

Experimental verification and validation of a computer model for light-tissue interaction.

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Source

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Abstract

Laser light is frequently used in both diagnostics and treatment of patients. For any laser treatment to be effective it is important to deliver the correct dose at the treatment site. Human skin scatters and absorbs laser light in the visible wavelength region, which results in a decrease in fluence some distance into the skin. Computer simulations can be used to predict the fluence at the treatment site. Liquid and solid phantoms were prepared and the optical properties were measured. These values were then used as input values to a commercial software package simulating the different layers of skin representing phantoms. The transmission and reflected fractions of the different phantoms were measured with an integrating sphere and compared with the computer simulations. The results showed very good agreement with the measured values and the model can therefore be used with confidence to predict fluence at any treatment site inside the skin.

Keywords Laser – Light propagation – Tissue – Phantom