Laser Therapy

For IPF/Lung Disease

By Andrew K. Hall D.C.

HISTORY

Albert Einstein developed a theory in 1916 about laser light. The word LASER is an acronym for Light Amplification by Stimulated Emission of Radiation. A few years after the first laser was actually invented, in 1967, Endre Mester at the Semmelweis University in Budapest, Hungary wanted to find out if laser light could cause cancer. He took some mice, shaved the hair off their backs, and divided them into two groups and gave a laser treatment with a low powered ruby laser to one group. They did not get cancer and to his surprise the shaved hair grew back more quickly than the untreated group. He learned that laser was actually bio-stimulative.

The first low-power lasers suitable for treating pain became available in the late 1970's and ever since then, laser therapy has been widely utilized in Europe by physical therapists, nurses and doctors. FDA approval came for Class III lasers in 2001 and Class IV lasers in 2005 for use in the US. It has quickly gained popularity due to the success with laser therapy. Thousands of studies have been done in Europe, hundreds of which were performed in rigorously controlled conditions. Laser therapy became 'mainstream' in Europe for nearly 30 years before approval in the US. The reason for that is due solely to 'medical politics' in this country. Effectiveness of laser therapy is very well documented. There have been very few studies done in the US. The first studies done here were prior to FDA approval. The studies done were with Class III lasers with a power output of only 10mW. 10mW is only $1/10^{th}$ of 1 watt. That is the power of a typical laser pointer. The outcomes assessments were actually very poor, but there was pretty good success with superficial conditions such as skin burns. World renowned doctors/researchers Tune and Hode of Sweden (authors of Laser Therapy Handbook) have spoken on the not so great outcomes assessments in the US and sited inadequate power of the lasers for the studies that were done. They had serious concerns that doctors would only make decisions about lasers due to these limited studies. They highly recommend higher power lasers. Class III lasers have a power level of up to 500mW, or ½ of 1 watt. Class IV laser have power over 500mW and most are at least 10 full watts and some VERY powerful lasers are up now to 30 watts. That is a LOT of power. Higher power is required to reach the 'target tissue' which for our purposes would be the lungs. That is why Class IV lasers are required.

The Medical Director for K-Laser USA is Dr. Phil Harrington, who is recognized as a top expert in the field of Class IV laser therapy. He is a resource for your questions about Class IV laser therapy and can be reached at phil@k-laserusa.com.

IMPORTANCE OF WAVELENGTH

Wavelengths (the color) of light determine the depth of penetration in tissue and specifically targets the beneficial chromophores to stimulate the photochemical reaction. K-laser is one of the premier lasers that I **highly** recommend. It has 4 different wavelengths used in treatment.

650nm (nanometers) works well with superficial conditions. Since light can both inhibit bacteria and promote cell growth, laser therapy has incredible results in wound healing and scar growth regulation.

810nm. The enzyme determining how efficiently the cell converts molecular oxygen into ATP has the highest absorption at 810nm. Regardless of the enzyme's molecular state, when it absorbs a photon it will flip states. Photon absorption will accelerate the process and increase ATP production.

915nm. The quicker oxygen is released into the bloodstream, the more fuel the cell has to carry out all of its natural healing processes. The peak of hemoglobin's absorption lies at 915nm, when this wavelength is absorbed, more oxygen-fuel is made available to the cells.

980nm. Water in our blood transports oxygen to the cells, carries waste away, and absorbs very well at 980nm. The energy created from absorbing a photon gets converted to heat, creating a temperature gradient at the cellular level, stimulating microcirculation, and bringing more oxygen-fuel to the cells.

UNDERSTANDING THE EFFECTS OF BIOMODULATION (LASER THERAPY)

Laser Therapeutic Effects: During each painless treatment, laser energy increases circulation, drawing water, oxygen, and nutrients to the damaged area. This creates an optimal healing environment that reduces inflammation, swelling, muscle spasms, stiffness and pain.

There are a number of photochemical processes that take place when a laser is used. We will cover these in some detail so as that we all have an understanding what it is that lasers actually do, especially as it relates to lung diseases.

Enhancement of ATP production. Adenosine Triphosphate is the substance that cells derive their energy from and what damaged cells use to heal themselves with. Very important in the healing process.

Stabilization of cellular membrane of damaged cells. (Helps damaged lung cells heal and become strong and viable again.)

Decreased C-Reactive protein Neopterin. Neopterin is a marker showing levels of inflammation and autoimmune stress. (laser reduces autoimmune stress)

Acceleration of leukocytic activity. Resulting in removal of non-viable cellular tissue and components. (gets rid of bad tissue in the lungs)

Enhanced lymphocyte response. Lymphocytes are also known as Killer Cells. White blood cells that attack invaders like bacteria. (Essential for fighting bacterial pneumonia)

Increased Prostaglandin response. Prostaglandins are powerful acting vasodilators and inhibit the aggregation of platelets, reducing blood clot formation. (we don't need blood clots in the lungs, that's a bad thing…… vasodilators increase blood flow, that's good thing)

Reduction of Interleukin 1 (IL-1). Interleukin 1 is an inflammation starting Cytokine. It starts and maintains the inflammatory process. (reducing one of the causes for lung inflammation)

Enhanced superoxide dismutase. (SOD). Arguably the most important anti-oxidant, responsible for disarming the most damaging free radicals of all. (reduces oxidative stress with life threatening diseases like IPF)

Stimulation of vasodilation. Helps with the dilation of the blood vessels (Important for good blood circulation in the lungs)

Increased angiogenesis/neovascularization. Laser helps build new blood vessels to replace damaged ones. (May help with formation of new lung vessels that are compromised with lung disease, again helps with improved oxygenation)

Enhanced microcirculation. Improves circulation at the extracellular level. (more efficient circulation at a microscopic level, allowing the lungs to work better transferring oxygen into the blood)

Increased Nitric oxide production. The endothelium (inner part of the blood vessels) uses nitric oxide to get the surrounding smooth muscles to relax, increasing blood flow and oxygenation (Lung diseases need good oxygenation)

Decreased Bradykinin levels. Bradykinin contracts the blood vessels, resulting in less blood flow. Also, plays a part in the inflammatory process. (lung diseases need good blood flow and no inflammation)

Increased Macrophage activity. Involved with phagocytosis, these white blood cells engulf and digest cellular debris and foreign substances and microbes. (gets rid of stuff in the lungs like particulate matter. **May be VERY important if the IPF is due to mycoplasm and/or fungus!**)

Dr David Bradley, DVM, is a renowned expert in laser therapy in the veterinary sciences. He is on staff with K-laser USA and author of many articles in use of laser on animals. Several articles are related to lung conditions including IPF in dogs. He is quoted: "Laser can reduce and remodel some of the abnormal collagen (fibrosis) that is causing the decreased function and increased effort of normal breathing". He goes on to say "The laser effects can last for days or even weeks at a time which limits the number of treatments needed after the initial induction

phase". (the initial frequent laser treatment schedule, lasting 2 months before weekly treatment begins)

DISCUSSION

There is a host of other things that therapeutic laser does for other conditions not related to lung issues, that is, reduction of pain, improving nerve function, axonal sprouting, etc. But I will not elaborate on those things with this essay, as for this forum we are particularly interested in lung diseases and how therapeutic laser may be of help. It is possible, and in this authors opinion probable, that other important photochemical processes also take place. Laser research is far from over, and new discoveries are being made every day.

It should be noted that normal cells are not affected by laser therapy. There are no side effects with the use of laser. It is safe to use with metal implants like stents in the heart, etc.

I have found time and again that pulmonologists state that they really don't know anything about laser and have difficulty agreeing that their patients should undergo laser therapy. It is **NOT** their fault they don't know about it as laser was never a part of the studies they have had. It's ok for us to educate them about it. I would suggest you copy this article to share with your doctor. We all need to be educated about it.

I have said it before and I will say it again, I do NOT believe laser therapy is a CURE for IPF or any other lung disease. Limited post laser therapy CT scan results often show no additional fibrous tissue present, but at no time have we seen reduction of fibrous tissue. So, as we can see, with all the amazing processes that take place with the laser, it is not curing, as per my definition. It would be irresponsible for anyone to call laser therapy a cure.

It should also be noted that even with the typical treatment of musculoskeletal conditions, yes, the laser can work wonders, but for some reason not all of those conditions respond to laser for reasons we have yet to understand. The same may be said for lung conditions. We have seen some dramatic results in some cases and some cases are rather subtle. We must have realistic expectations, and I believe that the further along the disease process is the less help the laser is likely to be. So, just like any other serious disease like cancer, the sooner treatment begins after the initial diagnosis, the more likely good results. I believe that if we can even just slow the disease process down, we are 'ahead of the game'. The good thing is that if we can even just slow the process down, unlike Ofev and Esbriet (that only slow the process), there are no side effects, and the cost is minimal upon comparison. In no way would I suggest anyone stop Ofev or Esbriet even if being treated with laser therapy. They have been proven to slow the disease process with many patients. However, we need to know that laser therapy is an option worth looking at.

Yes, the current anecdotal evidence is good. But just like Stem Cell therapy, the successes that have been seen through patient testimonials are just that, anecdotal. And this is why it is very

important that a study is done for IPF using a laser. We need facts and figures not just anecdotal evidence. If one decides that they would like to use laser therapy for themselves, it would be very much appreciated to be a part of the study. It can't be done without strong numbers of patients to make it a viable study. All that is really required would to be to forward ALL copies of PFT's and CT reports. Subsequent PFT's and CT scan reports are to be forwarded as well. Again, I don't want anyone to feel pressure to be involved in the study, but participation would be greatly appreciated.

LASER TREATMENT PROTOCOL

There are many Class IV laser manufacturers and models of lasers. Some of them have 'preset' treatment protocols for a variety of conditions. Some lasers can be programed by the doctor/practitioner for specific wattage and modulation (hertz).

For lasers that have minimal programmability, it is recommended that you use a minimum of 10 watts, continuous wave, 5 minutes on the entire front of the chest, 5 minutes on the entire back of the chest. Using continuous wave, a total of at least 5,400 joules should be used.

Ideal laser treatment protocol for IPF/Lung Fibrosis Conditions is as follows:

For programmable lasers

IPF	**HZ**	**WATT**	**SECONDS**
Capillary	15	12	25
Circ., nerve, lymph	587	12	25
Lung, Bronchi	727	12	25
Edema	2,500	12	25
Skin, inner	584	12	25
Damage, tissue stress	266	10	25
Chronic or Plateau	2349	10	25
Optimize cell activity	2128	10	25
Lymph B	292	10	25

<u>4.15 min per quad (1405 joules) Therefore, 4.5 min front left, 4.5 min front right intercostal application</u>

<u>4.5 min back left, 4.5 min back right intercostal application</u>

Treatment plan is 3X/wk for 1 month, then 2X/wk for 1 month, and weekly thereafter.

Many thanks to our friend and caring colleague Dr J Rod McGinnis for his tireless research and help for this scientifically based protocol.