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ORIGINAL PAPER

Characterization of human bone tissue for diagnosis

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Abstract.
Thermogavimetric methods and differential thermal analysis (DSC) are generally used diagnostic techniques of Materials Science. There are a particular group of specific methods for measuring the properties of a system depending on temperature. Moreover, measuring the heat released or absorbed during a reaction provides important analytical information. Applying these methods of investigation in the study of human bone has led to promising results in early diagnosis of various diseases in the bone tissue with great therapeutic importance. Preliminary study that we conducted reveals encouraging results of using these techniques in early clinical diagnosis of some bone diseases, given the complex structure of bone and the advantages of knowledge the degree of tissue damage before surgery which offers the premises for more advanced studies in this direction. Experimental results will be shown to assess the suitability of the pointed out characterization method , and to allow the definition of parameters to evaluate the hallux valgus and coxarthrosis diseases.

Key words: Bone tissue, thermal analysis, termogravimetry, differential thermal analysis

Introduction

One of the most remarkable tissues of the human body, bone, is the material which makes vertebrates distinct from other animals. Far from inert and lifeless, bones are living, dynamic structures, with same strenght as cast iron, meanwhile light as wood. Bones serve a wide variety of very diverse functions within us: structural support for heart, lungs and marrow; protection for brain, uterus and other internal organs; attachement sites for muscles allowing movement of limbs; mineral reservoir for calcium and phosphorus; defense against acidosis; trap for some dangerous minerals such as lead. Noted for their strength and resiliency during life, it is light, strong, can adapt to its functional demands, and repair itself, bones will remain after we are long gone.

Bone origin - The origin of the bone cells are mesenchymal cells which were within the embryo during early development; some of them remain in the bone