



COLD LASER RESEARCH

The Fascinating Cold Laser Story:

Albert Einstein proposed the idea back in 1917. The use of low-level focused light waves as a therapy to heal tissue sounded like something straight out of a science fiction novel. However, as was the case with most of his brilliant ideas, Einstein was way ahead of his time, even though everyone laughed at him.

It's important to note that most of Einstein's brilliance was thought to be foolishness by the scientific community of his time. Unfortunately, nothing has changed. Scientific breakthroughs – especially in health care – are often *violently* opposed by the status quo.

Despite continued opposition, 43 years passed, Einstein's prediction was finally proven right, and low-level light was first developed into a therapy. In 1960, Hungarian surgeon Endre Mester first reported his experience using laser light to treat infections that would not heal, and inflammation (swelling) in rats.

Mester reported a 70% success rate treating these infections, which led to the development of a science he called "laser biostimulation," or the stimulation of the local immune system.

Today there is an entire scientific field devoted to this subject, called photobiology – the study of how light affects living things.

Since 1967, scientists and research groups worldwide have published more than 24,000 clinical studies on cold lasers. A majority of the studies are positive, but many were small and not designed well enough to stand up to the scientific standards we have today.

In the past decade or so, all that has changed.

Getting a patent and market clearance from the FDA for *anything* related to health care is one of the most difficult processes in this day and age. According to Steven Shanks, one of the inventors of the Erchonia Medical Cold Laser, they spent 25 months and two multisite randomized and placebo-controlled clinical trials in order to achieve this feat.

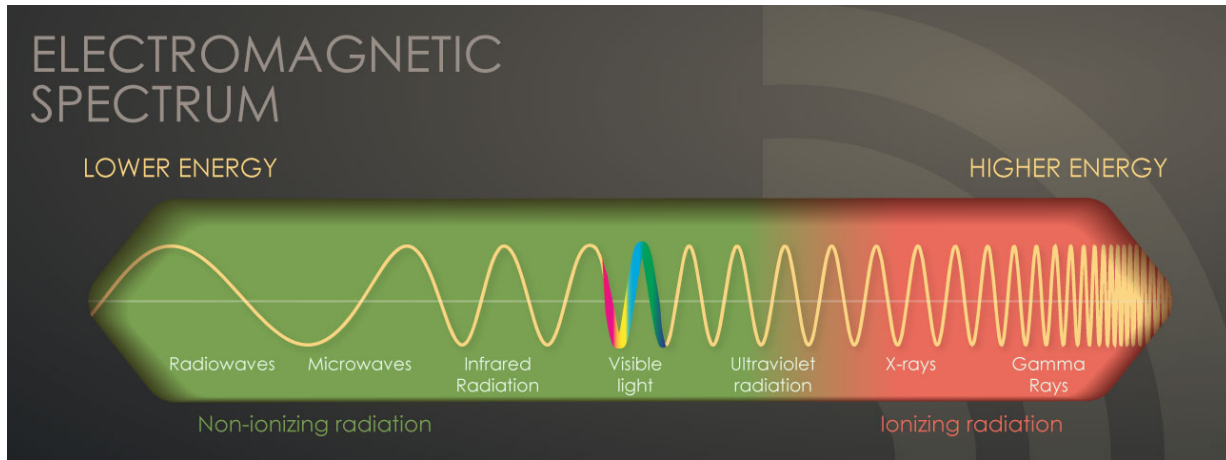
After much time and dedication, on January 17, 2002, the first patent and market clearance were given to a cold laser for the non-surgical treatment of neck and shoulder pain. The patent and market clearance were granted after the Erchonia Medical Company conducted and submitted "sufficient research" to pass rigorous FDA standards.

What's the most shocking about all this?

- The study documented that the vast majority of patients felt improvement!
- And one of the most important benefits was – no documented side effects!
- The only warning was not to shine the laser directly in the eye for a prolonged period of time.

What Is Cold Laser?

Light comes in a variety of forms, and the light that we see is the visible part of the electromagnetic spectrum. What we can perceive is a very small fraction of the electromagnetic radiation that continually surrounds us. Other parts of the spectrum are not visible, such as the ultra-violet light that tans (or burns) your skin



Low-level laser light is compressed light of a wavelength from the cold, red part of the spectrum (hence the name “cold laser”).

The cold laser is very different from natural light. When natural light hits your skin, it produces heat that is capable of damaging skin. Since a cold laser is one color, the beam travels in a straight line, is a single wavelength, and its beam can be concentrated in a small area. The cold laser can penetrate the skin without heat, without damage to your skin, and without any known side effects.

Comparison of Laser Light and Sun Light or Other Sources

Typical Incandescent Light Bulb

Light waves are not in phase with one another

Light waves of different wavelengths make for different colors

- Produces light consisting of all the colors of the rainbow (Polychromatic Light)
- Produces light consisting of photons rushing about in all directions each photon out of phase with other photons (Incoherent)

Comparison of Laser Light and Sun Light or Other Sources

Typical Laser Light

Light waves are all in phase with one another

Light waves are all of the same wavelength

- Produces light of one pure color (Monochromatic Light)
- Produces light where all the waves are in phase and traveling in the same direction. (Coherent)

Two Types of Lasers

The cold laser is very different from what most people think of when they think of a “laser.” Typically, people think of lasers as something from the movies that burn holes or cause explosions. That view is only half correct.

In reality, there are two types of medical lasers: High power and low power. High power lasers are used to cut through tissue, while low power lasers have the ability to stimulate tissue repair and healing.

Cold laser therapy is an application of red and near-infrared light over an injured area to improve soft tissue healing and relieve both chronic and acute pain. Non-heat producing, or “cold,” laser directs light energy into the body’s cells without injuring them.

“Cold” laser light dramatically boosts the body’s natural healing response.

Of all the visible light waves, near-infrared penetrates the deepest. Cold laser therapy optimizes positive healing effects in the body.

Cold laser therapy:

- **Relieves acute and chronic pain**
- Increases the speed, quality and tensile strength of tissue repair
- **Increases blood supply**
- Stimulates the immune system
- **Stimulates nerve function**
- Develops collagen and muscle tissue
- **Helps generate new and healthy cells and tissue**
- Promotes faster wound healing and clot formation
- **Reduces inflammation (swelling)**

Cold Laser Studies

Here are just a handful of studies that show how effective Cold Laser Therapy is:

Almost 60 years of worldwide clinical success, over 24,000 published papers and more than 120 randomized, controlled trials for cold lasers support the effectiveness of the cold laser. The cold laser is the only therapeutic modality with a cumulative effect on cells and tissues. Both NASA and the US Defense Advanced Research Projects Agency have engaged in cold laser therapy research over the last decade, with noteworthy success.

***The Effect of Low Power Laser Therapy on Osteoarthritis of the Knee**

Basirnia A., Sadeghipoor G., Esmaeeli Djavid G. et al. Radiol Med (Torino).1998 April; 95 (4):303-9. ...”We achieved significant improvement in *pain relief and quality of life in 70% of patients.*”

Positive Outcomes for Infrared diode laser in low reactive-level laser therapy for knee osteoarthritis.

M.A. Trelles, J.Rigau, P. Sala, G. Calderhead, T. Ohshiro. Laser Therapy, (1991): 3(4): 149-153. “82% reported significant removal of pain and recovery of joint mobility. Cold Laser Therapy is concluded to be a safe, effective, and noninvasive alternative to conventional surgical and medical treatment modalities for DJD patients.”

The Influence Of Low Level Infrared Laser Therapy On The Regeneration Of Cartilage Tissue.

P. Lievens, Ph. Van der Veen. Abstract from Laser Florence 2002. Laser in Medical Science. 2002:17(4). This study concerns the influence of laser treatment on the regeneration process of cartilage tissue. There is no need to say that the regeneration of cartilage tissue is a very big problem in rheumatic diseases, for example. The lack of blood supply remains one of the most important factors involved in the regeneration process. *Many previous publications give us proof of the regeneration capacities of laser therapy.* “In this study we have chosen to experiment on cartilage tissue of the ear of mice...Microscopic as well as histological evaluations were performed on the cartilage regeneration of both ears... *After the second day, only in the irradiated group there is a clear activation of the perichondrium (the connective tissue surrounding cartilage).*”

Beneficial Effects of Laser Therapy in the early stages of Rheumatoid Arthritis onset

Ailioaie C, Lupusoru-Ailioaie LM. Laser Therapy (1991) 11(2); 9-87

The purpose of this study was to determine the effects of laser therapy in pain reduction and/or recovery of patients at the onset of Rheumatoid Arthritis, comparatively with the traditional non-steroidal anti-inflammatory drugs (NSAIDS). Group 1 received laser therapy, Group 2 received placebo laser therapy, Group 3 was treated with only NSAIDS....*“The overall efficacy rate in these studies was 86% in the first group (who just had laser), 50% in the placebo group, and 40% in the NSAIDS treated group. After 4 months of treatment, our investigations showed the laser therapy group promoted the restoration of function, relieved pain and limited the complications of Rheumatoid Arthritis.”*

Improvement of Pain and disability in elderly patients with degenerative osteoarthritis of the knee treated with low power light therapy (cold laser therapy)

Stelian J, Gil I, Beni-Habot, Rosenthal M, Abramovici I, Kutok N, Khalil A. Journal American Geriatric Society. (January 1992) 40 (1); 23-26.

“Low power light therapy (Cold laser therapy) is effective in relieving pain and disability in degenerative osteoarthritis of the knee.”

Cold Lasers, Electrical Stimulation Curb Knee Pain

Boggs, Will MD. BMC Musculoskeletal Disorders. (June 22, 2007).

“People with knee pain caused by osteoarthritis may find relief with...electrical nerve stimulation, (and) low-level laser therapy (cold lasers), research shows.”

“Electrical stimulation and low-level laser therapy have fewer and less severe side-effects than NSAIDS, and unlike oral drugs they seem to...maintain the positive effect for some weeks after treatment has stopped.”

Dr. Bjordal, MD said, “In our opinion, there is currently more short-term potential in refining these safe treatment methods for osteoarthritis than there are for drugs.”

Laser Therapy More Effective than Medication?

From the findings of a recent Norwegian Health Technology Assessment Report, laser therapy was given the potential of becoming at least twice as effective as NSAIDS (non-steroidal anti-inflammatory drugs), if applied with optimal dose and energy...Although the number of laser trials is still smaller than for NSAIDS, *the unequivocal scientific findings so far, has earned cold laser therapy a top spot in levels of evidence and treatment recommendations for knee osteoarthritis issued by the Norwegian Drug Agency.*

Non-Drug Alternative for the Management of Chronic Pain

Chow RT, David MA, Armati PJ.

“830nm laser irradiation induces varicosity formation, reduces mitochondrial membrane potential and blocks fast axonal flow in small and medium diameter rat dorsal root ganglion neurons: implications for the analgesic

effects of 830nm laser” J Peripher Nerv Syst. 2007 Mar; 12(1):28-39.

Most dramatically and recently, Australian researchers have identified a direct effect on the flow of cellular materials down the long axon that makes up the “wiring” of nerve cells. Researchers have discovered that laser-induced neural blockade is a consequence of such changes and provides a mechanism for...laser-induced pain relief. The application of low level laser therapy for chronic pain may provide a non-drug alternative for the management of chronic pain.

Breakthrough in the Relief of Chronic Pain Without Drugs!

Goepp, Julius MD. Life Extension. October 2008: 63-70.

Dr. Norquist discusses his clinical outcomes for patients that received low-level laser treatments. “*Out of 300 patients more than 90% have reported total pain relief. And more than half the others have experienced at least partial relief of their pain after 10 full treatments. Only about 2-3% of patients have truly had no beneficial effects.*”

Efficacy of low-level laser therapy applied at acupuncture points in knee osteoarthritis: a randomised double-blind comparative trial.

Al Rashoud AS, Abboud RJ, Wang W, Wigderowitz C. Physiotherapy. 2014 Sep;100(3):242-8. doi: 10.1016/j.physio.2013.09.007. Epub 2013 Nov 15.

Only the cold laser group had significant improvement in knee pain, range of motion, functionality, and activity.

Treatment of 94 outpatients with chronic discogenic low back pain with the DRX9000: a retrospective chart review.

Macario A, Richmond C, Auster M, Pergolizzi JV. Pain Pract. 2008 Jan-Feb;8(1):11-7. doi: 10.1111/j.1533-2500.2007.00167.x.

The decompression group showed nearly 90% improvement in their joint pain after just 6-8 weeks.

Restoration of disk height through non-surgical spinal decompression is associated with decreased discogenic low back pain: a retrospective cohort study.

Apfel CC, Cakmakkaya OS, Martin W, Richmond C, Macario A, George E, Schaefer M, Pergolizzi JV. BMC Musculoskelet Disord. 2010 Jul 8;11:155. doi: 10.1186/1471-2474-11-155.

This study showed the rebuilding of cartilage in spinal discs through non-surgical decompression.

Effects of controlled dynamic disc distraction on degenerated intervertebral discs: an in vivo study on the rabbit lumbar spine model.

Kroeber M, Unglaub F, et al. Spine. 2005;Jan 15;30(2):181-7.

This is one of many studies to show that decompressive forces stimulate the generation of new cartilage cells.

Can Low-Level Laser Therapy Have An Impact For Small Fiber Neuropathy? Volume 24 - Issue 6 - June 2011

Podiatry Today Author(s): Kerry Zang, DPM, Janna Kroleski, DPM, Shahram Askari, DPM, and Sanford Kaner, DPM

Patients reported a decrease in their neuropathy symptoms, and upon biopsy regenerating of the nerves in the epidermis.

The Photobiological Basis of Low Level Laser Radiation Therapy:

Kendric C. Smith, PhD., Department of Radiation Oncology, Stanford University School of Medicine

At the tissue level, Stanford found that low level (cold) laser treatment results in increased collagen production.

Low-Level Laser Therapy for the Treatment of Chronic Plantar Fasciitis: A Prospective Study.

Jastifer JR, Catena F, Doty JF, Stevens F, Coughlin MJ. Foot Ankle Int. 2014 Feb 7;35(6):566-571.

Low level (cold) laser significantly lowered the pain in patients with plantar fasciitis and results lasted through follow-up a year later.

Low-level laser therapy as a treatment for chronic pain.

Kingsley JD, Demchak T, Mathis R. Front Physiol. 2014 Aug 19;5:306. doi: 10.3389/fphys.2014.00306. eCollection 2014.

Because of its effects on nerves and reducing inflammation, Low level (cold) laser may have an impact on chronic pain, no matter what may be causing it.

Low-level laser therapy to treat fibromyalgia.

Ruaro JA, Fréz AR, Ruaro MB, Nicolau RA. Lasers Med Sci. 2014 Nov;29(6):1815-9. doi: 10.1007/s10103-014-1566-8. Epub 2014 May 7.

Fibromyalgia patients showed significant improvement in pain and other findings after low level laser therapy.

*In research, Cold Laser Therapy is often referred to as Low Level Laser Therapy.