

In Vivo Three-dimensional Motion Analysis of the Shoulder Joint During Internal and External Rotation at 90 Degrees of Abduction, using wide Gantry MRI.

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Despite its importance for the understanding of joint kinematics in vivo, there has been few studies about shoulder joints. The purpose of this study is to analyze the glenohumeral joint during internal and external rotation at 90 degrees of abduction using in vivo noninvasive motion analysis system. MRI was performed for the following seven positions from maximum internal rotation to maximum external rotation at intervals of 30 degrees. We used 3D-gradient echo sequencing (TR: 12 ms, TE: 5.8 ms, 0.8 mm-slice thickness). Our method is based on matching three-dimensional MR images by the similarity of the image intensity. We analyzed the in vivo three-dimensional motions of the glenohumeral and scapulothoracic joint during this motion. In scapula plane, the mean rotation angle of the glenohumeral joint was 105.5 degrees (SD±39.0°) The mean rotation angle of the scapulothoracic joint was 27.5 degrees (SD ± 7.7°) The contribution ratio is almost 3.8:1 of glenohumeral and scapulothoracic joint respectively.