

SPORTS MEDICINE

Red Light Therapy – *What is it? What does it do?* *How do we use it?*

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Walking around the Vendor Showcase at the PBATS Baseball Winter Meetings in December of 2025, it was impossible to miss the influx of Red Light modalities. Ammortal and Aspen/TheraLight had large machines on display, but there were other companies spread around the room offering some form of red or infrared therapy amongst their product lineup. The spotlight, pun intended, has been shining brighter on Red Light therapy over the last few years. Therabody has added it to their compression boots. Beauty companies are selling wands, masks, wraps, and panels that purport to rejuvenate skin. Wellness centers and Spas are charging good money for just a 30min session of Red Light Therapy. So what is all the buzz about? What is all this light exposure actually doing? Does it really

improve recovery for our athletes?

What is it?

True red light is part of the visible light spectrum between the wave lengths of 600 and 700nm, however most devices produce wavelengths between 660-1000nm which actually covers both the red light and near-infrared (NIR) spectrums. Research has shown that true Red Light at 600-700nm can cause mitochondrial stimulation via cytochrome c oxidase which increases enzyme activity, increase oxygen consumption, and ATP production. Studies also show that NIR wavelengths between 780-980nm have been shown to provide the same effect. Furthermore, at the higher end of the spectrum, NIR can be absorbed by intracellular water creating a heat effect. The NIR spectrum covers wavelengths from 780-1400nm. From 1400-50000nm is mid-infrared, and from 50000-100000nm is considered far-infrared (FIR). Any wavelength above 980nm has been shown to have minimal effect on cytochrome c oxidase and the most profound effect it seems to have on the body is via intracellular water and the creation of heat. Most infrared saunas operate on these higher wavelengths to create the heat effect from inside the body.

What does it actually do?

At the lower wavelengths the changes that occur at the cellular level are due to the stimulation of endogenous chromophores to stimulate biological processes. These processes aid in wound healing, pain relief, and stimulation of stem cell production. The higher wavelengths create heat that can also aid in relieving stiffness and muscle fatigue. Studies have shown beneficial effects in alleviating DOMS (delayed onset muscle soreness) at 48hrs in athletes following strenuous training sessions. Research on osteoarthritis of the knee showed beneficial effects on pain and reduction of inflammation with treatments between the 785-905nm wavelengths, with the 904-905nm wavelengths showing deeper penetration.

What products work?

When it was initially introduced, red light therapy was called Low-Level Laser Therapy (LLLT). The initial research was all performed with “cold” lasers but recent research has shown that LEDs are just as effective at stimulating cellular responses as lasers. This led to the use of the term photobiomodulation (PBM) to describe red light and NIR therapy. Recently there have been studies showing that clothing made with certain fibers and minerals can harvest body heat to transform heat

energy into radiation at wavelengths between 3000 and 20000nm. These wearable infrared clothes have been shown to increase blood circulation and cellular metabolism.

There has been an introduction of an abundance of products on the market, many of which do not undergo third party testing to ensure that the wavelengths that they advertise are what are irradiated. Additionally, manufacturers that do test their products, often test at the light source and not at the projected target for their devices. It is necessary to understand the target distance for the device you are using to ensure that you are getting the wavelengths and irradiance values that you are intending for the clinical outcomes desired.

Conclusion – How should we use it?

Red light therapy has exploded onto the wellness market over the last few years. As such the market is flooded with many options and biased studies purporting to cure low testosterone, male baldness, muscle soreness, and the list goes on and on. Anecdotal evidence has shown good results with regards to improved sleeping and recovery in athletes. However, peer-reviewed science has been studying the effects of Red Light and infrared radiation for years and has found that the benefits of Red Light Therapy happen between 660-680nm and the benefits of NIR happen between 810-980nm. Above 980nm the typical physiological response will be heat related. These studies show positive effects on inflammation, pain, and wound healing.

Most devices on the market focus on producing wavelengths in those ranges, though many are not third party tested and offer no guidance on target distance or dosage. Studies have noted a “biphasic dose response” that appears to show a diminishing return for over-exposure with some noting of negative or inhibitory effects at high quantities of exposure. Therefore, it is imperative to seek out responsible companies that test their products and provide guidance on treatment distance and dosing to ensure that the product is providing the desired effect on tissue. Red light and infrared therapies have been shown to be extremely beneficial in the rehab and recovery process, and players are beginning to ask for it and purchase their own devices. It is incumbent upon us as clinicians to understand the science behind it so that we can help guide them to the better products and ensure safe administration for their desired clinical outcomes.