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An Evaluation of Transcutaneous Electrical Nerve Stimulation for Pain Relief in Labour

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EDITORIAL COMMENT: *It is undeniable that fashion determines details of management in obstetric practice e.g. techniques of antenatal preparation, place of birth, position at birth. Methods of pain relief in labour have also varied, but in recent years the trend has been towards an increased use of epidural analgesia on the one hand, and a wish to avoid conventional methods of analgesia altogether on the other! It is against this background that transcutaneous electrical nerve stimulation (TENS) has been introduced into labour wards in many hospitals. This careful, large study tackles the difficult task of critical appraisal of patients' perception of pain in labour and its influence by TENS. The authors have shown that although the method does no harm, it probably does little good and they do not advocate its widespread introduction for routine use in labour.*

Summary: The effectiveness of transcutaneous nerve stimulation (TENS) for pain relief in labour was evaluated by randomizing 280 patients in early labour into 2 groups. Inoperative sham machines were applied to patients in the control group and active units to those in the test group. Neither patients nor attending labour ward staff were aware of which group the patient was in. The intensity of low back pain and abdominal pain was assessed by the patient each hour on a visual analogue pain scale. Each patient served as her own control by switching off the machine for 2 contractions every hour and then recording the intensity of pain. The amount of conventional analgesia each patient received was recorded by labour ward staff.

There was no difference in the intensity of pain recorded by each group. Nor was there any difference between the 2 groups in the change of pain experienced when the machine was switched off. Moreover there was no difference in the amount of other analgesia required. Some differences were found when those with little low back pain were excluded from the study.

We conclude that TENS is ineffective as a routine method of pain relief in labour. It is likely to benefit only those with severe back pain and then only to a modest degree.

The aim of this study was to determine whether transcutaneous electrical nerve stimulation (TENS) is useful in providing relief of pain, especially back pain in first stage labour.

TENS has been used for several years in the management of chronic pain and more recently for acute pain (1). It is based on the gate control theory of pain (2).

Pain in stage one of labour, assumed to be from activation of pain receptors by dilatation of the cervix and contraction of the uterus, is referred to large areas of the abdomen and back, and is characteristically aching in type (3). In late stage one pain tends to be well localized and mainly suprapubic. The pain of stage two is said to be caused by distension of the perineum and vulva (3).

TENS has been widely used in Europe for relief of labour pain. The most common method is the use of dual channel machines, with one pair of electrodes located 1.5-3cm on either side of the spinous processes of T10-L1 and one pair in the region of S2-S4. Many authors report relief of back pain in labour with TENS but little effect on suprapubic and abdominal pain. Some have tried suprapubic placement of electrodes with little effect on suprapubic pain (1, 4).

Earlier machines interfered electrically with fetal monitoring devices. There was also a question whether they could induce irregularities in fetal heart function. A filter was designed allowing for safe application of TENS which also suppressed electrical disturbances of fetal monitoring equipment (5). When the electrodes are placed on the back the current densities produced are safe and do not affect the fetal heart rate. Hence TENS is now regarded as safe for mother and child.

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In 1977 Augustinsson et al reported that TENS provided relief of pain for most women in their study (3). Robson (1979) reported similar findings (1). Several others have enthusiastically recommended TENS as effective and safe, but all of these studies lacked controls (5, 6, 7).

Some studies have used a control group. Miller Jones (1980) (8) found significantly less pethidine was required in the TENS group compared with a control group. Bundsen et al (1982) (9) found more women using TENS reported good relief of back pain compared with controls, but when overall pain was measured, there was no difference between groups. This study was not randomized. The authors considered randomization a rather imprecise tool, not necessarily ensuring that the groups would be comparable. They also felt random allocation of women who consented to take part in a study of this nature may introduce a patient bias because women with a negative attitude to TENS would not consent to take part in the study. Conversely patients with a positive attitude to TENS allotted to the control group may then have a negative attitude to conventional methods of pain relief.

Vincenti et al (1982) (10), using matched controls, reported a significant difference in the pain intensity experienced by the 2 groups. The TENS group experienced less pain. This trend increased as the labour progressed.

In contrast, Erkkola et al (1980) (11), in a randomized controlled study, found no difference in the amount of conventional analgesia required by the 2 groups. Significantly more mothers in the TENS groups reported that the labour had been moderately or intensely painful compared to the control group up to a cervical dilatation of 7cm. Beyond 7cm dilatation the subjective judgement regarding pain was similar in both groups.

Thus even controlled studies gave conflicting results.

A small number of studies have investigated the placebo effect of using TENS in labour. Nesheim (1981) (12) randomized parturient women into 2 groups, one receiving TENS, the other mock stimulation with a facsimile machine. There was no difference in the use of analgesics in each group and no difference between the groups in their assessment of pain. Merry (1983) (13), in a smaller randomized, placebo-controlled study, assessed pain, using a visual analogue scale and also found no difference between the groups. The opposite conclusion was reached in another placebo-controlled study (14).

Because the available literature concerning the efficacy of TENS for pain relief in labour is so conflicting and confusing, an Australian study was considered essential by us before TENS is widely introduced here. The demand grows for nondrug techniques to provide pain relief during labour. If TENS is effective labouring women should not be denied it use. The method has many potential advantages. It has been shown to be safe for mother and baby, is noninvasive, easy to apply, easy to remove, does not cloud consciousness and can be combined with supplementary analgesia. Moreover, it can be applied early in labour perhaps delaying the need for other forms of pain relief and it can be useful in short, painful labours in which effective analgesia is often notoriously difficult. The patient can actively participate in the method.

On the other hand, if the benefits of TENS cannot be substantiated, widespread introduction can be costly and futile. Labour ward staff elsewhere have found that using the stimulator was more time-consuming than giving parenteral analgesia (15). There are clearly elements of 'suggestibility' and 'distraction' in the method.

The present study aimed to assess the effectiveness of TENS by a prospective, randomized, double-blind, placebo-controlled study of parturients.

Concerning the clinical assessment of pain, it is recognized that objective measurements carry severe limitations. The observing doctor or nurse may be influenced by the patients' comments and appearance; or biased by their own experience of pain and traditional cultural beliefs about the level of pain to be expected in labour. Because of this 'observer bias', subjective measures of pain are preferred as they enable the use of the patient's own estimate of pain as a basis for treatment (16).

PATIENTS AND METHODS

Primigravidas and multigravidas in early labour (spontaneous or induced) were recruited. Patient consent was obtained after full explanation, including the information that some of the machines applied would be inoperative.

Exclusions included those in advanced labour on admission (greater than 7cm dilatation), those who were already severely distressed with pain, had already received analgesia during labour, did not speak English, or for other reasons were judged unable to understand the explanations and so give informed consent, patients with malpresentation, multiple pregnancy, premature labour (less than 36 weeks), or previous exposure to TENS and those booked for elective Caesarean section but who presented in labour.

Consenting patients were assigned by reference to a list of random numbers to the TENS group or the control group. There had been no prior antepartum instruction in TENS. An active machine or a sham machine was applied by a staff member, not associated with the trial, when the patient reported discomfort. Four dual-channel 3M stimulators, model number 6242, with silicone rubber electrodes applied with dry gel, were used. Two of the machines were rendered inoperative by the biomedical engineers. The

sham machines were outwardly identical to the active machines, both showing a flashing light when switched on. The pulse rate and width were preset. One pair of electrodes was applied paravertebrally, on either side of the spinous processes of T10-L1, the other pair in the region of S2-4. Patients were instructed in the use of the machine according to a standardized protocol. Both groups maintained a low-amplitude setting between contractions and increased the setting of both channels as found necessary during contractions. The instructor had no input into assessment of the pain of labour and was not called again unless requested to advise on adjustment of the TENS unit.

Labour was managed in the normal way by the attending staff not part of the study team. Patients were perfectly free to make use of other methods of pain relief as required.

Each hour throughout the labour the patient was asked to indicate separately the degree of low back pain and of abdominal pain. She was given a visual analogue scale (see figure 1) and asked to indicate a point representing the level of pain at that moment.

Figure 1. An analogue Scale for Pain Measurement (16)

NO PAIN AT ALL	THE PAIN COULD NOT BE WORSE

The distance of the mark from the left end of the line was measured in millimetres. This was called the pain score. During stage 1 each patient was asked to switch off the machine for 2 contractions each hour and assess any difference in both types of pains on the visual analogue scale. A midwife recorded the results.

On the day following delivery, a member of staff, not aware of which group the patient was in and not associated with the patient during labour, visited her to arrange completion of a short questionnaire. The patient was asked to state how the pain compared with what she had expected before the onset of labour, how much help she found the TENS unit and whether she would like to use it if she had another labour.

Advice from a statistician in the planning stages indicated the desirability of a sample size of 140 patients in each group.

RESULTS

(a) DETAILS OF PATIENTS

Of the 280 consecutive patients accepted into the study, 148 were randomly allocated to the control group A (sham machines) and 132 to the test group B (functioning machines). Patients in each group were comparable in age, length of gestation, birth-weight and country of birth but the proportion of primiparas was greater in the test group (57% v 45%).

The surgical induction rate was somewhat higher in group A (53% v 39%); the use of Syntocinon was similar in both groups. The duration of labour, the interval from onset of labour until first given treatment for pain and the duration of the balance of labour were similar for each group. The amount of cervical dilatation on admission to labour ward and at the time of first treatment for pain were also similar for the 2 groups. A similar proportion in each group laboured with an occipitoposterior position (OP).

(b) PAIN SCORES DURING LABOUR

Table 1 indicates the highest pain scores assessed by patients with the machine on for 3 phases of labour (less than 7cm dilatation, 7 to 10cm dilatation and stage 2). It indicates no significant difference in the mean scores for either low back pain or abdominal pain between the control and test groups for any of these phases of labour.

While this study concentrated on pain intensity in stage 1, the scoring continued amongst those willing to participate in stage 2. Only 96 patients were able to continue with pain scoring beyond 7cm dilatation and only 16 continued scoring their pain into the second stage. The remainder were withdrawn from the trial, either at their own request, or because other intervention was required, e.g., epidural.

Table 2 summarizes the findings where each patient served as her own control by scoring her pain level with the machine switched on and then turned off for 2 contractions. A negative difference indicated more pain when the machine was switched off and a positive difference indicated the patient felt less pain when the machine was switched off. Table 2 shows no significant difference between control and test groups. Interestingly, the most frequent finding was no difference in the pain level with the machine on or off. A proportion of women in the control group reported increased pain when the machine was turned off, while some women in the test group indicated an improvement in pain with the machine off.

(c) OTHER METHODS OF PAIN RELIEF REQUIRED

Table 3 compares the use of nitrous oxide, pethidine, epidural and general anaesthesia. A similar percentage of patients in each group required nitrous oxide and pethidine for relief of pain. Moreover the amounts of nitrous oxide and pethidine used in each group were also similar. The epidural rate was actually higher in the test group — 35% v 27% (not significant).

(d) PATIENT OUTCOME

Maternal outcome with respect to method of delivery and postpartum haemorrhage was similar in each group as was outcome for babies with respect to Apgar scores at 1 and 5 minutes (table 4).

Table 1. Pain Scores During Labour

Highest pain score (with machine switched on)	Group A (Control group)			Group B (Test group)		
Stage of labour	Stage 1 <7cm	Stage 1 7-10cm	Stage 2	Stage 1 <7cm	Stage 1 7-10cm	Stage 2
Low back pain						
Mean Score	35	35	50	33	37	26
SD	33.8	34.7	43.2	31.1	35.1	33.2
Range	0-100	0-100	0-95	0-100	0-100	0-90
* Number of patients	144	56	7	131	40	9
Abdominal pain						
Mean score	56	63	61	57	62	66
SD	27.8	28.3	41.0	26.3	22.5	21.5
Range	0-100	0-100	0-100	0-100	5-100	40-100
* Number of patients	144	55	6	131	39	6

* As labour progressed increasing numbers of patients retired from the trial.

Table 2. Difference in Pain Score when Machine Switched Off (i.e. the patient acts as her own control)

Pain score difference when machine switched off	Group A (Control group)			Group B (Test group)		
Stage of labour	Stage 1 <7cm	Stage 1 7-10cm	Stage 2	Stage 1 <7cm	Stage 1 7-10cm	Stage 2
Low back pain						
Mean difference in score +	-5	-5	-5	-7	-3	-4
SD	12.6	19.8	13.8	16.1	9.0	9.6
No. of patients*	140	37	4	128	28	5
Patients with:—						
no difference in pain	57	16	2	48	14	2
(%)	(40.7)	(43.2)	(50)	(37.5)	(50)	(40)
Less pain	18	6	1	19	3	1
(%)	(12.9)	(16.2)	(25)	(14.8)	(10.7)	(20)
More pain	65	15	1	61	11	2
(%)	(46.4)	(40.5)	(25)	(47.7)	(39.2)	(40)
Abdominal pain						
Mean difference in score +	-5	-6	0	-7	-7	3
SD	14.4	11.6	0.9	13.7	14.5	11.6
No. of patients*	145	42	5	129	32	8
Patients with:—						
no difference in pain	32	19	4	22	12	4
(%)	(22.1)	(45.2)	(80)	(17.1)	(37.5)	(50)
Less pain	29	4	0	21	4	1
(%)	(20)	(8.9)	(0)	(16.3)	(12.5)	(12.5)
More pain	84	19	1	86	16	3
(%)	(57.9)	(45.2)	(20)	(66.7)	(50)	(37.5)

* See footnote table 1

+ A positive difference indicates less pain when the machine is switched off. A negative difference indicates more pain when the machine is switched off.

(e) DISCONTINUANCE OF TENS

Table 5 shows that 52 (35%) of the patients in the control group asked for the machine to be removed compared with 54 (41%) in the test group (NS).

The reasons for discontinuance by patients are given in table 5. The percentage who, at the time of labour, found TENS ineffective was similar in each group. One patient in the control group asked for the machine to be switched off because she found a tingling sensation troublesome. Miscellaneous reasons for the patients requesting discontinuance of TENS included a desire for the husband to rub her back instead (2 patients), electrodes fell off (2 patients), development of a skin rash over the site of application (1 patient), a feeling of 'sea sickness' in the back (1 patient), the patient dozed off and forgot to use the machine (1 patient) and one husband found it annoying.

Table 3. Other Methods of Pain Relief Required

Method of pain relief used	Group A (Control group)	Group B (Test group)
Nitrous oxide (N20)		
No. of patients	136 (91.9%)	120 (90.9%)
Duration (minutes)		
Mean (SD)	115 (108.3)	102 (93.8)
% of duration of Labour in which N20 used		
Mean (SD)	23 (18)	20 (16.9)
Pethidine		
No. of patients	100 (67.6%)	88 (66.7%)
Total dose used		
Mean (SD)	70 (52.3)	69 (52)
Dose per 10 kg weight (mg)		
Mean (SD)	9.7 (7.68)	9.3 (7.40)
Epidural	40 (27.0%)	46 (34.9%)

Table 4. Patient Outcome

Outcome	Group A (Control group)	Group B (Test group)
Mother		
Method of delivery		
Spontaneous vaginal	124 (83.8%)	106 (80.3%)
Forceps/Vacuum	13 (8.8%)	11 (8.3%)
Caesarean section	11 (7.4%)	15 (11.4%)
Postpartum haemorrhage (> 300 ml)		
Number (%)	24 (16.2%)	28 (21.2%)
Baby		
Apgar score at 1 min		
Mean	7.9	7.8
SD	1.60	1.72
Apgar score at 5 min		
Mean	9.0	9.0
SD	0.75	0.64

Table 5. Discontinuance of TENS at Patient's Request

	Group A (Control group)	Group B (Test group)
Reason for ceasing		
not effective	36 (24.3%)	28 (21.2%)
found tingling sensation troublesome	1 (0.7%)	7 (5.3%)
equipment annoying	12 (8.1%)	14 (10.6%)
miscellaneous	3 (2.0%)	5 (3.8%)
Total ceased*	52 (35.1%)	54 (40.9%)
Number who did not cease	96 (64.9%)	78 (59.1%)
Total	148 (100%)	132 (100%)

* Not significant

(f) POSTPARTUM ASSESSMENT BY PATIENT

Table 6 summarizes the result of the questionnaire completed by patients the day after delivery. There was no difference between the 2 groups in the comparisons of pain actually experienced in labour with what had been expected before the onset of labour.

Table 6. Postpartum Assessment of Labour by Patient

Question asked	Group A (Control group) 148	Group B (Test group) 132
Comparison of pain actually experienced with what had been expected before labour*		
Less than expected	25 (16.9%)	24 (18.2%)
As much as expected	58 (39.2%)	55 (41.7%)
More than expected	65 (43.9%)	53 (40.2%)
Degree of relief of pain the patient felt TENS had given**		
Excellent relief	5 (3.4%)	7 (5.3%)
Good relief	19 (12.8%)	22 (16.7%)
Moderate relief	25 (16.9%)	35 (26.5%)
Slight relief	40 (27.0%)	35 (26.5%)
No relief	59 (39.9%)	33 (25.0%)
Would like to use TENS in another labour***		
Yes	47 (31.8%)	71 (53.8%)
No	63 (42.6%)	42 (31.8%)
Undecided	38 (25.7%)	19 (14.4%)

* Chi square = .41 DF = 2 p = 0.82 NS
** Armitage trend
Chi square = 6.78 DF = 1 p <0.001
*** Chi square = 14.55 DF = 2 p <0.001

Slightly more in the test group felt on reflection the following day that the TENS unit afforded excellent or good relief of pain (22% v 16%). More women in the control group felt there had been no or only a slight relief of pain (67% v 52%). Many more in the test group said they would like to use TENS in another labour ($p < 0.001$). (Patients still did not know what group they were in when they completed the questionnaire).

(g) COMPARISON OF PRIMIPARAS AND MULTIPARAS

Because of the higher proportion of primiparas in the test group the data were analysed for primiparas and multiparas separately but no significant differences were found between the control and test groups.

(h) COMPARISON OF PATIENTS WITH SPONTANEOUS ONSET OF LABOUR AND THOSE IN WHOM LABOUR WAS SURGICALLY INDUCED

Since slightly more patients in the control group were induced the data were analysed separately for spontaneous and induced labours, but, again, no significant differences were found between control and test groups for any of the parameters.

(i) COMPARISON OF SHORT, MEDIUM AND LONG LABOURS

For the purposes of this study, short labour was defined as up to 4.0 hours duration, medium more than 4.0 and up to 12.0 hours, and long labours as greater than 12.0 hours. Each of these groups was analysed separately. No differences were apparent, however, between control and test groups.

Table 7. Patients With More Severe Pain
(Statistically significant differences when patients with lesser degree of low back pain are excluded)

		Group A (Control)	Group B (Test)	Degree of Significance
A.	Excluding patients with zero score (with machine on) for low back pain <7 cm dilatation			
	(i) Low back pain — highest score < 7 cm dil (machine on)			
	Mean (SD)	52 (29.3)	46 (27.4)	t test
	No. of patients	96	95	$p < 0.05$
	(ii) Wish to use TENS again			
	No. of patients (%)	35 (35.0)	54 (56.3)	chi square $p < 0.05$
B.	Excluding patients with score <50 (as in A)			
	(i) Low back pain — highest score <7 cm dil (machine on)			
	Mean (SD)	67 (23.5)	57 (23.9)	t test
	No. of patients	61	59	$p < 0.01$
	(ii) Abdominal pain — highest score < 7 cm dil (machine on)			
	Mean (SD)	65 (25.4)	59 (27.7)	t test
	No. of patients	61	59	$p < 0.05$
	(iii) Pain score difference with machine off.			
	Mean (SD)	-11 (12.3)	-14 (18.3)	t test
	No. of patients	62	57	$p < 0.05$

(j) EXCLUSION OF PATIENTS WITH NO BACK PAIN

Many patients experienced no low back pain during labour. Because it was felt such women may mask possible beneficial effects of TENS, the data were analysed, excluding the 84 who experienced no back pain with the machine switched off during the phase of less than 7cm dilatation. Differences between the groups which reached statistical significance are indicated in table 7A. The mean low back pain score at less than 7cm dilatation was statistically significantly lower in the test group. More women in the test group wished to use TENS again. Otherwise, there was no difference between the groups. The other pain scores and the use of analgesia were similar.

Patients with more severe low back pain were identified by excluding those with a score of less than 50. Differences which attained statistical significance are detailed in table 7B. Even in this selected group the mean pain score varied by only 10. The increase in mean pain score when the machine was switched off for 2 contractions differed by 3 between the groups (control -11 v test -14). This time, the groups did not differ significantly regarding the proportion who would like to use TENS in a future pregnancy.

DISCUSSION

Several controls were incorporated in this study. Allocation to groups was made according to a list of random numbers (hence the unequal number in each group). Sham machines were used in the control group. Each patient served as her own control by her monitoring the pain scores with the machine switched off for 2 contractions each hour.

There was no prior education of patients about TENS in the antenatal parentcraft classes. Patients who had previous experience of TENS were excluded. In this way the risk, feared by Bundsen et al (9), of biased entry into the study was minimized. Moreover, nursing and medical staff looking after the parturient women had no previous tuition in or experience of TENS. Some of the more curious may have been tempted to ascertain which group the patient was in by leading questions about the presence of a tingling sensation, but staff were asked, deliberately, to refrain from doing so throughout the trial in order to minimize possible attendant bias. In any case it was noted that one patient with a sham machine asked, at an early stage, for TENS to be discontinued because she found a tingling sensation troublesome. The senior physiotherapist who had applied the machine and was not part of the trial happened to become aware of this and arranged for the biomedical engineer to check the unit. He confirmed the unit was inactive. Even though patients had been told on entering the trial some would have a sham machine, there was still a marked placebo effect. Hence, any bias of the attendant in influencing the patient in her assessment of pain intensity is considered minimal.

The 2 groups had similar characteristics except for a higher induction rate in the control group and a higher proportion of primiparas in the test group. The induction rate in this study sample is a lot higher than the hospital rate (12%) for organizational reasons. Induction of labour did not appear to have any effect on the comparison between control and test groups.

When the data were analysed for any differences between primiparas and multiparas, it was found that the proportion of patients requiring each form of analgesia was higher in primiparas. There was no difference, however, between the control and test groups in the use of analgesia or in the intensity of pain experienced. Therefore, the difference in parity rates in the 2 groups is considered to be inconsequential.

A visual analogue scale as advocated by Bond (6) was used to assess pain. Clearly there are several disadvantages of such a score. A confused patient of low intelligence may not be able to use the scale. The pain score is open to influences of personality and the effect on the patient's rating of expectations by the doctor or nurse. Nevertheless, this method seems better than a verbal rating system.

Only the highest pain score for each patient is given in table 1. Although comparing maximum individual pain scores may be an unusual approach from a mathematician's viewpoint, we consider the highest pain score is likely to be the most significant as far as the patient is concerned. In any case, the mean number of pain scores per individual was found to be similar in both groups and, so, comparison of highest pain scores in each group is considered not to distort the true picture.

The study failed to demonstrate lower pain scores in the test group when compared with the control group. Many authors report little effect on suprapubic and abdominal pain, but good relief with TENS on back pain in labour. In this study, not only was there no significant difference in the abdominal pain scores but, also, there was no significant difference in the low back pain scores in the patient groups as a whole.

When those with no or little back pain were excluded from the analysis, there was a difference in the pain level in the test group which reaches statistical significance but the amount is only small even in those with the highest pains scores (10 points — table 7B). Such an amount would not seem to be of great clinical relevance. The inference from this study is that, if TENS does provide effective pain relief in labour, it is only in those troubled with severe low back pain. Moreover, the amount of relief afforded to this select group is limited, and the use of other forms of analgesia is not reduced.

A placebo effect of TENS was demonstrated in this study. During labour each patient served as her own control by recording pain levels when the machine was not turned on. In the control group, about 40% experienced more pain when the machine was switched off. Nor did the expected negative difference amongst the test group occur when the machine was off. In fact, there was virtually no difference between the 2 groups. A considerable number in both groups found no difference in the level of pain when the machine was switched off. The proportion of these patients is similar for each group.

These findings illustrate the great care required in interpreting patients' assessments of the effect of a treatment modality, even when a supposedly objective measurement is used.

Careful records were kept of the use of other methods of analgesia. A reduction in the use of alternative analgesics was anticipated in the test group. However, there was little variation between the groups. In fact, the epidural rate was higher in the test group than the control group (35% v. 27%).

The effectiveness of TENS was also measured by the willingness of participants to continue with its use. In fact, relatively more patients in the control group continued TENS than in the test group.

The postpartum questionnaire was completed on the day after delivery rather than immediately in order to allow some perspective to develop. Had TENS been effective in pain relief, it would be expected that more patients in the test group would have reported that they experienced less pain in labour than they had anticipated they would. No differences, however, were demonstrated between the 2 groups.

On the other hand, a significant trend was shown in the test patients to report, the day after delivery, they had experienced higher levels of pain relief. Interestingly, significantly more in the test group indicated they would like to use TENS in another labour. As previously pointed out, the patients did not know which group they were in when this questionnaire was completed. It is hard to explain why there should be differences like these.

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References

1. Robson JE. Transcutaneous nerve stimulation for pain relief in labour. Anaesthesia 1979; 34:357-360.
2. Melzack R, Wall PP. Pain mechanisms — a new theory. Science 1965; 150:971-979.
3. Augustinsson L, Bohlin P, Bundsen P et al. Pain relief during delivery by transcutaneous electrical nerve stimulation. Pain 1977; 4:59-65.
4. Bundsen P, Ericson K, Peterson LE, Thiringer K. Pain relief in labour by transcutaneous electrical nerve stimulation. Acta Obstet Gynecol Scand 1982; 61:129-136.
5. Bundsen P, Ericson K. Pain relief in labour by transcutaneous electrical nerve stimulation — safety aspects. Acta Obstet Gynecol Scand 1982; 61:1-5.
6. Kubista E, Kucera H, Riss P. The effect of transcutaneous nerve stimulation on labour pain. Geburtschilfe Frauenheilkd 1978; 38:1079-1084.
7. Bundsen P, Carlsson CA, Forssman L, Tyreman NO. Pain relief during labour by transcutaneous electrical nerve stimulation. Prakt Anaesth 1978; 13:20-28.
8. Miller Jones CMH. Transcutaneous nerve stimulation in labour. Anaesthesia 1980; 35:372-375.
9. Bundsen P, Peterson L, Selstam V. Pain relief in labour by transcutaneous electrical nerve stimulation — a prospective matched study. Acta Obstet Gynaecol Scand 1981; 60:459-468.

10. Vincenti E, Cervellin A, Mega M et al. Comparative study between patients treated with transcutaneous electric stimulation and controls during labour. Clin Exp Obstet Gynecol 1982; 9:95-97.
11. Erkkola R, Pikkola P, Kanto J. Transcutaneous nerve stimulation for pain relief during labour — a controlled study. Ann Chir Gynaecol 1980; 69:273-277.
12. Nesheim BI. The use of transcutaneous nerve stimulation for pain relief during labour. A controlled clinical study. Acta Obstet Gynecol Scand 1981; 60:13-16.
13. Merry AF. Use of transcutaneous electrical stimulation in labour. NZ Med J 1983; 96:695-696.
14. Neumark J, Pauser G, Scherzer W. Pain relief in child birth; an analysis of the analgesic effects of transcutaneous nerve stimulation, pethidine and placebos. Prakt Anaesth 1978; 13: 13-20.
15. Stewart P. Transcutaneous nerve stimulation as a method of analgesia in labour. Anaesthesia 1979; 34:361-364.
16. Bond MR. Pain — its nature analysis and treatment. Edinburgh, Livingstone 1979; 3:26-30.

Fourth Annual Convention of the All India Coordination Committee of the Royal College of Obstetricians and Gynaecologists at Chandigarh, India

November 11-13, 1988
Chairman AICC: Prof. N.N. Roy Chowdhury, FRCOG
Chairman Organizing Committee: Prof. G.I. Dhall, FRCOG
Organizing Secretary: Prof. Kamala Dhall
Under the Auspices: North Zone, India Representative Committee R.C.O.G.; Obstetric and Gynaecological Society of Northern India and the Postgraduate Institute of Medical Education and Research, Chandigarh.
Secretariat: Department of Obstetrics and Gynaecology, Postgraduate Institute of Medical Education and Research, Chandigarh-160 012, India.
Scientific Programme: Focal aspects:

- Imaging techniques in obstetrics and gynaecology
- Safety and efficacy of fertility regulating methods
- Gynaecological plastic surgery
- Genital infections
- Controversies in gynaecological malignancy
- Fetus as a patient
- Endocrinology of infertility
- Premature rupture of membranes
- Place of delivery
- Breast feeding

Free Communications
Poster Sessions:
Continuing Medical Education (CME) programme: November 11, 1988
Registration, abstracts and full text submission: August 15, 1988