



EDITORIAL
PAIN AND PHYSICAL MODALITIES

Physical modalities and pain control in rehabilitation: lights and shadows to dispel

Roberto CASALE¹, Giorgio FERRIERO^{2,3*}

¹Opusmedica PC&R, NPO, Piacenza, Italy; ²Unit of Physical and Rehabilitation Medicine, IRCCS Scientific Institute of Tradate, Istituti Clinici Scientifici Maugeri, Tradate, Varese, Italy; ³Department of Biotechnology and Life Sciences, University of Insubria, Varese, Italy

*Corresponding author: Giorgio Ferriero, Istituti Clinici Scientifici Maugeri IRCCS, Via Maugeri 4, Pavia, Italy.
E-mail: giorgio.ferriero@icsmaugeri.it

This is an open access article distributed under the terms of the Creative Commons CC BY-NC license which allows users to distribute, remix, adapt and build upon the manuscript, as long as this is not done for commercial purposes, the user gives appropriate credits to the original author(s) and the source (with a link to the formal publication through the relevant DOI), provides a link to the license and indicates if changes were made. Full details on the CC BY-NC 4.0 are available at <https://creativecommons.org/licenses/by-nc/4.0/>.

In rehabilitation, methods so far proposed for controlling pain are essentially based on drugs, exercise, invasive and minimally invasive treatments, cognitive-behavioural procedures, and physical modalities.^{1,2} Physical modalities have always been considered part of the DNA of Physical and Rehabilitation Medicine³ and a primary therapeutic element in pain control. Physical modalities, widely used in rehabilitation, are based on a broad range of thermal, electrical, mechanical energies, as well as on other sources of energy as the light itself. All these energies claim some clinical successes in controlling pain.⁴ Several guidelines recommend considering the use of non-pharmacological strategies, as physical modalities, to reduce or eliminate the need for medicines.^{5,6} However, there is no incontrovertible evidence to support the use of specific physical modalities in the treatment of pain in general, although there is a sufficient theoretical basis for their use in controlling pain almost in any rehabilitation setting.

All of the reviews so far published highlight the difficulty of comparing the research results because of the lack of information about the method used and, in particular, the physical characteristics of the stimulus (*e.g.* intensity, frequency, duration, time and site of application), or the needed therapeutic dose, also in the most used form of physical energy used, namely electrical currents.⁷

Another critical aspect of the use of physical modalities

is the mismatch between the clinical application and the neurophysiological background. A therapeutic approach based on pain mechanisms, as well as on robust clinical reviews, seems to be the only way of ensuring the correct clinical use of all of the possible physical therapies for pain.

This first series of review papers on physical modalities in rehabilitation has been dedicated to some physical energies that have often aroused enthusiasm and some disappointment: localised vibration, LL-LASER and transcranial magnetic stimulation. A narrative review is dedicated to the neurophysiological basis of the analgesic effect of localised vibration encompassing not only the well-established action on the spinal gate but also pinpointing quite interesting and not yet fully explored antinociceptive mechanisms.⁸ A more clinically based literature review is dedicated to the efficacy of low-intensity LASER and photobiomodulation therapy for pain control in some of the most common musculoskeletal conditions.⁹ An emerging role in pain control also in rehabilitation is that of transcranial magnetic stimulation. All the most recent acquisitions in this area are included in the review presented here with a very appealing title. It recalls us to the substantially actual anecdotal reports on the efficacy of physical modalities in controlling pain, and to the need to have sound and proof evidence of their clinical efficacy. In this specific

field like never before and in any other physical treatments technical parameters are of paramount importance to activate specific neural pathways.¹⁰

Physical modalities and their technological evolution are advancing rapidly on the better utilization of already established knowledge and pushed further on by the most recent basic science acquisitions. This series of papers aims, at least, to partially fill the gap between basic science knowledge and clinical application of the most relevant physical agents, publishing reviews on both topics.

References

1. Casale R, Boldrini P, Christodoulou N; SIMFER Special Interest Group on. "Pain and Disability" Italian Society of Physical Medicine & Rehabilitation. Pain, its diagnosis and treatment in a rehabilitation setting. A national survey. *G Ital Med Lav Ergon* 2021;43:74–81.
2. Tamburin S, Lacerenza MR, Castelnovo G, Agostini M, Paolucci S, Bartolo M, *et al.*; Italian Consensus Conference on Pain in Neurorehabilitation (ICCPN). Pharmacological and non-pharmacological strategies in the integrated treatment of pain in neurorehabilitation. Evidence and recommendations from the Italian Consensus Conference on Pain in Neurorehabilitation. *Eur J Phys Rehabil Med* 2016;52:741–52.
3. Tesio L, Franchignoni F. Don't touch the physical in "physical and rehabilitation medicine". *J Rehabil Med* 2007;39:662–3.
4. Rakel B, Barr JO. Physical modalities in chronic pain management. *Nurs Clin North Am* 2003;38:477–94.
5. Kolasinski SL, Neogi T, Hochberg MC, Oatis C, Guyatt G, Block J, *et al.* 2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee. *Arthritis Rheumatol* 2020;72:220–33.
6. Osteoarthritis: care and management. London: National Institute for Health and Care Excellence (NICE); 2020.
7. Travers MJ, O'Connell NE, Tugwell P, Eccleston C, Gibson W. Transcutaneous electrical nerve stimulation (TENS) for chronic pain: the opportunity to begin again. *Cochrane Database Syst Rev* 2020;4:ED000139.
8. Casale R, Hansson P. A narrative review on the analgesic effect of localised vibration - part 1: the neurophysiological basis. *Eur J Phys Rehabil Med* 2022;58:306–15.
9. De Oliveira MF, Johnson DS, Demchak T, Tomazoni SS, Leal-Junior EC. Low-intensity laser and led (photobiomodulation therapy) for pain control of the most common musculoskeletal conditions: a literature review. *Eur J Phys Rehabil Med* 2022;58:282–9.
10. Garcia-Larrea L, Quesada C. Cortical stimulation for chronic pain: from anecdote to evidence. *Eur J Phys Rehabil Med* 2022;58:290–305.

Conflicts of interest.—The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Authors' contributions.—Both authors read and approved the final version of the manuscript.

History.—Manuscript accepted: March 29, 2022. - Manuscript received: March 28, 2022.

(Cite this article as: Casale R, Ferriero G. Physical modalities and pain control in rehabilitation: lights and shadows to dispel. *Eur J Phys Rehabil Med* 2022;58:280-1. DOI: 10.23736/S1973-9087.22.07535-9)