



TENS THERAPY

A Practical Guide

**PERFORMANCE
HEALTH**

1) INTRODUCTION

- Explanation of Pain
- What is TENS
- How Does TENS Work
- What Can TENS be used for
- How is TENS used
- Electrode Positioning
- Cautions & Contra-Indications

2) PROGRAMMES

3) PREPARING YOUR TENS

- Neck
- Back
- Shoulder
- Elbow
- Arm, Hand and Wrist
- Groin
- Quadriceps
- Knee & Ankle
- Sciatic Pain
- General Pain Treatment with BURST
- Head
- Phantom Pain



EXPLANATION OF PAIN

Pain is a warning system and the body's method of telling us that something is wrong. Pain is important; without it abnormal conditions may go undetected, causing damage or injury to vital parts of our bodies. Even though pain is a necessary warning signal of trauma or malfunction in the body, nature may have gone too far in its design. Aside from its value in diagnosis, long-lasting persistent pain serves no useful purpose. Pain does not begin until a coded message travels to the brain where it is decoded, analysed, and then reacted to. The pain message travels from the injured area along the small nerves leading to the spinal cord. Here the message is switched to different nerves that travel up the spinal cord to the brain. The pain message is then interpreted, referred back and the pain is felt.

WHAT IS TENS?

Transcutaneous Electrical Nerve Stimulation is a battery powered electrical unit which uses electrodes placed onto the skin to deliver electrical impulses to the nerve fibres which lie underneath the skin surface. It is used to provide pain relief by blocking pain signals to the brain via the spinal cord and peripheral nervous

system, and also stimulates the production of endorphins, the body's own pain relieving mechanism. Usually the electrodes are placed around the pain area or on acupressure points. Unlike medication, TENS does not produce side effects such as nausea or drowsiness. It can be administered while the client is going about normal activity and is not addictive.

HOW DOES TENS WORK?

The TENS Machine can work in two ways but firstly it is important to understand how the body feels pain. Messages are sent from the brain to all areas of the body and back again by the nerves, which run from the brain down the spinal cord spreading out to the trunk, arms and legs. If you touch something hot a message will flash along the nerves, up the spinal cord and into the brain. A second message would immediately be sent back to the same area telling you to move your hand away. This process takes only a micro second.

TENS works by a method called pain gating where the stimulation of the TENS machine blocks the messages to the brain telling it the body is experiencing pain. It also encourages the brain to produce the body's own natural painkilling hormones known as endorphins.

ARE THERE ANY DANGERS OR SIDE-EFFECTS WITH T.E.N.S.?

Remember, the current travels through the skin between pairs of electrodes and only penetrates to a depth of 1-2 inches (to the level of the underlying nerve fibres). Such a small electrical current does not pose any danger. However, if you have a cardiac condition, a pacemaker or are pregnant, consult your doctor before using your TENS. For any conditions requiring electrode placement around the neck or head a health care professional should be consulted.

INTRODUCTION

WHAT CAN TENS BE USED FOR?

TENS can be used to treat most types of pain where the cause has been determined including:

- Arthritis
- Back Pain
- Bruising
- Calf Strain
- Dead Leg
- Fibrositis
- Finger Pain
- Headaches
- Migraines
- Knee Pain
- Lumbago
- Muscle Stress
- Neck Pain
- Neuralgia
- Osteo-arthritis
- Period Pains
- Post Herpatic
- Neuralgia
- Pregnancy/ Labour Pains
- Rheumatism
- Sciatica
- Shoulder Pain
- Sleeplessness
- Spondylosis
- Sports Injuries
- Tennis Elbow
- Tenosynovitis
- Wrist Pain



HOW IS IT USED?

The Standard TENS treatment (convention or high frequency settings) is performed when the Pulse Rate is set to 60 pulses per second or more. The sensation produced will be a steady buzzing or tingling feeling between the electrodes. Because the TENS signal is perceived as stronger than the pain signal being produced by the body, it effectively blocks the pain signal from travelling along nerves to the brain. Most clients find that high-frequency treatments produce the quickest relief from pain, as well as providing several hours of relief after the treatment.

Treatment duration - 30 - 60 minutes, or continuous if required. Most modern units are portable and can be clipped to the belt while going about normal activities.

Low-frequency or burst type of treatment is produced when the Pulse Rate setting on the TENS unit is set manually below 10 pulses per second (or as with some units, at automatic burst mode. Low-frequency treatments produce visible muscle twitching often described as a tapping or pulsating sensation. In reaction to this type of stimulation the body releases endorphins (pain-killing chemicals produced naturally in the body). These endorphins act as a chemical nerve block to reduce pain by interrupting the pain signals along the nerves to the brain. This type of treatment can take longer to be effective but the results last longer.

POSITION OF THE ELECTRODES

Best results are achieved by placing the electrodes directly over the pain site. With dual machines, additional electrodes can be positioned to surround the site. Electrodes can also be used to stimulate traditional acupressure points if required.

HOW DO I KNOW IT'S TIME TO REPLACE MY ELECTRODES?

It is very important that the self-adhesive electrodes (pads) be replaced when they no longer stick well or if you begin to feel a "stinging" sensation on your skin. The usual life-span is approximately 3-6 weeks, depending on skin type and weather conditions— humidity will effect how long they last.





Although most of these pre-gelled reusable electrodes are considered hypoallergenic, in some cases people with sensitive skin may develop an allergy to a particular type of electrode, just like some

people who are allergic to certain band-aids or tapes. One solution is to change the electrode and there are also products available to help act as a skin “barrier” in these situations



PLEASE NOTE!! Before using your TENS Machine, or for further information on its operation. Please read the manufacturers instructions carefully.

CAUTIONS

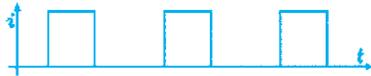
1. Read operation manual before use of TENS.
2. We emphasize that patient with an implanted electronic device (for example, a pacemaker) should not undergo TENS treatment without first consulting a doctor. The same applies to patients with any metallic implants.
3. If TENS therapy becomes ineffective or unpleasant, stimulation should be discontinued until its use is re-evaluated by the physician or therapist.
4. Avoid adjusting controls while operating machinery or vehicles.
5. Turn the T.E.N.S off before applying or removing electrodes.
6. Stimulate T.E.N.S. devices have no AP/APG protection. Do not use it in the presence of explosive atmosphere and flammable mixture.

WARNINGS

1. Caution should be used in applying TENS to patients suspected of having heart disease. Further clinical data is needed to show there are no adverse results.
2. Electrical stimulation safety has not been established during pregnancy. Do not use TENS during pregnancy.
3. Do not place electrodes on the front of the throat as spasm of the Laryngeal and Pharyngeal muscle may occur. Do not stimulate over the carotid nerve, particularly with patients with known sinus reflex sensitivity.
4. Care should be taken so that when operating potentially dangerous machinery the stimulator controls are not changed abruptly.
5. Cases of skin irritation at the electrode site have been reported. Stimulation should be stopped and electrodes removed until the cause of the irritation can be determined.
6. Electrodes should not be placed over the eyes, in the mouth, or internally.
7. Keep this device out of the reach of children.

PROGRAMMES/SETTINGS

CONVENTIONAL



Suitable for pain relief. The Therapy consists of short electrical pulses where the stimulation may never be so strong that any muscle contractions occur. Electrodes are usually placed on the nerve paths around the pain site.

TENS stimulation can be used for pain therapy for the following:

- Muscle pain
- Arthralgia
- Tennis elbow
- Arthritis
- Osteoarthritis
- Gout
- Fibromyalgie
- Tenosynovitis
- Carpal tunnel, Hip and back pain muscle tension(myalgia)
- Sinusitis
- Neuritis etc.

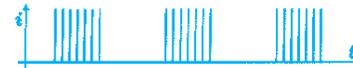
MODULATION



Stimulation pulses vary for both pulse width and stimulation current. The variation is random and built up as: pulse width multiplied by stimulation current being constant. This modulated TENS prevents any habituation to a set pulse width and has the following variables: frequency, pulse width and treatment time.

Modulated TENS stimulation can be used for pain therapy as mentioned for conventional mode. However, for chronic conditions where long-term treatment is required modulated TENS is recommended.

BURST



Stimulation form consisting of short series of pulses with high frequency that are repeated with low frequency. BURST stimulation is used for general pain relief and stimulation must be so strong that muscle contraction is perceived. In general terms the electrode is placed on a large muscle near the pain location. BURST has the following variables: frequency, pulse width and treatment time.

The effect of the stimulation has to be strong to achieve visible muscle movement; the muscle tension will be affected and forced to movement. A long-cycle pain relief is given with BURST stimulation due to the fact that the body increases its own production of the natural painkillers, the endorphins.

BURST stimulation can be used for relief of radiating pain such as...

- Sciatic pain
- Back pain
- Scleroses
- Tinnitus
- Circulatory disturbances
- Whiplash etc.

PREPARING YOUR TENS

1. Open the front compartment. Insert the battery and close the cover.
2. Connect the lead wires to the output channels on the device.
3. Connect the lead wires to the electrodes.
4. Clean the skin. Remove the plastic cover from the electrodes before attaching to the skin. The electrodes must not touch each other.
5. Turn on the TENS Machine by pressing the on/off button.
6. Choose programme and adjust the stimulation level.
7. The stimulation automatically stops when treatment time expires.



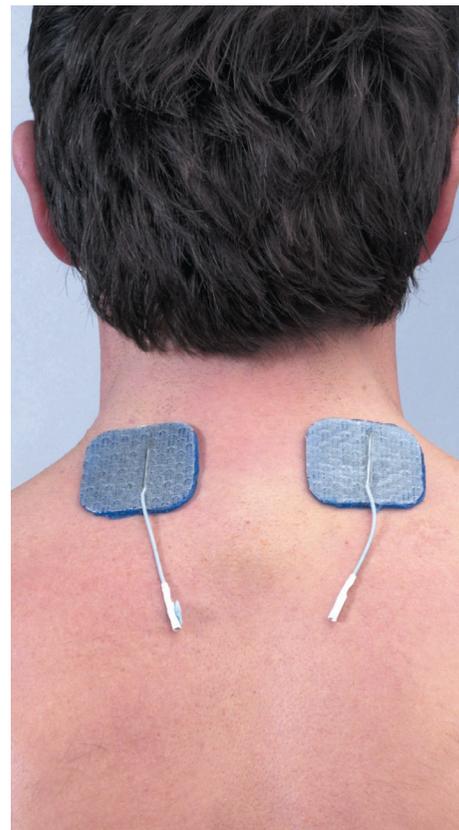
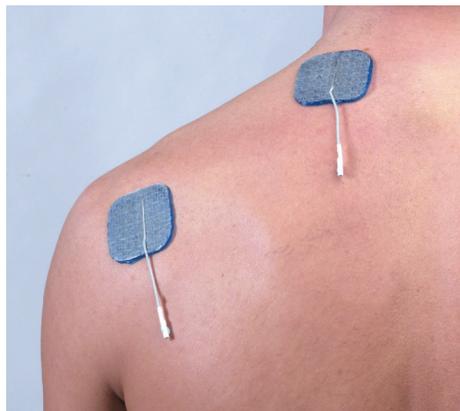
NECK

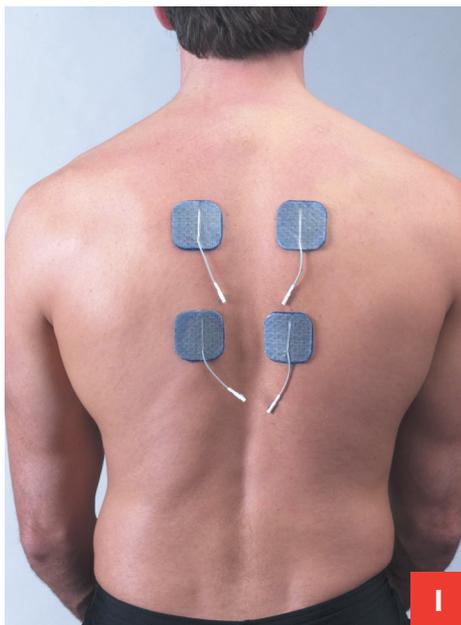
NECK

Muscle tension in shoulder & neck
cervical syndrome

Indications:

- Rheumatism
- Whiplash
- Slipped disk
- Cervical strain
- Head ache
- Arthritis

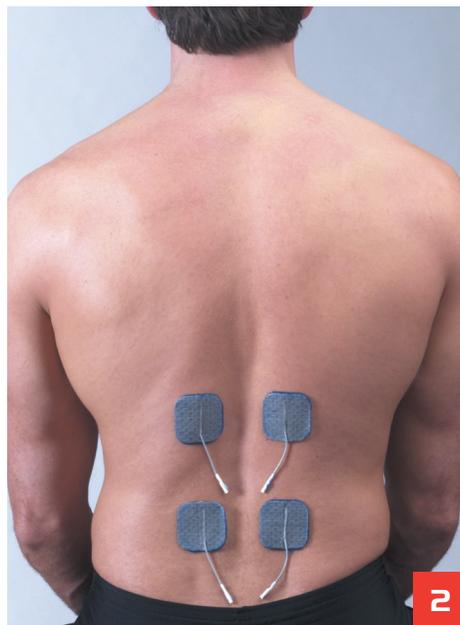




1

1) BACK PAIN & MUSCLE INSUFFICIENCY

If reinforcement of muscles is needed, use TENS on both channels. In order to get the movements try treatment for the stomach.



2

2) LOWER BACK PAIN & DYSMENORRHOEA

The area above Os Sacrum is a junction of the sensory nerve pathway for the lower back and the abdomen.

BACK

Indications:

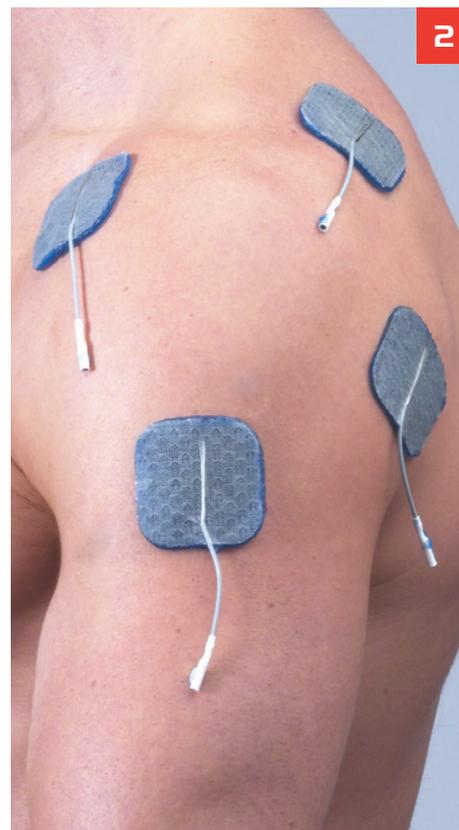
- Back pain
- Scoliosis
- BWS syndrome
- Bilateral radiation
- Dysmenorrhoea
- Labour pain
- Slipped disk

SHOULDER

SHOULDER

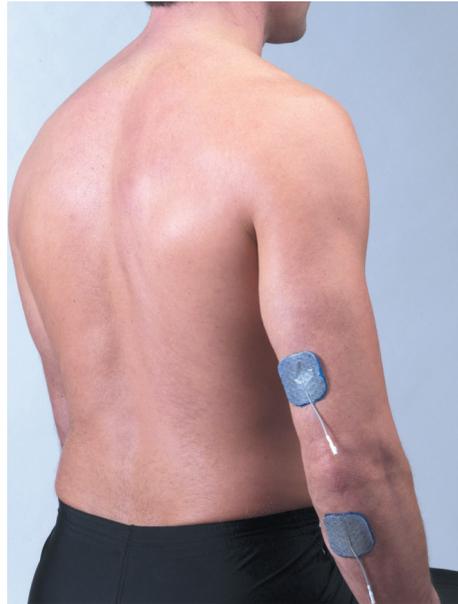
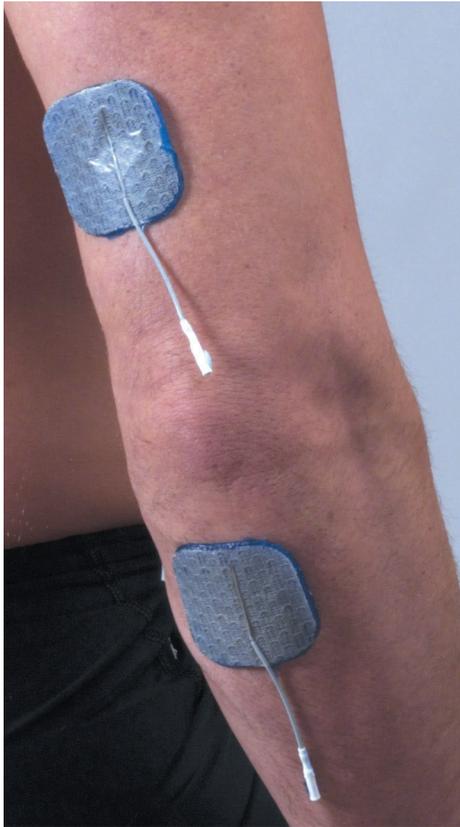
Indications:

- Rheumatism
- Subluxation
- Shoulder dislocation
- Shoulder sprain
- Arthritis
- Frozen shoulder



If the shoulder feels cold, B is particularly beneficially as BURST stimulation increases the blood circulation.

- 1) Shoulder Pain
- 2) Shoulder Subluxation



ELBOW

Indications:

- Rheumatism
- Tennis elbow
- Golf elbow
- Sports injuries
- Arthritic pain
- Pain radiation

ARM, HAND & WRIST

ARM, HAND & WRIST

Indications:

- Tendonitis
- Carpal tunnel
- Rheumatism
- Spasm and spasticity



1) Pain relief & Hand Paralysis (Apoplexy):





GROIN

Indications:

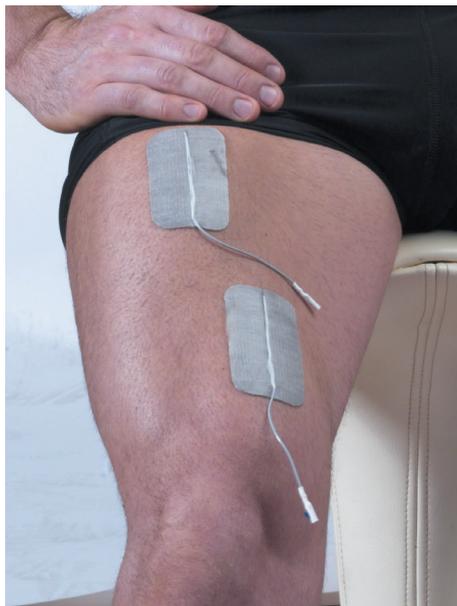
- Sports injury
- Overworked muscles and ligaments
- Dysmenorrhoea

QUADRICEPS

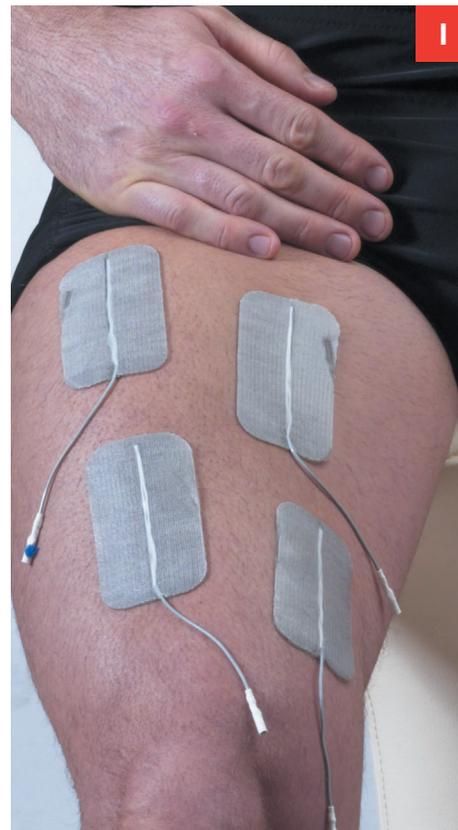
QUADRICEPS

Indications:

- Low back radiating pain
- Sensibility



1) Quadriceps insufficient





1) KNEE PAIN

If the pain is located on the inner side of the leg, use the electrode placement shown on the left knee



2) PAIN AT THE JOINT OF THE ANKLE

At lateral pain, place the electrode as on the right ankle; left ankle shows the electrode placements to treat medial pain

SCIATIC PAIN

SCIATIC PAIN

Indications:

- Sciatic pain
- Post-Herpetic neuralgia of sciatic nerve
- Arthritic pain of sacroiliac joint

Channel A:

Negative electrode (black) placed posterior on the upper thigh and positive electrode (red) below popliteal crease.

Channel B:

Bilaterally at L5 - S1 level.





GENERAL PAIN TREATMENT WITH BURST

Indications:

- General pain
- Tinnitus
- Raynaud's phenomenon
- Fibromyalgie
- Circulatory disturbances
- Gout
- Cold hand etc.



HEAD

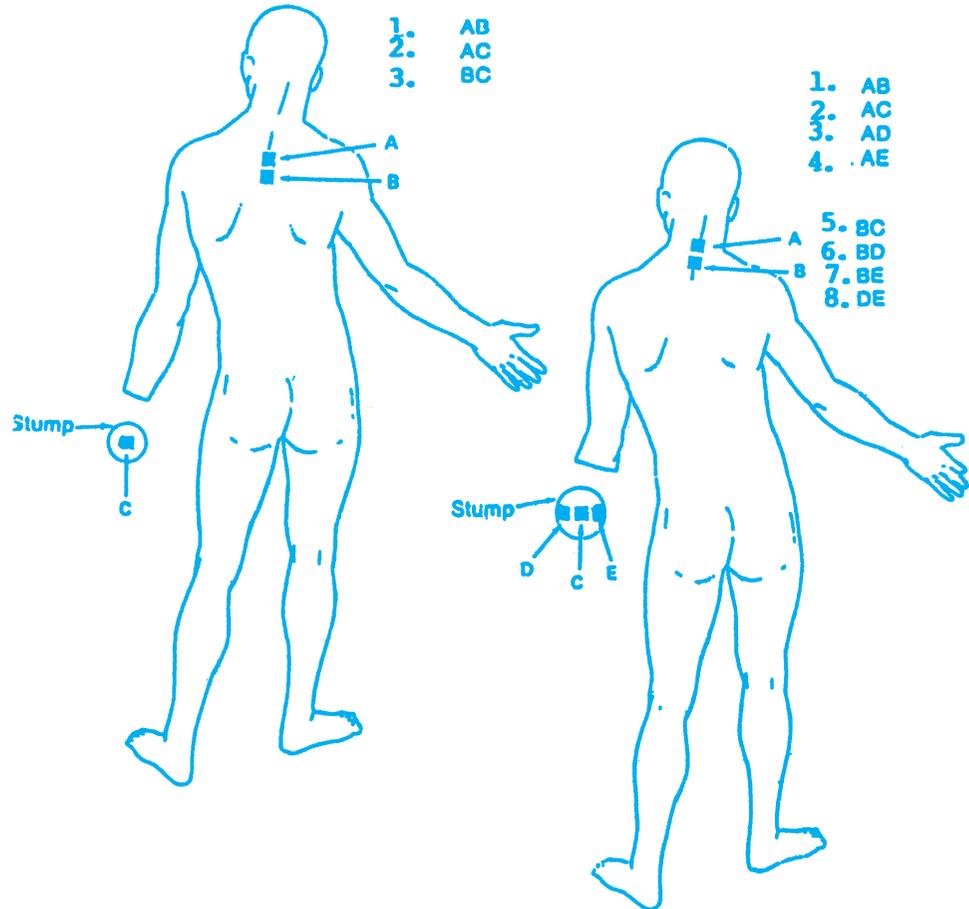
Indications:

- Trigemius
- Sinusitis
- Frontal headache

PHANTOM PAIN

PHANTOM PAIN

Electrodes can be placed on painful trigger points, correlated to peripheral nerves and spinal cord segments that innervates the painful area. For general pain management the BURST therapy as shown on page 17 is recommended.



Walsh, D. (1997),

TENS: Clinical Applications & Related Theory, Churchill Livingstone

Ellis, B. (1996),

A retrospective study of long term users of TNS, Br J Therapy & Rehabilitation 3(2);88-93

Han, J. et al (1991),

Effect of low and high frequency TENS on Met-enkephalin-Arg-phe and dynorphin A immunoreactivity in human lumbar CSF Pain 47(3): 295-298

Garrison, D & Foreman, R. (1994),

Decreased activity of spontaneous & noxiously evoked dorsal horn cells during TENS, pain 58(3);309-315

Walsh, D. & Baxter, D. (1996),

Transcutaneous Electrical Nerve Stimulation - A review of experimental studies, Eur J Med Rehabil 6(2);42-50 <http://www.electrotherapy.org/electro/tens/tens.htm> 31/01/2006

Transcutaneous Electrical Nerve Stimulation (TENS)

Roche, P. & Wright, A (1990), An investigation into the value of TENS for arthritic pain. Physiotherapy Theory & Practice 6; 25-33

Alves-Guerreiro, J., G. Noble, et al. (2201).

"The effect of three electrotherapeutic modalities upon peripheral nerve conduction and mechanical pain threshold." Clinical Physiology 21(6):704-711.

Bodofsky, E. (2002).

"Treating carpal tunnel syndrome with lasers and TENS." Arch Phys Med Rehabil 83(12): 1806: author reply 1806-7.

Brosseau, L., s. Milne, et al. (2002).

"Efficacy of the transcutaneous electrical nerve stimulation for the treatment of chronic low back pain. "spine 27(6): 596-603.

Carrol, E. N. and A. S. Badura (2001).

"Focal intense brief transcutaneous electric nerve stimulation for treatment of radicular an postthoracotomy pain. " Arch Phys Med Rehabil 82(2): 262-4.

Chandran, P. and K. A. Sluka (2003).

"Development of opioid tolerance with repeated transcutaneous electrical nerve stimulation administration." Pain 102: 195-201.

Chesterton, L.S., P. Barlas, et al. (2002).

"Sensory stimulation (TENS): effects of parameter manipulation on mechanical pain thresholds in healthy human subjects. "Pain 99: 253-262.

Chesterton, L.S., N.E. Foster, et al (2003).

"Effects of TENS frequency, intensity and stimulation site parameter manipulation on pressure pain thresholds in healthy human subjects. "Pain 106(1-2): 73-80.

Cosmo, P., H. Svensson, et al. (2000).

"Effects of transcutaneous nerve stimulation on the microcirculation in chronic leg ulcers. "Scand J Plast Reconstr Surg Hand Surg 34(1): 61-4.

Johnson, M. I. (2000).

"THE clinical effectiveness of TENS in pain management." Critical Reviews in Physical and Rehabilitation Medicine 12(2): 131-149.

Lone, A. R., Z. A. Wafai, et al. (2003).

"Analgesic efficacy of transcutaneous electrical nerve stimulation compared with Diclofenac **Sodium in osteoarthritis of the knee.**"

Physiotherapy 89(8): 478-485. <http://www.electrotherapy.org/electro/tens/tens.htm> 31/01/2006

Palmer, S.T., D. J. Martin, et al. (2004).

"Effects of electric stimulation on C and A delta fiber-mediated thermal perception thresholds." Arch Phys Med Rehabil 85: 119-128.

Roche, P., H.-Y. Tan, et al. (2002).

"Modification of induced ischaemic pain by placebo electrotherapy." Physiotherapy Theory and Practice 18: 131-139.

Sherry, J.E., K. M. Oehrlein, et al. (2001).

"Effect of burst-mode transcutaneous electrical nerve stimulation on peripheral vascular resistance." Physical Therapy 81(6): 1183-91.

Sluka, K.A. and D. Walsh (2003).

"Transcutaneous electrical nerve stimulation: basic science mechanisms and clinical effectiveness." J Pain 4(3): 109-21.

Walsh, D. M., G. Noble, et al. (2000).

"Study of the effects of various transcutaneous electrical nerve stimulation (TENS) parameters upon the RIII nociceptive and H-reflexes in humans." Clin Physiol 20(3): 191-9.

Wang, R. Y., R.C. Chan, et al (2000).

"Effects of thoraco-lumbar electric sensory stimulation on knee extensor spasticity of persons who survived cerebrovascular accident (CVA). "J Rehabil Res Dev 37(1): 73-9.



Performance Health International Ltd.
Nunn Brook Road, Huthwaite, Sutton-in-Ashfield,
Nottinghamshire, NG17 2HU, UK.
Tel: 03448 730 035 Fax: 03448 730 100
www.performancehealth.co.uk

09 151 2227 Is3