Wavelength of the Laser in Low Level Laser Therapy

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I read the article entitled "Evaluation of low-level laser therapy in reducing diabetic polyneuropathy related pain and sensorimotor disorders"(1) in the Acta Med Iran journal 2013;51(7):444-8. I would like to commend the author on my concern for this clinical trial manuscript.

In this manuscript, the low-level laser therapy (LLLT) technique was used for treatment of the symptoms of the patients with diabetic polyneuropathy. There is evidence proving the positive biological effects of LLLT or photobiomodulation (PBM) including reduction of inflammation, promoting wound healing, and pain relief (2-4). There are also several clinical trials using the LLLT technique as a new noninvasive and non-pharmacological approach for treatment of the symptoms of the patients with diabetic neuropathy (5-9). The important parameters of LLLT include the wavelength of the laser(nm), power density(W/cm^2), energy density(J/cm^2), number of treatment sessions and treatment time (2-9). The most important parameter of LLLT is the wavelength of the laser which determines the type as well as intensity of the interactions of the laser with biological system at cellular, tissue and organ level (10). Generally, LLLT treatments are conducted by red or near-infrared (NIR) lasers with wavelengths in the range of 600-1100 nm (2-10), which is known as therapeutic window.

The major problem in the manuscript is in the materials and methods section and inappropriate selection of a laser with a wavelength of 78 nm for treatment of patients. This wavelength is in the Ultraviolet C (UVC) region of the spectrum of light and could be very harmful to patients. On the other hand, a laser with a wavelength of 78 nm was not implemented in the clinical trials using LLLT for treatment of diabetic neuropathy or diabetic wound patients (5-10).

As a conclusion, I agree with the author about using a non-invasive and non-pharmacologicl approach for treatment of the symptoms of patients with diabetic neuropathy, but the type of the laser used in this manuscript is inappropriate and using this type of laser could not only be harmful to the patients but also without any positive therapeutic effects.

References

1. Bashiri H. Evaluation of low-level laser therapy in reducing diabetic polyneuropathy related pain and sensorimotor disorders. Acta Med Iran 2013;51:543-7.
2. Hamblin MR. Mechanisms and applications of the anti-inflammatory effects of photobiomodulation. AIMS Biophys 2017;4:337-61.
3. Brignardello-Petersen R. Laser use may improve pain and wound healing in patients with recurrent aphtous stomatitis. J Am Dent Assoc 2017;148:e112.
4. Hunter S, Langemo D, Hanson D, Anderson JW, Thompson PA. The use of monochromatic infrared energy in wound management. Adv Skin Wound Care 2007;20:265-6.
5. Yamany AA, Sayed HM. Effect of low level laser therapy on neurovascularv function of diabetic peripheral neuropathy. J Adv Res 2012;3:21-8.
6. Shashi KC, Maiya AG, Hande HM, Vidyasagar S, Rao K, Rajagopal KV. Efficacy of low level laser therapy on painful diabetic peripheral neuropathy. Laser Ther 2015;24:195-200.
7. Zinman LH, Ngo M, Ng ET, Nwe KT, Gogov S, Bril V. Low-intensity laser therapy for painful symptoms of diabetic sensorimotor polyneuropathy: a controlled trial. Diabetes Care 2004;27:921.
8. Khamseh ME, Kazemikho N, Aghili R, Forough B, Lajevardi M, Dabaghian FH, et al. Diabetic distal symmetric polyneuropathy: effect of low-intensity laser therapy. Lasers Med Sci 2011;26:831.
9. Shanb AA, Youssef EF, Al Baker WI, Al Baker WI, Hassan A, Jatoi NA. The Efficacy of Adding Electromagnetic Therapy or Laser Therapy to Medications in Patients With Diabetic Peripheral Neuropathy. J Lasers

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10. Randa Zein, Wayne Selting, Michael R. Hamblin. Review of light parameters and photobiomodulation efficacy: dive into complexity. J Biomed Opt 2018;23:1-17.