

Use of TENS for pain relief in labour

Joyce Hawkins

This article examines the effectiveness of transcutaneous electrical nerve stimulation Machines (TENS) in relieving labour pains, and describes two case studies where the machines were used.

For the past 3 years, I have been the coordinator of a scheme, run by Glan Clwyd Hospital, Clwyd, North Wales, which loans transcutaneous electrical nerve stimulation (TENS) machines to pregnant women, free of charge. The machines are non-invasive, easy to use and provide an effective method of pain management which can be discontinued quickly if necessary.

The TENS unit consists of a portable hand-held box containing a battery-powered generator which transmits electrical impulses. A low-voltage electrical current is transmitted to the skin using surface electrodes which are first covered with contact gel. This results in a 'buzzing' or 'tingling' sensation. The labouring woman may vary the intensity of the electrical impulse transmitted by the TENS machine and the frequency of stimulation, thus increasing or decreasing the sensations as she wishes.

The concept of using TENS or electrical impulses as a form of analgesia is not new. The use was first recorded some 2000 years ago by the Roman physician Scribonium Largas. He applied electric eels to haemorrhoids, arthritic joints, headaches and the feet of gout sufferers.

Further research allowed clinicians to advance their knowledge and by the 20th century, electrical equipment such as the cardiac pacemaker was in use. The development of electronics enabled scholars to research its use for pain relief. As Wall (1978) states:

'The development of modern electronics made it possible to search the spinal cord for the cells which were receiving the nerve impulses delivered by the sensory peripheral afferent fibres which had detected injury.'

It was this research that allowed Melzack and Wall to formulate the Gate Control Theory in 1985. The theory can be broken down into four main points:

1. Nerve impulses from injured tissue excite dorsal horn neurones, which are called transmission cells.
2. Transmission cells carry the messages to reflex circuits and the brain.
3. Stimulation of low threshold, sensory nerve fibres excite the inhibitory interneurons which decreases the messages being transmitted by the transmission cells.
4. Stimulation of the long descending nerve pathways further excites the inhibitors interneurons and the messages of the transmission cells are again limited (Melzack and Wall, 1988)

TENS is believed to work by closing the gate and reducing the amount of pain felt. It is also believed to stimulate the release of the body's natural narcotics, endorphins. Sweet (1992) defined endorphins as one of a group of opiate-like peptides produced naturally by the body, which modulate the transmission of pain preceptors interneurons, thereby raising the pain threshold to produce sedation and euphoria.

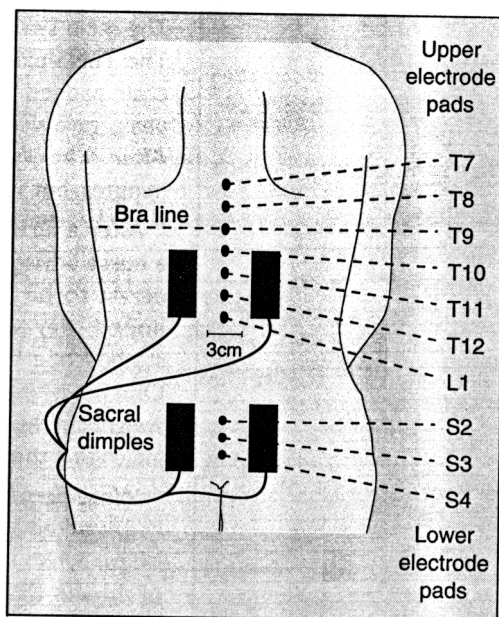


Figure 1. Correct positioning of the TENS unit is critical.

Joyce Hawkins is
Midwifery Sister at Glan
Clwyd Hospital, Clwyd,
North Wales

'A trained midwife should explain the use of the machine to the woman so the intensity of the impulse is gradual and unpleasant sensations are avoided.'

Relief of labour pain by TENS
Bevis (1989) concludes that the correct positioning of the TENS unit, by either the midwife or the woman's partner is critical. The pads should be placed in a position that allows the electrical impulses to travel to the point at which transmission cells receive the pain messages from the tissues. The nerve supply of the uterus passes to the last two thoracic nerves (T11 and T12) via the paracervical plexus, which is responsible for transmitting the pain of cervical dilation. During the latter part of the first stage of labour, T10 and the first lumbar nerve L1 are also involved with the sacral nerves S2, S3 and S4 which accept the impulses from the pudendal nerve caused by the stretching of the pelvic floor (Bevis, 1989). The first pair of electrodes should thus be placed between T10 and L1, with the remaining pair being placed 3cm apart on either side of the spine (*Figure 1*).

Midwives' responsibilities
The safety of any form of analgesia is of prime importance to the woman and midwife. In 1991, the UKCC ruled that midwives could use TENS machines to relieve pain in labour, on their own responsibility. This should be in accordance with the Midwives Rules (1991, UKCC) which were updated in 1994. These state:

'A practicing midwife shall not on her own responsibility, administer any medicine which includes analgesia, unless in the course of her training, or as a midwife, she has been thoroughly instructed in its use and is familiar with its dosage or application.'

All midwives at Glan Clwyd Hospital are trained in the use of TENS and each year the company updates them on any new developments.

Two case studies will be described. Both

Case study I

A primigravida contacted me when she was only 26 weeks pregnant. She had read about the use of TENS in labour from the Bounty antenatal pack which was given to her by her community midwife. She was eager to see and try the machine and wanted to book one early enough to be sure that she got what she termed 'The Magic Box'. I entered her name, address and telephone number in the TENS booking book and asked her to contact me again at 38 weeks gestation to arrange a demonstration collection. A hospital confinement was booked. The pregnancy continued normally, receiving care shared between consultant unit, a community midwife and the family practitioner. At 38 weeks gestation, I was contacted and arranged a visit to collect the machine and to give them full instructions on how to use it. We discussed the birth plan and talked about what she wanted in labour.

Flexibility in communications between the midwife and the couple was important, while not opposing any intervention deemed necessary during labour if there was a problem. Labour started spontaneously at 40 weeks, which was not the expected date. The main symptom was excruciating backache which seemed to be present all the time. The TENS pads were applied using the contact gel. It was found that sitting in a big arm-chair padded with cushions, pressing the boost button when the backache reached its peak, gave very good relief. The boost dial only went to four, the maximum being 10. After 4 hours, the backache became much easier. The contractions were every 2-10 minutes, but were not felt abdominally. It became easier for her to walk around.

After a further hour at home a show was evident. She called the delivery suite, where a nurse advised her to make her way to the hospital. A vaginal examination revealed the cervix to be fully dilated. The membranes were left intact as requested, since it was hoped they would rupture spontaneously. Intermittent auscultation with a Pinard's stethoscope had been documented on the birth plan. Cardiotocography was not used. One hour after admission, a healthy boy was delivered spontaneously, Apgar 9/10, birth-weight 3.5 kg. There was a small 2° perineal tear which was sutured with Dexon after infiltrating the perineum with 5 ml of 1% lignocaine local anaesthetic.

What part had TENS played? The response was encouraging. The choice of analgesia had worked well. It had given adequate pain relief especially early in the first stage of labour when the back pain seemed to be constant. It had given security, a longer period of time in the woman's own home, control over the intensity of the contractions, and mobility. Although too early to think of future labours, the choice would be the same. It had been completely satisfactory.

I was asked to demonstrate and advise on the use of a TENS machine. It was worth trying as this was the woman's fourth pregnancy, and she had tried most other forms of analgesia. During her first labour, which had lasted 16 hours, her pain was mercifully relieved by epidural anaesthesia.

For the birth of her second baby, she had tried an intramuscular injection of pethidine in an attempt to achieve complete euphoria; other expectations were of a short labour. The labour lasted 11 hours, without the desired effect. This was accompanied by a jerking feeling when going to sleep, strange dreams and labour pains.

For labour number three, she chose meptazinol 150 mg with promethazine 25 mg. This dosage was repeated 4 hours later. The total duration of the labour was 9 hours. Each confinement had been booked for a consultant obstetric unit and all three babies were born normally. So, on reflection, of all three labours a good explanation was given antenatally on choice of analgesia, and an informed choice had been made. Anxiety was expressed regarding the use of opiates and the effect they would have on the baby's respiratory system. The lack of mobility was the only criticism of the epidural.

Our free loan scheme of TENS appealed very much. A preference was expressed for the community midwife to give further instructions on its use. A 'domino' delivery was arranged.

Labour started at 41 weeks gestation. The community midwife was called and remained throughout the labour and delivery. The TENS machine was applied immediately, with contractions 1-15. Four hours passed before admission to hospital when, on vaginal examination, the cervix was 8 cm dilated. One and a half hours later, a normal delivery resulted in the birth of a live boy weighing 4.23 kg. The perineum was intact although the baby was the heaviest of the four. Previous deliveries had required perineal repair.

We discussed at length why she thought the TENS machine had been so good. Again, security, mobility and control were mentioned. She also stated that the controls kept her very busy getting the frequency 'just right.'

cases demonstrate the effectiveness of TENS as no other analgesia was used.

Conclusion

Not all women have used TENS alone for pain relief in labour. Some women have complemented its use with Entonox or one of the intramuscular opiates of their choice, perhaps just for the latter part of the first stage of labour, and this worked well. It is important to have success stories of women who have benefitted totally throughout their labour using only TENS, to relate to other women considering its use. It is also important to have good liaison with community midwives, so that the woman and

her partner do not receive conflicting advice. A central point and a familiar name are crucial for contact and collection. Our present system works well for this very popular form of analgesia. I have been a practising midwife for 25 years and have experienced many changes in the types of analgesia used for labour. My experience is that TENS is by far the most popular at the present time.

- Bevis R (1989) Pain Relief and Comfort in Labour. In: *Miles Textbook for Midwives*. Edinburgh Churchill Livingstone, London: 177-91
- Melzack R (1987) Low back pain during labour. *Am J Obstet Gynecol* 155: 901-5
- Melzack R, Wall PD (1965) Pain mechanism: a new theory. *Science* 150 (3699): 971-9
- Melzack R, Wall PD (1988) *The Challenge of Pain* 2nd edn. Penguin Books, London
- Simkin P, Dickinson K (1986) Non-pharmacological use of drugs in labour. In: Chalmers I, Enkin M, eds. *Effective Care Pregnancy and Childbirth 2* Oxford University Press: 893-5
- Sweet WH (1980) Pain: a general discussion. In: Bonica JJ, ed. *Addiction of Pain*. Raven Press, New York: 379-80
- Wall PD (1978) The Gate Control Theory of Pain Mechanism. In: *Textbook of Pain* 2nd edn. Churchill Livingstone, Edinburgh: 165-93
- Wall PD (1985) Discovery of TENS. *Physiotherapy* 71(8): 348-50
- UKCC (1994) Code of Professional Conduct for Nurses, Midwives and Health Visitors. UKCC, London

KEY POINTS

- TENS offers another choice of analgesia, which is drug-free.
- It gives women increased confidence in their own ability to cope with labour, by giving them complete control over the situation.
- The woman has longer in her own surroundings, which ensures greater relaxation as well as increasing her mobility.