

2020 Guide to Therapeutic Lasers, Clinical Research and Laser Therapy Equipment

Are you trying to make sense of this seemingly new language that encompasses the many facets of hot and cold laser therapy and cold laser therapy equipment vs Class 4 Lasers?

This guide was created to support you on your quest for reliable and trustworthy information. It will help to guide you through the web of questionable information currently available online about hot and cold laser therapy and PhotoBioModulation (PBM).

You will learn how to distinguish the merits of different therapeutic lasers including common terminology to help you more fully grasp the differences, such as:

- laser power, measured in milliwatts (mW) or Watts (W),
- laser wavelength, measured in nanometers (nm),
- FDA Safety Classifications with ratings 1 through 4, approvals, clearances
- therapeutic lasers ranging in price from a low-cost home system to high-end systems for practitioners.

There are now over 6000 clinical studies and hundreds of books, video and other resources showing the effectiveness of laser therapy, some of which you can review using our online [Clinical Studies and Research Guide](#). There are over 200,000 health care providers using cold lasers in their practice and over 800,000 laser users, so laser therapy is definitely NOT an "experimental" therapy. Sadly, insurance companies have been known to use that as an excuse to deny a claim for a laser, or laser therapy. Most practitioners benefit from the added cash business and some use code 97026 for IR or 97139 IR+Manual Therapy or 97039 Attended Modality.

In this age of pharmaceutical and surgery dominated medicine, most conventional MDs shy away from laser therapy, outside of commonly accepted laser surgery procedures. However, therapeutic cold lasers primarily, along with some class 4 hot lasers, are increasingly used as complimentary treatment therapy in a wide range of therapeutic

practices. There is a wide spectrum of health care providers that focus on treating both symptoms and the root cause of health issues, while supporting the body on a cellular level.

Practitioners that utilize cold lasers include: Chiropractors, Acupuncturists, Physical Therapists, Massage Therapists, skin care professionals, weight control centers, smoking cessation centers, Herbalists, Osteopaths, functional medicine specialist, Veterinarians, Dentists, Podiatrists and many others. While lasers are not a “cure-all”, there is overwhelming evidence over a 50+ year track record, that cold lasers and Class 4 lasers are effective in treating a significant variety of symptoms and conditions.

What sets Cold Laser Therapy (CLT) aka Low Level Laser Therapy (LLLT) apart from other treatment modalities?

Cold lasers have also been called healing lasers, soft lasers, biostimulating lasers and more. They offer a means of delivering photons (energy packets) directly to cells and target tissues, which is absorbed by the Mitochondria and instantly turned into a usable form of energy called Adenosine Triphosphate (ATP). CLT also helps to significantly reduce inflammation by deactivating 7 of the 9 enzymes that cause inflammation by up to 70%. Other touted benefits include increased production of collagen, elastin, osteoblasts, fibroblasts, increased lymph movement and blood circulation and much more.

The majority of therapeutic lasers are used to treat damaged tissue, joints and structural (bone, joint and ligament) issues, and the use of cold lasers to treat trigger points, acupoints and lymph nodes is growing significantly. Most therapeutic cold lasers have a treatment area between the size of a dime to the size of a silver dollar, but laser systems created for trigger point and acupoint therapy focus the energy into a concentrated beam. Many Cold lasers are typically FDA cleared for pain reduction, inflammation reduction and increasing blood circulation. However, the research shows that far more applications are relevant for treatment and will be revealed over time.

There are 3 main categories that people use to compare therapeutic laser systems:

- Power density (measured in milliwatts [mW] for class 1-3b and watts [W] for class 4 laser systems)
- Wavelength (measured in nanometers [nm])
- Pulsing, which includes: Pulsed laser (PL), continuous wave (CW) laser and super pulsing technology.

Some lasers are super pulsed, some pulsing only, some continuous wave only and some combine both pulsed and continuous wave).

These are the primary variables that determine the quality of laser light (measured in Joules for power and Hz for pulsing frequency) administered to the treatment area.

A laser's ability to successfully treat a wide variety of symptoms and conditions is mostly based on power output at an appropriate wavelength, with some added benefit from pulsing with Hz frequencies.

Many laser therapy protocols call for a specific amount of Joules per cm squared (J/cm²). Pulsed laser therapy reduces the time it takes to build up an energy dosage compared with continuous wave laser. For a fixed treatment time, the addition of pulsing makes up for the lower dosage and the Hz frequency, which causes the pulsing, often lends additional therapeutic benefits.

A common solution is to set the laser on pulsing and increase the treatment time to achieve the same dosage. Most of the scientific research is focused on dosage, which is the total energy put into the treatment area as measure by J/cm². There is less emphasis in the research on using unusual wavelengths and pulsing frequencies but there is still some evidence that combining cold laser with Hz frequency is also important for achieving maximum benefits. For example: The earth emits an electromagnetic frequency of 8Hz. It has been determined over many decades of research that prominent and successful healers also emit an electromagnetic frequency of

8Hz. Martial artists, Saints, Sages and Healers have known for thousands of years that developing a grounded connection to the earth is good for health, healing and balancing.

Choosing a wavelength:

Many people are confused and concerned about finding and choosing the right wavelength. This guide will help you to more confidently wade through the noise, hype and claims and make a more educated decision. To begin with, it is important to differentiate between the often-confused Near Infrared or NIR and Far Infrared or FAR, which are totally different. NIR or IR as it is most commonly referred to is what's used in cold lasers. FAR is used in saunas and heat lamps. While they are both beneficial for health, they do different things. Only cold laser therapy delivers photons directly to cells for conversion to ATP in the Mitochondria of the cells. A defining accomplishment never before achieved by any other therapy or technology.

The obscure 1064nm wavelength for example, falls in the NIR category at the far end of the Infrared Laser Spectrum. Even if there were an individual study that showed promising results for some condition, I do not believe that it would produce superior results than the 780nm to 980nm wavelength range of lasers that are more commonly available. These are the ones that are most highly used and promoted for the simple reason that they work, by maximizing tissue photon absorption. The 810nm wavelength has won preference among many who have used it. The 905nm wavelength is most commonly used for super pulsed lasers, which are touted to offer the deepest penetration.

Although some manufacturers or researchers have made claims of effectiveness in certain situations for an obscure wavelength, doesn't necessarily mean that other wavelengths would not produce similar or even better results.

The wavelength of the light significantly affects depth of penetration and how it interacts with cells and tissue in the body. Although there is no one right answer, the general consensus is as follows:

- Using different wavelengths allows more flexibility in a treatment. Each wavelength can affect cells in a slightly different way. This provides the option for several different mechanisms to treat the same or multiple issues in a single client.
- Infrared diodes in the 800nm range (780nm to 830nm) are best for deep tissue work because they are not quickly absorbed by hemoglobin or water.
- Many higher-end and more expensive cold lasers and super pulsed lasers offer wavelengths in the 904nm and 905nm range, because they have proven results over many year of successful application.
- Class IV lasers commonly use the 980nm wavelength. This is the preferred option for rapid pain control with expensive class IV lasers. 980nm shares some therapeutic characteristics with 780nm to 850nm lasers, however the bulk of the energy goes to creating thermal gradients in the H₂O that increase circulation and blood flow. The increase in circulation allows the bodies natural healing process to accelerate. Consequently, the Class IV lasers have become popular for high-end, speedy pain control and some doctors prefer the 980nm system due to quicker treatment times and high level of pain control. Additionally, 980nm can also serve well in some cases for a surgical laser. The flipside to 980nm is that much of the energy converts into heating water in tissue, which is great for laser surgery but less productive for regenerative therapy.
- Emitters in the red laser spectrum of 600nm to 660nm range are recommended for treating, inflammation, root nerve, acupuncture and trigger points. Red light lasers are great for soft tissues and small joints, with shallow penetration up to ½". They are useful as a guiding light when used in combination with infrared lasers.
- The growing consensus in the cold laser industry is that multiple wavelengths are beneficial to effectively treat the widest range of conditions. The type of healing needed will dictate to the laser user which wavelength is preferred.

- For example: Red lasers are great for soft tissue, nerves, skin and shallow muscles. Red laser offers the strongest anti-inflammatory effects.
- Infrared (IR) Lasers, sometimes called Near Infrared (NIR) lasers deliver a significantly longer wavelength, typically down to the bone level and are preferred for hard tissue issues such as bones, tendons, ligaments, spine and large and small joints of the musculoskeletal system.
- Fortunately, protocols that call for treatment of acupoints (acupuncture points) can be treated with nearly all of the therapeutic wavelength lasers because an acupoint is close to the surface of the skin, as revealed by heat and skin resistance sensors. These acupoints are revealed as a small explosion of heat beneath the surface of the skin. Anything you can do with a needle, you can do with a laser, just faster, easier, more effectively and completely painlessly.
- The 905nm IR wavelength is preferred where safety is the highest priority. At this point, it appears that all the wavelengths are appropriate for treating structural or cellular damage.

Laser Power Density Explained

Much of the misinformation about cold lasers (aka low level lasers) is related to power levels and how they affect the safety and effectiveness of the end product. Low power laser manufacturers have many ways to justify why their product is the best, however the growing consensus is that power is the single most important factor in determining the effectiveness of cold lasers, especially when it comes to fast pain relief. The exception is with some class 4 lasers, AKA hot lasers, which are typically much higher power and might have the capability to burn tissue if used incorrectly. More power is frequently better in a clinical setting because it allows practitioners to give patients higher dosage when it is appropriate, without wasting time.

FDA Laser Classification

Lasers come in classes 1 through 4. This classification is often highly misunderstood. In reality it is easy to understand. Lower numbers equal a more user-friendly safety factor and the higher the number, the greater the risk is of injury to the eye.

- Class 1 & 2 lasers can be purchased for use at home, typically referred to as over-the-counter (OTC) for use on humans and no license or prescription is needed. These lasers have a maximum power of 5mW continuous per diode. Several manufacturers make higher power lasers that qualify as a class 1 or 2 by pulsing or super pulsing higher powered laser diodes. For the sake of time and effectiveness, it's a good idea to avoid inexpensive laser pens and pointers as they simply don't emit enough power to treat a given point or injury in a reasonable amount of time with predictable effectiveness.
- Class 3, 3a and 3b. Class 3a lasers are not common or particularly desirable. *Class 3b lasers are the gold standard of therapeutic cold lasers.* They are designed for practitioners but can be purchased for use on humans at home with the recommendation of a health care provider. They can be purchased without any restrictions for use on pets and horses. Class 3b lasers are commonly less than 500mW per laser diode continuous output. Several manufacturers have higher power laser devices that use multiple 500mW diodes that have TOTAL power level in the class 4 range, but are safe enough to qualify as a class 3b device because they have less chance of eye damage and no chance of tissue heating damage.
- Class 4 lasers. These laser devices feature one or more laser diodes calibrated with a power output in excess of 500mW. Class 4 lasers typically start at 7000mW (7 Watts) and can range all the way up to 60 Watts without doing damage to the eye or tissues, when used correctly. This danger is easily eliminated with training. However, it is important that practitioners utilize Class 4 lasers in a laser safe room with proper signage and while both patient and practitioner are wearing laser safe goggles or glasses. Class 4 lasers can be sold for home use with a recommendation letter or for use on animals without

any restrictions. Some laser manufacturers have a doctor on staff who can write a recommendation letter to meet the requirements so you can buy a laser that fits your needs.

Laser Wavelength

The wavelength of a cold laser is important because it determines three things: depth of penetration, absorption of photonic energy and reduction of inflammation. There is a therapeutic window in which energy is best transferred into tissue. Most lasers operate in a therapeutic range from 635nm (Red) to 1080 (NIR). Most common wavelengths are 635, 650, 660, 780, 810, 905, 910, 980 and 1080nm. These wavelengths have advantages and disadvantages as discussed below.

- 600nm to 660nm is the red laser wavelength, which is best for shallower treatments up to 1/2" and for neurological applications. Commonly used in cosmetic and skin care lasers. Good for treating skin, wrinkles, wounds, burns, acne, small joints, lymphatic tissue, acupuncture therapy and other shallow areas. It is also popular for more complex issues because much of the energy is absorbed by the blood flowing throughout the body. This activates and supports healing in different problem areas.
- 800nm to 860nm is considered the sweet spot for combining maximum penetration, depth and a positive photo-chemical reaction. European laser specialist such as Dr. Weber and Dr Hamblin promote 810 nm as the optimum wavelength because it is said to produce the maximum interaction with the mitochondria, which is the powerhouse of the cell and responsible for converting the photonic energy from the laser into ATP.
- 900nm to 1080nm is very popular in super pulsed lasers and class 4 lasers, with 904-910nm being the standard for all superpulsing lasers. 980nm has become the standard for many class 4 laser systems. At 980nm, much of the energy is converted to heat and absorbed by the water in the tissue so it is less efficient than 810nm at creating photobiomodulation. However, many class 4 lasers make up for the inefficiency with the delivery of more power.

Several of the best lasers offer multiple wavelengths. This gives you more flexibility in treating a wider range of ailments with a single laser. We offer the [Remy](#) and [Medray](#) dual with both 980 and 810.

Continuous Wave vs Pulsing or Super Pulsing

Another factor in understanding and choosing a therapeutic laser is the action of the laser beam. Is it continuous wave (CW), or standard pulse (measured in Hz), or does it utilize a super pulsing feature? To understand this better it is helpful to imagine a flashlight with your thumb on the switch. Turn the flashlight on and it is in CW mode. Now repeatedly flick the switch on and off at different speeds. This "chopping" of the beam as it turns on and off is like standard pulsing, which allows some lasers to deliver one or many different frequencies. Now imagine a computer with a "Q-switch" that is rapidly and repeatedly pulsing the diode on and off at a billionth of a second. This represents super pulsing and allows for much higher-powered diodes to be used safely, without generating heat. More power for deeper penetration, but relatively low average power.

Other frequency benefits can be obtained from what are called laser sweeps, in which the laser cycles or sweeps through multiple frequencies. A sweep is when the laser operates at a constantly changing pulse frequency. This was made popular with Erchonia lasers starting in 2002 when they were the first cold laser company in America to achieve FDA Clearance for use on humans. Erchonia lasers use significantly low power laser diodes (10-20mW), and supports the thesis that the majority of the work is done with the frequency pulsing and not as much the dosage. Another theory is that with continuous wave lasers, the cells can adapt to the continuous input, which can sometimes reduce results. The pulsing helps keep the body from becoming desensitized to receiving benefit from application of the laser light. The pulsing can provide a stronger stimulation effect in the cells.

The original thesis was that Continuous Wave (CW) laser light could provide more Joules/cm² in a shorter time. However, it is now known

that both CW and Pulsed have their place and unique benefits. Consequently some of the more popular professional lasers do both.

According to a recent study of laser therapy research by Huang et al, there is conclusive reason to believe that pulsing is preferable for most applications except nervous system therapy.

Laser Therapy Tips & Things To Consider When Investing In Laser Therapy Equipment

Acute symptoms and conditions are easier to treat with a cold laser and respond faster than chronic issues. Some conditions can take weeks or months of treatments depending on how long the person has had it and how their body responds to the treatment. In order for Practitioners to keep their clients from giving up if they don't see an immediate improvement, they start out the therapy procedure with a higher dosage than might typically be given. As the patient continues treatments they bring down the dose over time to allow for different levels of regeneration and biostimulation to occur. Utilizing both continuous wave and pulsed wave allows professionals and home users to optimize each treatment protocol according to the issue being treated and the patient's expectations.

When investing in a Laser, it's helpful to purchase from a laser specialist who can actually answer your most pressing questions. We understand that Practitioners often prefer a more powerful laser with flexibility in output or frequency options, while home-users want a laser that is safe, effective and easy to use for a wide range of symptoms and conditions. It's a good idea to purchase from a well-established company who has been around for many years and can offer you a choice of different types of lasers from several manufacturers, in desktop and portable models; in order to find one that meets your needs and budget. There are so many variables to consider and a laser specialist, such as the ones at Health Is Wealth Lasers and ColdLaserSupplies.com have over 15 year of experience supporting Practitioners and Home Users alike.

Anyone who invests in a therapeutic laser deserves to know how to use it to receive the most benefit for themselves, their family, their

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pets and their patients. When you invest in a laser from ColdLaserSupplies.com you receive exclusive support, training and protocols procured by a 17-year laser specialist. We give you our exclusive, Ultimate Protocol Library of over 500 Protocols included with your laser purchase, PLUS an extensive overview of how to work with the microsystems (ears, hands and feet); with instructions and a dozen picture charts for clarity. Of course you will also receive the training and protocols guides developed by the manufacturer of the specific laser of your choice, along with videos when available and a full factory warranty.

Are You Ready To Start?

As explained earlier, Therapeutic Lasers are sold under 4 primary classifications and following are many of the lasers that we have available in each class:

Class 4: These are more expensive lasers & typically only used by practitioners who are concerned about treatment times and have an appropriate, "eye safety" structured environment. This elite class of lasers offers the option for high dosages with quicker treatment times over lower Class 1-3b lasers. A popular and affordable class 4 laser system is the [9W Pilot Laser](#). If you are looking for a practical, powerful laser, with no risk of tissue heating, check out the [LZR7 Next Generation ZX2 Cool Laser](#) with multiple emitter head options including a 3.1W, 6.1 Watt & an 18.1 Watt emitter. These are the fastest & most powerful cool lasers to date. We also offer the [Remy](#) & [Medray](#) dual with both 980 and 810, which are exceptional full-featured Class 4 Lasers with touch screens & preloaded protocols.

Class 3b: The best overall value in class 3 lasers are the [AVANT LZ30z](#), [AVANT LZ30x](#) and [AVANT LZ30p](#) portable cold lasers. None of the competitors can compete based on the specs and they work well for the widest range of treatment options. The AVANT Lasers offer both RED and IR wavelengths in impressively high power levels, both Pulsing and CW output, both broad and pinpoint treatments in one compact, hand-held, ultra portable, rechargeable laser that fits comfortably in the palm of your hand or in your pocket.

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Never before has there ever been such a powerful, feature rich, high quality, portable laser as the AVANT in 2 Pro use and 1 home use model.

Another quality, portable handheld option does come close and has lower price options available, along with some other exceptional features such haptic feedback. Introducing: **PowerMedic Pro lasers**. PowerMedic makes several excellent hand-held, portable, rechargeable cold lasers including a model **with a built-in acupuncture tip**. For acupoint and auricular therapy this is one of the best options on the market because it is optimized for that application.

We also offer the **Evolution Fusion All-In-One Ultimate 20,000mW (20W) system** with 3 different laser probes including a cluster hand pieces and 14 versatile laser pads. Excellent for Pain & Weight Management, Smoking Cessation, inch-loss, skin care, hair growth, acupoint treatments and much more.

For Vet, Pet and Animal-Use Lasers we offer 3 different models of effective cold lasers from **Laserex 3000**. These digitally controlled, hand-held, rechargeable, portable lasers are excellent for most animal treatment applications and range in power from 300-450mW.

Unattended Laser Therapy Options:

Consider the **AVANT** with the available Tripod, or ***the famed 18 Watt GigaLaser with 3 panels, multiple wavelengths, long adjustable arm and rolling castors.*** This large hands free laser array covers the most surface area of the lasers on the market, but is also the most expensive.

Next are Class 1, 2 & 1m Lasers such as the TerraQuant Desktop Lasers, which can be ordered with optional hands free armatures and medical carts for ease of use and portability (optional probe sets for acupoint treatments, skin care applications, and dental applications). If safety is a high priority, the TerraQuant Laser series are an ideal choice. They have an extremely high safety rating for home and pro use with portable and desktop models to choose from. **TerraQuant lasers** have been manufactured in Russia and Israel with a 20 plus year proven track record and boast being one of the

top selling lasers in the world. The [TerraQuant Solo](#) is definitely the most popular, portable, hand-held, rechargeable laser at an average price of \$2495. TerraQuant lasers utilize super pulsing technology, featuring higher peak power levels than you can normally get in a sub 3b class laser. It's best to avoid devices that look like a laser pointer as these systems are legally limited to 5mW. *Class 1m lasers are limited to 500mW (the same as a class 3b) but can not cause eye damage unless the laser is focused through a lens. Therefore, a class 1m laser can be 100 times stronger than a class 2.*

QUOTE from a Naturopathic Doctor who nicely sums up the current state of cold laser therapy use when he wrote:

"Cold Laser Therapy has experienced dramatic and explosive growth over the last 50 years, becoming a leading non-invasive therapy. This is a highly effective and powerful healing technology used in tens of thousands of clinical settings throughout the world.

Uniquely suited to both clinical and individual usage, handheld lasers are an essential therapeutic mainstay over a broad spectrum of treatment applications. Medical specialties including Sports Medicine, Traumatology, Orthopedics, Dental Medicine, Urology, Gynecology, Physical Therapy, Acupuncture & Veterinary Medicine have all developed highly specialized and unique protocols to utilize cold lasers' unique applications.

Almost all professional sports organizations are now using Low Level Laser Therapy (LLLT), many of them extensively. In the US, at the professional level, every sport across the board has incorporated handheld lasers, both as a tremendously effective tool for reducing severity of injuries and greatly speeding recovery, and in a preventative and performance enhancing capacity."

Jonathan Mather, ND

If you need help, please call to speak with one of our cold laser specialists at Toll Free 888-824-7558. We are here to serve you.

To speak with a Class 4 Laser Specialist, Call 800-575-7963. We will be happy to answer any questions about therapeutic lasers and we can make specific recommendations based on your needs and budget.

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