Difference Between PEMF and TENS

If you have been suffering from chronic pain, it's likely that you might have searched for nonpharmacological pain management strategies. During your search, you may have come across two commonly used modalities: TENS (transcutaneous electrical nerve stimulation) and PEMF (pulsed electromagnetic field). While both of these methods are intended to help patients manage their pain without using medication, the effect of each therapy is different for every individual.

Continue reading to understand the differences between PEMF and TENS and to find out which one can provide temporary relief and which one has permanent benefits.

What is TENS therapy?

TENS is a noninvasive pain relief therapy. It uses low-voltage electrical impulses to block pain or temporarily mask pain signals in your body. The therapy changes your perception of pain.

A TENS machine is a small, battery-powered device with wires that are connected to sticky pads known as electrodes. These electrodes are placed directly on your skin at or near the affected nerves or at trigger points (muscle knots). The machine sends mild electrical signals to the affected area.

These electrical impulses stimulate nerve cells that stop pain signals from traveling to your brain. This reduces the pain. They may also increase the levels of endorphins, which are your body's natural painkillers.

TENS therapy is generally considered safe and usually does not have any side effects. However, some people may be uncomfortable with the prickling, tingling sensation that is caused by the electrical impulses.

Some people might also have allergic reactions to the adhesive pads. In rare cases, the electrodes might also cause burns.

It is also advised to avoid placing the pads on the front of your neck or your eyes. Placing them on the neck can lower blood pressure and cause spasms. When used on the eyes, the electrodes might raise intraocular pressure, which could cause injury.

What is PEMF therapy?

PEMF is another noninvasive pain relief technology becoming popular in the United States (US). Unlike TENS, PEMF therapy does not send electrical currents into your body.

Electric current is only used in PEMF devices to generate therapeutic electromagnetic fields. The electricity goes into the coil (which produces an electromagnetic field) but does not enter your body. The electromagnetic energy used is completely safe. It stimulates your body and encourages pain relief through natural healing processes.

As your cells get older or are damaged, their ability to function is affected. This results in various adverse effects, including pain. The treatment works on a cellular level to improve damaged cell health and promote new cell production.

PEMF therapy is primarily used to relieve acute and chronic pain, but it also has several other health benefits, such as:

- Promoting cellular rejuvenation
- Increasing cell metabolism
- Promoting cell health and function
- Accelerating recovery and healing
- Removing body toxins
- Improving the immune response
- Reducing pain and inflammation

PEMF therapy has been approved by the U.S. Food and Drug Administration as a treatment for a number of different health concerns, including bone healing in cases of nonuniform fractures, muscle injury, and depression. This technology is also used by veterinarians to improve the health and performance of horses and to treat dogs and other animals.

A closer look at the key differences between PEMF therapy and TENS

Mechanism of action

Both treatment modalities use complex mechanisms. PEMF therapy works at the mitochondrial (powerhouses of the cell) level to repair cells and tissues. On the other hand, TENS triggers nerve stimulation and activates the opioid system to change how pain is perceived by your brain.

TENS uses the distraction technique called gate control theory to help patients with their pain management. In other words, it confuses your brain by using nonpainful electrical sensations beneath the electrodes. Thus, TENS doesn't heal but only provides temporary relief.

Meanwhile, PEMF therapy affects the body in different ways that help reduce the cause of the pain. It modulates specific signaling cascades in cells, such as the calmodulin-dependent nitric oxide pathways. This modulation helps reduce pain by speeding up the removal of inflammatory substances.

PEMF also stimulates cell activity, promoting tissue repair, cell growth, and the synthesis of the extracellular matrix, which are crucial for maintaining healthy tissues. The therapy also improves blood flow in your body. Increased blood flow boosts oxygen and nutrient delivery to tissues. This accelerates tissue recovery, aids cellular healing, and reduces pain. The efficiency of toxin removal is also enhanced, preventing further damage and inflammation. Ultimately, the modality supports faster healing and pain relief.

One good example is the alleviation of pain in fibromyalgia, a chronic pain condition affecting approximately 4 million adults in the US. A study on PEMF therapy for fibromyalgia showed that patients who underwent the treatment reported a significant reduction in pain intensity and duration, along with improvements in overall quality of life. Furthermore, the treatment provided benefits beyond pain relief, such as better sleep patterns and enhanced daily functioning. When used to treat fibromyalgia, it seemed to be safe and resulted in improvements in overall symptoms.

On the other hand, a study on TENS showed that patients experienced only slight reductions in pain intensity and no improvement in other fibromyalgia-related symptoms. The evidence supporting its effectiveness was also not too strong.

Usage

PEMF can be used on the entire body without any side effects; however, TENS can be harmful if administered at the wrong places on the body. TENS can irritate the skin and can also cause burn marks if the electrodes come into direct contact with the skin. TENS cannot be used for more than 30 to 60 minutes each time.

However, low-intensity PEMFs are safe to use for a long time. In fact, some low-intensity devices can be used overnight for therapeutic benefits such as improved sleep. The device can be used every day to promote healing without compromising your daily routine.

Convenience

TENS units require direct skin contact, making them slightly difficult to use. Whereas, PEMF devices can be used over light clothing and thus can be used anywhere, such as while sitting on an office chair or even while driving.

The electrodes used in TENS need to be transferred from one spot to another on the body. This can be time-consuming and a tedious job. PEMF devices can target more areas of your body at once, unlike TENS. In terms of convenience, PEMF is a better choice over TENS.

Customization and versatility

PEMF devices offer a high level of customization. It allows you to tailor the frequency, intensity, and duration of treatment based on your specific needs. This flexibility ensures an optimized therapeutic approach. Moreover, while TENS units can be adjusted to some extent, they may not offer the same degree of customization.

PEMF vs TENS: which is a better investment?

Given the above comparison, many people choose PEMF over TENS. PEMF is a better option if you're looking for regenerative therapy that addresses the underlying causes of pain. PEMF not only promotes cell growth and repair but also reduces inflammation. Inflammation can be a leading cause of many health issues. Thus, using a device that minimizes inflammation is an excellent choice. It will also help you avoid potentially habit-forming medicines like steroids.

TENS therapy only temporarily blocks pain signals. On the other hand, PEMF devices may be used for a wide range of therapeutic benefits that extend far beyond pain management. The therapy is widely used to treat various health issues, including cardiovascular problems, bone fractures, arthritis, insomnia, stress, depression, and many more, all backed up by science.

Conclusion

While both PEMF and TENS have their merits, PEMF comes out as the clear-cut winner over TENS. TENS units are mainly beneficial for managing pain, and PEMF devices not only relieve pain but also promote healing processes. PEMF, with its ability to penetrate deeply, promote cellular healing, and offer holistic pain relief, stands out as a superior option. The treatment is a promising choice for individuals seeking comprehensive and

lasting pain relief. It justifies the investment in terms of long-term convenience and effectiveness.

References

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