Can carbon dioxide laser substitute moxibustion?

Insoo Jang · Jongbae Park

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Dear Editors

We read with interest an article by Shen et al. reporting that combined 10.6 μm carbon dioxide (CO_2) laser and 650 nm indium–gallium–aluminum–phosphide (InGaAlP) laser irradiation on patients with knee osteoarthritis is beneficial [1]. For a constructive debate in the academic arena, we would like to share our comments as follows: (1) The substitution of moxibustion by CO_2 laser, as implied by the authors in ‘laser moxa’, is inappropriate, because of substantially different penetration depths and the patterns of heat transfer; (2) the claim of successful allocation concealment casts doubt, due to the significantly high drop-out rate in the placebo control group.

Approximately 99% of the thermal energy of CO_2 laser is absorbed less than 0.2 mm from the skin surface, no matter how intense it is [2]. The epidermis is usually less than 0.15 mm thick, and the dermis is 1–3 mm [3]; therefore CO_2 laser cannot reach the deeper parts of the dermis. The term moxibustion covers a broad range of thermo-stimulation, from direct to indirect methods, using a moxa stick. Different methods create different patterns of heat transfer, i.e., conduction, infrared irradiation, and

convection. While the proportion of the patterns varies among diverse moxibustion, all moxibustion heat reaches the depth of subcutaneous tissues. This substantially differentiates CO_2 laser from moxibustion [4].

A significantly higher drop-out rate in the control group [55%, 95% confidence interval (CI) 33% to 77%] than in the experimental group (10%, 95% CI 0% to 23%) at 4 weeks indicates unblinding one way or another. Insignificant correct guessing between the two groups may mislead the status of blinding when this significantly different compliance and drop-out rate are not taken into consideration. Therefore, the success of blinding in the study is doubtful. It may be plausible that the participant in the control group noticed the lack of heat sensation that he or she might have anticipated, and hence became disappointed with the allocation, which resulted in the drop out.

In summary, we contend further discussion is necessary to approve the idea of substituting moxibustion with CO_2 laser, and the interpretation of the findings reported in the study need cautious revisiting.

References

1. Shen X, Zhao L, Ding G, Tan M, Gao J, Wang L, Lao L (2008) Effect of combined laser acupuncture on knee osteoarthritis: a pilot study. *Lasers Med Sci* [Epub ahead of print]
2. Tunér J, Hode L (2002) Laser therapy: clinical practice and scientific background. Prima Books, Grängesberg, Sweden, pp 28–33, 92–7
3. Sanders JE, Goldstein BS, Leotta DF, Richards KA (1999) Image processing techniques for quantitative analysis of skin structures. *Comput Methods Programs Biomed* 59:167–180. doi:10.1016/S0169-2607(99)00003-6
4. Schieke SM, Schroeder P, Krutmann J (2003) Cutaneous effects of infrared radiation: from clinical observations to molecular response mechanisms. *Photodermatol Photoimmunol Photomed* 19:228–234. doi:10.1034/j.1600-0781.2003.00054.x

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I. Jang · J. Park (✉)
Department of Physical Medicine and Rehabilitation,
School of Medicine, University of North Carolina,
Chapel Hill, Campus Box 7200, Room 1203, UNC Hospitals,
Chapel Hill, NC 27599-7200, USA
e-mail: jongbae_park@med.unc.edu

I. Jang
College of Korean Medicine, Woosuk University,
Woosuk University Hospital,
Junghwasan-dong, Jeonju,
Jeonbuk, South Korea