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Measurement of the tortuosity and the viscous characteristic length of human cancellous bone via transmitted waves

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For a few years several authors have proposed the model of Biot to describe the ultrasonic wave propagation in cancellous bone. One drawback of this model is the number of parameters which it needs. Two significant parameters to describe the geometry of the trabeculae are tortuosity and viscous characteristics length. In this communication, we propose two methods to measure these parameters. The first method consists in estimating these two parameters by inversion from the transmission coefficient. In the second method, we get the tortuosity from direct measurement using the focused transducers. The scan of a layer of cancellous bone shows a good correlation between direct measurements and the results of the inversion.