

Damage Assessment of Spinal Bones Due to Prostate Cancer

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ABSTRACT

Bone is the most common site for metastases in cancer and is of particular clinical importance in breast and prostate cancers because of the prevalence of these diseases [1]. Metastatic bone disease results from the interactions between cancer cells in the bone marrow microenvironment and normal bone cells [2]. The effects of cancer on bone cell function can now be assessed accurately by the measurement of specific biochemical markers; for the assessment of bone reabsorption, these markers are derived from the breakdown of type I collagen, the main protein of bone [3].

The objective of the research is to propose a methodology to determine the strength of a spinal bone in patients who suffer from prostate cancer, with the purpose of verifying if metastases has occurred. The computed tomography images (CAT) allow obtaining the needed information to simulate a 3D model of the bone, in this case the lumbar vertebra L5 [4], with the software Mimics v 7.1 is possible to identify the bone and its mechanical properties by means of this information [5]. Advanced numerical methods allow the modelling of anisotropic materials for different applications in engineering [6]. The 3D model is evaluated by a finite element analysis software with their respective boundary conditions and compared with the healthy bone to assess the damage.

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