

ULTRASOUND EXAMINATION FREQUENCIES APPROPRIATE
FOR BREAST TISSUE: EFFECTS OF FREQUENCY CHANGE ON
SCATTERING AND CONTRAST RESOLUTION

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In a current research study, patients previously indentified as having solid breast masses are examined by an automatic ultrasound instrument that incorporates a transducer pulsed under conditions which allow the operator to vary, without transducer replacement, frequency of the examining beam. Frequencies of 3.5, 4.5, 6.5 and 8 MHz are currently available. Frequencies above 8 MHz are scheduled for this investigation. An automatic, bi-plane scanning technique allows multiple frequency examinations at scanning planes of the mass that are mutually perpendicular.

The primary purposes of these approaches are to: (1) collect image data on the variation in the scattering characteristics of benign and malignant masses in order to further improve the diagnostic accuracy of ultrasound imaging; (2) to evaluate the diagnostic importance of the increased backscatter from breast fat at higher frequencies. Our preliminary clinical studies, using separate 4 and 7.5 MHz transducers, indicated that as the frequency increases, the backscatter from breast fat is significantly greater than that from malignant and benign breast masses. (Also, Foster et al Ultrasonic Imaging 6, 1984.) Differences between the frequency dependent, backscatter value of fat and that of non-fatty breast masses allows, by means of frequency manipulation, dynamic control over some aspects of contrast resolution.

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