

THE TOP 6 WAYS

LASER THERAPY

IS USED IN

EQUINE MEDICINE

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EQUINE MEDICINE

THIS EBOOK IS BASED OFF CUTTING EDGE'S WEBINAR, PRESENTED BY MARYBETH STANTON, DVM, DIPLOMATE ACT, CVA.

MARYBETH STANTON DISCUSSES THE MOST COMMON APPLICATIONS THAT SHE UTILIZES LASER THERAPY FOR. THE PRESENTATION INCLUDES CASE EXAMPLES AND CURRENT RESEARCH THAT YOU WILL FIND THROUGHOUT THIS LITERATURE PIECE.

APPLICATIONS COVERED:

- ❑ WOUND HEALING
- ❑ MUSCLE, TENDON, AND LIGAMENT INJURIES
- ❑ ARTHRITIS
- ❑ BACK INJURIES
- ❑ NERVE AND PAIN RECOVERY

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What is laser?

LIGHT
AMPLIFICATION
STIMULATED
EMISSION
RADIATION

WHAT

IS

LASER?

"In medicine, we try to target certain wavelengths and doses to achieve a therapeutic response. Lasers, of course, have been used across the industry and have many different functions; surgical lasers vs lasers designed to have more of a therapeutic effect."

Low level laser therapy (LLLT), also known as "cold" laser therapy, is designed to minimize, or prevent in total, any thermal damage to tissue.

Photobiomodulation therapy is the use of light to be absorbed by chromophores in the body to trigger non-harmful biological effects. Laser works by targeting mitochondria to stimulate the increase of H.E.P. production, which then alters bone membrane physiology and improves cell function.

There has been a shift over the past few years as to the amount of laser use in clinical practice. A [2006 study](#) shows less than 50 veterinarian practices offered laser as an option for patients. A recent study shows that in 2017 over 7,000 practices utilizing lasers on a daily basis.

HOW DO LASERS

BENEFIT MY PATIENTS?

When comparing therapies to add to your practice, there are several different considerations you must look into. The first of which being; how is laser therapy going to benefit my patients?

"As an alternative therapy, it is incredibly useful", Dr. Stanton notes during the webinar. "You now have an option for a non-pharmaceutical treatment that is non-invasive and extremely helpful in achieving pain control and healing."

"In the case of Cutting Edge lasers, they can also be non-contact, which can be very effective when you're dealing with horses that don't want to stand still for a procedure...". After years of studies and clinical proof, and FDA approval in 2002, we know MLS Laser Therapy is a very effective tool to relieve pain and promote healing of damaged tissue. It's also an extremely cost effective means of treating patients as well.

TERMS &

MISCONCEPTIONS

There are many misconceptions about lasers; one of the more popular being that the higher power, the better therapeutic results. This is just not the case!

"The therapeutic window for the use of lasers is certainly narrow and overuse or administration of energy will NOT improve the outcome and can actually cause thermal damage which can result in apoptosis and cell membrane stress."

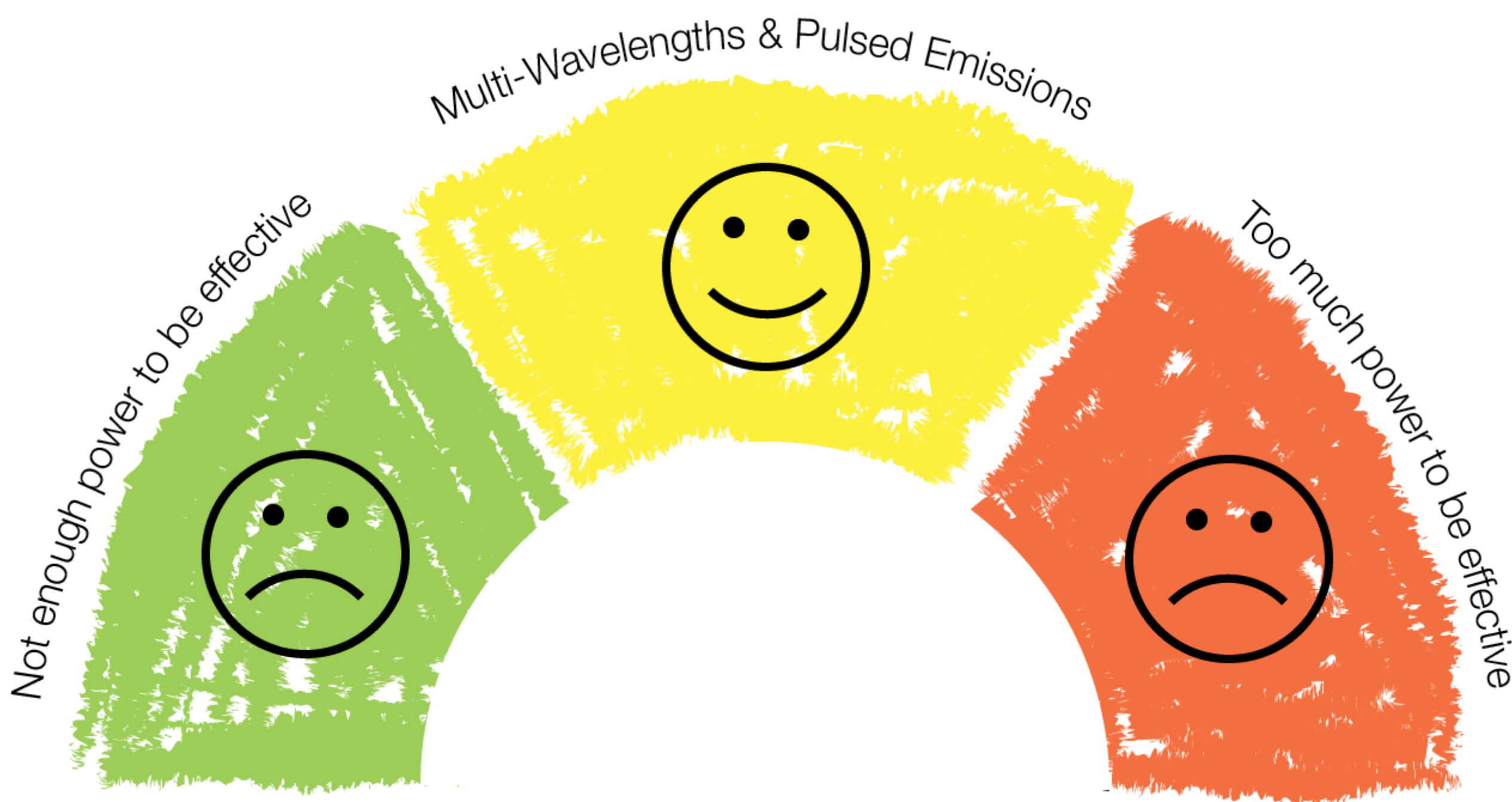
Larger doses and higher power does not mean a better product or treatment plan.



When you look at the classifications of lasers, you'll see there are class II, class III(b), and class IV. Class II and III lasers have been available commercially for quite some time, but do not carry the power and penetration of a class IV. Thus making them less effective and allowing patients to see pain relief only at the end of a treatment cycle, if at all.

Class IV lasers are newer and some contain higher powers, which can be a negative aspect considering side effects and the window of healing being so narrow. You must be careful not to cause further damage thermally when using these products.

So, where does MLS Laser Therapy fit into those categories? The Cutting Edge line of therapeutic lasers use a synchronized wavelength with pulsed emission. The technology provides patients with immediate pain relief due to the anti-inflammatory effect and provides peace of mind to the administrator that no thermal damage will occur.



LASER TERMS

- **Wavelength** - Spectrums of light measured in nanometers.
- **Joules** - Unit of energy, 1 joule is equivalent to 1 watt per second.
- **Dose - Joules / cm²** - Dosing, the amount of energy delivered to surface space.
- **Diode** - Semi-conductor that emits the light from the laser.
- **Emission** - The light energy emitted to the being.
- **Depth of Penetration** - How far the laser effectively penetrates the tissue.

PHYSIOLOGIC & TISSUE EFFECTS



Physiologic Effects

When using a dual wave length, physiologic effect such as edema and analgesic effects can be achieved using different wavelengths. Specifically the 808 nm for edema, and the 906 nm for analgesic effects. When you have a "synchronized emission" that involves two wavelengths acting as a single pulse pattern. This achieves the greatest anti-inflammatory treatment. When looking at lasers that provide this effect, you will understand that there are 2 diodes on the same axis and a Multiwave Locked System. Another main function of this is to interfere with pain transmission, getting a 3-5 cm penetration without thermal damage.

Tissue Effects

When looking at the tissue effects, there are some considerations that must be kept in mind. First of which being that not all species will absorb laser light in the same way, penetration is going to be wavelength specific. Some studies show that the 808 nm penetrates as much as 54% deeper than the 980 nm. Skin pigment will also play a big role in your tissue effects, light skin tends to absorb wavelengths and energy more easily. In looking at pulse verses continuous wavelengths, a study done on rat skin shows that the pulsed wave at 904 nm penetrated more easily than a continuous wave of 910 nm. Pulsed wave also has been found to have a better effect when dealing with wounds.

General Benefits

In looking at the systemic benefits of laser, we see increases in metabolic activity such as mitochondrial function and ATP production. In wound healing, we typically see accelerated tissue repair and reduction in fibrous tissue in scarring. Immunoregulation also occurs as a result of the activation of the mitochondria at the cellular level and we see improved nerve repair and function. Trigger and acupuncture points may be used to stimulate pain release and inflammation decrease. From the standpoint of pains, we typically see inhibition in peripheral no susceptor action potentials and a decrease in those susceptor activations at the spinal level. Some additional anti-inflammatory effects include decreased production of inflammatory cytokine.

PHYSIOLOGIC & TISSUE EFFECTS

What does a laser do to biological tissue?

Photons penetrate tissue and interact with chromophores to produce different effects. Generally, photochemical effects are the primary, but photothermal are also present. Photothermal effects are when light increases heat in the cells that results in cellular vaporization. Photomechanical effects can also occur, which is where there is a change in shape when exposed to light.

Photochemical Effects

Photochemical effects are biochemical changes targeted at pain and inflammation reduction.

Activation of enzymes

- Modifies cell metabolism
- Increase ATP synthesis
- Increase RNA production
- Increase cell proliferation and differentiation
 - Fibroblasts
 - Chondrocytes
- Immunomodulation
 - Release of growth factors



[Learn more about MLS Laser Therapy](#)

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Basics

SAFETY

DOSAGE

MODALITIES

SCANNING

WOUNDS

BASICS

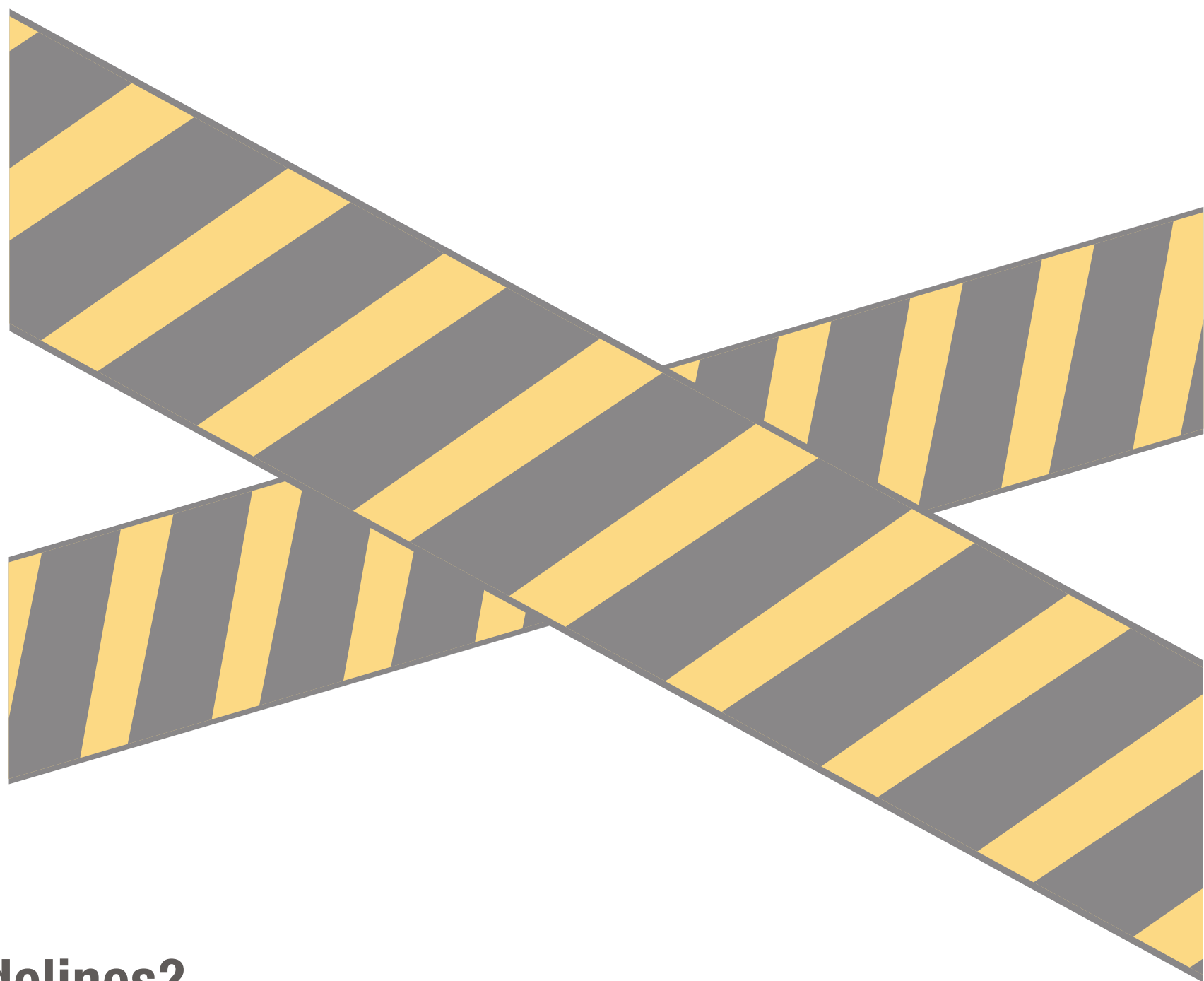
SAFETY & DOSAGE

What precautions should I be taking to ensure laser safety?

It's very important to consider the safety guidelines when you add laser into your practice or clinic. Making sure any technical staff is properly trained on this is also vital. We want to be certain that glasses are provided for any providers or bystanders. Clients should be informed that they should not look directly into the laser light. Posting warning signs is a good idea to inform unknowing people about the laser area. Keep treatment logs including the name, date, location of treatment, and the number of J/cm² used in the session.

Laser safety

- Glasses
- Post warning sign
- Treatment logs



What are general dosage guidelines?

View the general outline below. When looking at treatment programs, the cycle consist of between two and ten sessions. Acute pathology usually requires less treatments.

General Dosage Guidelines

- Acute Pathology 0.5-2 J/cm²
- Subacute 2-4 J/cm²
- Chronic 4-8 J/cm²
- Wounds 1-2 J/cm²

BASICS

MODALITIES & SCANNING

Two different laser modalities are used...

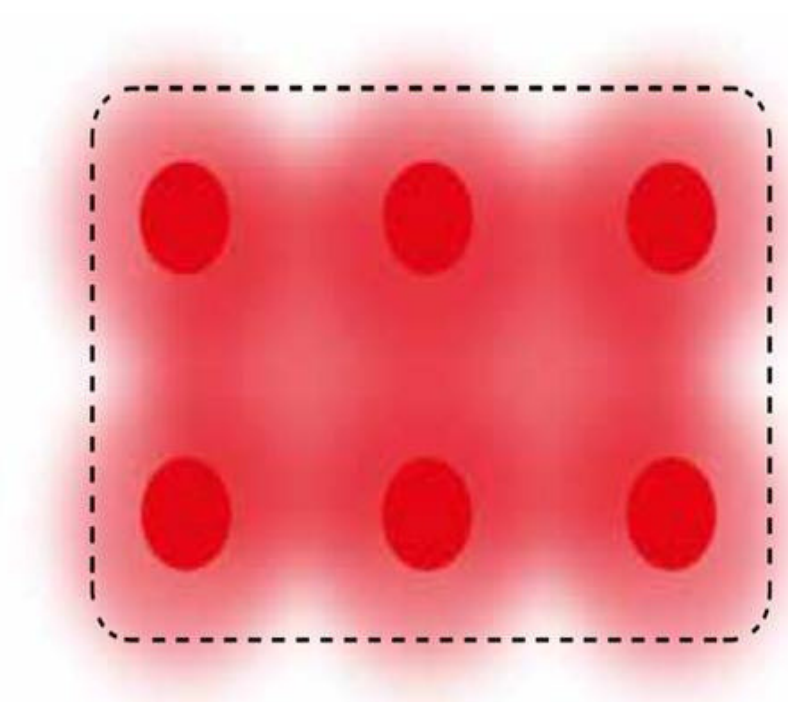
"Point-to-point" and "scanning" are user selected techniques, used according to the type or area of the tissue that you are treating. Most commonly, the point-to-point method is used for treating small areas, particularly irregular surfaces such as joints and is used for trigger points and most acupuncture.

Point-to-point:

In this technique the laser is held in place and moved in small concentric circles. The treatment area which is measured in cm^2 is typically divided into 6 points of application. The laser emission will stop as one-sixth of the dose is administered, then the location is changed to the next point within that treatment area and the laser hand piece is activated to complete the next dose.

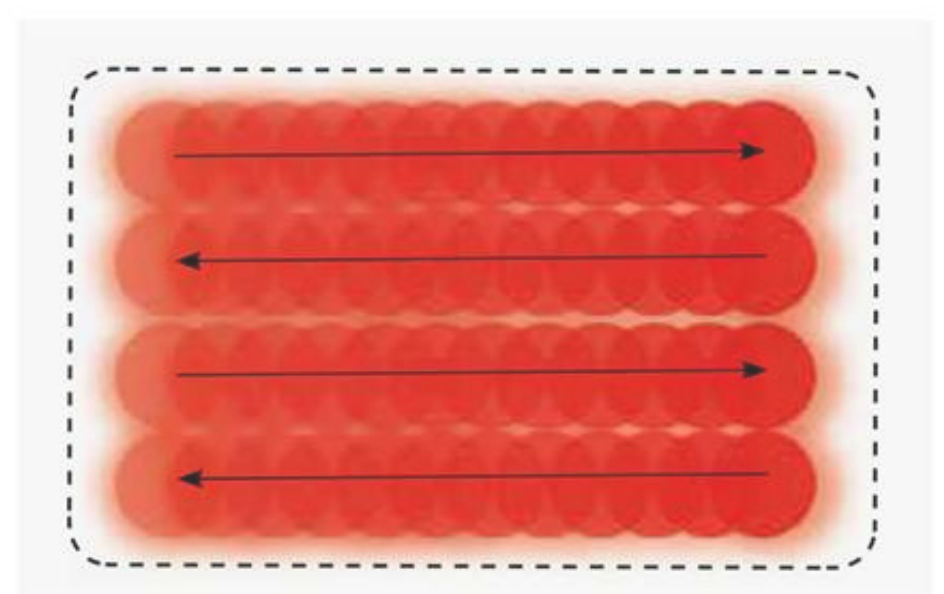
Point to point

- Treating small areas
- Irregular surfaces
- Trigger points
- Laser is held in place or moved in small concentric circles



Scanning:

The scanning technique is usually used for larger areas, typically the smoother shaped areas such as the back, muscle bellies, and for larger wounds. The dimensions of the treatment area is "small", "medium", or "large" selections, which are respectively 50, 100, or 150 cm^2 . You can alter the dose by increasing or decreasing the number of points, or altering the area of cm^2 . The device will then adapt a time to maintain the total energy dosage in J/cm^2 . In this technique the head of the device is constantly in motion, focused 8" from the target point for the tissue being treated.



BASICS

WOUNDS

Wound Healing

Laser therapy can be tremendously helpful in the healing of wounds. It assists with pain control, there's good anti-edema and inflammatory control. It creates a positive effect on infected tissue and controls the speed at which granulated tissue forms by controlling the edema and inflammation. Using the laser on surgical incisions is a good practice, "we tend to see less complications, like a wave of swelling secondary to our surgical procedures, by implementing laser after the surgery is completed", Dr. Mary Beth Stanton notes. Lasers act to promote growth factor release and increases angiogenesis which aids in healing.

Wound Protocol

The general protocol for wound treatment is dosing in 1-2 J/cm². In this particular treatment we are careful not to exceed the dosage, to avoid rebound effects and symptoms. For example; a 50 cm² wound would have a total emission of 50-100 Joules.

Typically in the beginning of wound treatment you will treat 1-2 times per day depending on the severity of the wound, edema, and pain.

Example:

This is a wound that presented to Dr. Mary Beth Stanton as a four day old wound. It's an extremely infected puncture wound that penetrated two and a half inches into the neck from a broken fence board. As you can see, the original wound was contaminated and there was barely any granulated tissue.

Day 1



BASICS

WOUNDS

Example:

The first thing considered for treatment in this case was infection control, which improved quickly with a combination of MLS Laser Therapy and antibiotics. As you can see, the difference between day one and day three is significant and there is quite a bit of healthy granulated tissue already starting to form at this point.

Day 1



Day 3



Day 7



Day 11



Treatment

- 1.07 J/cm²
- 42.96 Joules per treatment
- Twice daily initially for 5 days then daily treatment

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Effective Use

Tendon Repair

Joints

TMJ

Acupuncture

EFFECTIVE USE IN

TENDON REPAIR & JOINTS

Tendon Repair

Tendon repair is a major area in which lasers can be helpful in treatment. Traditionally we know that lasers will act to help with pain, inflammation, and edema control to promote repair initially, but there are several difficulties with achieving tendon repair. It is a difficult area of repair for many reasons; tendons are slow to regenerate, they have a dense extra cellular matrix and low cellularity. Additionally, tension on the wound, low blood supply, and its tendency for re-injury complicates the process of healing.

Tendon Injury Dosage

When considering dosage for tendon injuries, just like other conditions when you have acute vs chronic, you want to start off with a lower dose for acute. Dosing for acute conditions should begin at 1.04 J/cm² and move up to 2.03 J/cm² for more chronic injuries. This is done in conjunction with traditional therapies such as rest, bandaging, supportive care, and a rehabilitation program.

Joints / Osteoarthritis:

"MLS Laser Therapy is an extremely useful tool in animals with Osteoarthritis," Stanton explains, "Typically we're going to use an initial series of treatments followed by a maintenance program." There is certainly a good modification of inflammatory cytokines that are achieved from the laser treatments.

Osteoarthritis

Pain- 1.99 J/cm² · 292 Hz

Arthritis – 2.03 J/ cm² 18 Hz



EFFECTIVE USE IN ACUPUNCTURE & TMJ

Acupuncture with lasers

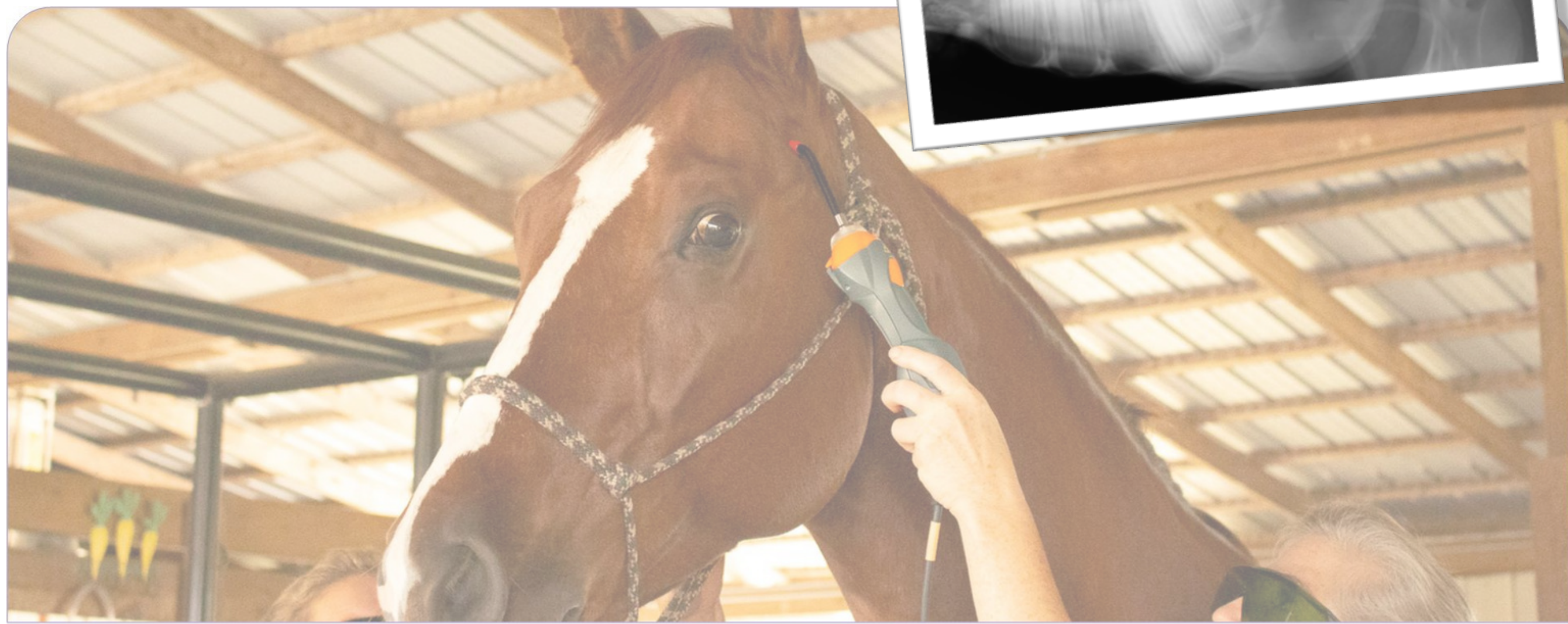
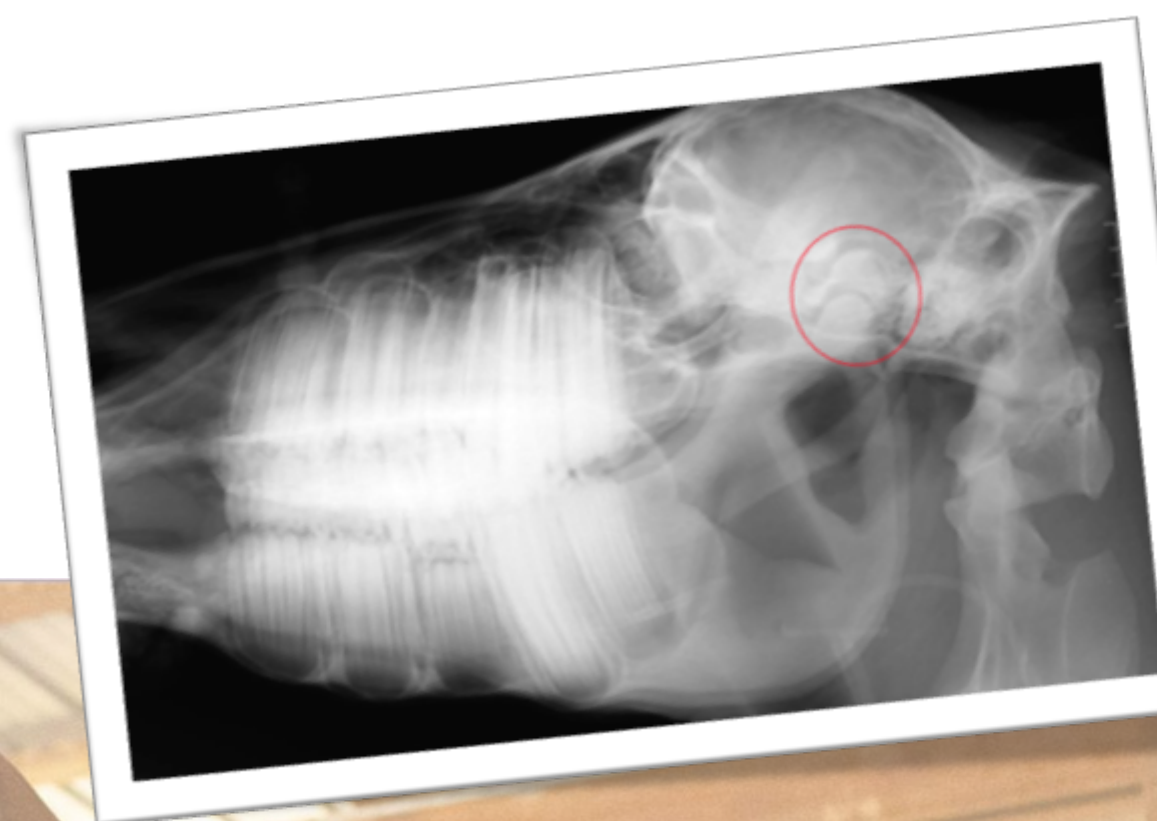
"Using laser for acupuncture in equine medicine is extremely helpful for a lot of reasons", Mary Beth notes during the webinar. She also shows that TCM, or traditional Chinese medicine, has used acupuncture in horses for over 2,000 years. Stimulation of trigger points can be achieved in many ways, the most popular way being needles, however laser may have some additional advantages.

Advantages of laser in acupuncture:

- *pain Free Alternative*
- *safer for Needle Phobia Patients*
- *positive Laser Effects in Tissue and Cells*
- *time Saving*

MLS Laser Therapy in TMJ

Another use of laser therapy is using the acupuncture tip for TMJ pain. The tip is particularly helpful in a focal point treatment near the eye with the acupuncture attachment. Of course we want to always use great caution when treating any structures with laser that fall near the eyes. Mary says she is starting to recognize more issues with this particular joint because of changes within the last few years in dental routine procedures, and new riding techniques.



EFFECTIVE USE IN ACUPUNCTURE & TMJ

Treatment Guidelines:

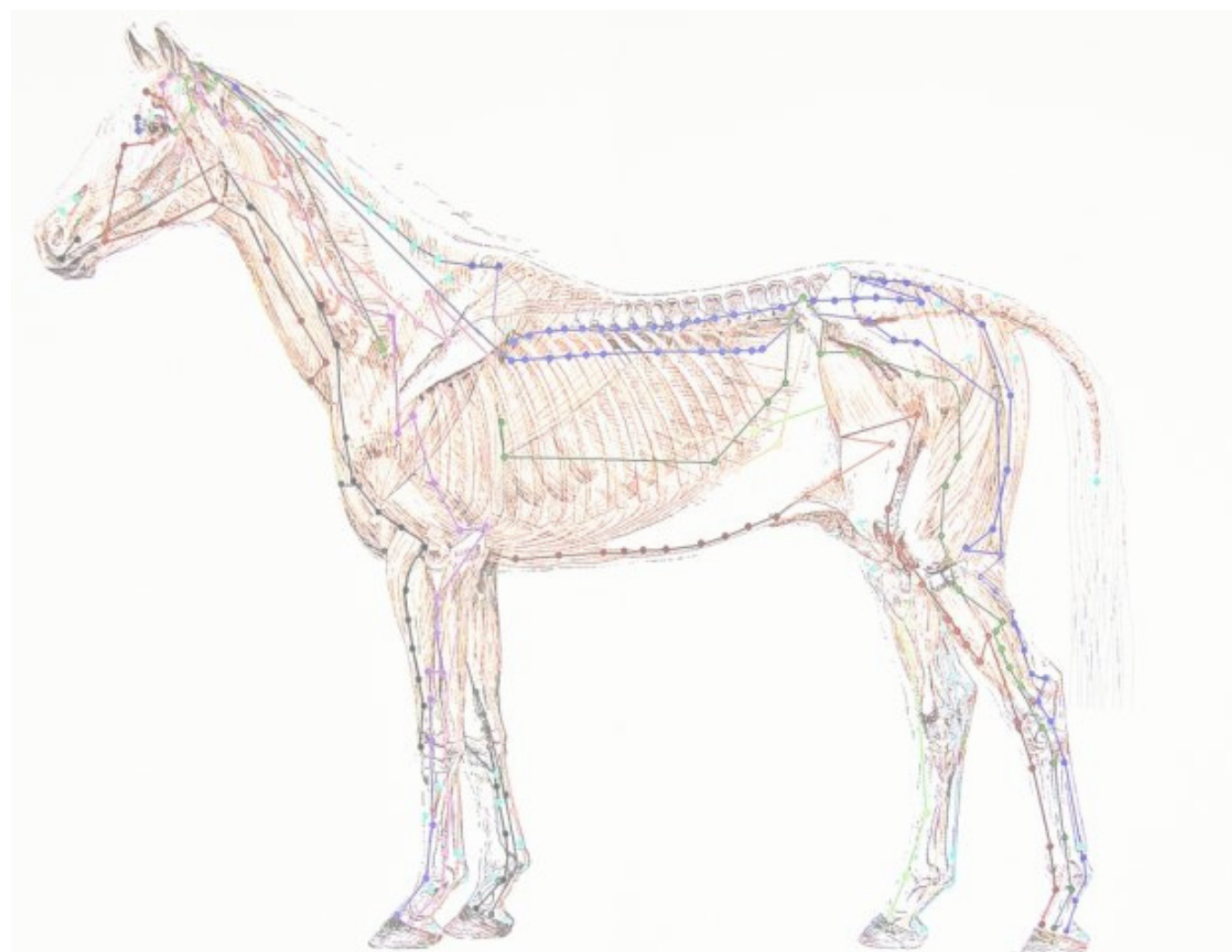
0.5 - 2.5 Joules

Acupuncture on Jing Well or Ting Points

Stanton explains in her presentation that using MLS Laser Therapy on Jing Wells or Ting Points is one of her favorite ways to utilize the laser for acupuncture... "The reason I like the laser therapy, is that I find that this is a much safer tool in my hands than trying to get a needle into many of these locations on fairly reactive horses."

Why acupuncture in Jing Wells or Ting Points?

- *Source points (first or last points of meridian)*
- *Qi is superficial and easy to tap into and engage entire meridian*
- *Engage meridian or locally*



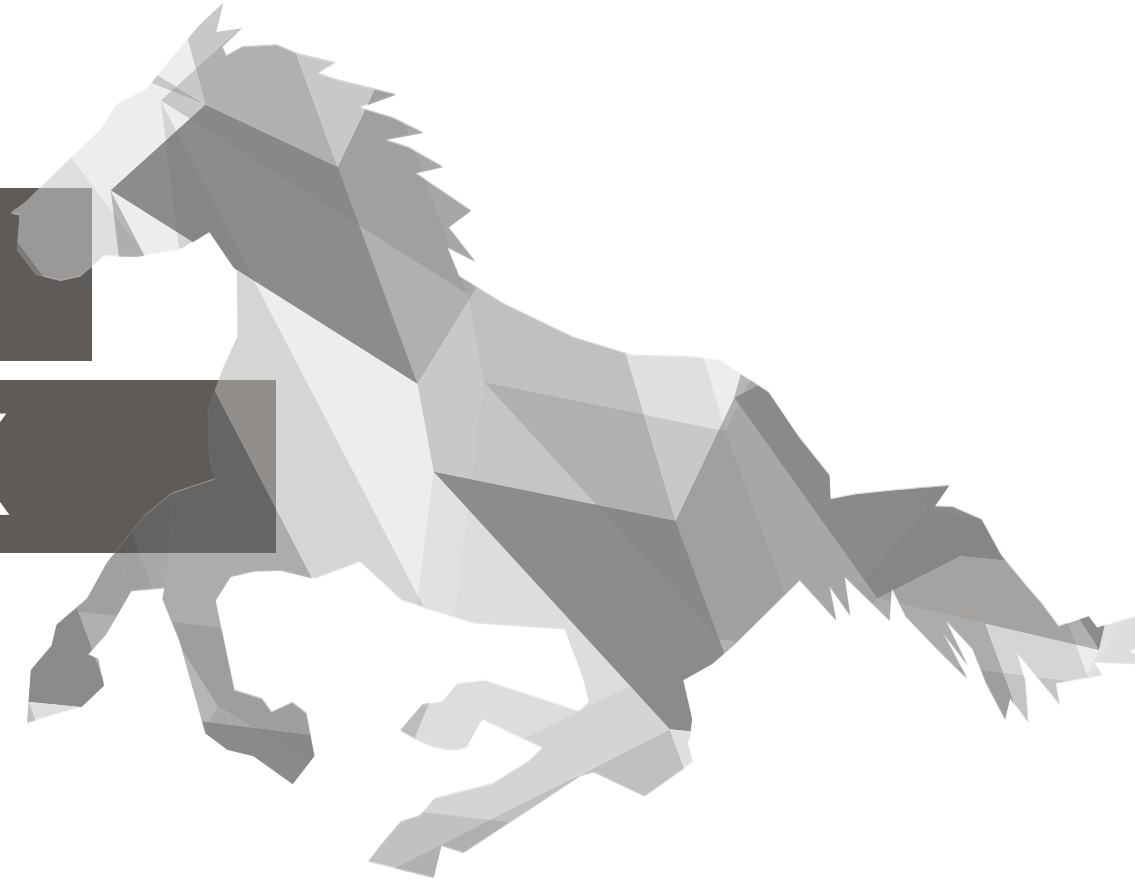
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Maintaining Athletes

Examination Pre/Post-Work
Clinical Observation at Work

MAINTAINING ATHLETES

EXAMINATION PRE-WORK



Pre-Work Examination

A regular standard examination taking place before the horse is moving around is a necessary procedure. **Observing the animal at rest** in a paddock or stall will show you which limbs they are resting (if they are), how they position themselves when they're eating hay or grazing, any hoof capsule changes, high-low syndrome, and general things to consider in relation to muscle and soft tissue potential issues.

Looking at a horse when first put into motion will help you catch any soft tissue issues because they may resolve a little after continuous movement. **Consider the shoeing** on the animal to make sure they have good foot balance, and bone and collar alignment as well. Observing the muscles before work, you should be looking for:

- *Atrophy (back, neck, and hips)*
- *Stippling*
- *Tension (neck or shoulders)*
- *Swelling*

Additionally before work you want to do a **manual palpation of the saddle area**, looking for any areas of discomfort and a diagnostic accupoint examination. You'll be looking for reactions to certain points on the bladder meridian, which can correspond to problems in other systems. Also, seeing how the horse is reacting during the actual process of being tacked up. **Saddle fit** is one of the huge issues that Mary runs into in her practice, having a lot of jumping horses for patients. "We want to make sure the tree points aren't pressing into the area around the withers, that the shoulders have good freedom, and that there is adequate width to trees on these saddles", Stanton explains.

Looking at **girth tightening** on horses too, you'll find that some horses get very "nasty", or try to bite the person tightening the girth. Many times those horses may have an alter issue where there is some referred pain during this process.

Bit issues are also a concern so you should be looking at jaw excursion, checking the teeth to make sure that they have normal lateral excursion. Determine whether they have any TMJ pain, and look for any broken teeth or thing that may be causing issues that would result in pain.

MAINTAINING ATHLETES

CLINICAL OBSERVATION AT WORK

Clinical Observation at Work

Here we are going to be looking for any obvious **lameness or asymmetry**, particularly in the four limbs which could be the result of shoeing. Neck injuries can also play a part in asymmetry in movement as well. We want to look at **how the rider is weighting**, are they in the saddle moving evenly? Are they up and twisting where it could be the cause of some back pain?

Observing the **saddle slip** is also a good idea, so that you can determine if the saddle stays in place and what alters in pressure points when the rider is actually in the tack. Any **difficulties with leads** is also a concern, horses swapping leads or unable to pick up a lead of course will indicate that we've some appendicular skeletal pain that needs to be addressed.

We also want to recognize **which limbs are more load bearing** as horses are traveling straight, on circle, or on leads. Bending will cause alterations and pressure on the inside limbs vs outside limbs. Of course, a horse with a canter will be loading the outside hind limb and then pushing from that limb. That would be a good indicator that you may be dealing with a horse that has some issues that need to be addressed.

In regards to **footfall**, as we're observing these horses under tack, we want to watch whether they're landing on the medial or the lateral aspect of the feet. There can be an imbalance caused by shoeing, confirmation, or potentially a pain issue involving the soft tissue structure within the foot. Also noticing any reluctance to land on a certain foot after a jump or swapping leads going into a jump, as this can certainly indicate some pain.

Bridle tact is an issue for many riders and we want to observe the contact level, the control over the head and neck positions in these horses. Hyperflexion can lead to some pull and TMJ pain, as well as issues in the lower cervical area.



MAINTAINING ATHLETES

EXAMINATION POST-WORK

Post-Work Examination

First thing to be considered in a post work exam, is the **sweat patterns** when removing the tack. This can indicate some areas of nerve damage, or facial tightness. **Observing the underside of the saddle** to see where the wet parts reside can give you a good understanding of the saddle fit. Also, **palpation of the saddle area** temperature will allow you to see if its even or if there are cold areas that may be lacking contact with the back.

Respiratory rate and recovery of course are observed here as well, just to make sure that you're dealing with animals that are in a normal athletic or recovery stage with respect to their cardiovascular system.

We want to do another **acupoint examination** in the post-work, and compare it to the one done in the pre-work exam. Certainly we can find that their are some trigger points that may need to be addressed. Any areas of concern should be palpitated, heat, swelling, muscle tightness.

The most common post-work exam laser protocols that Dr. Stanton uses are as follows:

- *Using the scanning setting for back pain and maintenance for inflammation.*
- *Acute inflammation setting with regular laser head and acupuncture head.*
- *Trigger point therapy.*

Back pain with the laser - 1 J/cm² (36 Hz)

"We use the back pain setting on the laser for maintenance therapy. After a period of cooling out we will go in and treat these horses 1-3 times weekly. We use the scanning technique to cover a large surface area, and we'll adjust the number of points to ensure that we get accurate dosing", Mary Beth explains. "For example, in our jumpers we will be treating the lumbar areas and when we're working with some of our cutting horses we're going to focus on not only the lumbar area, but the hips and then any other areas that seem to be experiencing some tightness."

Acute conditions with the laser - 1 J/cm² (1168 Hz)

"In cases where we find acute inflammation, sprain, or strain, we'll use the lower dose acute setting and treat those horses accordingly", Stanton points out. "But it's very important that this is done with proper diagnostics including radiography, ultrasounds, and additional support."



Trigger Point Therapy - 1 J/cm² (1168 Mhz)

We evaluate for trigger points, diagnosing these on palpation. When we look at certain areas that may be involved in trigger points, we want to consider what the nerve pathways are going to be for the muscles or points that are involved. We want to get indicators on whether this is an acute issue, or if there is some chronic pathology that's going on and decide how to move forward and with what modalities.

"Typically, we do quite a bit of laser therapy in conjunction with some of the body work that's done with our equine manipulators and acupuncturists", Dr Stanton shares during the presentation. "So, what we look for in these horses are some compensatory development and imbalances in the formation or the use of the muscles".

Trigger points are typically treated with the acupuncture tip on the laser, with fairly short treatments that're delivered quickly and have a high level of efficacy.

5

Conclusions


Practice Applications

CONCLUSIONS

PRACTICE APPLICATIONS

Practice Applications:

- *Wound repair*
- *Regenerative medicine*
- *Post-operative care*
- *Acupuncture therapy*
- *Pain control (chronic or acute)*
- *Maintenance of athletes*



Laser therapy has quite a broad spectrum of practice applications, I believe that over the course of the next few years, we will discover a lot more uses for laser and get more refinement in our treatments and applications. There's currently quite a bit of research going on leading to the development of these applications and uses of modality. The Cutting Edge laser has been quite useful in my practice...

It's quite nice to have something with the quality of a Cutting Edge Lasers to be able to offer to clients that expect that level of care within your practice.

- Mary Beth Stanton, DVM, DACT, CVA



THANKS FOR READING

For more information about MLS Laser Therapy, click below or simply give us a call at 800-889-4184 to schedule your complimentary in-office laser demonstration.

Request More Information