

Title: A COMPARATIVE STUDY OF THE EFFICACY OF CRYOGENICS AND TRANSCUTANEOUS NERVE STIMULATION IN THE CONTROL OF POST-OPERATIVE PAIN.

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Introduction. Previous work has established the efficacy of transcutaneous nerve stimulation⁽¹⁾ and cryoanalgesia⁽²⁾ in post-operative pain control. In order to determine the beneficial effect of each modality, transcutaneous nerve stimulation (TNS) and cryoanalgesia were compared against each other and a control group through pulmonary function testing of thoracotomy patients in the immediate and delayed post-operative period.

Methods. Informed consent was obtained from seventy-five patients undergoing thoracotomy who were randomly divided into these groups. Group I (25 patients) had TNS electrodes positioned in the Operating Room with continuous stimulation beginning after extubation in the Recovery Room. Group II consisted of 25 patients where cryoanalgesia was applied intra-operatively with a cryoprobe to the intercostal nerve at the level of the incision and one level above and one level below. Each intercostal nerve of subjected to a 40 second freeze and 5 second thaw cycle. Group III, the control group, received no cryoanalgesia or TNS. Pain medication was equally available to all three groups of patients as needed. Pulmonary function tests were performed on each group of patients pre-operatively, after twenty-four hours and on the fifth post-operative day.

Results. The control group showed greater impairment of pulmonary function than the TNS or cryoanalgesia groups as exhibited through testing of vital capacity, forced expiratory volume (FEV₁) and 3 and inspiratory force pressure. Using the same parameters to compare the TNS and cryoanalgesia group the TNS group's initially showed less pulmonary impairment than the cryoanalgesia group, however, by the fifth post-operative day the cryoanalgesia group had significantly improved. The pain medication requirements of Groups I & II throughout this period were less than the control group. Groups I & II subjective improvement was greater than Group III as exhibited by fewer pain complaints and earlier ambulation with less discomfort. Fever was exhibited in six control group patients while none in the TNS and cryoanalgesia groups. SAMPLE TABLE

Number of Pt. & Group	Day	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%
TNS	1 day (after 24hr)	-	5	8	8	2	2
	5th	-	-	2	12	8	3
CRYO	1st	8	10	5	2	-	-
	5th	-	-	7	2	14	2
CONTROL	1st	10	5	5	3	1	1
	5th	-	2	13	7	3	0

Discussion. Although previous work has established the effectiveness of TNS and cryoanalgesia in post-operative pain control, this study is the first to compare these modalities and their influence on pulmonary function through the testing of pulmonary parameters. This study demonstrates the beneficial use of TNS and cryogenics in the control of post-thoracotomy pain. Pain relief was sufficient in both the TNS and cryoanalgesia groups to allow greater lung expansion, less atelectasis and better pulmonary status than the control group. This coupled with the need for less narcotic medication in the TNS and cryoanalgesia groups resulted in better post-operative recovery.

References.

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