

This 808nm 200mW laser module is mounted onto a Mobile Power Bank USB 18650 Battery Charger. The battery can be charged 500+ times. It is currently set to put out 100mW's of laser power. Depth of penetration is about 2". Its power density is about 500mW's/square centimeter which is best for pain and healing.

Most research to date suggests putting 2- 5 Joules of energy into 1 square centimeter (3/8" square). The diameter of the laser is just slightly bigger than 1 centimeter and since it's round it's actual area is pretty close to 1 square centimeter. Joules of energy are simply calculated by taking the power of the laser in Watts and multiplying it by how many seconds used on a square centimeter. So if the laser is putting out 100mW's you simply multiply .1 watts by how many seconds you stayed on that one spot to get the Joules of energy applied. Many reports suggest that 2-5 Joules of energy is the best for healing. So If your laser is putting out 100mW's and you intend to put 2 Joules of energy into a spot, simply divide 2 Joules by .1 which gives 20 seconds. Again, take Joules wanted and divide by your laser power to get the time you need to apply the laser to one square centimeter. So if you're trying to heal an area up and you are using 100mW's, 20 seconds per spot would give you 2 Joules of energy per square centimeter. So roughly speaking, you can treat an area the size of a golf ball (golf balls measure about 4.3 centimeters in diameter) in about 2 1/2 minutes when laser is putting out 100mW's. thus achieving 2 Joules of energy per square centimeter. Even though you can actually fit 14 square centimeters inside the area of a golf ball you would probably only apply the laser to about 7 spots within that size. That's because when you apply this laser to the skin it's effective diameter is broadened some (and blood is also carrying energy to surrounding areas) and that is why when treating an area the size of golf ball or larger the treatment times can go down. In fact, if you are treating an area much larger than a golf ball than you should consider spending less time on each spot and going back later to concentrate on deeper problem areas. (Areas with more pain or in need of greater healing).

As a general rule apply the laser about 15 to 30 seconds per spot (The size of the shiny aluminum metal ring on the laser module is 1 spot). Also a small amount of pressure and direct contact to the skin is essential as the laser does not penetrate clothing very well and a small amount of pressure helps to move energy absorbing blood out of the way.

If you don't feel improvement right away it does not mean you aren't being benefited. This laser unit WILL increase the energy of the cells that receive it. Sometimes with laser treatment the cells start throwing off toxins (metabolic waste) and if the toxins are great enough you may actually feel worse. Don't give up, just proceed with shorter treatment times until your body can handle normal treatment times. Also, if you get a negative reaction then stop for a few days and allow time for things to settle down before starting again. Don't give up on your laser treatments. It's nearly miraculous what they can accomplish. Also, after 2 weeks of every day use take a break for 5-7 days to give your cells a change to stabilize, then you can start again.

General guidelines:

- 1. If the lens gets dirty, use a q-tip cotton swab & alcohol to clean the lens. Moisten tip so that it will not drip into laser, which is just below lens. Gently clean lens and then use dry q-tip to clear up lens of any remaining alcohol or smears. Don't over do cleaning because it's like cleaning your glasses. The more you do it the more chance of scratches on the lens.**
- 2. If treating larger areas, the time needed can go down because blood beneath the laser head will be carrying energy into surrounding areas.**
- 3. Care should be taken when lasering directly on top of your thyroid gland which is just beneath your larynx. You might consider using batteries that have been used over three hours or lasering through a white t-shirt placed over the area. If you feel it needs to be treated, it's safer to simply treat the surrounding areas and the blood will carry the energy into it. Become familiar with where your glands are and their depth. The Thyroid Gland can be easily over**

stimulated because it is just beneath the skin. It is advised to Not treat the Thyroid of children that are still growing. Also when lasering your brain, either move the laser either very slowly or change positions about every 15 seconds. Studies have shown no side effects to the brain even at much greater power densities and time.

4. Studies show that your cells can become somewhat desensitized to laser stimulation after 2 weeks of every day treatment. If an area you are treating seems to stop benefiting, than take a break for about 5-7days and your cells will have reset themselves to allow energy from the laser to charge them up again. Using lower power & or shorter treatment times can help to get daily pain relief for longer periods without taking a break.
5. Red lasers between 630 to 655nm and 5mW's are many times beneficial when the near infrared 805 to 835nm don't seem to do anything, probably due to the fact that most of the energy from an 808nm goes deep while the energy from a 635nm laser pointer only goes about 1/3 of an inch deep. Or it may actually be because of how the body absorbs different color light. You can get some good red laser pointers from Ebay for really cheap:

http://www.ebay.com/itm/3Pcs-Ultra-Powerful-Red-Laser-Pen-Pointer-Beam-Light-5mw-650nm-Presentation-/310813322411?pt=US_Laser_Pointers&hash=item485deaecab

They Costs 6.99 for 3 including shipping and I have tested them and verified that they do put out 5mW's of power. Red lasers have been shown to be of great benefit for Rheumatoid Arthritis and other skin and near surface problems. Depth of red laser penetration is about 3/8".

6. Take care that you don't shine the laser into anyone's eyes. It's unlikely that anyone will get blinded but it's harder for others to sense the danger with the infrared light because 80% of the near infrared 808nm laser light is invisible to the naked eye and it's not as bright as say the 650nm red laser. Keep this out of the reach of children who might think it's cool to stare at the light and not be able to realize that they are temporarily and sometimes permanently blinding themselves.
8. If the outside of the laser unit is getting uncomfortably warm to stay in one spot than you should consider turning it off for a minute. At the high setting the laser unit should stay cool enough when you're applying pressure because your skin will be acting like an additional heat sink.
9. You can get deeper penetrations by applying more pressure. Energy absorbing blood moves out of the way allowing greater penetration to take place.
10. Make sure the black lens keeper is in it's unfocused position. If you unscrew the silver lens ring it will expose the black lens keeper. It should be adjusted so that when the laser is moved closer or further from an object it does not produce a spot smaller than you get when the laser is pressed against it. If the laser forms a pinpoint it will then be able to burn black matches- (darkened with black marker), black balloons, black paper etc.. At the right pinpoint focus and distance it could blind you or someone else in a fraction of a second!!!

Frequently Asked Questions

What can laser therapy treat?

Therapeutic applications which have shown promising results based on studies include:

- Arthritis
- Acupuncture Points (Smoking Cessation/Addictions)
- Back Pain
- Enhances Lymphatic Drainage
- Releases Tight Muscles
- Soft tissue injuries, including sprains and strains, tendonitis and haematomas
- Carpal Tunnel Syndrome
- Chronic Pain
- Maxillofacial Disorders
- Nerve Regeneration
- Neuropathy/Musculoskeletal Pain
- Myofascial Pain
- Tendonitis
- Sports Injuries
- Growth factor response within cells and tissue as a result of increased ATP and protein synthesis
- Wound Healing (Speeds Healing)
- Pain relief as a result of increased endorphin release
- Suppression of nociceptor action (pain suppression)
- Strengthening the immune system response via increasing levels of lymphocyte activity and through a newly researched mechanism termed photomodulation of blood.

What is Low Laser Therapy?

Low Level Laser Therapy is a form of phototherapy or light therapy. This involves the application of low power light (red and near infrared light) to injuries or wounds to improve soft tissue healing and relieve both acute and chronic pain. It is also known as cold laser, soft laser or low intensity laser. **Low level laser therapy aims to biostimulate.** The therapy is precise and accurate; and offers safe and effective treatment for a wide variety of conditions. The energy range of low level laser light lies between 1 and 500 mW (milliwatts), while for surgical lasers the energy range lies between 3000 and 10000 mW.

The 808nm 100mW infrared diode, powered to produce 50mW's of laser power, penetrates up to 5cm (two inches) below the skin to treat deeper tissues such as tendons, deep wounds (proud flesh) muscles, and joints. A red 5mW 650nm laser penetrates 1cm (3/8 of an inch) below the skin to treat superficial skin lesions, acupuncture points, and fungal infections of the foot (anti-microbial effect).

Three effects are widely accepted in the literature.

- Reduction of Inflammation
- Analgesia
- Antibacterial/Antiviral

How does it work?

Low-level lasers supply energy to the body in the form of non-thermal photons of light. Light is transmitted through the skin's layers (the dermis, epidermis and the subcutaneous tissue or tissue fat under the skin) at all wavelengths in the visible range. However, light waves in the near infrared ranges, penetrate the deepest of all light waves in the visible spectrum. When low level laser light waves penetrate deeply into the skin, they optimize the immune responses of our blood. This has both anti-inflammatory and immunosuppressive

effects. It is a scientific fact that light transmitted to the blood in this way has positive effective throughout the whole body, supplying vital oxygen and energy to every cell.

What Is Low Level Laser Light?

Low-level laser light is compressed light of a wavelength from the cold, red part of the spectrum of electromagnetic radiation. It is different from natural light in that it is one precise color; it is coherent (it travels in a straight line), monochromatic (a single wavelength) and polarized (it concentrates its beam in a defined location or spot). These properties allow laser light to penetrate the surface of the skin with no heating effect, **no damage to the skin and no known side effects**. Rather, laser light directs biostimulative light energy to the body's cells which the cells then convert into chemical energy to promote natural healing and pain relief. It is NOT harmful.

Only use safety goggles that are made for the exact infrared wavelength you're using. The 808nm diode beams are barely visible but can still hurt your eyes if you look directly at them. In fact, infrared light can be even more dangerous to your eyes than visible red beams since the barely visible beams do not initiate the protective 'blink reflex' as the red ones do, so you don't know to look away. In other words, never at any time should you look directly into any laser beam. And never have any laser pointed at your eyes.

Most cold lasers cost well over \$6,000.00. Some are as high as \$20,000.00! Vetrolaser.com sells a three diode unit @ 50mW's each similar to a small flashlight for about 600.00. It says that it is under 200mW for all three diodes combined. It's been tested by a laser power meter and actually puts out about 150mW for all 3 diodes. Vetrolaser.com has recently changed their laser that was 200mW for three lasers to 300mw for it's three laser unit. That means that the total output of all three lasers is less than 300mW's.

A single infrared 808nm 100mW rated diode powered @ 50mW could take 4 to 12 minutes to treat an area the size of a silver dollar(3.8cm in diameter), depending on how many Joules of energy you need to apply. If you add more lasers you can treat an area faster. Also if you use a laser that is putting out more power with a larger beam you can treat an area faster. When you up the power of a laser from say 50mW to 100mW's you would also need to increase the laser beam size to maintain the correct energy density ratio. You can't keep pumping more and more energy into the same size beam without eventually creating a laser beam that is capable of creating heat damage. **An 808nm 200mW Laser diode powered @ 100mW's can treat an area the size of a silver dollar in 2 to 5 minutes. An 800nm 200mW Laser diode powered @ 150mW's can do it in 1 to 3 minutes or less.** (Laser diodes need to run at lower than maximum levels to get over 5000 hours use from them. While the Laser light itself is not hot, the electronics to power the laser can generate considerable heat. A good heatsink and running the laser at lower levels are what allow a laser to run continuously. If the laser Module seems to be generating a lot of heat then turning it off for a minute or two and then back on should help extend laser life)

The size of the laser beam needs to be larger as the laser beam power is increased. A 150mW laser dot should be about 1/4" long and 1/8" wide. If focused to a pinpoint Lasers greater than 100mW can start to burn dark paper, balloons, matches etc..

Tell me about the History of Laser Therapy

The word "laser" is an acronym for Light Amplification by the Stimulated Emission of Radiation. Lasers do NOT emit X-RAYS and do NOT present the dangers of X-RAYS. The theory was first described by Albert Einstein (1879-1955) who paved the way for the development of the therapeutic laser.

The first low-level therapeutic laser was developed in 1962. By the end of the 1960's, Endre Mester in Hungary was reporting an improved healing of wounds through low-level laser radiation. Since then, scientists and doctors around the world have been using laser light to treat conditions that can affect all age groups.

Dr. DelRe in his book states:

"It is not radiation like x-rays. It is not ionizing radiation, which means that it does not cause skin cancer or

anything like it. The discovery of the bio-stimulating effects of coherent light in 1967 was the result of a researcher trying to cause cancer in mice with a laser. It did not cause cancer, but it did make the shaved areas of the test mice grow hair back at a much faster rate! 62 Other researchers have tried to cause mutations with low-level laser as well but could not.

DelRe, Lawrence (2009-03-31). *Rejuvenation: Using The Power of Light to Increase Vitality, Energy, and Healing* (p. 11). Health-1st. Kindle Edition.

High Power vs. Low Power Medical Lasers

There are two types of medical laser: high power and low power. High power lasers are used to cut through tissue. Low-level lasers, on the other hand, are used to stimulate tissue repair through a process of bio-stimulation. Almost any diode frequency (green, red, infrared) can become a high power laser if you have enough power (wattage) behind it. For example, if you have 50 watts of power running a red laser you can bore a hole in the skin. Cold lasers use only milliwatts, small parts of a watt, and does not burn the skin unless focused to a pinpoint. Burning a hole in the skin with a high power laser should not be confused with safe cold laser tissue penetration.

How do you use the laser for therapy? Is it difficult?

Treatment is simple and painless. It is similar to holding a flashlight close to the skin and shining the light on it. Treatment times vary based upon the size of the area to be treated, and the output power of the laser. Another factor influencing the penetration is tissue compression – a probe that is mechanically pressed against the skin will force the blood in front to move away from the penetrating beam. Pigmentation (skin color & blood color) can absorb a great deal of the incoming light energy.

Bottom line

The most important factors influencing light penetration in tissue are wavelength, power, intensity, tissue contact and compression.

Are there any negative effects from LLLT?

In all the years that low level lasers have been tested in research and clinical applications, no adverse side effects or negative impacts have been reported. This is why the U.S. Food and Drug Administration (FDA) classifies lasers as “Non-Significant Risk” devices, requiring a minimum of safety precautions.

The major precaution is direct viewing of the laser beam. Care should be exercised not to stare into the laser beam or to point it at the eyes. The use of real laser safety glasses is recommended.

Generally, cold lasers for any use (human or animal) should not be used on women who are pregnant and on or near the thyroid or individuals with thyroid conditions. Also care should be taken when applying a laser around a **childs glands**, especially **infants** whose glands can easily be overstimulated and may lead to possible gland dysfunction. The FDA has Stated that Cold laser therapy should not be used on cancerous lesions because certain tests showed an increase in cancer growth – more on that below.

Cold laser therapy is considered much safer than other therapies such as ultra-sound, and electrical muscle stimulation, which are used to treat some of the same conditions. Ultra-sound therapy can burn the tissues during treatment and requires the practitioner to use a messy conductivity gel before treating—and in some cases, shaving off the hair before treating. Electrical muscle stimulation does not promote increased cellular activity.

How long have cold lasers been used for therapy?

Cold lasers have been used by Doctors in Europe on both animals and humans since around 1970. Andre Mester, a Hungarian researcher, reported good results with wound healing on rats in 1968. And veterinarians have been using therapeutic lasers in the U.S. since the early 70's. In fact, the FDA has

approved some cold laser brands for use on humans.

In simple terms, what does Cold Laser Therapy do?

For decades, researchers knew of the healing benefits of everyday, non-coherent light such as sunlight. In small doses, sunlight helps heal skin lesions. Of course if you overexpose yourself to the sun your skin will burn. What if there was a way of safely getting light to deeper tissues? Wouldn't it help heal those tissues? That is the purpose of cold laser therapy. The coherent, concentrated light emitted from the continuous wave infrared laser diode safely penetrates up to 2 inches below the skin to help stimulate cellular activity to promote rapid deep tissue healing. Super pulsed lasers claim to go as deep as 5 inches. This also explains why you should use caution when using cold laser therapy over cancerous lesions; it can speed up those cells if the laser intensity is high enough. It is important to note that research has shown that small cancers have been decreased and have even disappeared with **low** level laser therapy. The tests that were done showing an increase in cancer growth were done with **High** dose low level laser therapy in the range of 2.5 Watts, that's about 50 times the intensity (laser density) you would normally get from a 100mw 808nm laser putting out 50mW's of power. Some tests done on rats with cancer actually burned the skin and still had no effect on the cancer!

1. Wound healing is greatly improved by cold laser therapy.
2. An increase in circulation by widening of the blood vessels. This is important.
3. Decreased swelling/edema due to lymphatic drainage.
4. Coherent laser light stimulates the production of body's own natural pain relieving chemicals such as increased endorphin and enkephalin production.

Cold laser therapy is considered safe with very few contraindications. You should never look directly at the laser light and should wear protective eyewear such as real laser safety glasses built for the specific wavelengths you're using.

What Are The Five Effects Of Coherent (Cold Laser Light) On Body Tissues?

There are basically five effects cold laser light has on living tissues as concerns therapeutic value.

1. **Speeding Up Tissue Repair:** Just like the sun is responsible for photosynthesis (which is the conversion of light energy into chemical energy), the light used in cold laser therapy acts to increase energy to the cells by aiding in the synthesis of ATP (Adenosine Triphosphate). Increased energy to the cells means increased cellular activity for all of the cell's components that rely on this energy. Speeding up tissue repair also means less scar tissue formation. Scar tissue is a cheaper grade of tissue than never injured tissue. This is particularly important in tendons where they attach to muscles higher up in the leg where there are skeletal muscles. A scarred tendon has less elasticity than normal tendons.
2. **Faster Collagen Formation:** Much of our body's tissue is composed of the protein known as collagen. Increased collagen production is necessary for rapid tissue repair, and as mentioned above, to decrease scar tissue formation. This is especially apparent where you see a gooey residue formation around wounds.
3. **Increased Production Of natural Body Painkillers:** Endorphins (endomorphines) are endogenous opiod biochemical compounds. They are peptides produced by the pituitary gland and the hypothalamus in vertebrates, and they resemble opiates in their abilities to produce analgesia and a send of well-being. In other words, they might work as "natural pain killers.
4. **Increased Lymphatic Drainage:** Studies have shown that cold laser therapy can dramatically increase the size of the lymphatic ducts thus facilitating protein waste removal. This is especially important in the lower legs where circulation is limited.
5. **Increased Vascularization:** This means increased blood flow to the tissues because of increased capillary formation. That's the best positive sign you notice when treating a wound. This happens to deeper tissues as well—the ones you can't see such as muscles and tendons.

