

# T1 UNCERTAINTY ESTIMATION OF BONE MARROW IN LUMBAR VERTEBRAE USING MAGNETIC RESONANCE IMAGING

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**Summary:** The precise determination and analysis of longitudinal relaxation time (T<sub>1</sub>) is crucial for diagnosis, prognosis, and monitoring therapeutic response in a variety of diseases such as Acute Myeloid Leukemia either by comparing the native T<sub>1</sub> values in longitudinal studies or by quantifying the physiological parameters in Magnetic Resonance Imaging (MRI). Therefore, in this study we optimize the accuracy of T<sub>1</sub> using the derived uncertainty evaluation expression with the fixed two-flip angles and assess the error of T<sub>1</sub> measurement in bone marrow of an Acute Myeloid Leukemia patient. MR image data were collected and MATLAB software was used in the image processing and data analysis. For quantitative MRI data analysis, Regions of Interest (ROI) on multiple image slices were drawn encompassing vertebral bodies of L<sub>3</sub>, L<sub>4</sub> and L<sub>5</sub>. Both the T<sub>1</sub> and the uncertainty of T<sub>1</sub> were evaluated using the T<sub>1</sub> maps obtained. Then the accurate bone marrow mean value of T<sub>1</sub> was estimated as 747.3 (ms) at 3T. However, the reported T<sub>1</sub> value of healthy subjects is significantly higher (946.0 ms) than the present finding. This suggests that the T<sub>1</sub> for bone marrow can be considered as a potential prognostic bio-marker for Acute Myeloid Leukaemia patients.