Shoulder Instability: Clinical considerations and imaging needs
MR arthrography in evaluation of shoulder instability

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Arthrography Technique
The glenohumeral joint is a joint with large recesses. Therefore injection of the glenohumeral joint is usually fairly easy. Several approaches have been described such as antero-inferior, approach through the rotator cuff interval and a posterior approach. Most institutions use fluoroscopy or ultrasound for guidance. CT guidance and free hand techniques have been described. There is no crucial advantage to one or the other technique. The injection volume is usually between 12 to 20 ml. Most institutions use local anesthetics and iodinated contrast before injecting the diluted (2mmol/l) Gadolinium solution. Complication rate is low. The arthrography is usually well tolerated. Many patient report that the MR examination itself produces more discomfort compared to the injection itself (1).

MR Technique
Many institutions use T1 w fat saturated images in three plane. An additional fluid sensitive sequence is helpful to detect acute posttraumatic changes. A non fat saturated sequence, preferable in the sagittal oblique plane is used to detect fatty infiltration of the rotator cuff muscles (2). A transverse sequence using thin sections (For example a 3D gradient echoes sequence) is helpful to detect subtle cartilage and labral lesions. The ABER position is a useful position to detect lesions of the inferior capsuloligamentous complex and to detect subtle lesions of the supraspinatus or infraspinatus undersurface. The ABER position is routinely used in athletes in our institution (3).

The Role of MR Arthrography
The glenohumeral joint stabilizers commonly are categorized into two groups: static and dynamic. The main goal of imaging is to assess the integrity of the static stabilizers, which refer to bony, cartilaginous, capsular, and ligamentous structures. After a traumatic episode, more than 97% of patients with anterior shoulder instability were found to have a labral lesion. With this fact in mind, imaging of the unstable shoulder has to focus mainly on all other stabilizing structures than the labrum. The advantage of direct MR Arthrography is the distension of the joint. The joint distension helps to analyze the capsuloligamentous complex. Especially the attachments of the inferior glenohumeral ligament at the glenoid and at the humeral side are optimally delineated. Subtle cartilage and ligament lesions are well delineated. Recurrent instability tends to erode the articular cartilage of the anterior inferior glenoid rim. Chronic bony defects and small fractures are often difficult to detect with MR or MR Arthrography. However, theses bony abnormalities often have an important impact on the treatment plan(4) of patient with instability. Therefore, additional conventional radiographs or CT have to be considered for exact assessment of the bony structures.
In our institution CT arthrography is used to investigate patients with glenohumeral instability (5).