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⋮ **Laser and LED Treatments: Which is Better?**
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A look at coherence, incoherence and reversing entropy

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Introduction

There is quite a bit of controversy among light therapy proponents about the therapeutic value of lasers, which produce coherent light, versus LED and incandescent sources, which produce incoherent light. Laser enthusiasts, backed up by a large body of research, claim that only the intense, highly coherent beam of a laser can penetrate deeply into the body's tissues and meridian system for significant results. Yet some of the most respected names in light therapy research have used gentler, much more diffuse light sources for effective treatment of a staggering range of health disorders. Who is right? The purpose of this article is to explore this question by offering some fascinating contemporary research about coherence and non-coherence of light, and their effects on the human body.

There has been an explosive growth of interest in the uses of light for healing and cosmetic treatments in recent years. Light pens are used for non-needle acupuncture treatments, lasers are used for many common surgical procedures, and some ophthalmologists prescribe color light therapy through the eyes for a wide range of health disorders. "Photo-facials" are also becoming a common offering in beauty salons.

Even the U.S. Army and NASA have gotten into the act, developing LED light therapies for accelerating wound healing, photo-dynamic cancer treatment and much more. According to Dr. Harry Whelan, professor of pediatric neurology at the Medical College of Wisconsin, who utilizes the NASA LED technology: "So far, what we've seen in patients and what we've seen in laboratory cell cultures, all point to one conclusion - The near-infrared light emitted by these LEDs seems to be perfect for increasing energy inside cells. This means whether you're on Earth in a hospital, working in a submarine under the sea or on your way to Mars inside a spaceship, the LEDs boost energy to the cells and accelerate healing."¹

One of the first proponents of color therapy in the U.S. was Dinshah Ghadiali. In the early 1900's he developed the practice of "tonating", which is bathing the entire body, or body segments, in therapeutic colors of light². While this remains highly a beneficial practice for a wide range of health disorders, a more modern trend is "colorpuncture", developed by Peter Mandel of Germany. Colorpuncture is a specific form of therapy in which a series of colored light beams are applied to patterns of acupuncture points. The greater sophistication of the colorpuncture system allows targeted beneficial effects on the endocrine, lymphatic, organ, psycho-emotional and central nervous systems³.

Colorpuncture is so effective because acupuncture points are energetic communication gateways, and highly responsive to light. According to acupuncture researcher Ion Dumitrescu of Romania: "The electrodermal points are electrical pores – concerning two-way energy exchange between the body and the environment."⁴

¹ Quoted in Science Daily website: <http://www.sciencedaily.com/releases/2000/12/001219195848.htm>

² Dinshah, D., Let There Be Light, Dinshah Health Society, 2001

³ Mandel, P., Practical Compendium of Colorpuncture, Edition Energetik 1986

⁴ I. Dumitrescu, Contribution To The Electro-Physiology Of The Active Points, International Acupuncture conference, Bucharest, Romania, 1977, as quoted in American Journal of Acupuncture, Volume 9, #3, 1981

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The work of scientist Fritz Popp from Germany proved the existence of natural light communication between all living plants, animals and people. He called this phenomenon "biophoton" luminescence⁵. Biophotons are carriers of "information" without which our bodies are lifeless collections of molecules.

According to Popp, the coherent biophoton fields within the body mainly originate in our DNA⁶.

Coherent and Incoherent Light

There are two forms of light used in therapy - coherent and incoherent. Most visible light on Earth and in the Universe is incoherent. This means that photons (light particles) randomly spread out as soon as they are emitted from a light source. Incoherent sources include the Sun and light from incandescent, fluorescent, and LED sources.

LED stands for Light Emitting Diode. A LED is a silicon microchip with various added substances, each of which releases a different wavelength (color) of light when electrically stimulated. LEDs used to be mainly used as low-power indicator lights for electronic devices. Now manufacturers are racing to release LEDs with higher intensity and greater range of available colors and designs. LED light has been used for acu-point stimulation and wound healing since the 1980's.

Lasers are the only manufactured form of light therapy that does not spread out, but stays tightly collimated, i.e, coherent. The difference between coherent and non-coherent light is easy to see. If a bright flashlight with an incandescent or LED bulb is directed toward a distant wall in a dark room, the beam projected upon the wall will be diffuse and widely spread out. Yet if a laser pointer or therapy tool is directed in this way you will only see a tiny spot on the wall. That is because the beam remains coherent over long distances.

Coherence and Entropy

There is an inverse relationship between coherence and *entropy*. Entropy is the tendency for any organized system to become chaotic, that is, break down over time. Examples of entropy are the aging and death process, stars burning down, and social breakdown in over-crowded cities. According to the pioneering research of Nobel prize-winning physicist Ilya Prigogine, living and evolving systems resist entropy (negentropy) because they are able to take in new, outside energy and dissipate entropic tendencies away from themselves⁷. This ability to reverse entropy, in fact, may be considered a prime quality of life and consciousness.

There are two kinds of energy systems in regard to entropy – closed and open systems. Closed systems operate in isolation – they do not interact with a greater environment. Open systems are ecological, that is, they are in a continual state of communication and energy exchange with their environment. Only an open system can dissipate entropy as described above, and maintain or increase its coherence. Human beings, and all living things on Earth, are open systems. Therefore our bodies can take in energy from our environment and maintain coherence. This supports homeostasis and health. It also allows us to evolve into increasing levels of order and expanded consciousness.

⁵ F.A. Popp & B. Becker, Electromagnetic Bioinformation, ed. 2, Urban and Schwartzenberg, Germany 1988

⁶ F.A. Popp, J.J. Chang¹, A. Herzog, Z. Yan and Y. Yan, Evidence of Non-Classical Light In Biological Systems. Published by the International Institute of Biophysics on webpage <http://www.lifescientists.de/publication/pub2001-08.htm>

⁷ As quoted on numerous websites about Prigogine, for example: <http://www.fortunecity.com/emachines/e11/86/entropy.html>

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According to the research of Popp, consciousness is based on this ability to maintain coherence⁸.

A timely application of this principle is the field of so-called “anti-aging” medicine, which is greatly in demand from our huge baby boomer population. Any therapies or supplements that genuinely slow the aging process must do so by increasing the body’s ability to dissipate entropy and maintain energetic coherence.

Laser and LED Stimulation

Let’s now return to the question of the differing values of coherent light (laser) vs. incoherent light in therapy. In support of laser proponents, it can seem intuitive that a highly focused and coherent beam of light would penetrate more deeply into the body than scattered, incoherent photons, and hence have more profound clinical effects.

Yet some of the most fascinating contemporary research shows that this may not necessarily be the case! Under many conditions now recognized by modern physics, *incoherent light can transform into coherent light*.

A simple example of this principle is in the workings of a telescope. Light emanating from a distant star is incoherent, yet once captured in the collector lens system of the telescope, it becomes coherent.⁹

Our bodies evolved for millions of years in a field of incoherent light (the Sun). All our food sources did as well. Yet the DNA in our bodies produce coherent biophoton emissions¹⁰. Apparently our bodies are negentropic (entropy reducing) organisms, and can transform incoherent light into coherent light as needed.

According to Mandel, it is energetic interference fields in the body that do this¹¹. They act as “filters” to produce this transformation. According to Mandel, the more dense and complex the interference fields, the greater the capacity to transform incoherent light into coherent light. Acupuncture points are interferences in which two or more energy pathways intersect, and hence have this filtering effect. Mandel also states that repeated use of intense laser light on acupuncture points can eventually weaken or “blow out” the subtle circuitry they regulate.

So, are lasers or incoherent LED light sources superior for therapy purposes? It is clear that laser light more closely resembles that coherent light our DNA produces to transmit and receive the information of life. Yet our bodies have evolved negentropic systems to utilize incoherent sunlight as energy “fuel”, and transform it into coherent biophotons as needed.

It is well established that both forms of light therapy have demonstrated value. In the opinion of the author, because laser therapies are so much more focused and intense, they are a more invasive form of therapy than use of incoherent light from LEDs. This is evidenced by the wide use of lasers for hair removal and many forms of surgery. Yet this is not necessarily a negative indictment of laser acupuncture. More invasive therapies are often useful for treatment of acute or recalcitrant conditions,

⁸ F.A. Popp, Consciousness As Evolutionary Process Based On Coherent States, Published by the International Institute of Biophysics on webpage <http://www.lifescientists.de/publication/pub2003-04-11.htm>

⁹ Leonard Mandel & Emil Wolf, Optical Coherence and Quantum Optics, Cambridge University Press, 1995, section 4.2. This phenomenon is noted in the absence of atmospheric tremors, i.e., on a good observing night.

¹⁰ As quoted in note 3, above

¹¹ Interference fields are intersections of two or more interacting frequencies. Interference fields are a major aspect of brain, nervous system and acupuncture point function, and such fields store memory. Quoted from Course notes Esogetic Colorpuncture Basic Training by Peter Mandel, N.D., 2003

and certainly have their place in the physician's armamentarium. Lasers also enjoy a very positive reputation for treatment of some skin diseases¹².

It is clear, however, that our bodies have developed sophisticated mechanisms to thrive on direct incoherent light from the Sun, and secondarily from the light held within the bio-chemical bonds in food sources. The DNA in our cells possesses the alchemical ability to produce coherent light carrying the precise information required for growth, functioning and healing of our magnificent bodies. According to Prigogine's pioneering research, open systems such as our bodies are able to take in energy from the environment and make it coherent, thus reversing entropy. Surely such remarkable life systems superbly respond to the incoherent light it is programmed to process.

As with most forms of energy medicine, therapeutic light is applied in a more intense manner than that which is ambient in the environment, with more precise selection of color (wavelength) that is supportive of the individual condition. A well-designed LED light therapy device is therefore a step between generalized bathing of the body in diffuse light and the coherent beam of a laser.

The differing values of laser and LED acupoint treatment, as stated in this article, can be summed up in the following chart:

| Advantages of LEDs | Disadvantages of LEDs | Advantages of Lasers | Disadvantages of Lasers |
|---|------------------------------|---|---|
| Less invasive, safer | Less precise wavelengths | Coherent – more focused, penetrates well into body | Invasive, may blow out acu-points over time |
| Body is evolutionarily programmed to respond to incoherent light – can transform into coherent light internally | | Greater body of research available on laser acupuncture | Unnatural stimulation to body |
| Greater choice of colors | | | Less choice of colors |
| Lower cost | | | Much higher cost |
| May be used for whole-body or point treatment | | | Not suitable for whole-body treatment |
| Suitable for acute and chronic conditions | | | Eye hazard |

As is clear from this chart, LED acu-therapy offers more advantages and less disadvantages than laser use. There may be other considerations on both sides not included in the chart, and no doubt there are some laser proponents who will disagree with some of its points. The author welcomes dialogue and additional information on this subject.

I hope this discussion opens interest in further use of and research into light acu-therapies. This is a fascinating and valuable healing art in which advanced physics, acupuncture, medicine and spirituality converge.

¹² As quoted in Harvard University Gazette, June 2000, on webpage <http://www.news.harvard.edu/gazette/2000/06.01/psoriasis.html>

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