METHOD TO OBTAIN AN IMAGE BIOMARKER THAT QUANTIFIES THE QUALITY OF THE TRABECULAR STRUCTURE OF THE BONES

DESCRIPTION OF THE TECHNOLOGY

The present invention encompasses a method that allows to obtain an image biomarker that quantifies the quality of the trabecular structure, QTS (Quality Trabecular Structure), from medical images from Computerized Tomography (CT) and / or Magnetic Resonance (MRI) that contain anatomical regions with a significant presence of bony trabecula, generally wrist, vertebrae or femoral head
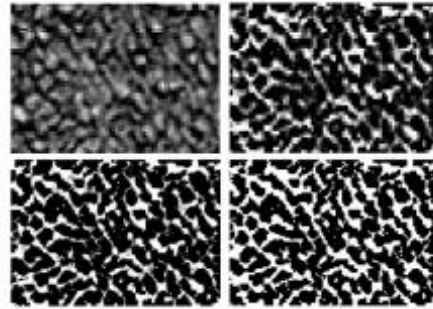
Currently, for the diagnosis and prediction of the prevention of fractures in osteodegenerative pathologies such as Osteoporosis, the technique used is dual energy X-ray absorptiometry (DXA), a non-invasive technique that provides accurate and reproducible information on bone mineral density (BMD). However, this technique is not capable of providing sufficient spatial information, neither in resolution (it does not allow to appreciate the trabecular mycostructure) nor in dimensionality to become a complete diagnostic technique.

MARKET APPLICATION SECTORS

Medical Imaging Diagnosis Sector

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

• It provides a single parameter (image biomarker), QTS, for evaluating the quality of trabecular bone.
• It evaluates the quality of the bone from the multiple dimensions that define the bone trabecula and not only from its quantity or density.
• It estimates the bone quality based on the volume of the bone trabecula with respect to the volume of examined bone, the average thickness of the trabeculae, the average distance between them as well as the fractal dimension by which they are distributed in space.
• It provides information in both two and three dimensions.

CURRENT STATE OF DEVELOPMENT

The technology is developed in the absence of external validation and the creation of all documentation in accordance with ISO13485 and FDA 510k for its commercialization.

INTELLECTUAL PROPERTY RIGHTS

National Patent / Priority Date: P201931050, dated 11/27/2019, jointly owned with the University of Zaragoza y Quibim, S.L.
PCT international extension: PCT / ES2020 / 070033, dated 01/17/2020.
Title: Method to obtain an image biomarker that quantifies the quality of the trabecular structure of bones.

COLABORATION SOUGHT

Company interested in the license of the patent.

MÉTODO PARA OBTENER UN BIOMARCADOR DE IMAGEN QUE CUANTIFICA LA CALIDAD DE LA ESTRUCTURA TRABECULAR DE LOS HUESOS

RELATED IMAGES

Image 1. Method to obtain an image biomarker that quantifies the quality of the trabecular structure of bones, characterized in that it comprises:

- retrieval of high resolution trabecular images from a modality selected from Computed Tomography "CT", Magnetic Resonance "MRI" and a combination of "CT" and "MRI", where the high resolution trabecular images come from a database of medical images with high content of trabecular regions;

- pre-processing the high resolution trabecular images by means of the following sub-steps: obtaining a region of interest "ROI"; calculating a bone fraction map; eliminating a partial volume effect; 15 binarized;

- post-processing the high resolution trabecular images through the following sub-steps: skeletonization; and, extraction of morphological and structural characteristics;

- obtention of a unique image biomarker "QTS":
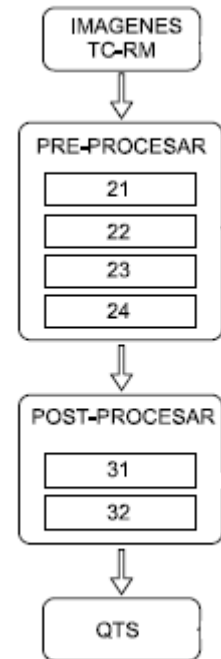
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