

Early degenerative changes in shoulder joint on T2 relaxometry (Cartigram)

Rajitha D*; Elangovan S; Rajadurai M; Sathyanath A

*Corresponding Author: Rajitha D

Department of Allied Health Sciences, Faculty of Life and Allied Health Sciences, Ramaiah University of Applied Sciences, New BEL Road, MSR Nagar, Bengaluru-560054, Karnataka, India.

Tel: +91-709-597-2247; Email: rajitha.ah.ls@msruas.ac.in

Description

A 29-year-old man presented with a one-year history of left shoulder pain, which increased with range of motion and further aggravated on gym training. The patient underwent Magnetic Resonance Imaging (MRI) of the shoulder, which revealed significant hypertrophy of the coracohumeral and superior glenohumeral ligaments on normal grey scale images (Figure 1). We performed cartigram (T2 relaxometry) and the necessary post-processing techniques such as colour mapping (Figure 2a) and T2 values (Figure 2b) on coronal plane (where maximum glenohumeral cartilage can be seen) with a 1.5 Tesla MRI machine (SIEMENS MAGNETOM Avanto, Siemens Medical Solutions USA, Inc., PA, USA).

We obtained the higher T2 value in the post-processing image of T2 relaxometry sequence (Figure 2b) at the superior glenohumeral cartilage and were co-related with Figure 2. We used the rainbow scale (Figure 3a & b) in colour map post-processing techniques, where blue indicates higher T2 values and red indicates lower T2 values according to the references [2,3]. The standard T2 relaxometry value of the cartilage is 32.1-35 ms and that in mild and severe osteoarthritic changes of the cartilage is 34.4-41.0 ms and >45 ms, respectively. However, in this case, the T2 values were 45-60 ms (>45 ms) which correlates with the colour maps. Hence, there is an early degeneration of the cartilage (early osteoarthritis) which was difficult to discern in standard greyscale images.

By diagnosing degenerative changes, an irreversible process [4], at very early stages in younger patients, further cartilage degradation can be prevented by timely management, which increases the patient's healthy life expectancy [5].

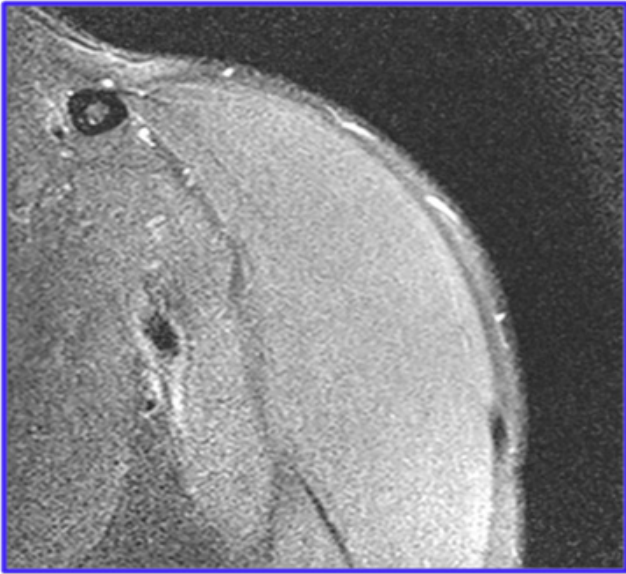


Figure 1: Proton density images -coronal plane.

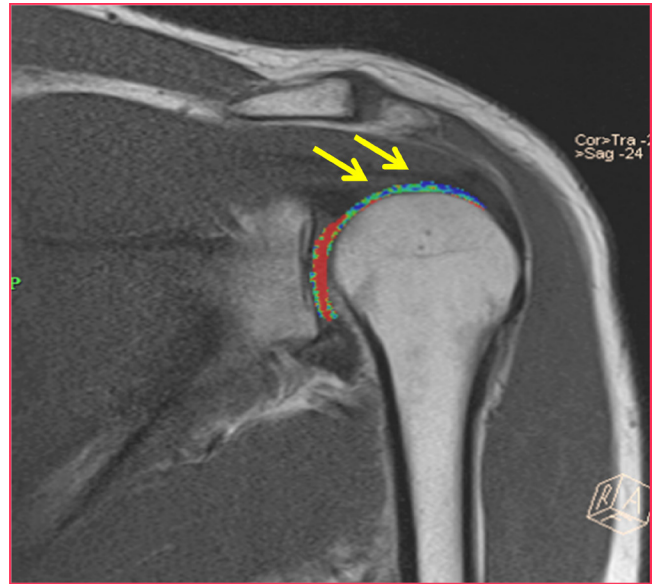


Figure 2a: Color mapping (Glenohumeral cartilage -coronal plane).

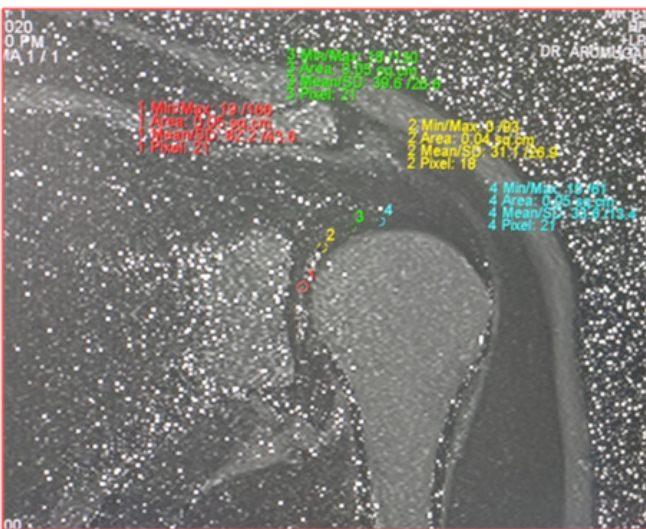


Figure 2b: T2 values at the glenohumeral cartilage (45-60ms-inferior to superior in coronal plane).

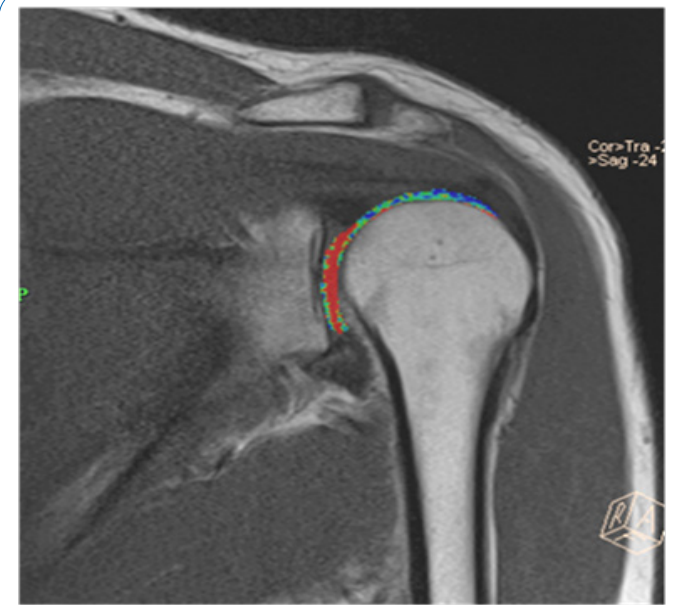
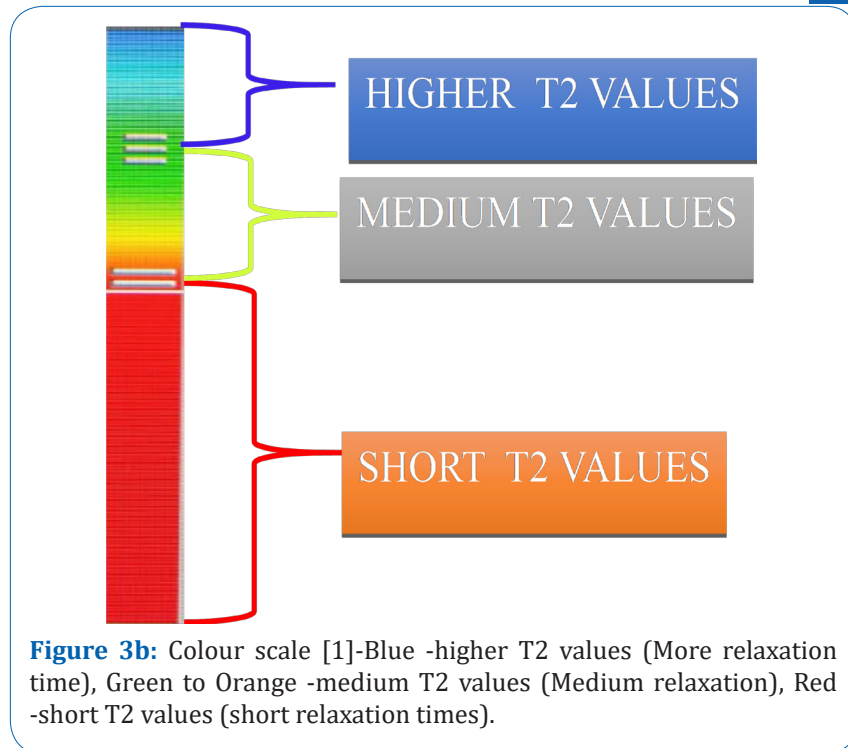


Figure 3a: Color mapping of the glenohumeral cartilage.



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Authors Information: Rajitha D^{1*}; Elangovan S²; Rajadurai M³; Sathyanath A¹

¹Department of Allied Health Sciences, Faculty of Life and Allied Health Sciences, Ramaiah University of Applied Sciences, Bengaluru, Karnataka, India.

²Department of Radiology and Imaging Sciences, Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai-600116, Tamil Nadu, India.

³Department of Food technology, Faculty of Life and Allied Health Sciences, Ramaiah University of Applied Sciences, Bengaluru, Karnataka, India.

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