

## ***NEUROREFLEXOTHERAPY INTERVENTION FOR EXACERBATIONS OF CHRONIC LOW BACK PAIN: CLINICAL EVIDENCE AND BIOLOGICAL SUBSTRATE***

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### ***OBJECTIVE***

To describe neuroreflexotherapy intervention and to present the evidence available on the clinical usefulness of this procedure for the treatment of exacerbations of chronic low back pain.

### ***NEUROREFLEXOTHERAPY INTERVENTION***

This procedure consists of temporary implantation of surgical staples in trigger points in the back and epidermal burins in referred tender points in the ear. Trigger points are defined as either locations with local tenderness on palpation within involved dermatomes, or the location where direct pressure evokes the patient's local or referred pain. Surgical staples are commonly used in surgery for skin closure. Epidermal burins are small metallic punches placed less than 2mm below the surface of the skin. Staples are left in place for about 90 days and epidermal burins for about 14 days, obtaining a more persistent stimulation than that achieved by transcutaneous electrical stimulation (TENS)<sup>15</sup> or intradermal injections<sup>16</sup>. Neuroreflexotherapy interventions may be confused with acupuncture. Zones of the skin stimulated by neuroreflexotherapy are exclusively defined by their innervation and they neither coincide with the points describe in Chinese acupuncture texts<sup>17</sup> nor with migration pathways of some radioactive tracers, as has been shown in the case of acupuncture points.<sup>18,19</sup> They also differ in their electrical characteristics<sup>20</sup> and in the methods of stimulation used.

### ***CLINICAL STUDIES***

The potential efficacy of neuroreflexotherapy intervention for treating chronic low back pain was first suggested by a follow-up study of 2,751 patients<sup>1</sup>. Two double-blind, randomized, controlled clinical trials have been conducted in different settings with the participation of 169 patients with low back pain (persistent for more than 8 years, with a current episode lasting longer than 12 weeks) in whom drug treatment was unsuccessful.<sup>2,3</sup> Patients were referred from the Spanish National Health System; from primary health care facilities in the first trial,<sup>2</sup> and from the outpatient clinics of three rheumatology departments and one rehabilitation unit of three different teaching hospitals, in the second one. Main exclusion criteria were history of surgery in the dorsolumbar region, spinal stenosis, dermatological conditions that prevented neuroreflexotherapy intervention, and other factors that may prevent the assessment of the patient's clinical course, such as pain related to other conditions or use of NSAID or analgesics for other disorders.

In both studies, there was an immediate (within 10 min) and clinically relevant improvement in back pain, referred pain, and pain on movement that persisted until the end of follow-up (30 and 45 days). Transient cutaneous discomfort was noted in 13 patients and limited dermal infection in 2. The number of days off from work and of bed rest was less in the treatment group than in controls. Forward bending showed a better evolution in the treatment group when compared with the control group. Treated patients used less medication than controls in the first trial but not in the second, probably because drug use before neuroreflexotherapy was not common among participants. The COOP chart items were used to examine other potential changes in quality of life after neuroreflexotherapy. Only two of those items ('changes in quality of life' and 'pain experienced during the follow-up period') showed a statistically significant improvement in the treatment group. In the second trial multiple linear logistic regression models were used to assess the association between neuroreflexotherapy (real in treatment group, sham in control group) and the improvement of back pain, referred pain and pain on movement. Results of multivariate analysis showed a high pain improvement attributable to the effect of neuroreflexotherapy.

Although some general-related items of the COOP chart did not change after neuroreflexotherapy, this procedure appears to be a simple effective treatment for reduction of disability and pain relief in a current episode of low back pain in patients for whom medication are not effective.

### **COMMENTS**

In most patients with chronic low back pain it is not possible to establish an organic cause<sup>4</sup> and in these cases, certain neural mechanisms may explain the pathophysiology of the syndrome. It has been shown that activation of capsaicin-sensitive fibers correlates with episodes of low back pain<sup>5</sup> Depolarization of these fibers is accompanied by release of substance P and other neuropeptides. Antidromic release of substance P causes neurogenic inflammation of the innervated territory and gives rise to its humoral inflammation.<sup>6-8</sup> Depolarization of capsaicin-sensitive fibers activates nociceptive neurons of spinal cord layers I, II, and V resulting in pain and muscle contracture<sup>9</sup>. If activation of capsaicin-sensitive fibers persists, substance P also causes activation of NMDA receptors of spinal nociceptive neurons inducing protooncogenes c-fos and c-jun and probably others. As a consequence, nociceptive neurons may remain activated although the initial stimulus has disappeared.<sup>10</sup> This mechanism may explain the persistence of these signs and symptoms (painful limitation of motion, muscle contracture, inflammation, referred pain, etc.) in the absence of an organic cause to which low back pain could be attributed.

In this situation physical stimulation of dermal nerve endings related to the dermatomes involved could determine release of enkephalins.<sup>11</sup> Binding of enkephalins to receptors of capsaicin-sensitive fibers and nociceptive neurons prevents the release of substance P and deactivates nociceptive neurons,<sup>12</sup> inhibiting the mechanism involved in the pathophysiology of low back pain. In addition, structures in the thalamus and brainstem activated by stimuli applied far from the painful zone are capable of triggering pain-relieving effects.<sup>13</sup> In this respect, the ear may constitute a suitable territory for stimulation because of the connections of its innervation-related nuclei.<sup>14,21</sup> This hypothesis is consistent with results of these two clinical trials, that is, rapid appearance of pain-relieving effects following neuroreflexotherapy intervention and its persistence up to the end of the follow-up period.

However, further studies are essential to confirm the present results in a larger sample size and to assess the effect after 45 days.

Neuroreflexotherapy appears to be a simple and effective treatment for rapid pain relief of the current episode in patients with chronic low back pain for whom medication is not effective.

## **REFERENCES**

1. Moreno J, Gestoso M, Kovacs FM. La efectividad de la intervención neurorreflejoterápica en el tratamiento de la patología mecánica crónica del raquis: resultados preliminares. *Medicina del Trabajo*. 1992;1:433-443.
2. Kovacs FM, Abraira V, Lopez-Abente G, Pozo F. La intervención neurorreflejoterápica en el tratamiento de la lumbalgia inespecífica: un ensayo clínico controlado, aleatorizado, a doble ciego. *Med Clin (Barc)*; 1993;101:570-575.
3. Kovacs FM, Abraira V, Pozo F et al. Local and remote sustained trigger point therapy for exacerbations of chronic low back pain: A randomized, double-blind, controlled, multicenter trial. *Spine* 1997;22:786-797
4. Deyo RA, Cherkin D, Conrad D, Volinn E. Cost, controversy, crisis: low back pain and the health of the public. *Annu Rev Public Health* 1991;12:141-56.
5. LeVasseur SA, Gibson SJ, Helme RD. The measurement of capsaicin-sensitive sensory nerve fiber function in elderly patients with pain. *Pain* 1990;41:19-25.
6. Szolcsanyi J. Antidromic vasodilatation and neurogenic inflammation. *Agents Actions* 1988;23:4-11.
7. Baraniuk JN, Kowalski ML, Kaliner MA. Relationships between permeable vessels, nerves, and mast cells in rat cutaneous neurogenic inflammation. *J Appl Physiol* 1990;68:2305-11.
8. Serra MC, Bazzoni F, Della Bianca V, Greskowiak M, Rossi F. Activation of human neutrophils by substance P. Effect on oxidative metabolism, exocytosis, cytosolic Ca<sup>2+</sup> concentration and inositol phosphate formation. *J Immunol* 1988;141:2118-24.
9. Cross SA. Pathophysiology of pain. *Mayo Clin. Proc* 1994;69:375-383
10. Thompson SWN, Woolf CT. Primary afferent-evoked prolonged potentials in the spinal cord and their central summation: role of the NMDA receptor. In: Bond MR, Charlton JE, Woolf CJ. *Proceedings of the VIth World Congress on Pain*. Amsterdam:Elsevier, 1991;291-7.
11. Bing Z, Cesselin F, Bourgoin S, Clot AM, Hamon M, Le Bars D. Acupuncture-like stimulation induces a heterosegmental release of met-enkephalin-like material in the rat spinal cord. *Pain* 1991;47:71-7.
12. Yonehara N, Imai Y, Chen JQ, Takiuchi S, Inoki R. Influence of opioids on substance P release evoked by antidromic stimulation of primary afferent fibers in the hind instep of rats. *Regul Pept* 1992;38:13-22.
13. Villanueva L, Cliffer KD, Sorkin LS, Le Bars D, Willis WDJ. Convergence of heterotopic nociceptive information onto neurons of caudal medullary reticular formation in monkeys (*Macaca fascicularis*). *J Neurophysiol* 1990;63:1113-27.
14. Ferré J, Gonzalo LM. Remote Electrodermic Response to an Algogenic Stimulus. Pathway and Spinal Integration. *Revista Española de Fisiología*, 1987;43(4):407-414.
15. Marchand S, Charest J, Li J, Chenard JR, Lavignolle B, Laurencelle L. Is TENS purely a placebo effect? A controlled study on chronic low back pain. *Pain* 1993;54:99-106.

16. Gunn CC, Milbrandt WE, Little AS, Mason KE. Dry needling of muscle motor points for chronic low back pain. A randomized clinical trial with long-term follow-up. *Spine* 1990;5:279-91.
17. Aku-Moxi Therapy Group of Chinese Medicine Academy of Shanghai. *Aku-Moxi therapy treatise*. Shanghai: Medicine Academy of Shanghai, 1960.
18. Kovacs FM, Gotzens V, Garcia A, et al. Experimental study on radioactive pathways of hypodermically injected technetium-99m. *J Nucl Med* 1992;33:403-7.
19. Kovacs FM, Gotzens V, Garcia A, et al. Kinetics of hypodermically injected technetium-99m and correlation with cutaneous structures: an experimental study in dogs. *Eur J Nucl Med* 1993;20:585-90.
20. Niboyet JEH. *La moindre résistance à l'électricité de surfaces punctiformes et de trajets cutanés concordant avec les points et méridiens, bases de l'acupuncture*. Paris: Louis-Jean, 1963.
21. Bengoechea O, Insausti R, Gonzalo LM. Spinal topography of the projection of the auricular nerve in the rabbit: a transganglionic WGA-HRP study. *Brain Res* 1985;329:340-5.