

THERMOGRAPHIC INVESTIGATION OF ULTRASONICALLY INDUCED TEMPERATURE DISTRIBUTIONS IN TISSUES AND TISSUE-EQUIVALENT PHATOMS

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Investigation of spatial distributions of temperature in biological tissues due to ultrasonic heating is important for many problems of therapeutic and diagnostic applications of ultrasound.

The purpose of this study was to develop a computerized thermographic method of visualization of temperature distributions in insonated tissues and tissue-equivalent phantoms (t.-e.p.). T.-e.p. used in the present investigation were made of agar gels containing chalk powder and sodium chloride and having similar acoustical characteristics to those of soft tissues. The phantoms were cut along the different planes, such that after heating by ultrasonic pulse they could be split. The exposed plane was imaged using a scanning thermographic system "AGA-Thermovision-780". The obtained image was recorded digitally on the magnetic tape and after computer analysis was displayed as a three-dimensional picture. The system provides also the measurements of the kinetics of heating and cooling of the object.

The insonation of t.-e.p. was performed by plane ultrasonic waves and by focussed ultrasound at various intensities and duration. The heating of phantoms with inclusions of different soft and bone tissues were investigated as well.