Lasers in Surgery and Medicine

The Official Journal of the ASLMS American Society for Laser Medicine and Surgery, Inc.

American Society for Laser Medicine and Surgery
Twenty-Third Annual Meeting
Anaheim, California April 9–13, 2003

Abstracts

121

PHOTON RECYCLING AS A MEANS OF INCREASING EFFICACY AND SAFETY OF FLASHLAMP SYSTEMS

I. Yaroslavsky, G. Altshuler, A. Yaroslavsky, M. Pankratov, M. Stoll, D. Manstein, and R.R. Anderson

Palomar Medical Technologies Inc., Burlington, MA, Massachusetts General Hospital/Harvard Medical School, Boston, MA

Background and Objective: Photon recycling (PR) in skin results in an increase of the actual fluence at the target in comparison to the incident fluence. It is particularly significant for flashlamp systems (FLS) having large treatment spotsize. However, clinical implications of this effect have been poorly investigated so far.

Materials and Methods: Study consisted of two parts. First, efficiency of PR was measured at different wavelengths (between 450 and 870 nm) as a function of Fitzpatrick skin type. These data were used to verify a computational model, which had been developed to evaluate the effect of PR for realistic skin and irradiation conditions. Predictions of the model were then compared with clinical data on the efficacy of hair removal with a commercially available FLS (EsteLux, Palomar, Burlington, MA) implementing the PR principle in its design.

Results: Efficiency of PR depended strongly on wavelength, skin pigmentation, design of light delivery system, and spotsize. Quantitatively, PR resulted in a several-fold gain in fluence. Clinically, the effect led to a significant (1.2 to 1.5 times) decrease in the thresholds of fluence required for long-lasting hair reduction.

Conclusion: PR can be effectively used in clinical applications of FLS in order to achieve desired treatment goals with lower fluences.

121

PHOTON RECYCLING AS A MEANS OF INCREASING EFFICACY AND SAFETY OF FLASHLAMP SYSTEMS

I. Yaroslavsky, G. Altshuler, A. Yaroslavsky, M. Pankratov, M. Stoll, D. Manstein, and R.R. Anderson

Palomar Medical Technologies Inc., Burlington, MA, Massachusetts General Hospital/Harvard Medical School, Boston, MA

Background and Objective: Photon recycling (PR) in skin results in an increase of the actual fluence at the target in comparison to the incident fluence. It is particularly significant for flashlamp systems (FLS) having large treatment spotsize. However, clinical implications of this effect have been poorly investigated so far.

Materials and Methods: Study consisted of two parts. First, efficiency of PR was measured at different wavelengths (between 450 and 870 nm) as a function of Fitzpatrick skin type. These data were used to verify a computational model, which had been developed to evaluate the effect of PR for realistic skin and irradiation conditions. Predictions of the model were then compared with clinical data on the efficacy of hair removal with a commercially available FLS (EsteLux, Palomar, Burlington, MA) implementing the PR principle in its design.

Results: Efficiency of PR depended strongly on wavelength, skin pigmentation, design of light delivery system, and spotsize. Quantitatively, PR resulted in a several-fold gain in fluence. Clinically, the effect led to a significant (1.2 to 1.5 times) decrease in the thresholds of fluence required for long-lasting hair reduction.

Conclusion: PR can be effectively used in clinical applications of FLS in order to achieve desired treatment goals with lower fluences.