Lasers, Acupuncture, LED's and Massage: What is the Evidence?

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Acupuncture has been used for thousands of years and up until recently was infused with folklore, myths and ancient paradigms. With the advent of modern medicine and the scientific method, the evidence behind acupuncture is now starting to emerge.

Acupuncture has neurological effects

Afferent nerve fibers and receptors including muscle spindle fibers, muscle afferents, C fibers, and A-Delta fibers are involved. The brain is also involved with analgesia arising from different pain sites such as the peri aquaductal gray

The autonomic nervous system is also involved. Electroacupuncture evokes activity in the brain resulting in parasympathetic outflow resulting in effects on myocardial function, stress reduction and GI disorders.

Neurotransmitters including transmitters and systems such as serotonin, GABA, Alpha 2 adrenoreceptors, opioids, and NMDA. Inflammatory regulators cause a decrease in cytokine levels and a reduction of the release of nitric oxide. Brain function is affected including changes in limbic activity, opioid peptides and effects on the cerebellar vestibular neuromatrix decreasing nausea.

This results in potential treatment of many areas. Pain such as postoperative analgesia, laminitis, osteoarthritis, and IVDD. Reproduction issues like anestrous. GI issues like motility disorders, dysphagia, IBD, vomiting and ileus. Cardiopulmonary issues such as depression, stabilization of function, reversal of hypertension and ischemia, heaves, arrhythmias and laryngeal hemiplegia. Urologic issues such as incontinence and infection. Otitis, wound healing and toxic side effects of chemotherapeutic agents can also be treated. There are too many research papers to list here for all of the above uses.

Laser

Laser stands for light amplification by stimulated emission of radiation. All lasers have several common characteristics. They are monochromatic, coherent, polarized and have a parallel beam. There are several classes of lasers.

- Class I which are 0.4 mW in strength and are used in laser printers, cd players, and lab equipment to name a few. They are eye safe
- Class II which are 0.5-1 mW in strength. These are primarily used as pointers. Although they can cause retinal damage they are considered eye safe as the induce a blink reflex.
- Class IIIa are 1-5 mW in strength. These are used as pointers and scanners. They are an eye hazard.
- Class IIIb are 5-500 mW in strength. They are sometimes called cold lasers. They are therapeutic in nature. They are considered an eye hazard.
- Class IV are > 500 mW in strength. They are therapeutic in nature. They are both a fire hazard and an eye hazard
- Class IIIb and IV are the only lasers looked at. Virtually all the research done was done on class IIIb and applied to both class IIIb and IV when claims are made.

Research shows certain physiological effects including accelerated cell division, increased phagocytosis, stimulation of fibroblasts and collagen formation, degranulation of mast cells, enhanced synthesis of ATP and angiogenesis.

LED's

A light emitting diode is an electronic device that emits light when an electrical current is passed through it. The exact molecular mechanisms are unclear. To complicate matters further, they come in three different wave lengths; blue red and green. It is unclear if the different colors may have different physiological effects.

The evidence for the uses of LED devices are slightly less compelling than it is for lasers. There is the suggestion that whatever a laser can do, an LED can do but much more slowly. Some papers that I found for good solid research behind LED shows that they can:

- Speed Wound healing
- Assist in photodynamic therapy
- Treat tendinopathy
- Slow the development of osteoarthritis

Besides the difference in colors, there is no agreement on what the strength, time and frequency of treatments should be

Massage

Massage is one of the oldest forms of manual therapy used to employ pain relief. Common to many different cultures. Types of massage vary but common to veterinary medicine are petrissage, effleurage and tapotement. Arguably, if you have ever had massage,

you know it works to reduce stress and pain. When it comes to the evidence, there are many good papers out there that show it's effectiveness. For example:

- Pain and relaxation in cancer patients
- Muscle Damage
- Degenerative Myelopathy

The three studies above showed pain relief, pain and faster healing secondary to muscle damage, and a delay in the progression of degenerative myelopathy respectively.

Magnets

Magnets have been used for their purported healing properties probably from the time they were first discovered. Historical records going back to the time of Cleopatra mention magnets used for healing. With the advent of the scientific method, most claims have been disproven. The one thing that has been found to occur with magnets is that they have an effect on vasodilation and vasoconstriction. Although other, yet-undiscovered actions could be found, probably all healing effects of magnets are a result of these two actions.

Pulsed Electro Magnetic Fields are different from standard magnets in that an electrical pulse goes through a coil and creates a magnetic field. The strength of the field varies greatly depending on the electric input and the number of coils that create the field. They come in a variety of shapes for animals including beds, blankets, wraps, collars, boots and loops. It is the second most common CAM approach among humans with a total of $500,000,000 a year spent on products.

Claims with moderate to good research for PEMF devices are

- Improved brain and peripheral nerve function after damage. This includes a paper showing the treatment of urinary incontinence in people
- Tendonitis
- Improved wound healing
- Osteoarthritis treatment
- CNS disease including MS and spinal cord damage
- Augmentation of pain relief when used alongside morphine
- Relief from chronic pain

Safety of these devices has been looked at by WHO and they have determined that at the strength of these devices currently on the market, there are no suggestions of adverse effects on people. However, they could have effects on medical devices including pacemakers, neurostimulators and insulin pumps. This could be a concern especially for the owner. Since vasodilation occurs, then use should be avoided when a transdermal patch is in place. Finally, no studies have been done on pregnant animals.