AVICENNA™

Laser Technology

The World's Most Powerful Therapeutic Laser

"In a Class by Itself"

Avicenna VTR75® Class IV
Therapeutic Laser Technology

1-888-AVI-LASER

www.avicennalaser.com

AVICENNA™
Laser Technology

Introducing the Therapeutic

Revolutionizing Pain Management...

VTR75®
FDA Clearance
Class IV Therapeutic Laser

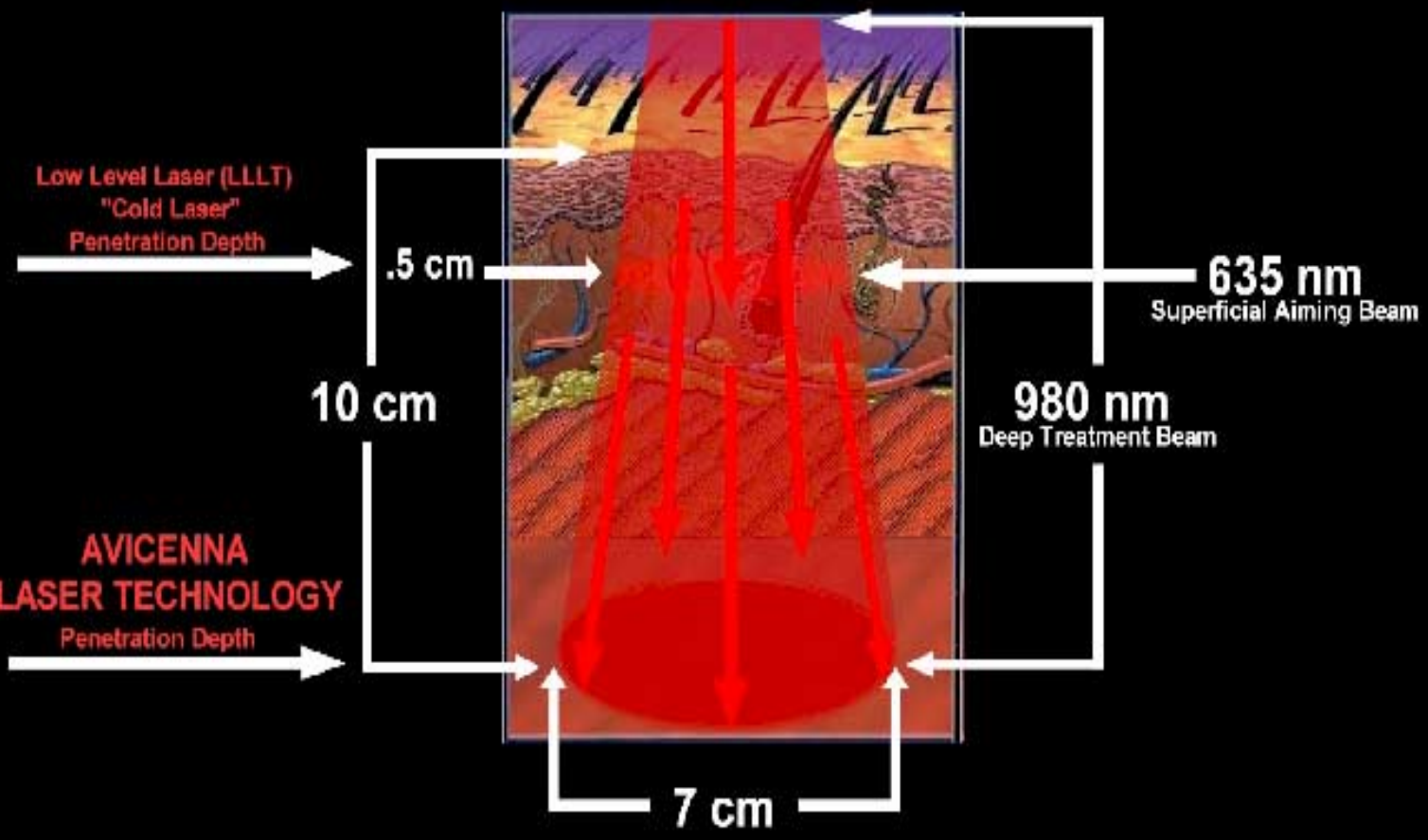
- **Beam Within a Beam Technology**
- **Simultaneous 635 nm and 980 nm wavelengths**
- **1000 -7500 mW maximum output**
- **Adjustable diameter beam width up to 7 cm**
- **9 Different preset protocols for treatment**
- **Adjustable LED Screen Contrast Display**
- **CPT Code for Insurance Reimbursement**

World's Most Powerful Laser

Laser Therapy has just undergone an innovative advancement. One in which the old and minimally effective Low Level "Cold Laser" technology, has now been replaced by the FDA's first approved powerful Class IV laser, thus rendering the existing technology obsolete.

Avicenna's VTR75® Class IV Therapeutic Laser generates 7500 mw of power within a 980 nm treatment beam making it the most powerful, deepest penetrating therapeutic laser on the market today.

...One Satisfied Patient at a Time!



A 7,500 mw, 980 nm laser beam with a 635 nm visible red aiming beam that enables appropriate therapeutic levels of energy to be delivered simultaneously, over large treatment areas.

Build Your Practice by Serving a Critical Need

Pain:

Affects Millions, Costs Billions.

A recent study commissioned by Merck Pharmaceuticals revealed that 9 out of 10 Americans suffer with pain.

Pain in America. A research report prepared for Merck. Ogilvy Public Relations Worldwide. April, 2000.

Pain Statistics

- Chronic pain has been said to be the most costly health problem in America. Estimated annual costs, including direct and indirect costs are close to $50 billion.
- Low back pain - Seventy to 85 percent of adults in the US have back pain at some time in their lives. Five million Americans are partially disabled by back problems, and another 2 million are so severely disabled they cannot work. Low back pain accounts for 93 million workdays lost every year and costs over $5 billion in health care.
- Arthritis pain - Arthritis pain affects 40 million Americans and costs over $4 billion in lost income, productivity, and health care.
- Headache - As many as 45 million Americans suffer chronic, recurrent headaches and spend $4 billion a year on medications. Migraine sufferers lose more than 157 million workdays because of headache pain.

APPLICATIONS OF CLASS IV THERAPEUTIC LASER TECHNOLOGY

A recent review of over 2500 articles in the medical literature indicated that many acute and chronic conditions may be improved or eliminated with therapeutic lasers including:

- Acupuncture Points
- Arthralgia/Arthritis
- Back Pain
- Bursitis
- Carpal Tunnel Syndrome
- Chondromalacia Patellae
- Fibromyalgia
- Heel Spurs/Plantar Fascitis
- Migraine Headaches
- Neck Pain/Whiplash
- Nerve Root Pain
- Post-Operative Pain
- Repetitive Stress Injuries
- TMJ Pain/Dysfunction
- Tendonitis
- Tennis Elbow
- Trigeminal Neuralgia
- Trigger Points
- Sprains/Strains
- Swelling
- Wound Healing

AVICENNA is revolutionizing the fields of orthopedics, chiropractic, physical therapy, physiatry, pain management, podiatry, dermatology, plastic surgery, dentistry, acupuncture, rheumatology, wound management, sports medicine, veterinary medicine, and more!

Product Comparison

Capability	Avicenna Class IV Laser	Most "Low-Level " LASERS
Ability to deliver direct therapeutic energy to damaged tissues >1" below the skin?	**YES**	NO
Ability to deliver direct therapeutic energy to intra- and extra-articular spinal joint tissues?	**YES**	NO
Ability to deliver direct therapeutic energy to all intra- and extra-articular peripheral joint tissues?	**YES**	NO
Is there variable beam width up to 7 cm (without a loss of power) in order to decrease treatment time, especially for large areas?	**YES**	NO
"Beam within a Beam" Technology. Ability to deliver 2 treatment beams simultaneously for variable depth applications?	**YES**	NO
Ability to choose optimum wattage between 1000 mW up to 7500 mW?	**YES**	NO
Class IV LASER?	**YES**	NO
Ability to preprogram up to nine (9) different protocols that can then easily be recalled from the front panel buttons.	**YES**	NO
Ability to adjust the contrast of the LCD display while working in low light or bright conditions?	**YES**	NO
Presence of an emergency cut off switch?	**YES**	NO
Ability to connect an optional power footswitch?	**YES**	NO
Presence of an internal cooling system?	**YES**	NO

LASER ENERGY

Diffuse scattering of laser light in tissue:
Gives interference and speckle formation.

Volumes of partially scattered light are formed

Absorbtion of polarized light in cytochrome molecules (e.g., porphyrines) stimulates the creation of a singlet of oxygen.

Points of high laser light intensity appear.

In points of high intensity the probability is higher for multiphoton effects. The electrical field across the cell membrane creates a dipole moment on the barshaped lipids.

Areas of high difference in light intensity levels.

Local differences in intensity create temperature and pressure gradients across cell membranes.

Increase of ATP-ase and activation of cAMP and enzymes.

Influences the permeability of cell membranes, which effects Ca^{2+}, Na^{+}, and K^{+} as well as the proton gradient over the mitochondria membranes.

Triggers an immunological chain reaction.

Activation of Macrophages.

Increase of procollagen synthesis in fibroblasts.

Increase in numbers of mast cells.

Increase of endothelial cells and keratinocytes.

Enhancement of SRF.

Increased receptor activity on cell membranes.

Enhanced synthesis of endorphine.

Bradykinine decrease.

Increase of serotonin level in blood.

Decreased C-fiber activity.

Enhancement of SOD levels.

Increased nerve cell action potential.

Wound Healing

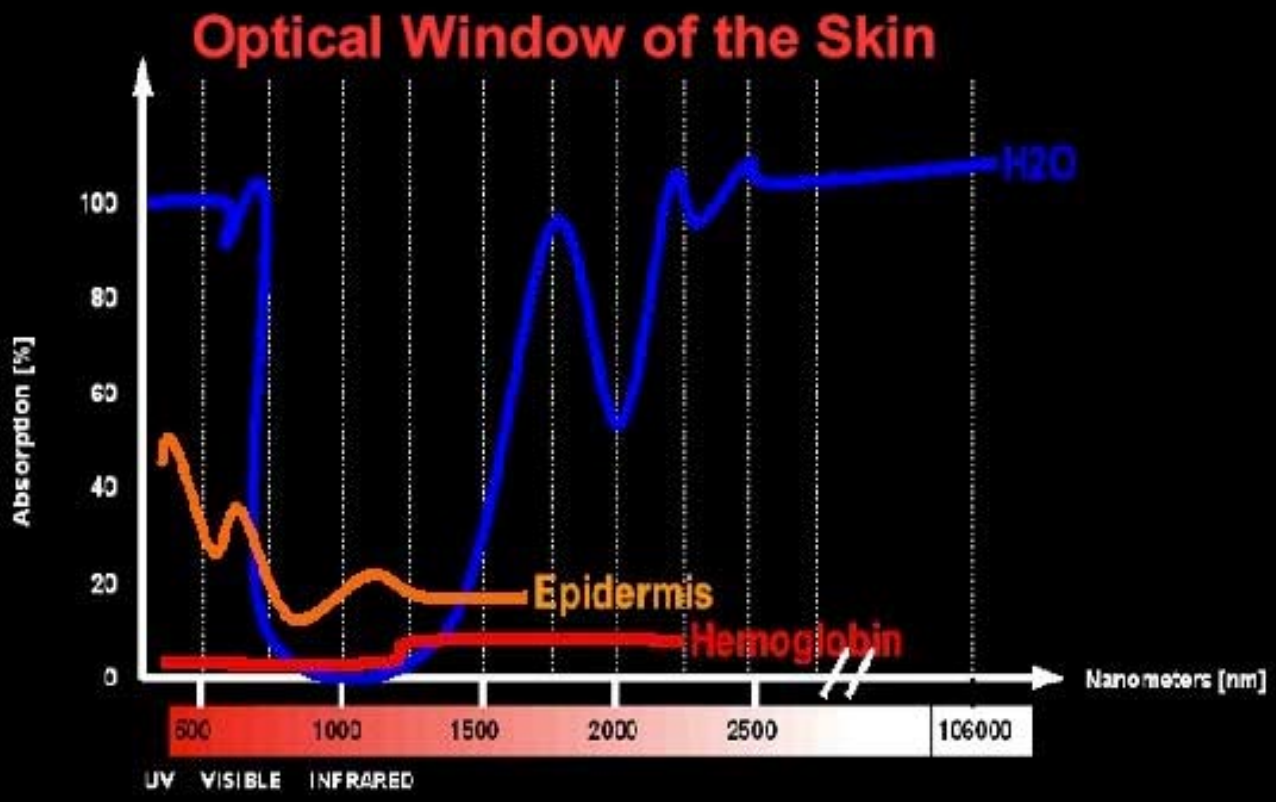
Acceleration of the Wound Healing Process

Pain Influence

This diagram is from the new book by Tunér/Hode; “Laser Therapy - Clinical Practice and Scientific Background".

Energy = Power x Time

Positive Clinical Outcomes



Red Light Laser Beams with Wavelengths Between 620 - 675 nm.

- **Readily absorbed by the mitochondria and therefore stimulatory.**
- **Source of stimulation of a range of growth factors.**
- **620 to 675 nm laser beams DO NOT penetrate very effectively below the skin surface and into the tissue below.**
- **620 to 675 nm laser beams are best for wound healing or superficial conditions but is not the most effective way to treat deeper injuries.**

Infrared (Invisible) Laser Beams with Wavelengths Between 780 - 950nm.

- **Absorbed through the cell walls (acting differently between cells) and therefore cell response is more wavelength specific in the infrared range, responding differently to different wavelengths.**
- **Much greater penetration through the tissue, especially the 980 nm range, therefore this has been selected for treatment through intact skin for pain relief.**
- **An extremely wide, non-pulsing beam delivers the greatest amount of healing energy, in the least amount of time.**

How to Buy a Therapeutic Laser

Therapeutic Lasers keep getting better. Deeper penetration, larger diameter treatment beams, and better technology allow Laser Therapy to achieve better clinical outcomes than ever. Sifting through the sea of peer reviewed literature and case studies can be difficult, but we'll walk you through what you need to know if you're considering adding the latest therapeutic modality into your practice. Here is a shortlist of the things you need to know.

1) **Learn as much as you can about Therapeutic Lasers.** There are several thousands of dollars of motivation to "know your stuff" about Therapeutic Lasers. Visit our website at www.avicennalaser.com in order to educate yourself about Therapeutic Laser technology. Once you have viewed our website, feel free to explore the links that lead to additional valuable information

2) **Decide which of the properties of a Low Level Laser are the most important to you.** Write down, in order of importance, which of the qualities you care most about: Wattage, Wavelength, Portability, Treatment Beam Diameter, and the time it takes to deliver a specific therapeutic dose for the conditions you most frequently treat. Most people want "bargains" when they shop for equipment. There's absolutely nothing wrong with that. But we'd like you to be aware of what you may be giving up in exchange for a "bargain laser." When we show health-care providers two competing therapeutic lasers, one that's larger with a treatment beam that's much more powerful and covers a larger treatment area and the other that's a bit smaller, much weaker with a very small diameter treatment beam, they will usually prefer the larger more powerful unit.

3) **Compare Prices.** Make sure that when you are comparing prices you are comparing "apples to apples". This is actually very easy to do.

For example, a $10,000 therapeutic laser that offers 5 milliwatts of power actually costs $2000 per milliwatt. Another therapeutic laser may deliver 7500 milliwatts and retail at $49,500. This comes out to be a cost of $6.60 per milliwatt. Clearly the more expensive laser is a better value, as the "bargain laser" cost per milliwatt is 97% higher! That's right! You'd be paying 300 times more per milliwatt for the same energy.

4) **Power Outputs.** In most instances where individuals have not responded to Laser Therapy, a review of the literature reveals that low dose is by far the single most significant factor. By dose (D) is meant the energy (E) of the light directed at a given unit area (A) during a therapy session. The energy is measured in joules (J), the area in cm^2, and consequently, the dose in J/cm^2. Assuming that the power of the laser remains constant (non-pulsed) during treatment, the energy (E) of the light will be equal to the power multiplied by time (t) during which the light is emitted. The dose may then be calculated as follows:

$$D = \frac{Pt}{A} \quad [J/cm^2]$$

It can be seen from this formula that energy, expressed as joules, is related to the power of the laser and the duration of irradiation so that a higher power laser takes less time to generate the required number of joules than a lower power laser.

5 Things That You Need to Know Before Investing in Therapeutic Laser Technology

Most therapeutic lasers approved in the US provide less than 10 milliwatts of power. Considering that the skin has been shown to absorb up to 65% of the energy emitted by a laser, the energy emitted by these lasers is totally inadequate for treating most areas of the body below the level of the skin. There are several other factors, other than skin absorption, that reduce the "advertised" power output of lasers leading to poor clinical outcomes. These include:

a) Pulsed or Modulated. Sometimes power output is not constant. Such as when a laser is pulsed or modulated. This may be achieved in many ways. The preferred method of pulsing for many lasers is to use some form of mechanical switching device or shutter, such as a rotating pierced disc, the useful proportion of the time during which light is emitted by the laser normally being fixed at a given value (duty cycle), most often 50%. In other words, light is permitted to pass through the disc for 50% of the total operating time (and is blocked for the remaining 50%). This results in a 50% decrease in the energy delivered over a set period of time. The pulse frequency is expressed in Hertz (Hz).

b) **Power Density.** Several studies have concluded that the Power Density (PD) may be of even greater significance than the dose. PD indicates the degree of concentration of the power output. It is measured in watts per centimeter squared (W/cm^2).

Many older lasers produce a beam with a diameter of 5 mm (approx. 0.2 cm^2) and operate at an output of 5 mW (Laser #1), the biological effects are quite different from those produced by a laser illuminating a circular area of 5cm diameter (approx. 20 cm^2) with an output of 7500 mW (Laser#2). Let's see how that occurs:

Laser #1: $PD = \frac{W}{cm^2}$ ----> $PD = \frac{.005\ W}{0.2\ cm^2}$ Total PD= $0.025\ W/cm^2$

Laser #2: $PD = \frac{W}{cm^2}$ ----> $PD = \frac{7.5\ W}{20\ cm^2}$ Total PD= $0.375\ W/cm^2$

Conclusion: Laser #2 covers a larger treatment area while providing 15 times more Power Density than Laser #1.

c) Fiber Optic Cables. Fiber optic cables transmit laser energy from the laser to the treatment probe (wand) at the end of the cable. Several studies reveal that as much as 50% of the light energy generated by a laser can be lost by the time it reaches the probe at the end of certain types of fiber optic cables. Ask the manufacturer if they have conducted tests to measure the actual output of the laser at the tissue. If you base your decision on the maximum wattage stated by the manufacturer without knowing the reduction in power caused by the fiber optic cable, your dosage could be off by up to 50%.

For example, in a frequently quoted study utilized to refute the effects of low level laser therapy, the authors utilize a laser with an output of 1 mW. It is estimated that losses in the fiber optic cable reduce this to 0.5 mW. Given the stated irradiation time per point of 15 seconds, the dose would be 0.5 mW x 15 sec= 0.0075J. Since a normal dose today is 0.5 – 2J per acupuncture point and 1 – 4J per trigger point, it is hardly surprising that no significant effect was observed.

Furthermore, since the laser used can be pulsed, the dose may actually have been reduced further.

5) Wavelength. The wavelength of a laser is determined by the medium from which it is generated. Wavelengths of therapy lasers in common clinical use are 632.8 nm (Helium Neon, gas) in the visible light range, 810 nm (Gallium/ Aluminium/Arsenide, diode) and 904 nm (Gallium/Arsenide, diode) in the infrared region of the light spectrum. Other wavelengths are used in surgical settings. The wavelength is the prime determinant of tissue penetration. Lasers that do not penetrate as deeply (ex. 635 nm) are suitable for acupuncture point stimulation and wound healing. Infrared lasers (ex. 980 nm) penetrate more deeply and are used in deeper tissue stimulation such as trigger points, ligaments and joint capsules.

Important Buyer's Guide

AVICENNA

LASER TECHNOLOGY

“In a Class by Itself”

Wavelength (Treatment Beam)	980 nm, Continuous Wave Laser
Diode	7.5 watts (7500 mW)
Classification	Class IV Laser Product
Treatment Spot Size	2 - 7 cm
Wavelength (Aiming Beam)	660 nm visible red aiming beam
Diode (Aiming Beam)	7 mW
Programmable Pre-sets	9
Warrantee	1 year on laser, 90 days on probe
Approved Testing	EN 60825-1
Compliance	21 CFR 1040.10 and 1040.11
Accessories Included	2 Pair Safety Glasses, Protective Carrying Case
Weight	Approx: 14 lbs
Patent	Pending

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