Use of TENS guidelines

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Transcutaneous means “across the skin”. In simple terms, a TENS unit stimulates your nerves via an electrical current through your skin.**

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The TENS unit is powered by a 9 volt battery which produces pain relieving electrical pulses. Either two (single channel) or four (dual channel) self-adhesive electrodes are applied to the skin and attached to the TENS unit with lead wires.

Modified electrical pulses are then passed from the TENS unit, via the lead wires and electrodes, to the nerves which lie underneath the skin surface. It works on the superficial and spinal nerves traversing to the brain.

TENS is a non invasive tool to assist with pain relief. Regular application of the TENs machine can result in reduced pain for up to 4 hours following use. TENs is considered a pain relief tool and not considered curative. The degree of pain relief declines with prolonged use; vaiation of electrode placement may combat this.

Setting the Mode
Three mode settings, Normal, Burst and Modulation.

Constant Stimulation at the frequency and pulse width setting. Most commonly used or acute pain relief via a gating effect.

Modulation. The frequency varies between different settings and uses a cyclical to help reduce nerve adaptation. This is useful for acute and chronic pain relief.

Burst Mode is useful in chronic pain relief. The unit will send through a burst of pain relieving power.

Setting the Pulse Rate (Frequency)

Pulse Rate is the number of electrical pulses you will feel in one second. Frequency is measured in Hertz (Hz). Pain relief can occur at various frequencies. Acute pain is usually most effective between 80 and 120 Hz. Chronic pain can also benefit from lower settings 2 to 10Hz that stimulates an endorphin release. A setting between 35 and 50Hz is commonly used to stimulate muscles for strengthening or even relaxation.

The following settings are recommended:

80 to 120Hz-acute pain

35-50Hz-muscle stimulation

2 to 10Hz – chronic pain

Setting the Pulse Width

These are the ON periods of the current. Generally speaking, pain relief will occur with low to mid time periods. Muscle stimulation requires a longer pulse width to successfully reproduce a muscle contraction.

You can alter the time that each pulse lingers before resetting. The time period is extremely small. It's measured in microseconds uS (1000th's of a second). While you may not notice the difference, your nerves can.

The following setting is recommended:

175 to 200uS
You can strengthen the power of your machine by increasing the pulse width.

What Time Duration Should You Use a TENS Machine?
The following settings are recommended:

Acute pain 20 to 60min up to four times daily

Chronic pain – 20 to 30min up to five times weekly

How Often Should You Use Your TENS Machine?
You can safely use a TENS machine as often as you like. Usually for 30-60 minutes up to 4 times daily.

TENS can provide relief for up to four hours.

Application of electrodes
Positioning
The electrodes are self adhesive; discontinue treatment if the resident develops a skin irritation following treatment.

The electrodes are normally positioned over the area of pain but other more advanced applications may often prove better. Please consult with physio for initial set up of electrode positioning.

Examples

Central neck pain

Position each set of electrodes on either side of the neck in the area of discomfort.

Shoulder pain

Position each set of electrodes above and below the pain site
Position one electrode pad on the neck on the same side as the painful shoulder and the other paired electrode on the painful area; position the other electrode in a similar way

Knee pain

Position electrodes around the knee joint above and below on each side

Lower back

Position electrodes on either side of the back at the level of pain
If pain is out to one side position one of the paired electrodes over the site of pain next to the spineand the corresponding electrode close to the spine at the same level; position second electrode near same position.

Hygiene and housekeeping considerations:

One set of electrodes per Resident

Keep in packet with name of Resident and date of first use written on plastic packet with permanent marker
Ultrasonic gel can be placed on the electrodes if they appear to be dry and not in adequate contact with the Resident
Micropore can be used to tape electrodes in place
Place TENs unit in carry case when not in use
The 9 volt battery will require replacement depending on level if use.

Where and when to not use TENS machines
TENS electrodes should NEVER be placed:

Across your eyes (intraocular pressure) or brain
On the front of your neck due to the risk of acute hypotension (through a vasovagal reflex) or even a laryngospasm
Through the chest (using a front and rear of chest wall electrode positions). Either side of your spinal column is permitted.
Across an artificial cardiac pacemaker (or other indwelling stimulator, implantable cardioverter-defibrillators (ICDs), including across its leads) due to risk of interference and failure of the implanted device. Serious accidents have been recorded in cases when this principle was not observed.
On open wounds or broken skin areas (although it can be placed around wounds).
Over a malignant tumour (based on experiments where electricity promotes cell growth).
Directly over the spinal column (although it can be placed either side of your spinal column).
Internally, except for specific applications of dental, vaginal, and anal stimulation that employ specialised TENS units.
Epilepsy patients
On areas of numb skin/decreased sensation TENS should be used with caution because it’s likely less effective due to nerve damage. It may also cause skin irritation due to the inability to feel currents until they are too high.
Areas of Infection. There’s an unknown level of risk when placing electrodes over an infection (possible spreading due to muscle contractions). Cross contamination with the electrodes themselves is of greater concern.
Patients who are non compliant or have dementia

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TENS Stimulation for Pain and Swelling

Filed under Treatments

Published on 12/01/2019 Miranda Materi 4 Comments

In this article we're looking at the difference between Inferential Current versus Transcutaneous Electric Nerve Stimulation (IFC vs TENS).

Transcutaneous Electric Nerve Stimulation (TENS)

TENS variations are often described by their technical characteristics: high frequency, low intensity (conventional TENS) or low frequency, high intensity (acupuncture-like TENS, AL-TENS) (Walsh et al., 2009).

How TENS Addresses Pain:

Gate control theory, established in 1965, proposes a gate consisting of excitatory and inhibitory synapses that exist in the dorsal horn of the spinal cord (Walsh et al., 2009). This gate can regulate the amount of nociceptive traffic (painful stimuli) transmitted to the brain. This gate could be closed by non-noxious stimuli (e.g. touch, pressure and electrical currents), and block potential nociceptive stimuli.
Increased release of endorphins through heat transmission, possibly more localized to the area of the pain
Physiologically, conventional TENS selectively activates non-noxious low threshold afferent nerve fibers in the skin (A?-fibers). When administering TENS, A? nerve fiber activity is reported by the client to feel like a strong electrical paresthesia (pins and needles) beneath the electrodes (Walsh et al., 2009). AL-TENS is intended to generate a muscle twitch to activate small diameter afferent nerve fibers in muscles (A?) and descending pain inhibitory pathways. AL-TENS is administered at low frequency and high intensity currents over muscles, without pain.

Placement for TENS (Borst, n.d.)

Can either be placed directly over the area of pain, or pads can "sandwich" the pain
Pad placement effects the depth of the current

Close placement=superficial current

Further placement= deep current

Inferential current (IFC)

Developed in the 1950s, IFC is most commonly used for pain relief (Kitchen, 2001). IFC is also claimed to reduce inflammation, and assist tissue repair (including bone fractures), and reeducate muscle (especially with incontinence).

How IFC Addresses Pain:

IFC delivers current to deep-seated structures through an amplitude-modulated interference wave typically with the use of four electrodes (Kitchen, 2001).
The wave is created by two out of phase currents that collide with each other to generate an interference with a frequency that can penetrate through the skin to deeper structures and even excite neurons.
Use of IFC should generate a strong but comfortable electrical paranesthesia at the site of the pain, to generate A? activity (Kitchen, 2001).

Image 1. Interference Wave (Kitchen, 2001)

Evidence to Support Use of Electrical Stimulation (TENS vs IFC) for Pain

A Cochrane systematic review found preliminary evidence that TENS reduces pain intensity over and above that seen with no treatment for acute pain (Walsh et al., 2009). Definitive conclusions were limited by the high risk of bias, inadequate sample sizes, and unsuccessful blinding of treatment interventions. Although the use of TENS as a potential

treatment option for managing acute pain is debatable based on these results, it can be self-administered, is safe, and can be inexpensive (Walsh et al., 2009).
Current evidence suggests that overall TENS and IFC have similar effects on pain and improvements in functional outcome measures (de Almeida et al., 2018). There is a need for larger, well-designed and standardized studies to establish the best parameters for pain management due to limitations in current literature.

General Contraindications for Using Electric Stimulation: cardiac pacemakers (in areas close to device), near the carotid sinus, near, central venous and peripheral intravenous central catheter lines, metal implants, pregnancy, severe obesity, active bleeding, cancer, over the spine (Borst, n.d.)

General Precautions for Using Electric Stimulation: muscle fatigue, peripheral nerve pathology, cognitive impairment, allergic reactions, decreased sensation, open wounds, tendon or nerve repair surgery (need to wait 4-6 weeks typically to not displace tendon or nerve repair) (Borst, n.d.)

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4 Comments

Collins on November 9, 2021 at 11:46 am

Any pictures on how to position the inferential probes

Reply

Mia on December 11, 2021 at 2:39 am

You cross cross the electrodes. Requires four leads, leads are likely color coded with one set red and one set black or something similar. Place the first set of leads (red) across the area of desired treatment area so that it is diagonal like this / with one lead at each end point. Then place the other set (black) perpendicular to it like this again with one lead at each end. When your done you should basically have an X shape or your four leads dotted out like the corners of a box with alternating colors, red, black, red, black. This will make the current cross paths, reminds me of GhostBusters movie from the 80’s haha. Place the leads so that the current will flow across/through the area being treated. If the leads are too far apart the current may not connect to the other lead, if this occurs then place the leads closer until there is a current noted. Hope this was helpful.