Dear Editor,

In the recent review of the literature by Loreti et al., the authors demonstrate the contradictory situation regarding the scientific documentation for using laser phototherapy (LPT) to improve wound healing. Although 557 studies were identified from 2008 up to today, only 31 of these had a score of 3 or more on the Jadad scale. And merely three of these were clinical studies. Therefore, although wound healing is the most studied indication for LPT, the scientific basis is only acceptable for rodents. And because rodent wound healing is different from human wound healing, the documentation for using LPT in a clinical situation remains questionable. So far the authors have made a good point, but it ends there.

First of all, the authors have only listed the reported doses (J/cm²). This is not enough; the applied energy (J) always has to be taken into account in an analysis. Almost any dose can be achieved by changing the output power, especially the spot size. A dose of 4 J/cm² is sometimes thought to be the gold standard for wound healing, but it can be reached in seconds or in minutes, depending upon the power of the laser. And if a thin fiber is used, a high dose is reached much faster than when using a wide fiber. Irradiation time in itself is an important parameter. Simply comparing the numerical values of the doses has no meaning, and can lead the reader in the wrong direction. Additionally, the reported doses are not always correct.

Next, the authors have chosen to use the lasing components instead of reporting the wavelengths. This leaves the reader unaware of the actual wavelength used, because, for example, GaAlAs has a wide wavelength range. And, it is not uncommon to find GaAlAs reported, but with the lasing components actually being InGaAlP. The latter is reported twice, as “phosphide indium-gallium-arsenic (InGaAlP)” and as “indium-gallium-arsenic (InGaAlP)” Both are incorrectly spelled and are actually the same. Even worse is the “laser” GmbH,” which does not exist. It turns out to be a 660 nm laser from Lasotronic GmbH in Switzerland, “GmbH” meaning “company with limited liability.” And an “InGasAs” laser turns out to be an ordinary GaAlAs 980 nm laser. This is a typo in the original article, but a review of the literature cannot only quote whatever is written. An independent analysis of the studies used in the review must be performed.

A review of the literature requires less analysis than a meta-analysis. However, it requires a critical look at the articles to be quoted. A Jadad evaluation is a good start, but because “it is all in the parameters,” these parameters have to be independently checked and analyzed. One of the three clinical studies used 90 J/cm², a very high dose, and because it was achieved by using a 15 W, 980 nm laser for 3 sec per cm² and increasing the skin temperature up to maximum 50°C; it is obvious that this is not LPT as we know it, and of course it is not effective.

One further aspect of a review on this topic should be the use of healthy individuals. Many studies have done so, but it is now well realized that the effect of LPT on wound healing in healthy animals is very limited. Instead, modern research has used, for example, genetically diabetic animals, in which the positive effect of LPT is more obvious.

A notable part of the discussion says “The shorter the wavelength, the higher its action and power of penetration.” What does “action” mean? And, actually, it is the other way around, or, rather with red having low penetration, ~810 nm is the best and then penetration is lowered as the wavelength is further increased.

In summary, the authors have gathered the best wound healing studies from recent years and come to the conclusion that the evidence is scarce, especially for the clinical aspect. This is a useful wakeup call, but apart from that, the review lacks quality and should be read with care.

The average cost of treating a chronic wound in a diabetic Swedish patient is >3000 USD per year. Therefore, if LPT works as well as is widely anecdotally reported, there are large potential savings for healthcare decision makers. Maybe we should leave the rats and mice and continue the work of Mester from the 1970s. Out of 1018 patients with chronic leg ulcers, 74% healed within a few months.

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References


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