Laser Therapy Compared to LED Therapy:

Not all light is the same and not all monochromatic light is the same or has equal medical benefit. Recently, controversy has arisen over the comparison of true laser light in low power therapy as contrasted with LED (Light Emitting Diodes). It is very important that the distinctions between the two and their completely different biological effects be accurately portrayed. Today there are a number of devices and therapies available that use LED's and super luminescent LED's (SLLED's) as the light emitting components for their therapies. Some of these are even advertised and promoted as lasers, which they are not. So, in order to set the record straight and to provide meaningful and accurate comparisons, let's explore these two light sources in a scientific approach.

Of the hundreds of referenced and reported clinical and scientific studies and papers available, they are almost exclusively done with laser light sources as the medically beneficial light source. In fact, **even on the web sites of the leading LED light devices, the sources and references they list are not for LED therapy, but rather for laser light therapy.** Manufacturers of such devices as Bioflex, Anodyne and the Dynatron Solaris units, which are LED therapy devices, primarily use laser light studies as their medical efficacy support.

A number of studies have been completed that compared the effectiveness of laser light to LED light and the majority **have found laser light to be far more effective**, particularly in treating tissue of any significant depth. While **LED light therapy** does have some beneficial effect, it **is limited to superficial tissue treatment only**.

The authors of the leading and most widely used laser therapy textbooks are unanimous in their opinion that there are significant differences between laser light and LED light and that their respective biostimulative effects are far from being equal. **The preponderance of opinion is that laser light (LLLT) can achieve much greater and deeper stimulative and therapeutically beneficial effect**. The following is taken from one of the most respected laser therapy textbooks in use today, "Laser Therapy", by Turner and Hode.

Many producers of therapeutic instruments have claimed that treatment with LED's is as effective as laser treatment. However, in light of the clear lack of peer-reviewed studies supporting these claims, LED producers make references to laser research in their marketing materials. A significant effect was observed with lasers, which was not achieved with the other, less narrow-band light sources (LED). Conclusion: Either all the investigators who conducted the research cheated, or the effects are specific to laser light.

In the literature there is a good support for the hypothesis that at least some of the biostimulative effects in-vivo are laser specific. In fact, **we have not yet found one single study indicating that non-coherent light (LED) is as efficient as coherent**

light. This does not mean non-coherent light (LED) is not useful, only that it (LED) is less efficient and probably only efficient on superficial structures.”

These international laser experts and researchers agree that in comparison, laser light therapy is far superior to LED therapy, as indicated by the studies of these researchers' published work. Literature:

Bihari - LED's, when compared to lasers, demonstrate a much lower efficacy.

Kubota - found there was no difference between control and LED 840 nm groups.

Berki - found the positive effects from laser therapy were not seen when irradiating the cell cultures with normal monochromatic (LED) light of the same wavelength and doses.

Muldiyarov - Analyzed cases where the rats were treated with ordinary red light and found there was no essential differences from the control group.

Haina - compared to the 22% increase in positive laser effects, the increase in the incoherent (LED) group was less than 10%.

Laakso - ACTH and B-endorphin levels were significantly elevated in the LLLT groups but not in the LED group.

Pöntinen - 670nm laser induced a temporary vasodilation and increased blood flow; however, LED at 635nm with doses between 0.68 and 1.36 J/cm2 decreased blood flow at least for 30 minutes after irradiation.

Lederer - found that incoherent light of the same wavelength and power density showed no influence.

Rosner - found that non coherent infrared light was ineffective or had adverse effect.

Nicola – Non-coherent light of the same wavelength and dose was less favourable.

Onac - The therapeutic window appears to be narrower for monochromatic non-coherent light.

Zhou - laser showed the best effect while the non-coherent LED light showed the poorest. Coherency does not influence the transmission; rather, because of interference in the scattered light field, coherency influences the microscopic light distribution into tissue. While it is easier to achieve higher power density with lasers than with LED's, this is not the general reason for the better results with lasers; the coherency of the laser light source is the most important factor behind the superior results of laser light.

PLASMA ACTH AND B-ENDORPHIN LEVELS IN RESPONSE TO LOW LEVEL LASER THERAPY (LLLT) FOR MYOFASCIAL TRIGGER POINTS

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ABSTRACT Excerpts:

B-endorphin was noted to be significantly elevated between days one and four ($p < 0.05$) in subjects who received IR (5 J/cm2) laser. That is, there may not have been sufficient photonic energy to stimulate responses using 660 nm near-monochromatic red light LED's or low dose 670 nm (red) laser. High dose (5 J/cm2) IR laser resulted in increases in plasma B-endorphin levels over the duration of the study, suggesting that localized, peripheral phototherapy of trigger points can induce cumulative activation of central hormonal/opioid pathways capable of regulating immune function. It is acknowledged that power density may have resulted in the fact that neither low dose nor high dose near-monochromatic red light LED (660 nm) was found to be capable of eliciting significant changes in blood biochemistry. This study has confirmed that responses to LLLT are dose, power output and wavelength-dependent.