

Photonic Stimulation

The Photonic Stimulator is an alternative pain therapy for people experiencing chronic pain, headaches, bursitis, tendonitis, and muscle spasms. The Photonic Stimulator is an approved non-invasive therapy approved by the F.D.A. The Photonic Stimulator directs a beam of invisible infrared light onto an area of the body which a patient is experiencing pain. How it works: Directing a beam of photons on traumatized nerves, major nerve plexuses and acupuncture or trigger points, usually re-equilibrates their electrical potential, Once the function of the nerves is restored and in communication with other parts of the body they begin firing normally, blood circulation will return to the affected area, bringing oxygen and nutrients and removing waste. Pain and numbness will disappear, as the body will naturally heal itself. The light assists healing because it "resets the electrical potential for nerve flow" and increases circulation. It relaxes muscle spasms and soreness seems to leave. Many times only 3-6 treatments are needed. Speeds healing and eases pain.

The photonic stimulator derives its name from using photonic, or light, emission to trigger, or stimulate, a biological response. Photonic Stimulation utilizes diffuse infrared light for the stimulation of certain biological responses, some of which may be fairly deep (several centimeters) into tissue. It turns out that certain wavelengths of light pass more readily through human and animal tissue than others. Hemoglobin, water and lipids each absorb and scatter light to different degrees at different frequencies, where each light frequency is typically expressed by the corresponding wavelength. Because of this, there is a "sweet spot" in the spectrum which provides more optimum penetration of the light, or photonic, energy. The DavaRay NanoBeam 940 infrared therapy device, or photonic stimulator, is designed to take advantage of this sweet spot in the Near Infrared, or NIR, portion of the spectrum. This region is below the frequency (longer wavelength) of light to which our eyes are sensitive, so we can see very little of the energy emitted at these wavelengths. Therefore, just like ultraviolet light, infrared is an "invisible light". Unlike ultraviolet, which is largely blocked by the top layers of skin, NIR penetrates deep into the tissue to reach nerve endings and the endothelial linings of the capillaries.

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neuritis, peripheral neuropathy, reflexive sympathetic dystrophy, complex regional pain syndrome. myofascial pain disorders such as trigger points, myositis, fibromyalgia and other areas of pain management including post- up spinal surgeries, tendonitis joint and soft tissue sprains and strains This can include whiplash work and sports injuries.

The photonic stimulator derives its name from using photonic, or light, emission to trigger, or stimulate, a biological response. Photonic Stimulation utilizes diffuse infrared light for the stimulation of certain biological responses, some of which may be fairly deep (7 inches into tissue). It turns out that certain wavelengths of light pass more readily through human and animal tissue than others. Hemoglobin, water and lipids each absorb and scatter light to different degrees at different frequencies, where each light frequency is typically expressed by the corresponding wavelength. Because of this, there is a "sweet spot" in the spectrum which provides more optimum penetration of the light, or photonic, energy, 940 photonic coherent light is designed to take advantage of this sweet spot in the Near Infrared, or NIR, portion of the spectrum. This region is below the frequency (longer wavelength) of light to which our eyes are sensitive, so we can see very little of the energy emitted at these wavelengths. Therefore, just like ultraviolet light, infrared is an "invisible light". Unlike ultraviolet, which is largely blocked by the top layers of skin, NIR penetrates deep into the tissue to reach nerve endings and the endothelial linings of the capillaries.

Similar light therapies (low intensity laser, LLLT) have been in use since the 1960s, especially throughout Europe, and there are now well over 100 published studies available in the literature. The FDA has approved Photonic Stimulation for use by healthcare professionals in the United States for the temporary relief of pain in muscles and joints, for muscle spasms and arthritis pain, for relieving stiffness, to promote the relaxation of muscle tissue and to temporarily increase local blood circulation where heat may be indicated. It is among the most effective devices available.

We have come to believe through observation that the infrared light has a balancing effect on the autonomic nervous system, whose nerve fibers are especially rich in the walls of blood vessels and micro-capillaries. Studies have shown that Nitric Oxide is released into the blood stream, causing the walls of the micro-capillaries to relax and expand, permitting increased blood flow, or perfusion. The resultant temporary reduction in inflammation can be observed, and certainly felt. It is now recognized that Nitric Oxide is a key parasympathetic cytokine, that is, it reduces inflammation.

Sympathetic nerves are also connected via the spinal column to the brain. As anyone who has experienced a cold can attest, inflammation impacts brain function and mood. Hyperactivation of the sympathetic nerves, as well as hyperproduction of proinflammatory cytokines (inflammation), has been observed by clinicians to have deleterious effects on brain function. We know that Myofascial pain and RSD pain are transmitted through the body by the sympathetic nervous system. Of course, if we are experiencing less pain on a conscious level, we tend to be much less irritable and more energetic. We can naturally think more clearly and concentrate better. Better mobility also naturally gives rise to better mood. The unconscious effects are less well understood, but have an undeniable, and often immediate, impact.

As with many devices and modalities recently put into practice (as well as some much older ones), more research is needed to more completely understand the mechanisms of action by which the photonic stimulator accomplishes what it does. We can certainly benefit by more fully understanding the often complex mechanisms by which the human body regulates itself, and the many roles of both the central and autonomic nervous systems in that process. In the meantime, the photonic stimulator, or infrared therapy device has been used extensively in Sports Medicine Clinics and by the United States Olympic Teams for tissue injuries in it's athletes, as well by Physical Therapy Clinics and Neurofeedback offices.

Q: What does it feel like when applied?

A: There is no feeling of sensation while the photonic stimulation is being administered. The unit has a small fan used to cool the emitter. People sometimes feel the vibration of that motor. The heat lamp when turned on evokes the sensation of warmth. This is not used in most cases. However, there are no feelings of electrical impulses or shocking sensations.

Q: How does photonic simulator therapy work?

A: Decreased blood flow through an injury site can result in slow healing. This stimulator emits infrared nonvisible photons that harmlessly penetrate the skin and soft tissues promoting blood flow. The result is that injuries heal faster and will feel better more quickly.

Photonic therapy is a natural therapy promoting the body's own immune responses, its own methods of controlling pain and its own healing abilities. There are no needles and no drugs. It is the use of monochromatic light.

They stimulate electro-sensitive spots on the skin, including those usually called acupuncture points.

Q: How many treatments are needed?

A: Each patient and diagnosis require different treatment applications. However, the general rule is 3-6 sessions with documented sustained improvement. If this is not accomplished then the treatment should be terminated.

PHOTONIC STIMULATION

- ***Faster healing***

Accelerates fibroblast development in damaged tissue as well as stimulating bone and cartilage regeneration.

- ***Anti-Inflammatory Action***

Reduces swelling and accelerates healing times of soft tissue injuries.

- ***Increased Vascular Activity***

Results in an increase of microcirculation of lymphatics and small blood vessels in injured tissue.

- ***Stimulates Nerve Function***

Accelerates the regeneration of damaged nerves.

- ***Safe***

The Food and Drug Administration (FDA) considers photonic stimulation to be a "non-significant risk" technology.

- ***Fast***

Typical photonic stimulation can be accomplished in less than 10 minutes.

- ***Non-pharmacological***

- ***No hidden side effects***

- ***Non-invasive***

Unlike acupuncture or injections. skin is not physically penetrated.

- ***Economical***

Photonic treatments often cost less than other therapy and offer greater benefits

MECHANISM OF ACTION:

The mechanism of action of infrared light photonic stimulation has been determined by the work of many scientists throughout the world. There are hundreds of published research articles on the topic. Most of the research has been conducted in Europe where it originated.

The effects are photochemical (not thermal). Bundles of light energy (photons) enter the tissue and are absorbed within the cell (in the mitochondria and at the cell membrane). The light energy is converted to chemical energy within the cell (ATP). Cell membrane permeability is altered and physiological changes occur through an enzyme cascade.

These physiological changes affect microphages, fibroblasts, endothelial cells, mast cells and nerve conduction rates. After treatment there is a measurable increase in enzymes and neurotransmitters, such as serotonin, that proves photonic stimulation has had physiologic effect. Also, measurable changes in blood flow occur.

Our device uses light in the infrared spectrum that has been shown to have the greatest depth of issue penetration. The cumulative effect of the light energy upon the tissue is to increase microcirculation, speed healing and give pain relief. It is important to note that this form of laser light does not heat or damage the tissue nor does it induce tremor or bacterial growth.

Soft tissue disorders account for many of the painful conditions in which patients come to therapy. Muscle, tendons, ligaments, fascia and periosteum are soft tissues that are often injured by trauma and/or the aging process. Tendon and ligaments are composed of collagen fibers which penetrate the periosteum as Sharpey's fibers. These fibers at the periosteum are vulnerable to repetitive stress and sudden tears from acute trauma.

The inflammatory response involves noxious chemicals such as bradykinins, prostaglandins, histamine, substance P and serotonin which irritate free nerve endings, causing pain. Part of the inflammatory reaction and pain response results in splinting, muscle and vasospasm which trap the irritating inflammatory substances in the tissue, resulting in delayed healing and prolonged pain.

Photonic stimulation breaks the painful inflammatory cycle by dilating small blood and lymphatic vessels.

This increase in circulation removes the irritating inflammatory products and results in accelerated healing and pain relief. The fibroblasts, immune system and nervous system are also stimulated by photonic stimulation to increase activity - thereby repairing damaged tissues sooner.

Important studies: Numerous tests show that the increase in circulation and reduction in pain associated with the use of the photonic stimulation unit is the result of an increase in the release of nitric oxide directly under the transmitter.

These tests are further supported by published scientific articles that show that light can increase circulation through the release of nitric oxide.

The photodissociation of nitric oxide (NO), either directly from the endothelial cells or from the hemoglobin within the red blood cell, may be responsible for these beneficial effects. Over 40 years ago Furchgott (Furchgott et al., JPET 113:22, 1955), demonstrated the ability of photo energy to induce vasorelaxation. Furchgott, Ignarro, and Murad were awarded the Nobel prize in medicine and physiology in 2000 for their work in identifying NO as the molecule responsible for regulating blood pressure.

Effects of Photonic Stimulation on Wound Healing

1. Acceleration of resolution of inflammation
2. Increase in growth factor release from macrophages, following temporary increase in membrane permeability to calcium ions
3. Enhanced synthesis of ATP
4. Increase in mast cell number and degranulation following injury
5. Increase in proliferation of keratinocytes, fibroblasts, and endotheliocytes
6. Increase in angiogenesis
7. Increase in collagen synthesis

Effects of Photonic Stimulation on Pain Relief

1. At appropriate energy densities and treatment parameters, can alter the pain threshold
2. Photonic stimulation has the potential to significantly alter the neurochemistry of the central and peripheral nervous systems. This suggests that there may be a neuropharmacological substrate for laser- mediate analgesia.
3. Photonic stimulation can alter electrically evoked potentials, in terms of latency (or velocity) and amplitude.

* Research studies on request.