Abstracts

A Direct-Contact Microwave Lens Applicator with a Microcomputer-Controlled Heating System for Local Hyperthermia

Y. Nikawa, H. Watanabe, M. Kikuchi and S. Mori. "A Direct-Contact Microwave Lens Applicator with a Microcomputer-Controlled Heating System for Local Hyperthermia." 1986 Transactions on Microwave Theory and Techniques 34.5 (May 1986 [T-MTT] (Special Issue on Phased Arrays for Hyperthermia Treatment of Cancer)): 626-630.

A direct-contact lens applicator for local microwave hyperthermia is proposed and developed with a computer-controlled microwave heating system. The applicator is a practical one that can converge the radiated electromagnetic field to deposit its energy deep in human tissues. The experimental results, which agree well with the theoretical ones, show that the applicator which operated at 2450 MHz could heat at twice the depth at which a simple and conventional waveguide applicator could heat. The experimental results using a developed computer system that supplies microwave energy and circulated cooling water to the developed applicator show that the fluctuations of temperature at the heating location in the human tissue model were maintained within ±0.3°C of the set temperature. The results of the phantom model and the animal experiment using the system with the applicator show that the maximum depth of noninvasive heating was more than 30 mm below the surface. These results are available for the clinical hyperthermia treatment of cancer.

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