



Transcutaneous Electrical Nerve Stimulation Versus Physiotherapy for Chronic Low Back Pain

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Abstract

The objective of this study is to analyse the effect in the long term of Transcutaneous Electrical Nerve Stimulation (TENS) in chronic low back pain (CLBP) compared to physiotherapy, to improve the symptomatology, to delay de surgery or to ovoid it, to reduce the number of sick-leave days. It's a prospective and randomized study, from September 2010 until December 2016, compared two groups; 95 patients with CLBP treated by TENS versus 66 patients, treated by physiotherapy (Infrared and ultrasound). The duration of treatment was 12 weeks, 3 sessions a week/patient, evaluated by; pain intensity: visual analogue scale (VAS), neurological signs, MRI, length of sick leave, recourse to surgery. Follow up time was 12 months. In the short and long terms, pain relief was significantly better in group TENS compared with group physiotherapy ($p < 0.001$). The average of sick leave was shorter in group TENS. However; in the two groups, the main radiological symptom was disc degeneration diseases. In the long-term TENS was better than physiotherapy, significantly improves the symptomatology and quality of life in patients with CLBP.

Keywords: TENS; Physiotherapy; CLBP

Introduction

The big problematic in rehabilitation [1] is the multiplicity of methods which used in low back pain treatment. We have surgical methods and medical treatments. For this reason, there is no consensus in rehabilitation treatment. In the other hand, and for many years ago, medical treatments targeted pain's treatment, and we don't have evidence in their benefit in the long term [2,3]. CLBP has become a major public health problem; in 1994, in USA; the cost of LBP was estimated at \$ 20 Billion, in United Kingdoms; 67 million days off work/year. 6,7% of the budget of Finland only for LBP [4]. TENS is an old history, the Romans used the torpedo fish in the treatment of pain. Torpedo fish delivers electrical discharges (50 - 150 Volts).

Objectives of the Study

The objectives of our study were:

- o To analyze the effects in the long term of "TENS for CLBP",
- o To compare between TENS and physiotherapy combining; Infrared and Ultrasound,

- o To improve the symptomatology of CLBP,
- o To delay the surgery or to ovoid it,
- o To reduce number of sick-leave days.

Materials and Methods

Prospective and randomized study, from September 2010 until December 2016, compared two groups; 1st group = 95 patients with CLBP treated by TENS, 2nd group = 66 cases, treated by physiotherapy combining Infrared and ultrasound.

The duration of treatment was 12 weeks, 3 sessions a week/patient, evaluated by; pain intensity: visual analogue scale (VAS), neurological signs, MRI, length of sick leave, recourse to surgery. Follow up time was 12 months.

From a technical point of view, we used to devices that delivers an electrical current respecting the four basic parameters of TENS, the infrared and ultrasound are known for their action at the Gate Control.



Figure 1: TENS application.

In our protocol, we used TENS between 5 and 10 Hz, it's a very low frequency which implicated for the chronic cases. It's very important condition to have secretion of enkephalins. The time of application per session was; between 20 and 30 minutes for TENS group, and 40 minutes for physiotherapy group.

In the CLBP, we are confronted with a real vicious circle, and physiotherapy intervenes; by braking the link between pain and lameness.

Results

Pain vas score			
Protocols	1 st Day	3 months (VAS between : 0 - 3)	12 months (VAS between 0 - 3)
TENS	≥ 7	88.8% p < 0.001	80,6% (p < 0.001)
	≥ 7	66,6% p < 0.001	44,3% (p < 0.001)
Surgery (after 12 months)			
TENS	10.3% (p < 0.01)		
IR + US	30.6% (p < 0.01)		
Neurological Complications			
TENS	4.8 % (p < 0.01)		
IR + US	6.2 % (p < 0.01)		

Table 1

As you can see on the table 1, after one year of follow-up, TENS outcomes were significantly better than physiotherapy, in pain relief, in surgery; there were fewer cases to operate, and in professional reinsertion. The radiological outcomes were homogenous between the 2 groups, and the etiologies were dominate by disc degeneration diseases.

Discussion

A good comprehension to physiotherapy requires a good comprehension of mechanisms of nociception. To this effect, functional neurosurgery [5] which act on the descending pathways has no indications in CLBP. Infrared acts at the level of medullar dorsal horn by reinforcing the Gate Control mechanism, and TENS, at very low frequency; by inhibiting the action of substance P. Microscopically, TENS, promotes the secretion of enkephalins, those enkephalins blocs the substance P. Substance P is considered as the most important mediator, which implicated in the transmission of the nociceptive message. However, its currently accepted that the action of TENS is similar to morphine's action but without its side's effects, related with habituation and with rowel problems [6].

Surgery for 10% of cases in the "TENS" group. This result notes a difference with a paper of F. Balagué. According to this study,82 patients with sciatica hospitalized in rheumatology, were followed for one year. Evaluation lumbar TDM, EMG, clinical assessment, isokinetic work ratio for ankle flexor and extensor muscles, VAS and two questionnaires; 30% of patients were operated [7].

However, in the nightlines, the evidence-based literature offers a little support for TENS in the CLBP, but actually, we have more and more papers with high level of evidence, this led to increase understanding of the role of physiotherapy in LBP treatment [8-10].

Substance P is considered as the main mediator of nociceptive messages, conducting researches into the development of antagonists specific to neurokinin receptors [11]. This path proved very disappointing in the field of analgesia. So, until now, electrotherapy is the only medical alternative to substance P. In this area, we have this American work [11], who obtained the ISSLS (International Society Study of Lumbar Spine) prize paper of basic science at the SPINWEEK of Amsterdam, In 2012. The authors where be able to delay disc degeneration diseases in a mouse model, by inhibiting NFKB Pro-factor. However, when the spikier exposed his inflammatory cascade, we could see the action of substance P and its role in activation of NFKB pro-factor.

Conclusion

This study showed the superiority of TENS in the long term, for the CLBP pain treatment, in comparison with Infrared and ultrasound.

However, other studies were necessary for a better comprehension of TENS on disc degeneration disorders effects.

Bibliography

1. F Brion., *et al.* "Evaluation d'un appareil vertical de traction lombaire". *Annales de Réadaptation et de Médecine Physique* 40 (1997): 223-227.
2. M de Sèze., *et al.* "Intérêt des critères de Cochin pour sélectionner les patients susceptibles de bénéficier des infiltrations articulaires postérieures de corticoïdes: une étude prospective portant sur 91 cas (SOFMER-SOFMOO)". *Annales de Réadaptation et de Médecine Physique* 43 (2000): 339-341.
3. N Messedi-Kamoun., *et al.* "Place de la mésothérapie dans le mal du dos". *Journal de Réadaptation Médicale* 20 (2000): 49-52.
4. S Poiraudeau and M Revel. "Lombalgies Encyc.Méd. Chir.(Paris France), Appareil locomoteur (1994).
5. P Martens and M Sindou. "La neurochirurgie fonctionnelle de la douleur". *Annales de Réadaptation et de Médecine Physique* 41 (1998): 377.
6. Emc Neurologie. *Physiologie de la douleur* (2004).
7. Balagué FJ. "Sciatiques opérées. Compte rendu ISSLS - HAWAI 1999. Revue de médecine orthopédique (1999).
8. Tang ZY., *et al.* "Mechanisms and applications of transcutaneous nerve stimulation in analgesia". *Sheng Li Xue Bao* 69.3 (2017): 325-334.
9. Krekoukias., *et al.* "Spinal mobilization vs conventional physiotherapy in the management of chronic low back pain due to spinal disk degeneration: a randomized controlled trial". *Journal of Manual and Manipulative Therapy* 25.2 (2017): 66-73.
10. Nnoaham KE., *et al.* "Transcutaneous Electrical Nerve Stimulation (TENS) for chronic low back pain". *Cochrane Database Systematic Review* (2008).

11. Nasto Vo., *et al.* "Inhibition of NF-KB Activity ameliorates age-associated disc degeneration in a mouse model of accelerate aging". USA. ISSLS Prize Paper. SPINEWEEK Amsterdam (2012).

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