

عنوان مقاله:

PRECISE NONINVASIVE QUANTIFICATION OF MECHANICAL PROPERTIES OF SOFT TISSUE THROUGH VIBRATION

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خلاصه مقاله:

In-vivo appraising and quantifying mechanical properties of soft tissues has been of increasing interest for many medical applications over the past two decades. Elastography is a promising imaging modality for in-vivo tissue characterization. It was proposed to be utilized for breast cancer detection since tissue hardness is an indication of presence of tumor. The new medical imaging technique vibroelastography has the potential as a clinical tool for noninvasive assessment of various mechanical characteristics of soft tissues. In this paper, at first, we introduce vibroelastography technique by expressing the results of almost a-decade investigations in this field. We discuss the basic concepts, principles and capacities of this technique for estimating different mechanical properties of biological tissues. Afterwards, we represent our analytical results implying the proficiency of vibroelastography in detecting and differentiating varying tumors' genera. Considering normal breast tissue and two different (benign and malignant) breast pathologies, we simulate the responses of these tissues to low-frequency vibration. We then calculate the strains and stresses applied to these tissues. We use these simulations and measurements to compute the parameters involved in distinguishing pathologies in tissues by vibro-elastography. These parameters are illustrated and evaluated. It is observed that the differences between the parameters of normal and abnormal tissues are distinguishable. We conclude the paper with the review of potential applications of this technique for medical diagnosis. The efficiency of this technique, the precise information it provides and its precipitous advancement denote .that it might soon be available as a commercial system

کلمات کلیدی:

Vibroelastography, Vibration, Mechanical properties, Soft tissue

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