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WE BRING ENERGY TO HEALTH

LIGHT THERAPY BUYER'S GUIDE FOR THE *HEALTHCARE* PROVIDER

QUESTIONS TO ASK BEFORE PURCHASING A LIGHT THERAPY PRODUCT

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INTRODUCTION

Many healthcare providers have purchased or are considering the purchase of Light Therapy devices. As a matter of fact, many different companies are selling "Light Therapy" devices now.

However, in our experience, not all companies are offering what is best for the doctor and patients. We speak with doctors every week who are confused about what is important and what is marketing fluff.

We prepared this Ebook as a "Buyer's Guide." We do not discuss specific Light Therapy pads/controllers or manufacturers. Rather, we discuss important items for your consideration and questions you should ask before purchasing light therapy pads and controllers.

AUTHOR BIOGRAPHY

We hope that we have shed a little "light" on your purchase decision. We are always happy to share information with you and answer your questions.

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Rob is a Partner at Energia Medical, LLC whose mission is to bring new and innovative light therapy, laser, and other energy based products to healthcare practitioners and consumers in the United States. Rob has written more than 10 ebooks on light therapy and lasers. He has published over 25 articles in magazines about light therapy, lasers, and marketing/management. He has an MBA in Marketing from Boston University.

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WHAT IS LIGHT THERAPY?

Light Therapy works by increasing ATP (adenosine triphosphate) synthesis in the mitochondria, activating the electron transport systems and many other biochemical and biophysical reactions in the tissue.

Decades of research have found that certain wavelengths of light within the red and infrared bands can be beneficial to living tissue.

- The light triggers the release of nitric oxide (NO) from blood vessels and red blood cells.
- Nitric oxide causes local vasodilation that lasts several hours after the therapy session ends.
- Vasodilation significantly improves blood flow.
- Improving blood flow promotes positive changes in patients, lessens pain and helps nerves begin to carry sensations again.[1]

Generally, if you can see the light- emitting device, then it is not an infrared LED (some human eyes may see up to 820nm).

Questions to Ask

1. Are the wavelengths all visible?
2. Are there only Near Infrared (NIR) wavelengths?
3. If not visible wavelengths plus near infrared wavelengths, then why not?

Citation 1: T. Karu, "Primary and secondary mechanisms of action of visible to near-IR radiation on cells," Journal of Photochemistry and Photobiology B, vol. 49, no. 1, pp. 1–17, 1999.

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OPTIMAL WAVELENGTHS

Energy radiation varies from Gamma rays on one end of the spectrum and radio waves on the other as shown in Figure 1. Light Therapy devices work at many different wavelengths. There is considered a "THERAPEUTIC WINDOW" that is optimal for different purposes. For Light Therapy to increase circulation and treat pain, muscle spasms, arthritis etc., that window is basically between 600 nm and 1200 nm as shown in Figure 2.

Therapeutic Window is roughly from 600 nm to 1200 nm. In this band light energy can penetrate tissue that is rich in water content. Not all wavelengths have equal penetration capabilities.

The energy needs to pass through the skin, melanin, water and hemoglobin. Then, it can be absorbed by bones, muscles, tendons, nerves, and ligaments.

The exception are blue wavelengths (400nm to 470nm) which tend to only penetrate the layers of the skin. These wavelengths are intrinsically anti-microbial rather than therapeutic.[2]

FIGURE 1

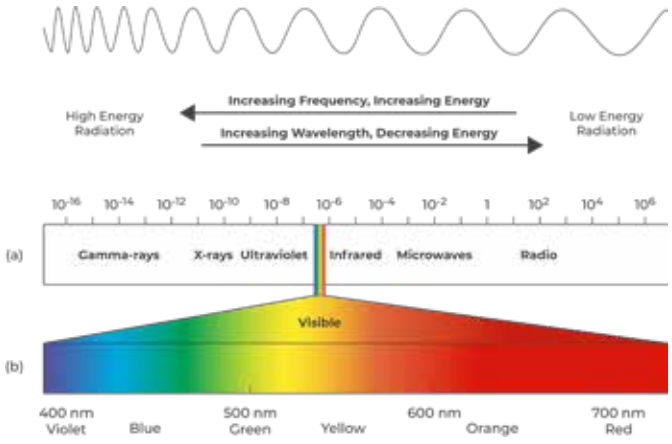
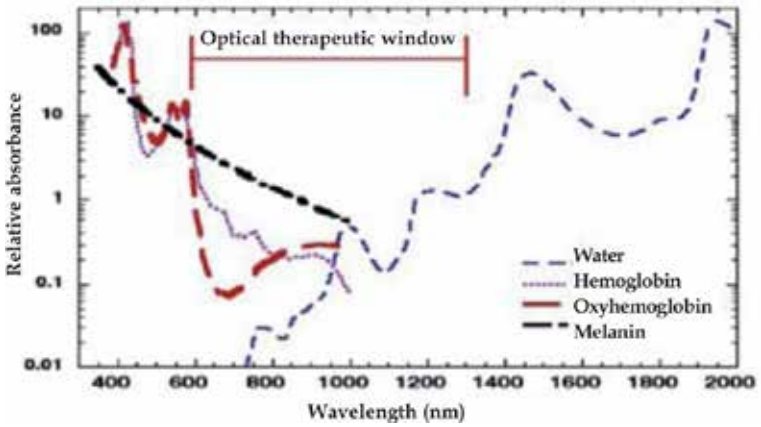


FIGURE 2



Questions to Ask

1. What wavelengths are being utilized?
2. Why were those wavelengths selected?

Citation 2: Halstead FD, Thwaite JE, Burt R, Laws TR, Raguse M, Moeller R, Webber MA, Oppenheim BA. Antibacterial Activity of Blue Light against Nosocomial Wound Pathogens Growing Planktonically and as Mature Biofilms. Appl Environ Microbiol. 2016 Jun 13;82(13):4006-4016. doi: 10.1128/AEM.00756-16. PMID: 27129967; PMCID: PMC4907187.

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OPTIMAL POWER

Dosage is the key to activate the biological effects via Light Therapy. Energy is measured in Joules. Energy is often referred to as fluence.

Energy = Average Power X Time

Let's consider some common type pads on the market to better understand the components that make up power.

Foot and Ankle Pad

Company A pad covers 35% less area than Company B pads. The number of red and infrared pads are relatively close and operate for the same treatment time. The total joules from company A is more than ***20 percent higher than*** the total joules from company B. How is that possible? Different duty cycles (time pulsing) is the situation here. However, Company B is 100% duty cycle meaning it fires continuously. We would expect many more joules of energy from these pads. The answer lies in the fact that these pads operate 20 degrees hotter than Company A. Considerable energy is wasted as heat and strength/quality of the diodes also play a part.

132 LED pad

The pads cover the same total area and have the exact same number of red and infrared diodes which operate for the same treatment time. The total joules from company A is more than double the total joules from company B. How is that possible? Different duty cycles (time pulsing) and strength/quality of the diodes.

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OPTIMAL POWER CONTINUED

264 LED pad

The pads cover approximately the same total area and have the exact same number of red and infrared diodes which operate for the same treatment time. They even have the same duty cycle. The total joules from company A is more than triple the total joules from company B. How is that possible? All else being equal it comes down to the strength/quality of the diodes.

Operating temperature is a good metric to judge the quality of the light therapy pads. If the temperature is much higher than other similar pads, then the amount of energy delivered and the quality of the LEDs tend to be lower.

Duty Cycle is another good metric to judge the quality of the light therapy pads. Too low does not provide enough joules of energy and too high creates too much heat and not enough joules of energy.

Questions to Ask

1. What are the number of visible LEDs in the pad or panel?
2. What are the number of infrared LEDs in the pad or panel
3. What is the total treatment area for the pad or panel?
4. How long is each treatment session?
5. How many times may treatment be administered each week?
6. What is the temperature at which the pad or panel operate?
7. What is the total amount of joules of energy being applied during the treatment? How is that split between visible and infrared?

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PULSING (DUTY CYCLE)

The LEDs in Light Therapy Pads are either on or off. If the LEDs are constantly on and emitting a beam, then it is operating in Continuous Mode. If there is a time on and time off, then the pads are operating in Pulse Mode.

Most light therapy pads operate in pulsed mode to control the heat that is a by-product of the photons of energy being employed. Continuous Mode tends to shorten the life span of a light therapy device.

GENERALLY UTILIZED FREQUENCIES

Two major types of frequencies are often utilized.

NOGIER FREQUENCIES:

Dr Paul Nogier working with his patients over many years identified seven frequencies natural to our body's cells. They became known as the Nogier Frequencies. Each frequency is associated with treating various conditions.

The Nogier Frequencies

73Hz, 146Hz, 293Hz, 587Hz, 1174Hz, 2349Hz and 4698Hz.

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PULSING (DUTY CYCLE) CONTINUED

SOLFEGGIO FREQUENCIES:

Dating back many years these frequencies are based upon historic musical tones. There are a total of 10 frequencies that start with low frequencies and move sequentially to high frequencies. Literature has shown that Solfeggio tones are thought to promote stress reduction, relaxation, sleep and meditation and through this may support the body's own natural healing processes. The software in a controller may allow you to select a program OR might already have a selection of frequencies already programmed for you to utilize. The program may be one frequency or a set of predetermined frequencies.

The Solfeggio Frequencies

63Hz, 174Hz, 285Hz, 396Hz, 417Hz, 528Hz, 639Hz, 741Hz, 852Hz and 963Hz.

Hertz (Hz): Unit of frequency, i.e. pulses per second, listed in Hz.

Questions to Ask

1. Does the light therapy device contain Nogier Frequencies?
2. Does the light therapy device contain Solfeggio Frequencies?

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PROXIMITY TO THE BODY

The photons of energy from the LEDs needs to enter the body to cause the beneficial cascade of biological effects to help the body heal itself. Light loses intensity and effectiveness the longer a distance it travels (Figure 3). The inverse square rule describes this phenomena (Figure 4).

Figure 5 below shows that the further distance away from the body the light source is the more intensity or power is lost.

FIGURE 3

$$\text{INTENSITY} \propto \frac{1}{\text{DISTANCE}^2}$$

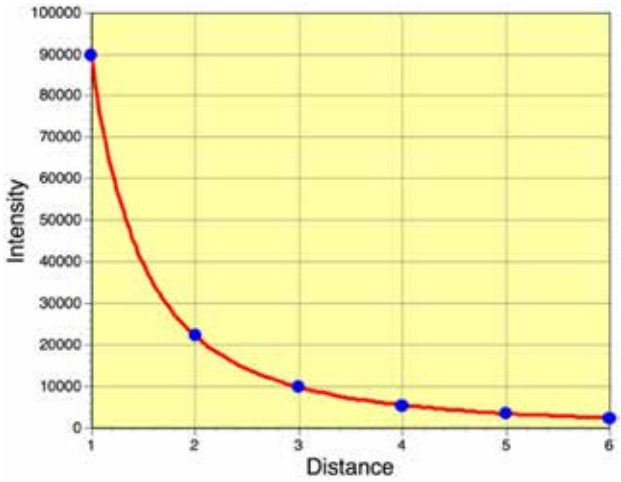
FIGURE 4

The Inverse Square Law

$$\frac{I_1}{(I_2)} = \frac{(d_2)^2}{(d_1)^2}$$

I_1 is the initial intensity of radiation, d_1 is the initial distance, and d_2 is the final distance, and I_2 is the final intensity.

FIGURE 5



Questions to Ask

1. Are the pads applied directly on the body?
2. If not directly applied on the body, then how far away are the pads or panels located?

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PLACEMENT OF THE LEDS

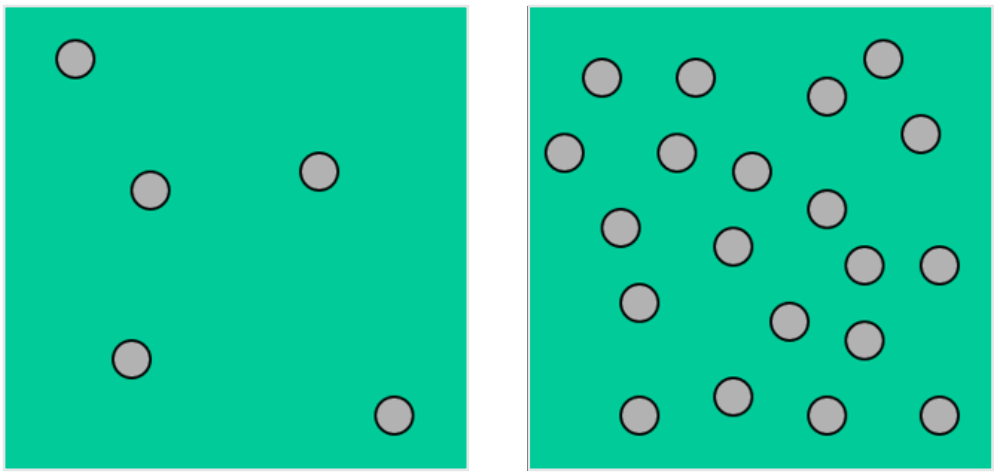
The LEDs are contained in solid material such as neoprene pads or plastic or metal panels. The neoprene pads allow the pads to bend to accommodate a variety of body parts. The panels treat the body from a distance as noted in the **Proximity To The Body Section** above.

Several other items should be considered: the density of LEDs per square centimeter and whether the LEDs are recessed in or raised from the pad.

Density of LEDs per square centimeter

Each LED produces a set amount of energy which is directed towards the body. The increased spread of the LEDs per square centimeter reduces the energy directed towards that square centimeter of the body. When viewing Figure 6 below the square on the left has less concentration of LEDs compared to the square on the right.

FIGURE 6



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PLACEMENT OF THE LEDS CONTINUED

LEDs are recessed in or raised from the pad

LEDs that are recessed below the surface of the pad tend to get hotter since energy is trapped within each cavity that houses an LED. In addition, less energy is capable of delivering the healing joules of energy to the body.

LEDs that are raised above the surface of the pad may be raised slightly or significantly. If raised too much they are uncomfortable for you when any pressure is applied to the body by the pad. Those raised just slightly have the advantages of not getting too hot and losing energy while also being more comfortable during treatment.

Are the LEDs flat or round?

Flat LEDs tend to be more comfortable than round LEDs because they are less pointy.

Is the LED light output coned?

The nature of LEDs is that the light will illuminate from the entire LED. Consider the loss of energy for the parts of the LED that are affixed within the pad. If only the top or tip of the LED directed the photons of energy, then more joules of healing energy will be directed towards the body where it is needed.

Questions to Ask

1. Are pads placed directly on the body?
2. If panels are utilized what is the distance from the body?
3. What is the density of LEDs per square centimeter?
4. Are the LEDs flat or round?
5. Is the light output coned?

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ARE THE PADS CLEANABLE?

Most pads are made of neoprene on both sides with the LEDs embedded in one side of the neoprene. Because electronics could be impacted by cleaners or water they are not easily cleanable. Often, a plastic bag must be worn on the pad or on the impacted body part. However, some pads have silicone on the side with the LEDs and are easily cleanable and do not require plastic bags.

Questions to Ask

1. Are the pads made with silicone or neoprene on the side with the LEDs?
2. What are the cleaning recommendations?
3. Do plastic bags need to be utilized for hygienic reasons?

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IS THE MANUFACTURING FACILITY ISO CERTIFIED?

According to the ISO website, "International Organization for Standards (ISO) is an independent, non-governmental organization with a membership of 165 national standards bodies. Through its members, it brings together experts to share knowledge and develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges."[3]

Light therapy pads that adhere to ISO standards typically involve higher standards of manufacturing, energy efficiency, and quality.

Questions to Ask

1. Are the pads and controllers manufactured in a facility that meets ISO certification standards?
2. Has the facility received written notification from the certification organization that they have met or exceeded the necessary standards?

WARRANTY AND REPAIRS

Your investment in light therapy pads/controllers needs to be protected. You hope to never need to use your product warranty. However, you should require a good one to protect you.

Questions to Ask

1. What does the warranty cover?
2. How long is the warranty?
3. Where are repairs done and what are the qualifications of the technicians?

Citation 3: SOURCE ISO.org

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FDA CLEARED OR LISTED?

The Food and Drug Administration regulates all Medical Devices in the US. Light Therapy pads are considered Class II. These devices receive a "clearance" or "listing". A regulatory review process must be undertaken for the products to be cleared. Products that do not receive clearance or have not filed for clearance are not permitted to be sold in the US.

Questions to Ask

1. Has a 510(k) been submitted to the FDA ?
2. Are the pads and controllers FDA cleared?
3. If not cleared, why not?

CLINICAL VERSUS AT HOME PRODUCTS

Some light therapy companies have only one line of products for consumers while others have a professional in office clinical line and a consumer line. Often, the clinical line is used in office and the consumer line is sold for at home usage to continue treatment especially for chronic conditions. You want clinical strength pads for your at home usage.

Questions to Ask

1. Are the same strength pads used clinically in office and at home?

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MARKETING SUPPORT

Purchasing light therapy pads and controllers for your office is an investment in your practice. You need to earn a good return on investment (ROI). The practice earns revenue when patients are treated with the Light Therapy device and you are paid for the service. Building patient awareness within your practice as well as outside your practice is key. You need these tools on day one.

Questions to Ask

1. What brochures and posters are available to help publicize and explain Light Therapy?
2. What social media materials are available to spread the word outside of the practice?
3. What testimonials and videos are provided to explain and support the benefits of Light Therapy?

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