

Wave Propagation in High Porosity Bones-a Cellular Model**Michał Pakuła**, Mariusz Kaczmarek, Józef Kubik*Bydgoszcz University, Bydgoszcz, Poland*

Experimental ultrasonic studies for high porosity cancellous bone give the results which can not be properly described in the wide frequency range (especially for high frequencies) using two phase macrocontinual models (Biot's or Schoenberg model). Hence, a cellular model for propagation of ultrasonic waves in such media is proposed. The sensitivity analysis of frequency dependent phase velocities and attenuations of both longitudinal ultrasonic waves is presented in order to extract physical properties and structural parameters of the cellular model which mostly influence wave parameters. The parameters calculated from the proposed model are compared with the data obtained from Biot's theory. It was shown that only for the long wave range (low frequencies) the predictions of both considered models are close to each other and that the results obtained from cellular model are in good qualitative agreement with the experimental data received from ultrasonic studies.

[View the extended summary](#)