

Current recommendations specify that LLLT dosage be provided in **Joules (J, total energy)**, rather than the previous recommended Joules/cm² (J/cm², energy density). Use **Joules** rather than *Joules/cm²* to specify how much energy is delivered in a treatment.

In Laser devices that do not calculate Joules automatically, dose can be determined in seconds of exposure required to give the desired Joules by using the following calculation:

Joules = watts.seconds
hence, Seconds = Joules/watts

For example:

For a 50 mW Laser (= 0.050 Watts), with a required dose = 2 J per point...

Seconds exposure = 2 / 0.05 = 40 secs.

This change is very important clinically as the use of the previously recommended Joules/cm² resulted in confusion when comparing dosages between protocols. The resultant dose in Joules/cm² could be the consequence of a number of different treatment options.

For example, 4 J/cm² can be delivered by:

Option #1: a 20 mW Laser with a beam cross section of 0.5 cm² in 100 seconds
i.e., 4 = (0.02/0.5 x 100)

Option #2: a 10 mW laser with a beam cross-section of 0.25 cm² in 100 seconds
i.e., 4 = (0.01/0.25 x 100)

In Option #1, the *total energy delivered would be **2 J***

In Option #2 the *total energy would be **1 J***

This example illustrates that using Joules/cm² resulted in one patient receiving *twice* the total amount of energy that is received by the other patient!

Therefore, it is recommended that Physical Therapists using LLLT should deliver dosages in Joules rather than Joules/cm². Using Joules rather than Joules/cm² will enable better standardization of dosage and permit comparison across different treatment regimes.

The World Association of Laser Therapy (WALT) provides dosage guidelines using Joules for various conditions. These dosage guidelines are based upon the best evidence from the literature in conjunction with expert opinion.

Physical Therapists are encouraged to set LLLT dose according to the WALT guidelines found at:

<http://www.walt.nu/dosage-recommendations.html> (Note that the WALT guidelines are given for surface exposure.)

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