

## **T.E.N.S (Transcutaneous Electrical Nerve Stimulation)**

You have been prescribed a T.E.N.S machine to help in the management of your pain. You should use it only for the condition for which it is prescribed. Not all pain will respond to the use of T.E.N.S and this will be monitored by your doctor. Please follow any instructions given to you by your doctor for proper control settings.

### **Why do we have pain?**

Pain is the body's warning system. It alerts us to injury or illness. When the body is functioning normally, pain serves as a warning sign that something is not right. Pain signals, in the form of electrical impulses, travel through the body's nervous system from the site of injury to the brain and the brain interprets these impulses as pain.

### **What is T.E.N.S?**

T.E.N.S stands for Transcutaneous Electrical Nerve Stimulation. Pain, whether chronic (long-term) or acute (short-term, often from surgery or trauma), can be relieved through a variety of methods including T.E.N.S.

T.E.N.S machines deliver mild electrical impulses through the skin to stimulate the cutaneous (surface) and afferent (deep) nerves which helps control pain.

T.E.N.S. does not have any known side effects.

### **How does T.E.N.S control pain?**

There are two theories as to how electrical stimulation relieves pain.

1. According to the "gate control theory," pain and non-pain impulses are sent to the brain from the local nervous system. These impulses travel through the surface nerves to the deeper nerves and then to the spinal cord and brain. Along the path are many areas referred to as "gates." These gates control which impulses are allowed to continue to the brain.

The gates prevent the brain from receiving too much information too quickly. Since the same nerve cannot carry a pain impulse and a non-pain impulse simultaneously, the stronger, non-pain impulse (from the T.E.N.S. device) "controls the gate," and blocks the pain signal, resulting in less pain.

2. According to the second theory, T.E.N.S. stimulation encourages the body to release greater amounts of a chemical called endorphin. Endorphins are the body's own natural painkillers.

For many people who have pain due to an injury, the use of T.E.N.S. can help manage the pain considerably so that it may still be possible to perform their daily

activities at home or at work, return to work sooner, or perhaps enjoy more activities than they have before.

## **How to use T.E.N.S**

- Insert battery into T.E.N.S unit.
- Ensure that the intensity controls (on the top of the unit) are switched OFF.
- Attach cable and electrodes to T.E.N.S unit (see diagram).
- Place electrodes (pads) on skin as instructed .Your doctor will show you where to apply the pads and mark the sites on the body diagram at the end of this leaflet. Any excess hair should be clipped (not shaved) to ensure the pad makes good contact with your skin.
- Select pulse width and rate as instructed by your doctor.
- Turn the intensity controls for Channel 1 and Channel 2 ON and adjust until sensation is felt.
- Your doctor will tell you how long and how often to use the T.E.N.S machine for.
- When the pads are removed it is advisable to keep them in the fridge as this prolongs their usefulness.

## **T.E.N.S controls and their functions**

### **Intensity controls**

These controls located at the top of the unit control the strength (intensity) of the stimulation and are also the ON/OFF controls. The ON indicator light will stay lit as long as the unit is working.

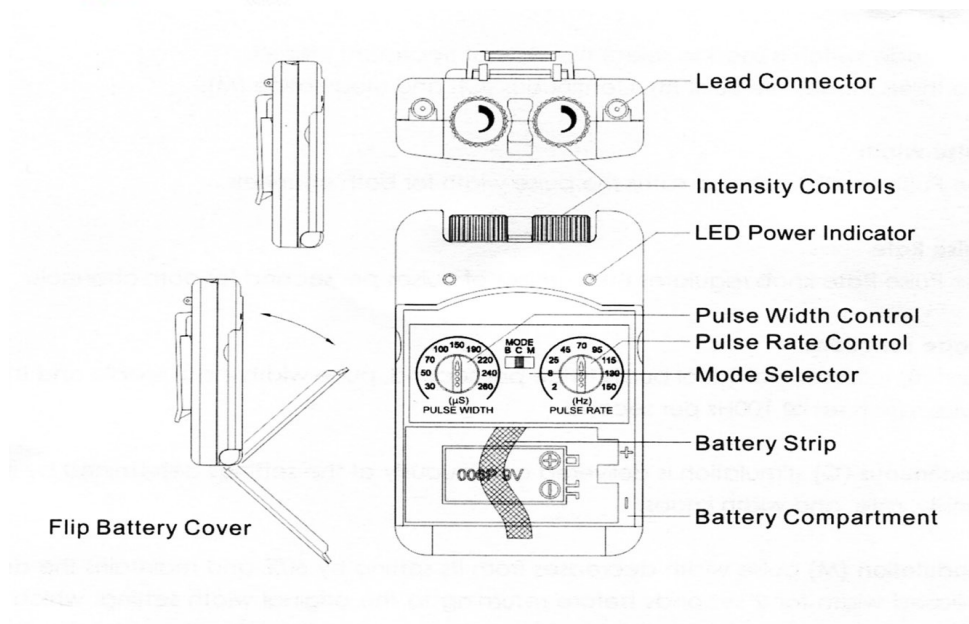
### **Rate and width controls**

These controls determine the how fast and how long the electrical impulses are applied through the skin. Open the front control panel to expose the rate and width controls.

**Pulse rate:** The pulse rate control adjusts the number of pulses per second. Pulse rate is also referred to as frequency. The device offers adjustable rates of 2 - 150 pulses per second (Hz). Lower pulse frequencies produce a “beating” sensation, whereas higher pulse frequencies produce a smoother, constant sensation.

**Pulse width:** The pulse width control adjusts the time length of each pulse. Pulse width is measured in micro ( $\mu$ ) seconds. The machine has adjustable pulse widths of 40 – 260  $\mu$  seconds. Wider pulse widths (more than 100  $\mu$  seconds) usually create a sensation of “deeper” stimulation.

## **T.E.N.S unit**



### Mode selector control

Located below the pulse rate and width dials is the Mode Selector switch. The T.E.N.S device has three different mode settings for a variety of stimulation sensations: Burst, Normal and Modulation. The Normal mode is the one most commonly used. Do not use burst or modulation mode unless advised by your doctor.

The table below shows the common treatment settings used.

SUMMARY OF COMMON TREATMENT SETTINGS				
	RATE	WIDTH	DURATION OF TREATMENT	USE
HIGH RATE NORMAL MODE	60-150HZ	70-100µsec	30 minutes	Most types of pain
LOW RATE HIGH WIDTH NORMAL MODE	2 Hz	225µsec	15-30 minutes	Pain from muscle spasms (more endorphin release)
HIGH RATE HIGH WIDTH NORMAL MODE	150Hz	260µsec	15 minutes	Short term relief for acute pain

### What precautions do you need to take with T.E.N.S use?

- It is not advisable to drive a vehicle or operate dangerous machinery whilst receiving T.E.N.S stimulation.
- T.E.N.S should not be used on the front of the neck as this can be dangerous.
- People who wear pacemakers should ask their doctors about whether T.E.N.S is

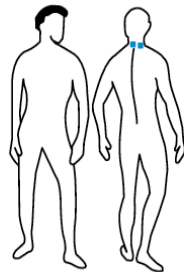
safe for them. T.E.N.S can interfere with the operation of some types of pacemakers and is not advised if a demand type pacemaker is fitted.

- T.E.N.S should not be used for undiagnosed pain.
- T.E.N.S machine should not be immersed in liquid.
- Skin irritation from the treatment itself does not occur. However, certain skin types react to the glue on the electrode pads and these users should use hypoallergenic brands.

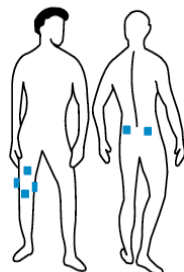
**Who to contact if you have questions:**

Dr Nicola Holtom  
Palliative Medicine Consultant  
Norfolk and Norwich University Hospital NHS Foundation Trust  
Tel 01603 286162  
Email [nicola.holtom@nnuh.nhs.uk](mailto:nicola.holtom@nnuh.nhs.uk)

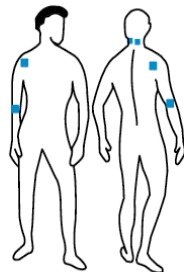
# ELECTRODE PLACEMENT CHART



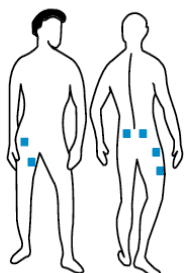
HEAD AND NECK PAIN



KNEE PAIN

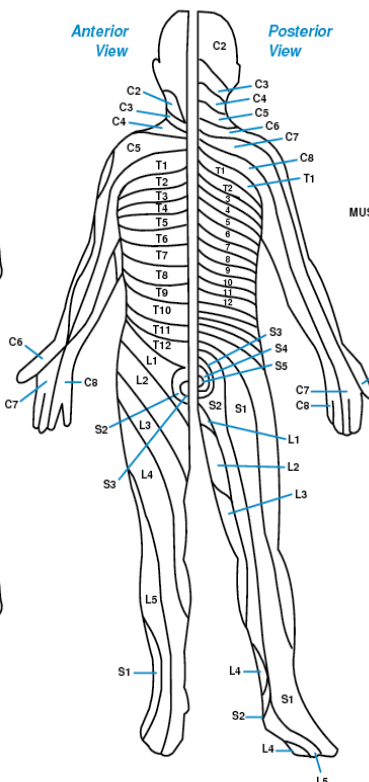


SHOULDER AND/OR  
ARM PAIN

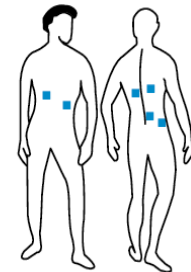
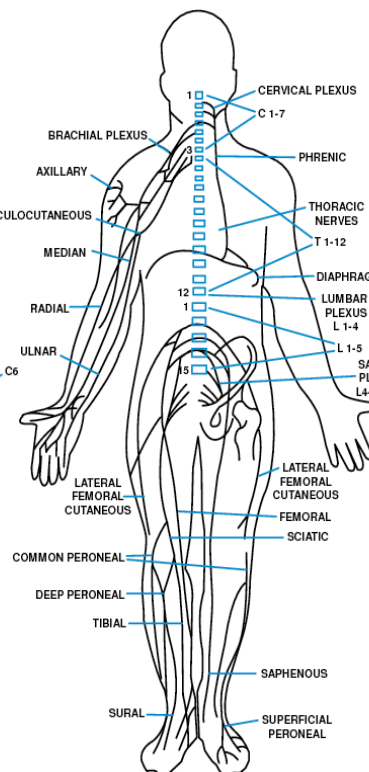


BACK WITH GROIN OR  
HIP PAIN

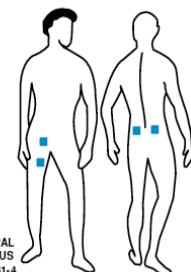
## DERMATOMES



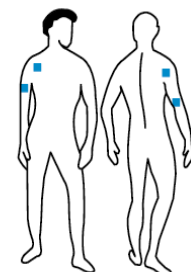
## PERIPHERAL NERVOUS SYSTEM



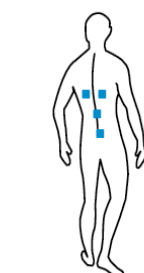
THORACIC OR INTERCOSTAL PAIN  
ALTERNATE  
USE BOTH CHANNELS



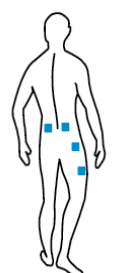
FEMORAL PAIN



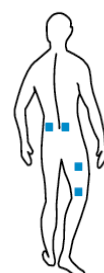
PHANTOM PAIN-  
UPPER EXTREMITIES



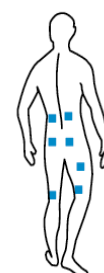
LOW BACK SACRAL OR  
COCCYGEAL PAIN



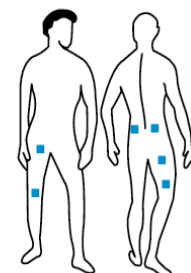
LOW BACK AND  
SCIATIC PAIN



UNILATERAL  
LOW BACK PAIN  
INTO SCIATIC NERVE  
DOWN LEG  
ALTERNATE



BILATERAL  
LOW BACK PAIN  
DOWN BOTH  
LOWER EXTREMITIES  
ALTERNATE



PHANTOM PAIN-  
LOWER EXTREMITIES