

## ULTRASONIC INVESTIGATION ON HUMAN GALLBLADDER STONES

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### ABSTRACT

The present investigation aims to determine the acoustical parameters of gallbladder stones using Pulse-echo-overlap technique to optimize a disintegrator design. The Ultrasonic velocity for different types of gallbladder stones was measured at 5MHz. From the measured values of Ultrasonic velocity (U), the Specific acoustical impedance (Z), Debye's temperature ( $\theta_d$ ), Elastic modulus (E) and Acoustical attenuation coefficient ( $\alpha$ ) were calculated. These measured parameters are helpful for the stone fragmentation by a disintegrator using Extracorporeal Shock Wave Lithotripsy (ESWL). The stone fragmentation depends on its mechanical properties such as hardness. It may be used to select an optimal frequency with appropriate intensity required for stone fragmentation. The tightness of molecular binding is determined by calculating the Elastic stiffness constant ( $C_{11}$ ) which varies among the types of gallbladder stones.

**KEYWORDS:** Gallbladder Stone, Hardness, Stone Fragmentation and Ultrasonic Velocity