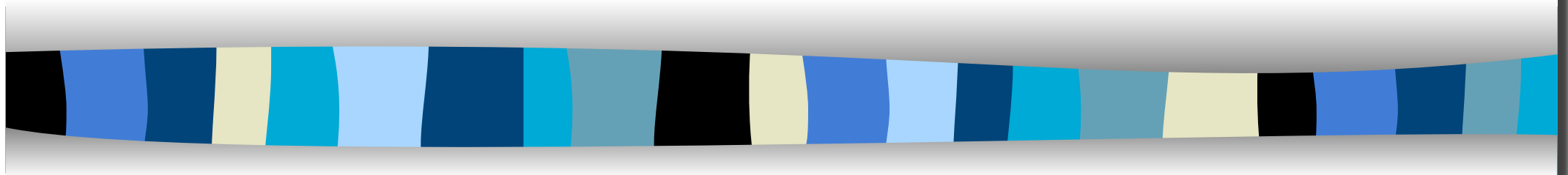


3ème Journée de Recherche en Kinésithérapie Respiratoire

26 juin 2010

Paris Hôtel-Dieu



**Efficacité de la T.E.N.S.  
sur la douleur post-opératoire après thoracotomie**

Anne FREYNET

Masseur-kinésithérapeute

Service de chirurgie thoracique et cardio-vasculaire

Besançon



# PLAN

- Introduction
- Objectifs
- Présentation du BestBET
- Historique du cas clinique
- Présentation de la TENS
- Question en trois parties
- Matériel et Méthode
- Résultats
- Discussion et conclusion
- Bibliographie



## INTRODUCTION

- Actuellement, la profession évolue vers une **kinésithérapie basée sur les preuves**.
- Plusieurs types d'étude, méta-analyse, revue de littérature (etc...) sont publiés ou en cours de publication.
- Dans ce cadre, voici un protocole de recherche nommé BestBET permettant d'avancer vers la kinésithérapie basée sur les preuves tout en donnant une recommandation **d'ordre pratique**.



Pourquoi une kinésithérapie manuelle...et strictement manuelle?



## OBJECTIFS

- Contribuer à une pratique basée sur les preuves en kinésithérapie
- Réaliser une recherche bibliographique et en déduire une évidence clinique
- Permettre une utilisation plus rationnelle de la T.E.N.S. en pratique clinique
- Etablir une recommandation pour la T.E.N.S. en chirurgie thoracique basée sur les preuves



## PRESENTATION DU BestBET

- Médecine basée sur les preuves (EBM)
- Praticiens en chirurgie cardio-vasculaire et thoracique confrontés à une interrogation d'ordre pratique
- Question élaborée en trois parties
- Recherche bibliographique
- Analyse des articles sélectionnés
- Recommandation formulée

## HISTORIQUE DU CAS CLINIQUE

- Patient opéré d'une lobectomie supérieure droite à J1
  - Douleur post-opératoire (EVA = 6 au repos ; EVA = 8 à la toux)
  - Patient BPCO( 120 PA tabac)
  - Effets secondaires des analgésiques  
(nausées et vomissements)
  - Difficulté pour la kinésithérapie respiratoire
- 
- **Et pourquoi pas la TENS???**



# La Stimulation Electrique Nerveuse Transcutanée (T.E.N.S.)

- Electrothérapie
- Gate-control ou programme endorphinique
- 2 électrodes antérieures et 2 postérieures de part et d'autre de la thoracotomie
- Intensité efficace: picotements forts mais supportables
- Durée de traitement: 30min 2 fois par jour, sur plusieurs jours







## QUESTION EN TROIS PARTIES

In [ patients undergoing thoracotomy for lung surgery] is  
[transcutaneous electrical nerve stimulation associated with  
analgesic treatment superior to analgesic treatment  
alone] in [reducing postoperative pain]?

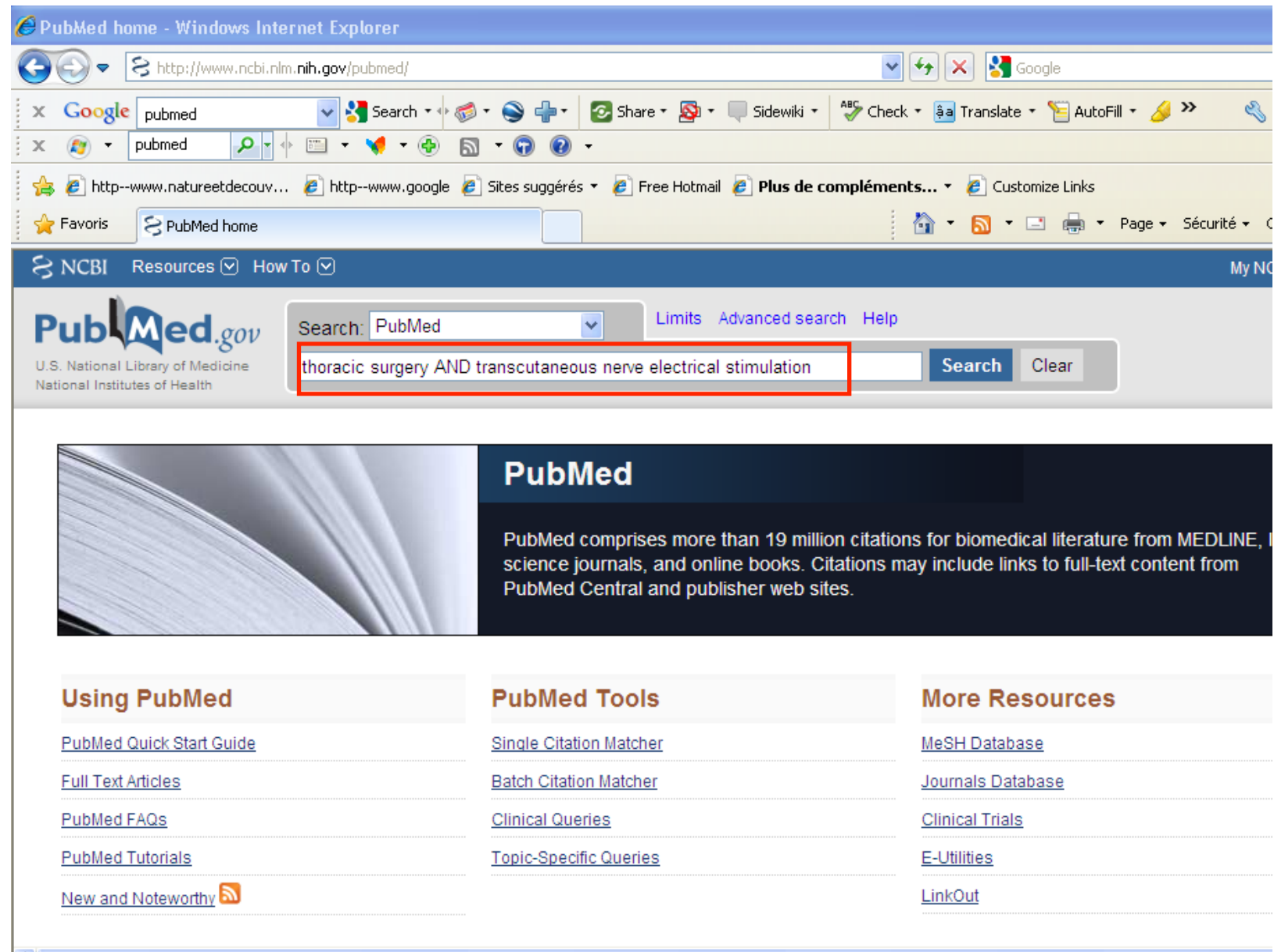


## MATERIEL ET METHODE

### RECHERCHE BIBLIOGRAPHIQUE – SELECTION DES ARTICLES

- Bases de données PEDro, Medline
- Critères d'inclusion:
  - Etudes thérapeutiques publiées entre 1980 à Mai 2009
  - Etudes concernant la TENS et la chirurgie thoracique via thoracotomie
- Critères d'exclusion:
  - Méthodologie contestable
  - Articles de chirurgie thoracique concernant une voie d'abord autre que la thoracotomie
- Mots-clés: [thoracic surgery] AND [transcutaneous electrical nerve stimulation]
- 74 articles trouvés dont **9 études prospectives randomisées** pertinentes évaluant l'efficacité de la TENS après thoracotomie

# RECHERCHE MEDLINE – étape 1



PubMed home - Windows Internet Explorer

http://www.ncbi.nlm.nih.gov/pubmed/

Search: PubMed

thoracic surgery AND transcutaneous nerve electrical stimulation

Search Clear

NCBI Resources How To My NC

**PubMed.gov**  
U.S. National Library of Medicine  
National Institutes of Health

**PubMed**

PubMed comprises more than 19 million citations for biomedical literature from MEDLINE, science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites.

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**PubMed Tools**

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**More Resources**

- [MeSH Database](#)
- [Journals Database](#)
- [Clinical Trials](#)
- [E-Utilities](#)
- [LinkOut](#)

# RECHERCHE MEDLINE - Etape 2

thoracic surgery AND transcutaneous electrical nerve stimulation - PubMed result - Windows Internet Explorer

http://www.ncbi.nlm.nih.gov/sites/pubmed

Search: PubMed

thoracic surgery AND transcutaneous electrical nerve stimulation

Search Clear

Display Settings:  Summary, 20 per page, Sorted by Recently Added

Send to:

Filter your results:

All (81)

Review (8)

Free Full Text (14)

Manage Filters

We found [1 article](#) by title matching your search:

[\[Use of transcutaneous electrical nerve stimulation \(TENS\) in the treatment of postoperative pain in thoracic surgery\]](#)  
Shibata K et al. *Kyobu Geka*. (1986)

**Results: 1 to 20 of 81**

<< First < Prev Page 1 Next > Last >>

# RECHERCHE MEDLINE –Etape 3

Comparison of continuous and intermittent transcut... [Heart Surg Forum. 2009] - PubMed result - Windows Internet Explorer

http://www.ncbi.nlm.nih.gov/pubmed/19833593

pubmed

Heart Surg Forum. 2009 Oct;12(5):E266-71.

**Comparison of continuous and intermittent transcutaneous electrical nerve stimulation in postoperative pain management after coronary artery bypass grafting: a randomized, placebo-controlled prospective study.**

Solak O, Emmiler M, Ela Y, Dündar U, Koçoıulları CU, Eren N, Gökçe İY, Çekirdekçi A, Kavuncu V.

Department of Physical Medicine and Rehabilitation, Afyon Kocatepe University, School of Medicine, Afyonkarahisar, Turkey.  
ozlemsolak@hotmail.com

**Abstract**

**OBJECTIVE:** We compared the effectiveness of continuous transcutaneous electrical nerve stimulation (TENS) and intermittent TENS in the management of pain after coronary artery bypass grafting (CABG). **METHODS:** We randomized 100 patients who had undergone median sternotomy for CABG into 4 groups with 25 patients each: (1) continuous TENS (CTENS) and pharmacologic analgesia, (2) intermittent TENS (ITENS) and pharmacologic analgesia, (3) placebo TENS (PTENS) and pharmacologic analgesia, and (4) pharmacologic analgesia alone (control). We studied these groups with regard to the relief of postoperative pain during the first 24 hours. For each patient we recorded the following: demographic characteristics; vital signs; intensity of pain with a visual analogue scale (VAS) before treatment (VAS(0)), at the 12th hour (VAS(12)), and at the 24th hour (VAS(24)); and analgesic intake. **RESULTS:** The groups were comparable with respect to age, sex, and body mass index at baseline. Mean VAS scores decreased within each group; however, the mean VAS(12) and VAS(24) scores decreased significantly in the CTENS and ITENS groups, compared with PTENS and control groups ( $P < .05$ ). We found no significant difference between the CTENS and ITENS groups with respect to decreasing VAS(12) and VAS(24) scores ( $P > .05$ ). Narcotic intake was significantly less in the CTENS and ITENS groups than in the control and PTENS groups ( $P < .01$ ). Furthermore, narcotic requirements were significantly lower in the CTENS group than in the ITENS group ( $P < .01$ ). **CONCLUSIONS:** CTENS and ITENS after median sternotomy for CABG decreased pain and reduced narcotic requirements more than in the PTENS and control treatments during first postoperative 24 hours. Neither CTENS nor ITENS is superior to the other in decreasing pain; however, CTENS leads to a greater reduction in the narcotic requirement than ITENS.

PMID: 19833593 [PubMed - indexed for MEDLINE]

**Related citations**

- Control of acute postoperative pain by transcutaneous electri [Heart Surg Forum. 2008]
- Prospective, Randomized, Placebo-controlled Study of the Effect of TENS [World J Surg. 2005]
- Lumbar versus thoracic epidural buprenorphine for postoperativ [Acta Anaesthesiol Scand. 1999]
- Review** Evaluation of intrapleural analgesia in the management of blunt traum [Am Surg. 1996]
- Review** Is transcutaneous electrical nerve stimulat [Interact Cardiovasc Thorac Surg. 2010]

See reviews...  
See all...

**All links from this record**

- Related Citations
- Compound (MeSH Keyword)
- Substance (MeSH Keyword)

**Recent activity**

Turn Off Clear

Comparison of continuous and intermittent

Terminé Internet 100%

# RECHERCHE PEDro –Etape 1

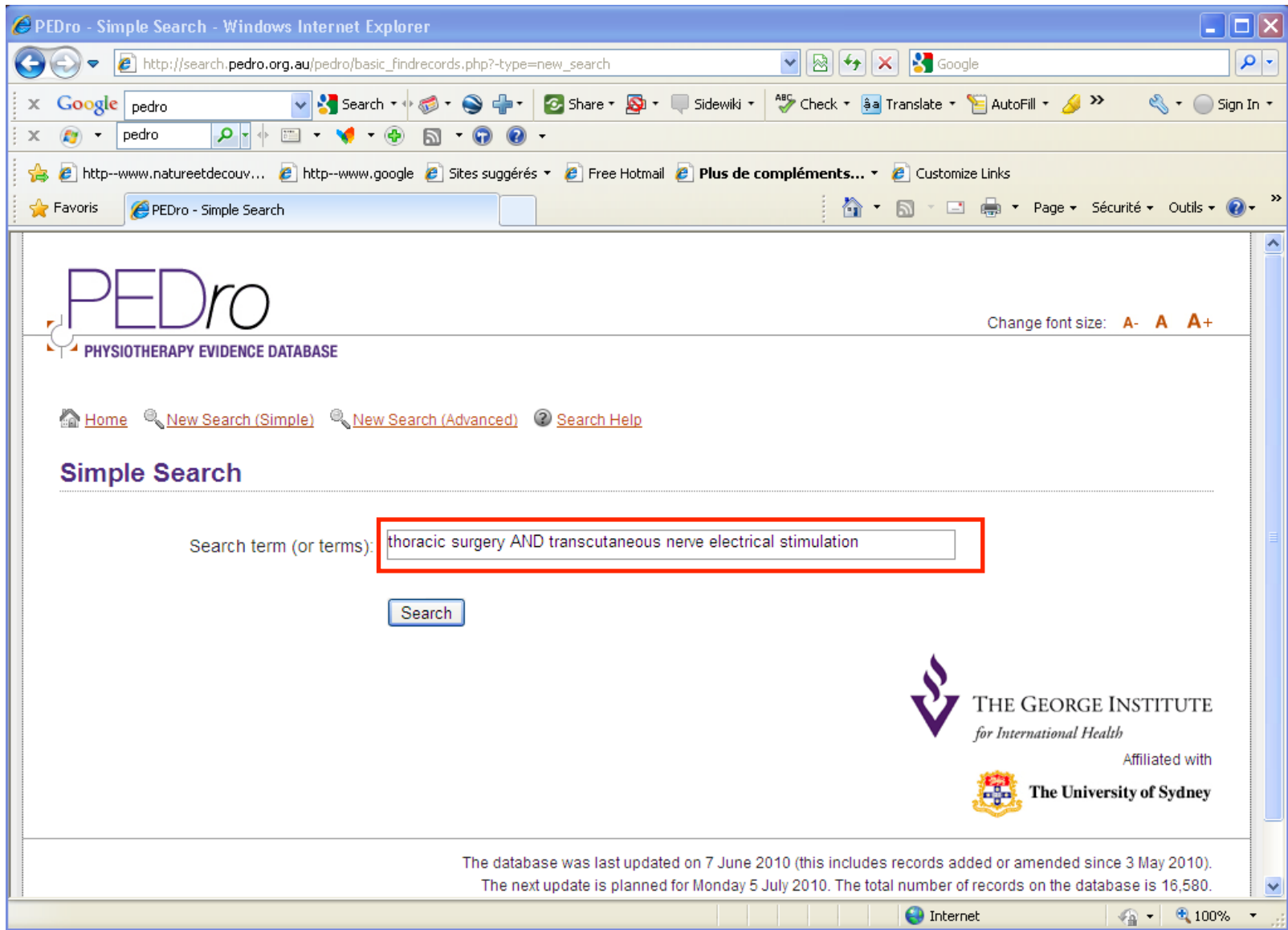
The screenshot shows the PEDro website in a Windows Internet Explorer browser window. The address bar displays <http://www.pedro.org.au/>. The browser's search bar contains the text 'pedro'. The website's header features the PEDro logo and the text 'PHYSIOTHERAPY EVIDENCE DATABASE'. On the right side of the header, there is a 'Change font size' option with buttons for 'A-', 'A', and 'A+'.

The main content area is divided into three columns:

- Left Column:** Contains search options ('Simple search' and 'Advanced search'), a language selector for 'English', and a list of links: 'Frequently asked questions', 'Search help', 'Downloads', 'Tutorials', 'Links', 'Supporters', 'Updates', and 'About us'. At the bottom of this column, there are links for '中文' and 'Português'.
- Middle Column:** Titled 'Welcome to PEDro', it provides a description of the database: 'PEDro is the Physiotherapy Evidence Database. PEDro is a free database of over 16,500 randomised trials, systematic reviews and clinical practice guidelines in physiotherapy. For each trial, review or guideline, PEDro provides the citation details, the abstract and a link to the full text, where possible. All trials on PEDro are independently assessed for quality. These quality ratings are used to quickly guide users to trials that are more likely to be valid and to contain sufficient information to guide clinical practice. PEDro is produced by the Centre for Evidence-Based Physiotherapy at The George Institute for International Health.' It includes a link for 'More on PEDro' and a section titled 'Search the PEDro database' which states: 'There are three search pages for the PEDro database. Two were designed for health professionals (simple search and advanced search). One was designed for consumers of physiotherapy and can be accessed via the Physiotherapy Choices web-site.'
- Right Column:** Features a blue box with the text 'VISIT Physiotherapy Choices WHICH TREATMENT IS BEST FOR ME?' and a section titled 'Latest updates' with the text: 'Find out the latest updates that have been made to the PEDro database via a range of tailored feeds.' It includes a link for 'More updates'.

The browser's status bar at the bottom shows 'Internet' and a zoom level of '100%'.

# RECHERCHE PEDro - Etape 2



PEDro - Simple Search - Windows Internet Explorer

http://search.pedro.org.au/pedro/basic\_findrecords.php?-type=new\_search

Google

Google pedro

pedro

http--www.natureetdecouv... http--www.google Sites suggérés Free Hotmail Plus de compléments... Customize Links

Favoris PEDro - Simple Search



Change font size: A- A A+

**PEDro**  
PHYSIOTHERAPY EVIDENCE DATABASE

[Home](#) [New Search \(Simple\)](#) [New Search \(Advanced\)](#) [Search Help](#)

**Simple Search**

Search term (or terms):

 **THE GEORGE INSTITUTE**  
*for International Health*  
Affiliated with  
 **The University of Sydney**

The database was last updated on 7 June 2010 (this includes records added or amended since 3 May 2010).  
The next update is planned for Monday 5 July 2010. The total number of records on the database is 16,580.

Internet 100%



# RECHERCHE PEDro – Etape 3

**Search Results**

Click on a title to view details of that record. If your search has returned many records you may need to click on *Next* (at the top or bottom of the list of records). To display a list of records from one or a series of searches, click on *Select* and then *Display Selected Records* (at the top of the page).

Record 1 - 7 of 7

Title	Method	Score (/10)	Select Record
<a href="#">Is transcutaneous electrical nerve stimulation effective in relieving postoperative pain after thoracotomy?</a>	systematic review	N/A	<a href="#">Select</a>
<a href="#">A clinical practice guideline on peri-operative cardiorespiratory physical therapy</a>	systematic review	N/A	<a href="#">Select</a>
<a href="#">Prospective, randomized, placebo-controlled study of the effect of TENS on postthoracotomy pain and pulmonary function</a>	clinical trial	6/10	<a href="#">Select</a>
<a href="#">Transcutaneous electrical nerve stimulation for pain management in patients with uncomplicated minor rib fractures</a>	clinical trial	5/10	<a href="#">Select</a>
<a href="#">The effect of transcutaneous electrical nerve stimulation on pain after thoracotomy</a>	clinical trial	5/10	<a href="#">Select</a>
<a href="#">Control of postoperative pain by transcutaneous electrical nerve stimulation after thoracic operations</a>	clinical trial	4/10	<a href="#">Select</a>
<a href="#">Effect of TENS on pain, medications, and pulmonary function following coronary artery bypass</a>	clinical trial	4/10	<a href="#">Select</a>



# RECHERCHE PEDro – Etape 4

**Author/Association:** Erdogan M, Erdogan A, Erbil N, Karakaya H, Demircan A

**Title:** Prospective, randomized, placebo-controlled study of the effect of TENS on postthoracotomy pain and pulmonary function

**Source:** World Journal of Surgery 2005 Dec;29(12):1563-1570

**Method:** clinical trial

**Method Score:** 6/10 [Eligibility criteria: Yes; Random allocation: Yes; Concealed allocation: No; Baseline comparability: Yes; Blind subjects: Yes; Blind therapists: No; Blind assessors: Yes; Adequate follow-up: No; Intention-to-treat analysis: No; Between-group comparisons: Yes; Point estimates and variability: Yes. Note: Eligibility criteria item does not contribute to total score] \*This score has been confirmed\*

**Abstract:** We investigated the efficacy of transcutaneous electrical nerve stimulation (TENS) for postthoracotomy pain control in a prospective, randomized, double-blind, placebo-controlled study. We studied two groups of patients undergoing posterolateral thoracotomy. In group 1, TENS was used postoperatively on 60 patients for 5 days. Group 2 contained 56 patients without TENS. In both groups a visual analog scale (VAS) was used to indicate if analgesia was needed. When the VAS was higher than 4, an analgesic was administered. We observed the forced expiratory volume in 1 second (FEV1), the forced vital capacity (FVC), partial arterial oxygen pressure (PaO2), partial arterial carbon dioxide pressure (PaCO2), and how many doses of analgesia were given at postoperative 0 (extubation time), 2, 6, 12, 24, 48, 72, and 120 hours. TENS was not employed in patients with cardiac or neurologic disease. In group 1, TENS reduced the need to administer opioids during the 5-day postoperative period. This result is statistically significant ( $p = 0.013$ ). Additionally, following the sixth postoperative hour, TENS increased the spirometric breath function. The FEV1, FVC, and PaO2 were high and PaCO2 was low when the first group is compared to the second. All these results are statistically significant ( $p = 0.012$ ,  $p = 0.01$ ,  $p = 0.024$ , and  $p = 0.02$  respectively). We observed that TENS produced no evidence of side effects or intolerance in the patients of group 1. TENS is thus beneficial for pain relief following thoracotomy and has no side



## MATERIEL ET METHODE

### RECHERCHE BIBLIOGRAPHIQUE – METHODE D'ANALYSE

- Deux lecteurs, une masseur-kinésithérapeute et un Professeur des Universités-Praticien Hospitalier de chirurgie thoracique
- Lecture individuelle et recoupement des résultats
- Grille de lecture de l' HAS adaptée aux études thérapeutiques
- Extraction des données grâce à un tableau récapitulatif
- Commentaires et points faibles exprimés dans le tableau

# RESULTATS (1)

## Miller–Jones et al. (1980)

- Population: 28 patients
- (TENS (n=14) / sans TENS (n=14))
- EVA: Pas de différence significative
- Dose de narcotiques: Pas de différence significative
- VEMS: Pas de différence significative



# RESULTATS (2)

## Stratton et al. (1980)

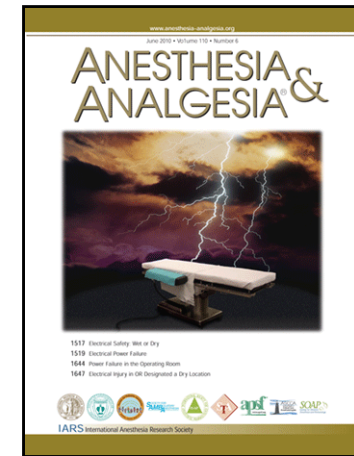
- Population: 21 patients
- (TENS (n=11)/ sans TENS (n=10))
- CVF: Différence significative au sein du groupe TENS (p=0,01)



# RESULTATS (3)

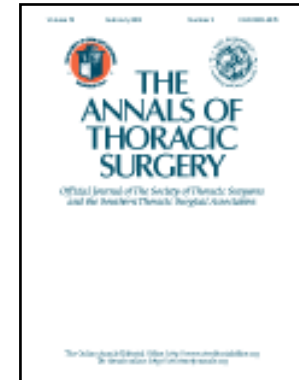
## Rooney et al. (1983)

- Population: 44 patients
- TENS (n=22)/ placebo TENS (n=22)
- Quantité consommée moins importante dans le groupe TENS ( $p < 0,05$ )
- Pas de différence significative pour la fréquence d'administration



## RESULTATS (4)

### Warfield et al. (1985)



- Population: 24 patients
- TENS (n=12)/ placebo TENS (n=12)
- EVA: TENS < placebo TENS (jour 1: p=0,014)
- Tolérance à la kinésithérapie: meilleure dans le groupe TENS (jr1: p0,018; jr 2: p=0,0064)
- Nausée: pas de différence significative
- Retour en chambre après SI: TENS < placebo TENS (p=0,013)
- Quantité de narcotiques demandée: pas de différence significative

## RESULTATS (5)

Liu et al. (1985)

- Population: 30 patients
- TENS (n=15) courant efficace/ TENS courant inefficace (n=15)
- EVA: baisse significative dans le groupe TENS ( $p < 0,05$ ) et non significative dans groupe TENS non-efficace
- Flexion d'épaule: gain d'amplitude significatif dans le groupe TENS ( $p < 0,05$ ), et non significatif dans groupe TENS inefficace
- Activités fonctionnelles: meilleure de façon significative ( $p < 0,05$ ) dans le groupe TENS, et non significative dans l'autre



## RESULTATS (6)

### Stubbing et al. (1988)

- Population: 40 patients
- TENS (n=20) / sans TENS (n=20)
- Demande d'analgésiques: pas de différence significative
- Temps d'analgésie per-os: pas de différence significative
- EVA: pas de différence significative
- Peak-flow: pas de différence significative

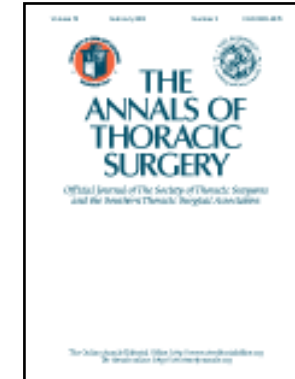




# RESULTATS (7)

## Benedetti et al. (1997)

- Population: 324 patients
- 3 groupes: TENS (n=103); placebo TENS (n=106); contrôle (n=115)
- 5 procédures étudiées: PL, MS, CT, ST, VAT
- EVA: pas de différence significative entre les 3 gpes
- Délai de demande entre analgésiques: PL pas de différence, TENS > autres pour les 4 autres procédures ( $p < 0,001$ )
- Quantité d'analgésiques: PL pas de différence, TENS > autres pour les 4 autres procédures ( $p < 0,001$ )



# RESULTATS (8)

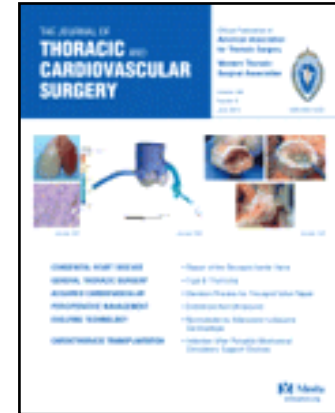
## Erdogan et al. (2005)

- Population: 116 patients
- TENS (n=60) / placebo TENS (n=56)
- Dose d'analgésiques: TENS < placebo TENS ( $p < 0,01$ )
- EVA: TENS < placebo TENS (repos  $p = 0,009$ ; toux  $p = 0,008$ )
- Fonction pulmonaire: TENS > placebo TENS (VEMS  $p = 0,01$ ; CVF  $p = 0,012$ )
- GDS: TENS > placebo TENS (Pa O<sub>2</sub>  $p = 0,024$ ; Pa CO<sub>2</sub>  $p = 0,02$ )
- Effets secondaires: seulement dans groupe placebo TENS (prurit, nausée et vomissements)



## RESULTATS (9)

### Solak et al. (2007)



- Population: 40 patients
- TENS (n=20)/ sans TENS (n=20)
- EVA: J0-J3: pas de différence significative; J4-J60: TENS < sans TENS (p<0,05)
- Echelle du Prince Henry: J0- J2: pas de différence significative; J3-J60: TENS < sans TENS p<0,05
- Fonction pulmonaire (VEMS et CVF): pas de différence significative



## DISCUSSION ET CONCLUSION

- 7 des 9 études sélectionnées considèrent la TENS comme un adjuvant pertinent au traitement antalgique classique après thoracotomie
- Bénéfice est démontré à la fois sur la douleur aiguë, mais aussi sur la fonction pulmonaire, la tolérance à la kinésithérapie, et sur le temps d'hospitalisation.
- DONC: cette technique est à **A NE NEGLIGER** en post-opératoire de chirurgie pulmonaire.



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