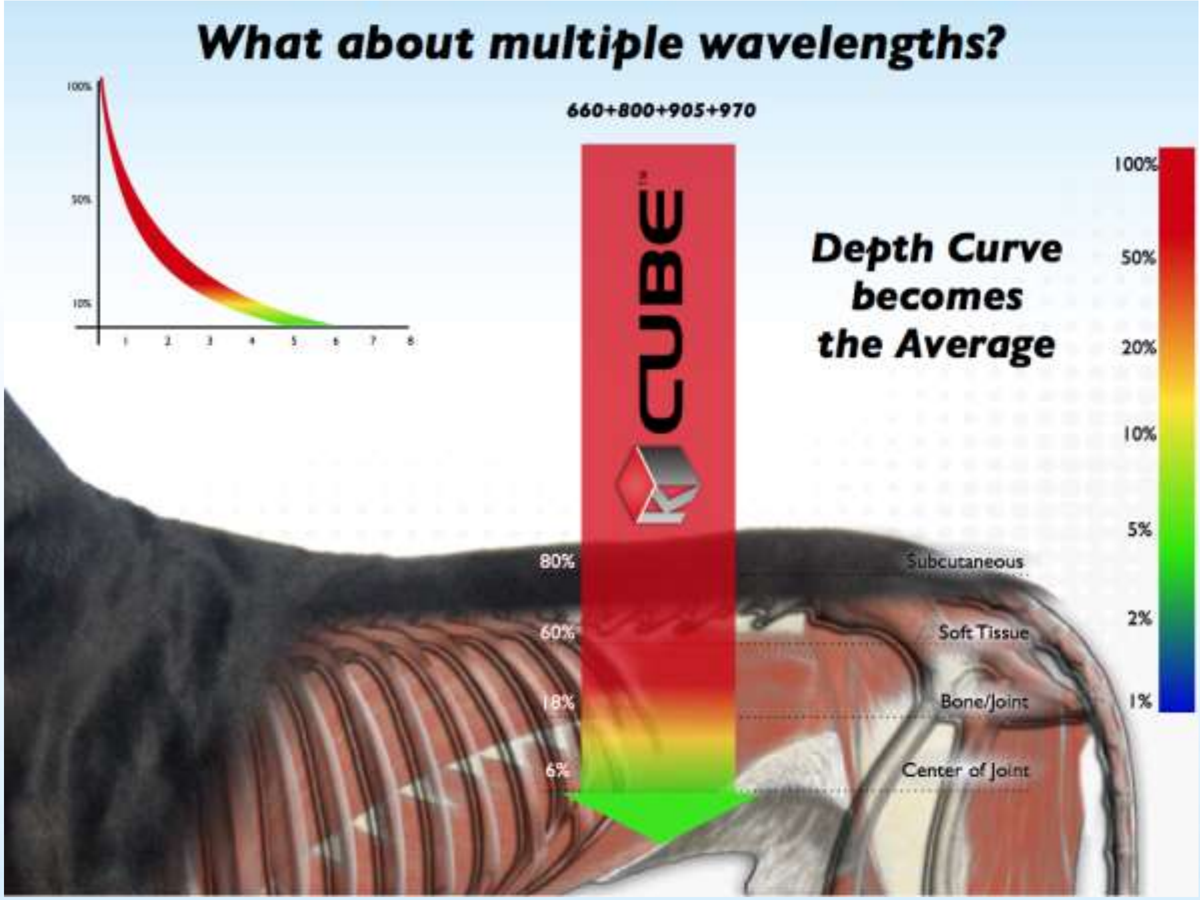
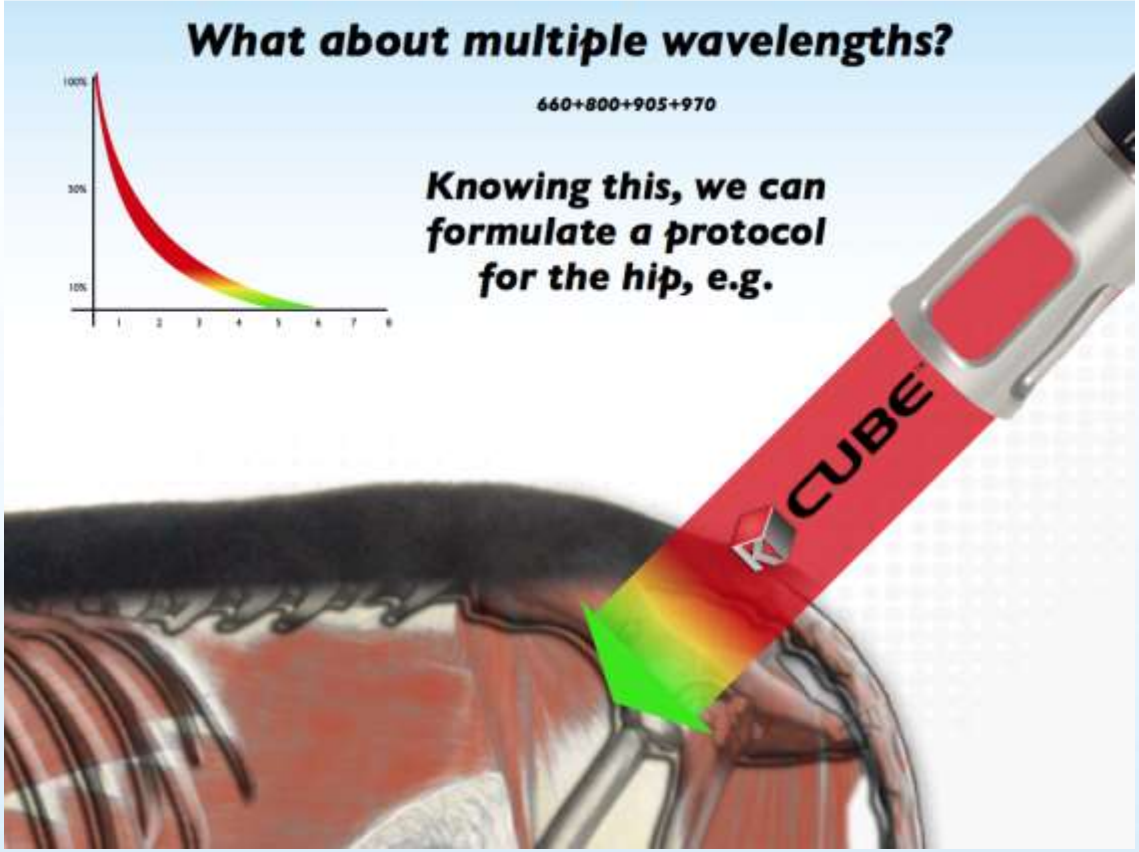
Multiple Wavelengths



Multiple Wavelengths



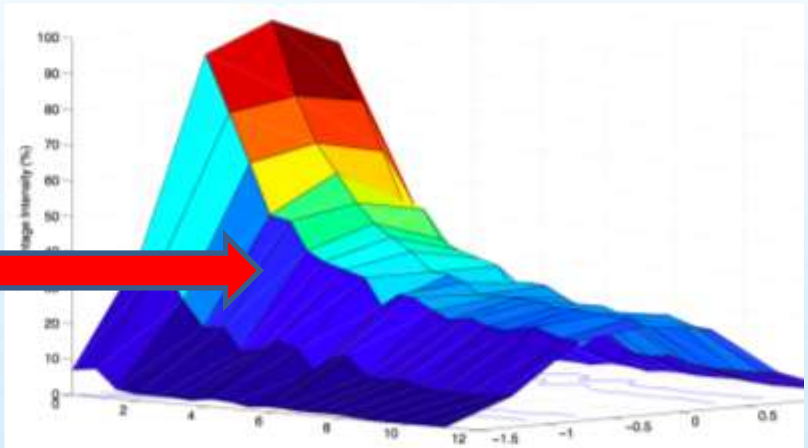
Multiple Wavelengths



Class III versus Class IV Lasers

Lumbar Pain (Chronic)	
Biostimulatory Dose	6 J/cm^2
Tx Area	150 cm^2
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	4.5
Hours	4.5!!!	0.07



Musculoskeletal Injury, Osteoarthritis and Pain Management

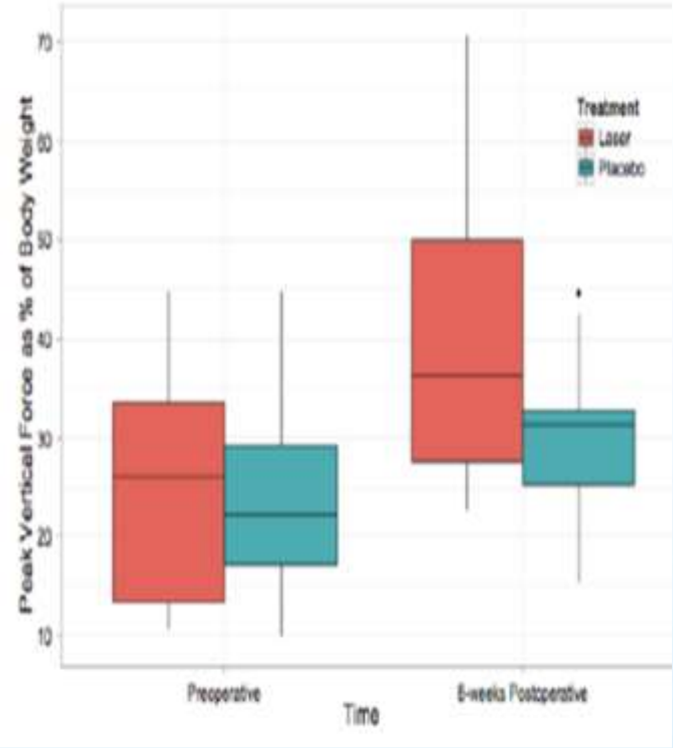
- Improves and Promotes Healing
- Relieves Pain and Reduces Spasm
- Increases Joint Flexibility
- Improves Peripheral Microcirculation
- Anti-inflammatory Action

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

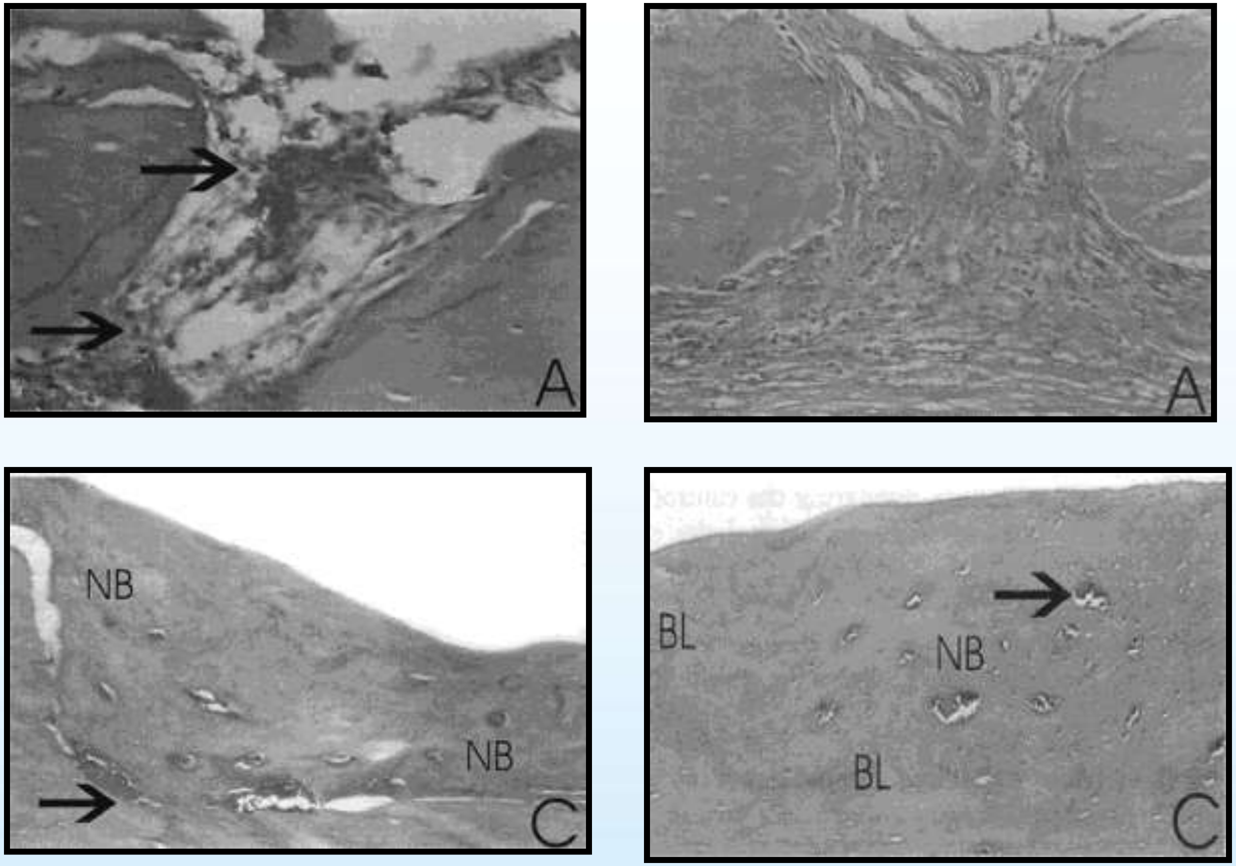
Force Plate Analysis

- 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 2nd 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 1st 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.

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Veterinary Testimonials - UK

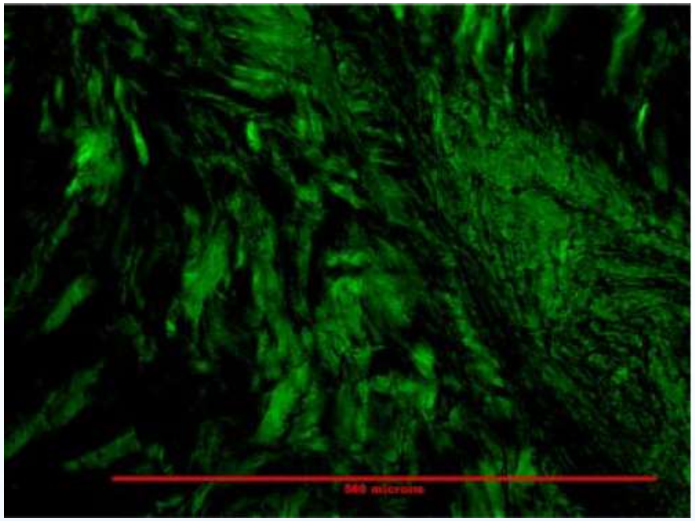
“We have had a large number of successes that can only be put down to the influence of the K-laser. They include: a rapid resolution of a difficult infected, non-union plated forelimb fracture referred from another practice, improved recovery times after TPLO surgery, significant pain reduction and improvements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

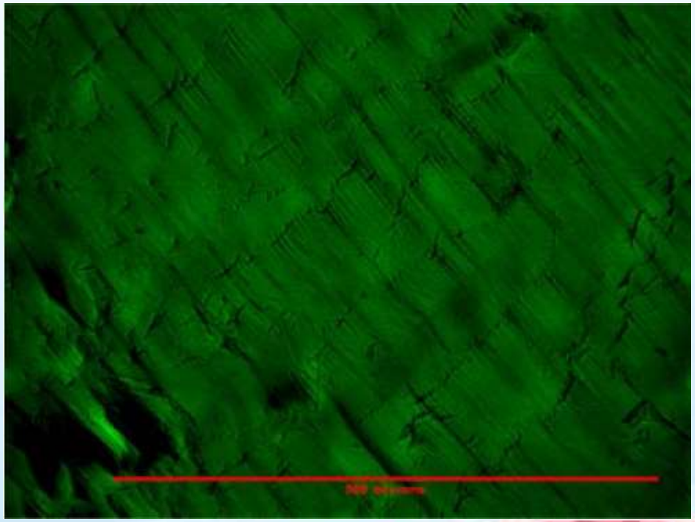
Mark Lindfield MRCVS, Director - Clerkenwell Veterinary Hospital

“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 27th 2011

Veterinary Surgical Center Initial Presentation

- March 29th 2011 – Exploratory for suspected right side abdominal muscular hernia
- April 15th 2011 – Skin sloughing & surgical debridement
- Wet-to-dry bandages
- Limited improvement

4 Hour Post Treatment

May 5th 2011

Kindness Small Animal Hospital

- Dr. Aaron Neeman owner of K-Laser

K-Laser 1st Treatment – April 27th of 2011

- Contaminated Wound Protocol (5W, 2 cycles, 1125J)
- 1 week, 4 treatments in one week

Shay O. – May 11th 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

Snake Bite Wound

12 Days - 3 Laser Treatments

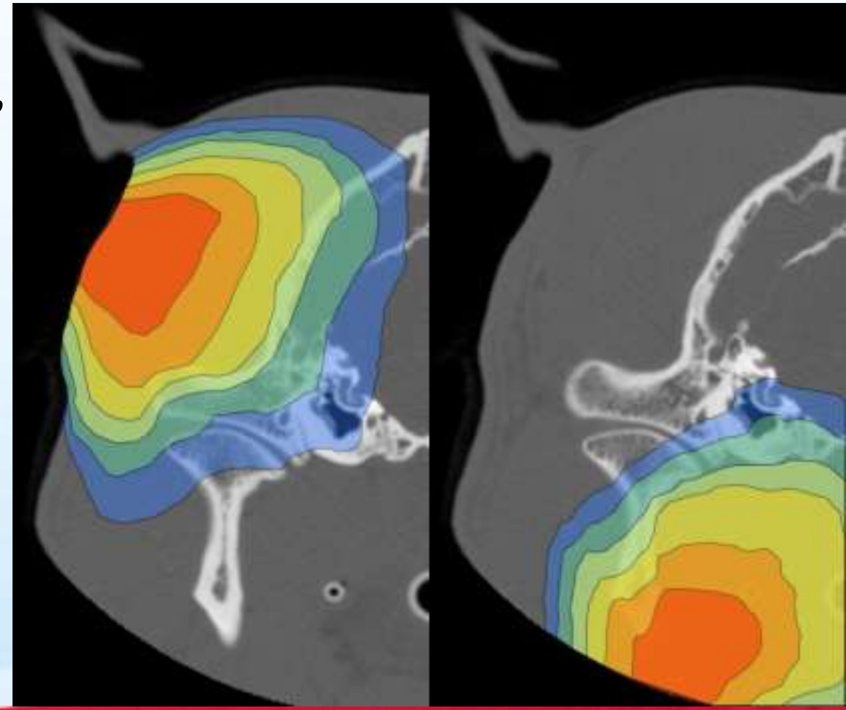
6 days after 1st Treatment

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 28th 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 18th 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