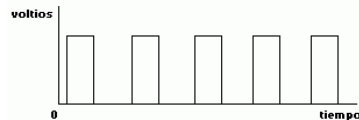


FEATURES OF A TENS

INTRODUCTION

A TENS unit is a signal generator typically used to relieve pain or provide muscle massage to tone a specific part of the body; the device is approved by the FDA (APTA, 1990) as safe to use at any of the intensity levels built into the device, and there are various brands available on the market.



The device's significance in broader fields for humanity began for me personally 15 years ago with the "Electrical Treatment of Diseases (TEE)" project. There are various brands and manufacturers of TENS devices—American, German, Russian, Chinese, etc. Their prices range from 650.0 to 1,300.0 Mexican pesos (1 U.S. dollar = 17.0 pesos as of 3/6/2024). They are typically found online, and retailers can be located on Google by searching for the terms "TENS electrical stimulator" or "transcutaneous electrical neurostimulator." See, for example: www.amazon.com, www.mercadolibre.com, [www.temu.com](http://www temu.com), etc. When purchasing a TENS device, it is important to review its features and determine whether it is suitable for electrical treatment. Some are used only for muscle stimulation and do not have the output mode known as "**Constant**," "**Normal**," or "**Continuous**"—a mode in which the generated signal consists of a train of pulses of equal amplitude, as shown in Figure 1, and is ideal for treating medical conditions. If the specifications do not indicate that it has this **mode**, you should not purchase it.

APPEARANCE AND FEATURES OF A TENS

POWER AND INTENSITY KNOB.

These are located on the top of the TENS unit; to turn the device on and increase the current intensity, turn the knob clockwise

clockwise to turn it on and increase the current intensity, and counterclockwise to decrease the intensity and turn it off until you hear a click.

As shown in Figure 2, a TENS unit actually contains two identical signal generators; each of the two knobs on the top controls one of them;

You'll never need to use both sides or TENS at the same time!

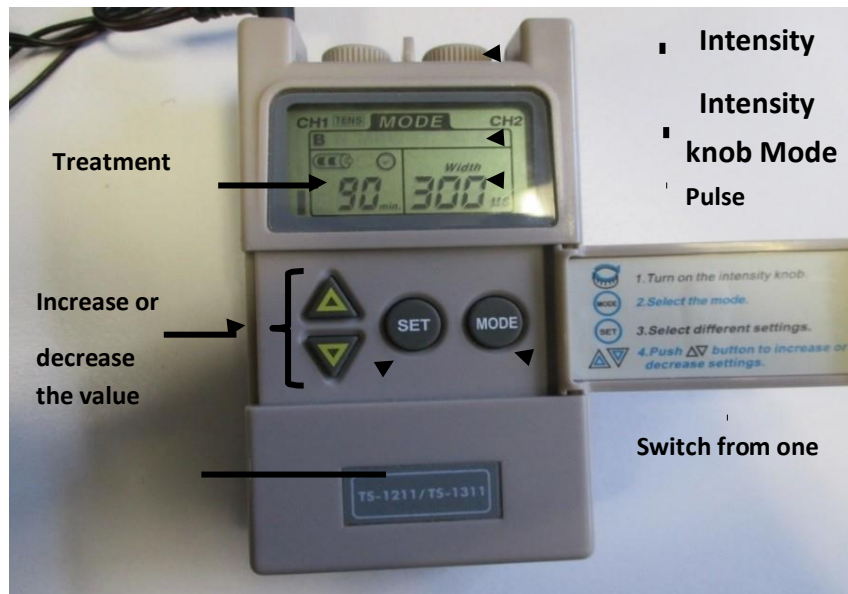


Figure 2. Image of commercial TENS devices

TENS CONTROLS

As you can see, it has two sections: one with visual displays and the other with buttons. Each section will be described briefly and simply:

DISPLAY

MODE:

This refers to the type of stimuli the TENS unit can generate: **CONTINUOUS (NORMAL OR CONSTANT)**; which is used in all treatments), **MODULATION**, **SD1**, **SD2**, etc., are other **MODES** for different purposes, depending on the user's preference.

To set this MODE, press the **MODE** button repeatedly; this will display the signal type in the upper window. Continue pressing it until the desired mode (**NORMAL or CONSTANT**) appears, then press the **SET** button. This will save the setting to your TENS's memory, and it will be activated every time you turn on the device.

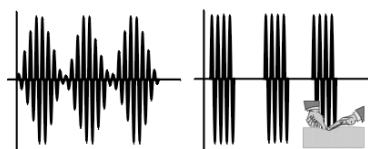


Figure 3. Shape of the pulses sent by a TENS device according to the selected MODE

Below this screen are two other screens displaying the following:

- **Pulse width**, which must be set to its maximum value (3,000 microseconds) using the up or down arrow keys,

Signal frequency. This should also be set to the maximum value—using the up or down arrow keys, which is typically 150 hertz.

“Both parameters are of little significance to the user or patient, so once they are saved, they should be forgotten.”

- **Stimulation Time.** This small window, located at the bottom of the screen, shows how to set a stimulation time each time you apply a treatment; for example, 10 minutes—the TENS will operate for 10 continuous minutes and then turn off automatically; *it* will not send any signals, although *it will remain powered on internally*, so you must turn it off using the intensity knob on top to prevent the battery from draining. So press the **MODE** button until this window flashes, and use the up and down buttons to set the number to 10.

Figure 1(b) shows square-shaped pads; they come in different sizes and shapes—circular, rectangular, etc.—depending on the intended use. The most important thing to remember is that the gel on the black part wears off quickly and should not be used once it has worn off, as this can cause pain or itching; continued use in this condition could lead to skin cancer. It should also not be used if it has come into contact with any type of microbe or an infected wound.

Frequency (Hertz). *This refers to the number of times the same signal (pulse) is generated in one second.*

Milliampere (mA). *This is a unit used to measure the number of electrons flowing between the two pads; for example, in the electric chair used to execute criminals, 2 to 4 amperes were used; each ampere equals 1,000 milliamps, so 2,000 to 4,000 milliamps (mA) were used—very high amounts compared to those used in electrical treatments for all diseases, which are approximately 5 mA.*

“Once these settings are saved, you no longer need to repeat the process; even if you turn off your TENS unit, when you turn it back on, the settings you selected will be automatically applied.”

To begin your TENS training, disconnect the cable from the pads and turn on the device by turning the knob until you hear a click; turn it until it reaches the maximum or top setting, and then turn it down until it turns off completely. Repeat this process until your mind gets used to both actions: increasing and decreasing the intensity. Repeating this simple process can save you a lot of headaches. Afterward, you can place a pair of pads on your forearm or calves and experience the various **MODES** the TENS unit delivers by pressing this knob to its different

settings; this will give you more experience when you need to use it for a medical condition.

The TENS signal is painful if applied at high intensities, but if you follow the instructions for each treatment—increasing the intensity slightly until you feel the signal and then lowering it slightly so that it is no longer noticeable, and leaving it at that level—you will have a pain-free treatment.