

ADVERTISEMENT

Breast Cancer Symptoms: A Guide



What's the Difference Between TENS and EMS Units?



Medically reviewed by Lauren Jarmusz, PT, DPT, OCS — Written by Carly Vandergriendt on January 15, 2021

- TENS vs. EMS | About TENS | About EMS | Effectiveness | Safety | FDA approval | Which one? | Bottom line

ADVERTISEMENT



Getty Images

TENS and EMS are two physical therapy techniques that may help treat pain or stimulate muscle contractions. Both are sometimes called [electrical stimulation \(e-stim\)](#).

In this article, we'll look at the key similarities and differences between TENS and EMS units, what they're used for, and whether they're safe to use. Read on to find out which unit best suits your needs.

ADVERTISEMENT



ADVERTISEMENT

What's the difference between TENS and EMS units?

TENS and EMS units serve different purposes. However, they operate on the same principle.

What's the difference between TENS and EMS units?

TENS and EMS units serve different purposes. However, they operate on the same principle. Both of them involve applying an electrical current to specific areas of your body.

What is TENS?

Transcutaneous electrical nerve stimulation (TENS) is a noninvasive pain-relief technique. It requires using a small handheld or tabletop device, known as a TENS unit, which is connected via thin wires to adhesive pads.

The adhesive pads, known as electrodes, are placed directly against your skin. When the unit is turned on, the electrodes transmit low-voltage electrical signals to your body.

The frequency and intensity of these signals can be adjusted as necessary. These signals interfere with pain regulation.

A single treatment typically lasts 15 to 40 minutes. It's not painful, but you might feel a slight tingling or warming sensation where the electrodes meet your skin.

It is important to note that TENS is not curative. This means that it will temporarily ease pain while being used. However, it will not be used to heal injuries.

What's a TENS unit used for?

TENS machines may relieve pain caused by many conditions, including:

- [arthritis](#)
- [fibromyalgia](#)
- [headaches and migraines](#)
- [labor pain](#)
- [menstrual pain](#)
- [nerve pain](#)
- [sports injuries](#)
- [surgery](#)
- [wounds and incisions](#)

People use TENS in physical therapy and pain clinics. Some hospitals also use them. Handheld devices are also available to purchase for at-home use.

ADVERTISEMENT

HEALTHLINE NEWSLETTER

Get our weekly Osteoarthritis email

To help you keep yourself motivated and moving, we'll send you treatment updates and pain management tips.

[JOIN NOW](#)



To help you keep yourself motivated and moving, we'll send you treatment updates and pain management tips.

JOIN NOW

 Also sign up for our popular Heart Health newsletterYour [privacy](#) is important to us

ADVERTISEMENT

What is EMS?

Electronic muscle stimulation (EMS) is a physical therapy and fitness technique. Like TENS, it involves a machine that transmits electrical impulses through electrodes that are applied directly to your skin.

Unlike TENS, though, the electrodes from an EMS machine are applied to key muscle groups. A common muscle group EMS is used on is the quadriceps after knee surgery.

The electrical signals trigger repeated contractions (tightening) of the muscles. The contractions can be short and frequent or long and sustained.

This process is not all that different from the voluntary muscle contractions associated with strength training.

What's an EMS device used for?

EMS devices are used to "jumpstart" muscle contractions otherwise known as neuromuscular re-education.

They may be found in fitness centers, as well as in physical therapy and rehabilitation clinics. Many EMS devices are also designed and sold for at-home use.

The electrical impulse from an EMS device is stronger than that from a TENS machine. An EMS device shouldn't be used to treat pain, and may cause damage to wound sites and incisions.

Are they effective?

The research on electrical stimulators is mixed. While TENS machines have been in use for decades, few quality studies have proven their effectiveness.

Literature reviews from [2008](#) and [2014](#) both concluded that more research was necessary. In addition a [Cochrane Review from 2019](#) found no evidence to either support or reject the use of TENS units among people who had chronic pain.

Most supporting research, like this [2018 study](#), shows the effectiveness of EMS when used on people following orthopedic surgeries, such as an ACL repair.

A [2012 study](#) evaluated the use of EMS among elite athletes. The authors concluded that EMS devices were a promising alternative to traditional strength training.

ADVERTISEMENT

people following orthopedic surgeries, such as an ACL repair.

A [2012 study](#) evaluated the use of EMS among elite athletes. The authors concluded that EMS devices were a promising alternative to traditional strength training.

ADVERTISEMENT

Are they both safe to use?

While both machines are generally thought to be safe, they can cause side effects. For instance, people with sensitive skin may experience irritation where the electrodes attach to your skin.

In addition, the current may be too strong for some people, causing shocks or burning sensations. These side effects are more likely with EMS units, since they deliver a stronger current.

If you have a heart condition, you should talk with a healthcare provider before using a TENS or EMS machine. These devices may also interfere with:

- pacemakers
- defibrillators
- similar devices

Similarly, it's not clear how TENS or EMS units affect unborn babies. Pregnant people should avoid using them in regions where an electrical current might transmit to their baby.

If you want to use a TENS machine during labor, talk with your midwife or healthcare provider first.

ADVERTISEMENT

Are they FDA approved?

The [FDA](#) regulates both TENS and EMS machines, which are considered medical devices. This means that manufacturers of these devices must meet certain standards to sell them legally.

Also, sellers cannot make false claims about the safety or effectiveness of these machines. TENS and EMS units that do not meet the FDA's standards are illegal. They are more likely to pose safety risks.

Was this article helpful?



Which option is right for you?

If you want to treat pain, a TENS machine might be helpful. An EMS unit may be beneficial:

- if you are recovering from a knee surgery

If you want to treat pain, a TENS machine might be helpful. An EMS unit may be beneficial:

- if you are recovering from a knee surgery
- under the direction of a physical therapist
- to improve muscle contractions while working out

Before shopping for either device, talk with your healthcare provider or physical therapist. They may be able to recommend a product or, depending on your health status, offer advice on other options.

When shopping, take the time to evaluate the machine's features, such as:

- battery life
- portability
- output intensity

Before making a purchase, check the seller's return policy and warranty options. Also, be sure to only consider units that are FDA approved.

It's important to watch out for any unproven claims associated with either type of machines.

For instance, although a TENS machine may help with temporary relief of pain, it isn't a miracle cure.

And while an EMS unit may help you tone your muscles, it probably won't help you magically shed a significant amount of weight.

The bottom line

TENS and EMS units use electrical currents. TENS devices may treat pain, while EMS devices may stimulate and strengthen your muscles.

It's currently unclear just how effective these devices are and more, larger-scale research is needed to confirm how well they work. They are, however, safe for most people to use.

Before using a TENS or EMS machine, consult a healthcare provider to make sure these devices are well suited to you and your needs.

ADVERTISEMENT

Accurate at-home test for C-reactive protein (CRP) levels

A CRP test may be used to diagnose inflammatory autoimmune diseases. Get checked at home with LetsGetChecked and receive online results in 2–5 days. Order today with free shipping and 25% off.

[LEARN MORE](#)

Last medically reviewed on January 15, 2021

LEARN MORE

Last medically reviewed on January 15, 2021

How we reviewed this article:

SOURCES HISTORY

Share this article

Our experts continually monitor the health and wellness space, and we update our articles when new information becomes available.

● Current Version

○ Jan 15, 2021

Written By
Carly Vanderriendt

Edited By
Claire Brocato

Medically Reviewed By
Lauren Jarmusz, PT, DPT, OCS

Copy Edited By
Sofia Santamarina



READ THIS NEXT

ADVERTISEMENT

Is E-Stim the Answer to Your Pain?



Medically reviewed by Gregory Minnis, DPT

Electrical stimulation (e-stim) is a physical therapy treatment that uses mild electrical pulses to help repair injured muscles,...

[READ MORE →](#)

How Can Orthopedic Physical Therapy Help You?

Medically reviewed by Lauren Jarmusz, PT, DPT, OCS

Orthopedic physical therapy involves the care of your musculoskeletal system, which includes your bones, muscles,...

[READ MORE →](#)

musculoskeletal system, which includes your bones, muscles,...

[READ MORE →](#)

ADVERTISEMENT

11 Ways to Strengthen Your Wrists

 Medically reviewed by [Gregory Minnis, DPT](#)

We outline 11 stretches and exercises that support wrist strength. Whether you're looking for improvement in your lifting sessions ...

[READ MORE →](#)



Transcutaneous Electrical Nerve Stimulation Unit

 Medically reviewed by [University of Illinois](#)

A TENS device sends small electrical currents to body parts to relieve pain. Find out how it works and what conditions it can...

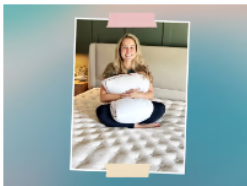
[READ MORE →](#)



The Effects of Chemotherapy on Your Body

Chemo affects your healthy cells. This can cause undesired side effects. Learn about the short- and long-term side effects.

[READ MORE →](#)



We Tried The 4 Best Hybrid Mattresses for 2025

 Medically reviewed by [Gregory Minnis, DPT](#)

Hybrid mattresses with coil and foam can cater to almost any type of sleeper. See our 2025 top hybrid mattresses.

[READ MORE →](#)

being sent from nerves to the brain.

What are the main types of e-stim?

The two main types of e-stim are transcutaneous electrical nerve stimulation (TENS) and electrical muscle stimulation (EMS).

TENS

TENS may be used for chronic (long-term) pain as well as for acute (short-term) pain. Electrodes are placed on the skin near the source of the pain. Signals are sent through nerve fibers to block or at least reduce the pain signals traveling to the brain.

EMS

EMS uses a slightly stronger current than TENS to get muscles to contract. The unit's electrodes (also placed on the skin near the affected muscles) cause rhythmic contractions. This can improve muscle strength if the user attempts to contract the muscle simultaneously.

ADVERTISEMENT

Other e-stim types

In addition to EMS and TENS, your doctor or physical therapist may recommend other e-stim treatments.

OTHER TYPES OF E-STIM

One of the following similar e-stim treatments may help you, depending on your condition:

- **Electrical stimulation for tissue repair (ESTR)** helps reduce swelling, increase circulation, and speed up wound healing.
- **Interferential current (IFC)** stimulates nerves to reduce pain.
- **Neuromuscular electrical stimulation (NMES)** stimulates the nerves in muscles to restore function and strength, prevent muscle atrophy, and reduce muscle spasms.
- **Functional electrical stimulation (FES)** involves a unit implanted in the body to provide long-term muscle stimulation aimed at preserving function and motor skills.
- **Spinal cord stimulation (SCS)** uses an implantable device to relieve pain.
- **Iontophoresis** helps deliver [ionically charged medication](#) to tissue to help speed up healing.

ADVERTISEMENT

You may have seen TV and online advertisements for home e-stim systems. If you're interested in one of these products, talk with your doctor or a physical therapist. Be sure to get proper instruction on its use before trying it out.