			Population						
Bibliographic Citation	**Evidence Level**	**Study Design : timing**	**Inclusion**	**Exclusion**	**Patients Demographics**	**Outcome measures - data collection**	**Results**	**Conclusions**	**Study Limitations**
Ahn K-S, Kang CH, Kim Y, Jeong W-K. Diagnosis of adhesive capsulitis: Comparison of contrast-enhanced MRI with noncontrast-enhanced MRI. Clinical Imaging 2015; 39(6): 1061-1067.	Low	retrospective consecutive	All patients undergoing CE MRI in registered time frame	49 patients were excluded due to the following reasons: previous history of trauma (n=3) and operation (n=2), neoplasm (n=18), infection (n=7), inflammatory arthritis (n=5), calcific tendinitis (n=8), neuropathy including brachial plexus pathology (n=2), and images obtained with an inappropriate protocol for evaluation of shoulder internal derangements (n=4)	50 AC patientswere comprised of 20 men and 30 women with a mean age of 53.5 years (range: 38 74 years),whereas the 53 control individuals were 26 men and 27 women with a mean age of 51.7 years (range: 22 78 years). There were no significant differences between the two groups in terms of sex ratio and age. "Control" patients had many other shoulder pathologies (selected based on physicians ordering CE MRI for the shoulder)	This paper specifically focuses on some of the key imaging features such as T2 signal, thickness, and enhancement of the axillary joint capsule and rotator interval abnormalities that help with the diagnosis of AC and reveal their sensitivity, specificity, and reliability.	With regard to axillary joint capsule thickness, a cutoff value of 5.0 mm provided the highest sensitivity and specificity (sensitivity: 92%; specificity: 53% for Observer 1 and sensitivity: 90%; specificity: 81% for Observer 2). Interobserver agreement was excellent (r=0.90) in measuring the joint capsule thickness. T2 signal intensity and contrast enhancement of the axillary joint capsule were helpful in the diagnosis of AC. Interobserver agreement for T2 signal intensity was substantial (k=0.80) and slightly lower than axillary joint capsule thickness (r=0.90). Observer 2 showed that T2 signal intensity of the axillary joint capsule had lower sensitivity of 84% and higher specificity of 74%, whereas Observer 1 showed it had high sensitivity of 94% and low specificity of 64%. In five patients with AC [5/50 (10%)] and in five controls [5/53 (9%)], the two observers disagreed on T2 signal intensity of the axillary joint capsule. In those cases, Observer 1 considered that the joint capsule was hyperintense, but Observer 2 did not. With regard to axillary joint capsule enhancement, grouping variables as "none"versus "mild+moderate+severe"had a sensitivity of 98% and specificity of 64% for Observer 1,while Observer 2 had a sensitivity of 96% and specificity of 66%. This measure had a higher degree of reliability (k=0.92) than joint capsule hyperintensity on noncontrast T2-weighted images. For "none+mild" versus "moderate+severe" and "none+mild+moderate" versus "severe"thesensitivity dropped and specificity increased incrementally, and the reliability was lower than "none" versus "mild+moderate+severe". In the evaluation of axillary joint capsule, there were 9 cases (9/10 [90%]) in which the two observers disagreed on T2-weighted fatsuppressed images but agreed on CE images. Among them, five cases were patients with AC and the cases were in the control group. For Observer 1, there were two AC patients (mean axillary joint capsule thickness 4.4mm) with hypo-signal intensity and enhancement of the axillary joint capsule. For Observer 2, there were six AC patients (mean axillary joint capsule thickness 6.28 mm) with hypo-signal intensity and enhancement of the axillary joint capsule. The presence (partial or complete) of fat obliteration was not helpful in discriminating AC patients from control patients with nonspecific shoulder pain and limited range of motion, and the reliability was fair (k=0.50). However, the presence of enhancement in rotator interval was helpful in discriminating AC and showed more consistent interobserver agreement (k=0.81) than non-CE T1-weighted images.	To the knowledge, this is the second report to compare the diagnostic performance and observer reliability of non-CE and CE MRI for AC. Capsular thickening, T2 hyper-signal intensity and enhancement of the axillary recess, and rotator interval enhancement were associated with shoulder AC. Therefore, these non-CE and CE MRI findings can be helpful in confirming the clinical diagnosis of AC. Although capsular thickening and altered signal of the axillary recess on both non-CE and CE MRI had similar diagnostic performance with high sensitivity, moderate specificity, and excellent interobserver agreement, CE-MRI may improve assessment of the rotator interval and lend further confidence in the radiologic diagnosis of AC.	Selection bias and its retrospective design are the major limitations of this study. These were unavoidable particularly given that the AC cohort was derived from the expertise of a single orthopedist specialized in maladies of the shoulder. In addition, not all patients in the control group were referred for imaging by the shoulder specialist. However, since the control group was imaged for symptomatic abnormalities that are included in the differential diagnosis of AC, this may lend better explanatory power to any MRI findings between the AC and non-AC cohorts, as compared to a study using completely normal and asymptomatic shoulders for controls. In addition, the retrospective format did not allow correlation of the clinical stage of AC with the imaging aspects of the axillary joint capsule and rotator interval. Further studies are necessary to assess these matters.
Ahn K-S, Kang CH, Oh Y-W, Jeong W-K. Correlation between magnetic resonance imaging and clinical impairment in patients with adhesive capsulitis. Skeletal Radiol 2012; 41(10):1301-1308.	Low	retrospective consecutive	n all patients with presumed diagnosis of adhesive capsulitis that were evaluated by the orthopedic surgery department, shoulder MRI exams were performed as a component of routine clinical care. Subjects were eligible if they fulfilled the following inclusion criteria. Unilateral adhesive capsulitis defined as ≥ 50 % loss of movement of the shoulder joint relative to the non-affected side in one or more of three movement directions (i.e., forward elevation, external rotation in 0 degrees of abduction, or internal rotation); duration of complaints ≥1 month; and radiographs demonstrating no pathologic findings (no evidence of joint space loss, glenohumeral osteophytes, calcium deposit, or decrease in acromio-humeral space). Also: The authors enrolled patients with partial-thickness supraspinatus tendon tear on MRI. Patients with diabetes mellitus were accepted.	Exclusion criteria included previous shoulder surgery; another condition affecting the shoulder (e.g., rheumatoid arthritis, osteoarthritis, substantial shoulder trauma, or Hill Sachs lesion); neurologic deficits affecting shoulder function in normal daily activities; clinical history and physical examination indicating a rotator cuff tear, or a full-thickness rotator cuff tear demonstrated on MRI.	50 women and 47 men. Subjects' age ranged from 34 to 72 years, with a mean age of 56. There were 53 dominant and 44 non-dominant involved shoulders. Thirty-five patients had diabetes mellitus. Nine patients had a minor trauma history prior to the development of shoulder symptoms and 25 patients had severe night pain. Clinical impairment measures in patients are shown on Table 2. The time interval between physical examination and MRI ranged from 0 to 28 days, with a mean delay of 9.5 days.	Joint capsule (thickness and contrast enhancement), rotator interval abnormality (signal abnormality in the subcoracoid fat); for rotator cuff pathologies, especially the supraspinatus tendon, MRI findings were graded as normal, tendinosis, or a partial-thickness tear of the supraspinatus tendon. Compared to: pain by visual analog scale, ROM by standardized assessment.	Thickening of the axillary pouch ranged from 5.0 to 15.9 mm, with an average of 8.8 mm; There was a statistically significant negative linear correlation between external rotation in shoulder ROM and thickness of the joint capsule measured on MRI, but there was no clear correlation between thickness of the joint capsule and limitation in forward elevation and internal rotation. The joint capsule in males and the non-dominant arm was statistically thicker than that in females and the dominant arm. Abnormal gadolinium enhancement was present in the subsynovial layer of the axillary joint capsule in all patients; mild grade in 22, moderate grade in 32, and severe grade in 43. There was a statistically significant positive linear correlation between the grade of joint capsule enhancement and the thickness of the joint capsule and the pain intensity in patients with adhesive capsulitis. Degrees of limitation in forward elevation, external rotation, and internal rotation were not associated with the grade of axillary joint capsule enhancement. All subjects had subcoracoid fat obliteration of the rotator interval, including 58 subjects with partial and 39 with complete fat obliteration, There was no significant correlation between subcoracoid fat obliteration of the rotator interval and either shoulder ROM or other variables, including pain intensity and symptom duration. Eighty-one of the 97 patients (83.5 %) presented with supraspinatus tendon pathology on MRI. A partial-thickness supraspinatus tendon tear was observed in 47 patients (48.4 %) and supraspinatus tendinosis was observed in 34 patients (35.1 %). Supraspinatus tendon pathology in patients with adhesive capsulitis was not associated with shoulder ROM or pain intensity.	Findings on MRI aimed at defining the status of the joint capsule with regards to its structural integrity are correlated with some of the clinical impairment measures in patients with adhesive capsulitis. Thickening and gadolinium enhancement of the joint capsule in the axillary recess on MRI is associated with both the external rotation ROM parameter and pain intensity.	The main limitation of this study was potential for significant selection bias. In the study, authors examined structural abnormalities determined by MRI images of the shoulder and the association between these abnormalities and clinical features in a large, but customized study population. The study population was primarily customized based on data derived from patients with adhesive capsulitis undergoing MRI at a tertiary referral hospital. The authors acknowledge that patients with severe adhesive capsulitis therefore may be overrepresented in the series and that similar results may not be found in a more diverse patient population. Another limitation of the study is that there is no gold standard diagnosis (e.g., surgery). The authors diagnosed adhesive capsulitis based on patient history and physical examinations. However, the referring clinician, specializing in adhesive capsulitis, appeared to have little difficulty diagnosing adhesive capsulitis on the basis of clinical grounds. To enter the study, patients were required to fulfill strict clinical criteria. Finally, a shortcoming of this study was that radiologists were not blinded to the clinical diagnosis, and bias might have been introduced during measurements and interpretations of the images. Despite these limitations, this study remains meaningful because it is the first known to directly correlate MRI findings indicative of adhesive capsulitis with the detail of the clinical features.
Cortes A, Quinlan NJ, Nazal MR et al. A value-based care analysis of magnetic resonance imaging in patients with suspected rotator cuff tendinopathy and the implicaed role of conservative management. J Shoulder Elbow Surg. 2019; 28(11):2153-2160.	Low	prospective consecutive	age 18 years or older, chief complaint of shoulder pain (located in anterolateral shoulder, worsened by overhead activities, nighttime pain), able to tolerate physical examination, strength test minimum of 4 of 5, no inciting traumatic event, and screening radiographs of the symptomatic shoulder exhibiting no to mild glenohumeral arthritis (no noticeable joint space narrowing and no significant osteophytes), and no cuff arthropathy (well-centered head with no superior migration).	Previously diagnosed RCT based on MRI, prior shoulder surgery, physical inability to tolerate physical examination, implanted MRI incompatible device, injury to the ipsilateral hand or wrist, contralateral shoulder injury, and prior shoulder dislocation. Patients were also excluded if they had documented steroid injections or physical therapy for the current episode of shoulder pain.	A total of 51 patients were included in this study; 33 were male (64.7%) and 18 were female (34.3%). The average age was 51.1 +/- 11.9 years. The baseline pain was 4.5 +/- 3.1 on a 10-point visual analog scale (VAS) scale, and patients had symptoms for 11.6 +/- 24.2 months before presentation. The average time from presentation to MRI/MRA was 10.4 +/- 11.8 days.	The primary outcome measure of this study was progression to surgery. All patients were suspected to have cuff tendinopathy based on clinical findings and completed a subjective shoulder questionnaire. All patients underwent an MRI or magnetic resonance arthrogram (MRA), which was read by both a musculoskeletal (MSK) fellowship trained radiologist and the senior author. All patients were offered the same initial trial of conservative management for a minimum of 2 months, which consisted of patient education, activity modification, nonsteroid antiinflammatory drugs, and physical therapy. Patient information, surgical reports, and demographics were obtained from the medical record. Statistical testing included independent sample t-tests for continuous variables and Fisher's exact tests for categorical variables.	Of the cohort, 46 (90.2%) patients did not go on to surgical intervention, whereas 5 (9.8%) patients did at an average 68.3 days after imaging. These results suggest that over 90.2% of patients (46 of 51) had premature MRI, posing an unnecessary economic burden of $181,619 in advanced imaging charges.	The use of MRI before a trial of conservative management in patients with atraumatic shoulder pain, minimal to no strength deficits on physical examination, and suspected cuff tendinopathy other than full-thickness tears provides negative value in the management of these patients, at both the individual and population level.	First, the study was performed at the specialized care of a sports medicine clinic, of a single, large tertiary hospital. This could lead to a more homogeneous or higher acuity sample population, due to referral patterns or patients seeking more advanced care. Although there is inherent selection bias in this sample of patients as there was some degree of patient-selected treatment, we believe that the diversity of the population under study should reinforce the generalizability of the study's findings. Second, the senior author reviewed the MRI scans before making a decision to offer the patient the option to proceed to surgery; this could have influenced the proportion of fullthickness RCTs that converted to surgery. Third, the results are limited to short-term follow-up, with an average follow-up of 28.3 +/- 5.3 months. Results, including conversion to rotator cuff repair surgery, could change with mid-term and long-term follow-up. Fourth, our follow-up was based on chart review of 1 tertiary hospital system; there is a possibility that some patients sought care elsewhere and underwent surgery without our knowledge. Finally, small subcohorts make it challenging to form definitive conclusions about prognostic indicators, given how few patients went on to have surgery or had fullthickness tears in our cohort.
De Maeseneer M, Boulet C, Pouliart N, et al. Assessment of the long head of the biceps tendon of the shoulder with 3T magnetic resonance arthrography and CT arthrography. Eur J Radiol. 2012;81(5):934-9.	Low	prospective non-consecutive	referral for CT or MR arthrography otherwise not defined	Five patients with metallic implants creating severe artefacts were excluded.	There were 21 men and 16 women in the study group. The mean age was 49 years (range 24-81 years). There were 5 cases of tendon degeneration, 3 cases of dislocation, 4 partial tears, and 1 complete tear. Additional findings included 21 supraspinatus tears, 2 infraspinatus tears, and 4 subscapularis tears.Clinical indications for the examinations included cuff tear (n = 18), dislocation (n = 6), biceps tendon (n = 3), labrum (n = 4) and impingement, capsulitis, osteoarthritis, pain, trauma, and os acromiale (n = 1).	diagnostic accuracy, sensitivity and specificity, kappa	The pooled sensitivity for lesion detection for CT arthrography was 31% and the specificity 95%. The pooled sensitivity for MR arthrography was 27% and the specificity 94%. There were no statistically significant differences between CT and MR. The interobserver agreement calculated with the kappa statistic was poor for CT and for MR. Both CT arthrography and MR arthrography perform poorly in the detection of biceps tendon pathology of the shoulder.	The authors found no statistically significant difference between CT and MR arthrography for diagnosis of tendon abnormalities. Both techniques could be used for the evaluation of the biceps tendon, although there is a low sensitivity and a high specificity	Limitations of the study include the small sample size. Studies would have to be performed with larger sample sizes to draw more solid conclusions. There were small differences in the CT and MR protocols between patients but the authors doubt this may have influenced the results. The authors also had to pool the biceps tendon abnormalities for statistical analysis because of the limited number of cases. However the trend for a low sensitivity and high specificity was evident for all abnormalities. In addition, arthroscopy was used as gold standard for all abnormalities but some findings may not be evident using this technique. Another limitation is the use of proton density and T2 weighted images in the sagittal plane for MR arthrography instead of T1 weighted images.
Foti G, Mantovani W, Catania M, et al. Evaluation of glenoid labral tears: Comparison between dual-energy CT arthrography and MR arthrography of the shoulder. Radiol Med. 125(1):39-47.	moderate	prospective consecutive	patients who underwent DE-CTA and MRA the same day (mean interval 30 min) were included.	Seven patients were excluded because of the lack of DECT or MRI studies (n = 2), lack of surgical confirmation (n = 4), or incomplete MRI protocol (n = 1).	A total of 47 patients (28 males, 19 females; mean age of 34.2 years, range 31–60 years) were included.	Diagnostic accuracy values were calculated by using surgery as standard of reference. Interobserver and intra-observer agreements were calculated with k statistics. A value of p < 0.05 was considered statistically significant.	Surgery revealed the presence of labral tears in 38/47 patients (80.9%). Sensitivity and specificity values in diagnosing labral tears were 84.2% and 77.8% for MRA (Reader 3), 84.2% and 77.8% for CTA (Reader 1), 84.2% and 88.9% for CTA (Reader 2), 89.5% and 88.9% for DE-CTA (Reader 1), and 92.1% and 88.9% for DE-CTA (Reader 2). A nonsignificant increase in AUC values with respect to MRA was obtained by reading the CTA (p = 0.470) and DE-CTA dataset (p = 0.217), respectively. Inter-observer agreements were near perfect for CTA (k = 0.84) and substantial for DE-CTA reading (k = 0.76). Intra-observer agreements were near perfect both for CTA (k = 0.88) and for DE-CTA reading (k = 0.82).	DE-CTA and MRA were not different in terms of diagnostic performance.	First, all the enrolled patients were sent by orthopedic surgeons with a concrete suspect of labral tear and subsequently received surgery, possibly introducing a selection bias with respect to patient population. Furthermore, the surgeons were aware of MRI findings. Only labral lesions were statistically analyzed. A qualitative assessment of imaging findings was performed in this study, and lesions were not graded. Also, a detailed analysis of additional non-labral findings was not carried out. Other imaging findings including bony Bankart and Hill–Sachs lesions and articular cartilage defects were not considered in our statistical analysis, even though they were relatively uncommon in our study population.
Hoenecke HR, Jr., Hermida JC, Flores-Hernandez C, et al. Accuracy of CT-based measurements of glenoid version for total shoulder arthroplasty. J Shoulder Elbow Surg. 2010;19(2):166-71.	low	prospective consecutive	patients with osteoarthritis scheduled for total shoulder arthroplasty.		The mean patient age was 75 years (range, 56-90 years). There were 11 males and 22 females.	Glenoid version and maximum wear of glenoid articular surface; inter-observer error tested.	In this cohort of patients, the true version (as measured on 3D-CT reconstruction) was mean -8.6 degrees (+/- 9.8 degrees). The average absolute error in the version measured on the 2D-CT slice passing through the tip of the coracoid was 5.1 degrees (range, 0 - 16 degrees; P < .001). When the high-resolution 3D-CT reconstructions were analyzed, the location of maximum wear in arthritic glenoids was most commonly posteroinferior (36% in the posterior direction [9 o'clock] and 21% in the posterior inferior position [8 o'clock]. This maximum wear was detected accurately in only 48% of cases in the clinical 2D axial CT slices.	Moderate difference between 2D and 3D. The maximum wear was detected accurately in only 48% of cases in the clinical 2D axial CT slices.CT assessments of glenoid version. We cannot, however, recommend a CT scan in each case, because we have yet to collect evidence in the form of better clinical outcomes.	Unclear if prospective or retrospective; suspect prospective review was not blinded incorporation reference standard is 3D CT - comparison and reference are the same no inter-rater reliability no post operative outcome measures, direct or indirect.
Jonas SC, Walton MJ, Sarangi PP. Is MRA an unnecessary expense in the management of a clinically unstable shoulder? A comparison of MRA and arthroscopic findings in 90 patients. Acta Orthop 2012; 83(3): 267-270.	Low	retrospective consecutive	All patients undergoing arthroscopic anterior stabilization surgery over a 3-year period.	none stated	78 men, 12 women. Mean age was 27 (range 15 -53) years. All patients had a history of traumatic anterior shoulder dislocation with persistent symptoms of instability. 41 had dislocated twice or less, 47 had dislocated more than twice, and 2 had a history of persistent subluxation. At clinical examination, all patients had a positive anterior apprehension test. They all had a preoperative MRA; this was thought to help in surgical planning.	MRA diagnosis, surgical diagnosis	83 of the 90 patients had a glenoid labrum tear identified at arthroscopy. These were all described as having substantial labral damage, 74 with avulsion of the anteroinferior labrum consistent with a Bankart lesion, 4 with avulsion of the posterior labrum, and 7 with avulsion of the superior anterior to posterior labrum consistent with a SLAP lesion. Of the remaining 7 cases, 2 were described as having a mobile labrum with a degree of anterior capsular laxity but no labral detachment, 3 were described as cases of medial subluxation, and 2 were described as having an essentially normal but anteriorly scuffed labrum. All patients underwent arthroscopic stabilization of the shoulder. MRA allowed correct identification of the 2 normal labra, the 3 cases of medial labral subluxation, and the 2 cases of capsular laxity. Of the 83 cases with labral avulsion, 43 were correctly identified as having anterior tears, 3 were correctly identified as having posterior tears, and 5 were correctly identified as having SLAP lesions. One was reported as having a posterior tear and 2 were reported as having a SLAP lesion, all 3 of which had anterior tears at arthroscopy. 29 patients were reported as having a normal labrum: 28 had an anterior tear and 1 had a posterior tear. Overall, 54 of 83 patients with some sort of labral pathology were identified w MRA, giving a sensitivity of 65% (CI: 0.54 0.74) and a specificity of 100% (CI: 0.65 1.00). Most patients (74 of 83) with labral pathology were found to have anterior tears. Of these, 43 were correctly identified w MRA, giving a sensitivity of 58.1% (CI: 0.47 0.69) and a specificity of 100% (CI: 0.81 1.00) in detection of anterior labral tears.	Our findings highlight the importance of an accurate history and clinical examination in the management of glenohumeral instability. The need for MRA may not be as high as is currently believed.	Although the study has a similar sample size to those reported previously, it has several shortcomings that could not be altered due to the retrospective nature of the study design. All the arthroscopies were performed by a specialist shoulder surgeon, but the MR arthrograms were performed by 7 different radiologists, only 4 of whom were musculoskeletal specialists. None of the images were checked by a second radiologist to confirm the result. This difference in level of radiologist training and experience may explain some of the reduced sensitivity and reflects practice in a standard hospital.

Khil EK, Choi JA, Lee E, Oh JH. Subscapularis (SSC) tendon tears: Diagnostic performance and reliability of magnetic resonance arthrography (MRA) with arthroscopic correlation and comparison with clinical tests. Skeletal Radiol. 2021; 50(8):1647-1655.	low	retrospective consecutive	patients who underwent clinical tests and subsequent arthroscopic surgery within 90 days of the MRA.	Of 548 patients, we excluded 276 due to the following reasons: 131 without arthroscopic surgery, and 65 with MR technical causes, such as nonstandardized protocol (n = 38), poor image quality (n = 24), and excessive contrast leakage from the joint (n = 3), 80 with previous SSC tendon surgery (n = 55), and an interval of more than 90 days between MRA and arthroscopy (n = 25), considering the 3-month conservative treatment and observation period.	A total of 272 patients (107 males and 165 females; age range, 19–78 years; mean, 59.6 years). The median time between MRA and arthroscopy was 47.7 days (1–88 days).	Diagnostic performance was determined using arthroscopy as gold standard and compared with results of four clinical tests. Intra- and inter-observer reliabilities of two reviewers were evaluated using kappa statistics.	For full-thickness tears, mean values of sensitivity, specificity, and accuracy of reviewer 1/reviewer 2 were 71.0%/ 87.1%, 97.3%/98.3%, and 94.4%/95.5%, respectively. For partial-thickness tears, mean values of sensitivity, specificity, and accuracy were 72.8%/73.4%, 78.3%/81.2%, and 76.5%/78.5%, respectively. Intra- and inter-observer reliabilities for both reviewers were good to very good (k = 0.85/0.93, p < 0.001; k = 0.74–0.89, p < 0.001). For all clinical tests, while specificity was very high, sensitivity was very low and the overall accuracy was also low.	MRA showed high diagnostic erformance for the diagnosis of SSC tendon tears, especially full-thickness tears, with good inter- and intra-observer reliabilities, regardless of the level of experience of the reviewer.	First, this was a retrospective study, which may include a selection bias. Second, although arthroscopy served as a reference standard, it has its own limitations, especially the inferior aspect and the footprint of the SSC tendon, which may have caused underdiagnoses of tears. Third, authors did not analyze the partial-thickness tears according to location because the numbers in each group would become too small for statistical analysis. Fourth, the time interval between preoperative MRA and arthroscopy was variable although authors included cases with arthroscopy performed within 90 days of MRA; the SSC tear may have progressed or been partially healed during the time interval. Lastly, authors did not analyze the tears according to the etiologies, such as degenerative vs. traumatic tears, because oftentimes, there were ambiguous and overlapping clinical histories and authors did not want to make incorrect assumptions.
Lee H, Ahn JM, Kang Y, et al Evaluation of the subscapularis tendon tears on 3T magnetic resonance arthrography: Comparison of diagnostic performance of T1-weighted spectral presaturation with inversion-recovery and T2-weighted turbo spin-echo sequences. Korean J Radiol. 2018; 19(2):320-327.	low	retrospective consecutive	Patients who had undergone MRA within 3 months between April and December 2015.	Patients who had not performed subsequent arthroscopy within 3 months, patients without detailed arthroscopic results of SSC tendon, patients who had previously undergone shoulder surgery, patients younger than 16 years of age.	A total of 120 patients were included in the study (mean age, 62.7 years; age range, 36–81 years; 50 men and 70 women). The mean interval between MRI and arthroscopic surgery was 31 days (range, 1–84 days).	T1 SPIR and T2 TSE images in separate sessions for the integrity of the SSC tendon, examining normal/articular-surface partial-thickness tear (PTTa)/full-thickness tear (FTT). Diagnostic performance of T1 SPIR and T2 TSE was calculated with arthroscopic results as the reference standard, and sensitivity, specificity, and accuracy were compared using the McNemar test. Interobserver agreement was measured with kappa (κ) statistics.	There were 74 SSC tendon tears (36 PTTa and 38 FTT) confirmed by arthroscopy. Significant differences were found in the sensitivity and accuracy between T1 SPIR and T2 TSE using the McNemar test, with respective rates of 95.9–94.6% vs. 71.6–75.7% and 90.8–91.7% vs. 79.2–83.3% for detecting tear; 55.3% vs. 31.6–34.2% and 85.8% vs. 78.3–79.2%, respectively, for FTT; and 91.7–97.2% vs. 58.3–61.1% and 89% vs. 78–79.3%, respectively, for PTTa. Interobserver agreement for T1 SPIR was almost perfect for T1 SPIR (κ = 0.839) and substantial for T2 TSE (κ = 0.769).	T1-weighted spectral presaturation with inversion-recovery sequences is more sensitive and accurate compared to T2 TSE in detecting SSC tendon tear on 3T MRA.	Study was performed in the patients who had undergone arthroscopic rotator cuff repair, a population expected to have a relatively higher prevalence of high grade rotator cuff tear. Concealed interstitial tears and bursal-surface tears were not included in this study, as the reference method of arthroscopy could not provide the information regarding these types of SSC tendon tears. not able to evaluate the separate diagnostic performance of MRA in each anatomical footprint (e.g., leading edge, upper tendon, middle tendon, muscular portion, and musculotendinous junction), as the performance evaluation of MRA was entirely based on the arthroscopic results. Did not use T2 TSE with fat-suppression, our results of the T2 TSE do not represent the true diagnostic accuracy of 3T MRI.
Lee JH, Yoon YC, Jung JY, Yoo JC. Rotator cuff tears noncontrast MRI compared to MR arthrography. Skeletal Radiol. 2015;44(12):1745-54.	Low	retrospective cosecutive	patients who underwent arthroscopic surgery after noncontrast MRI or indirect MR arthrography evaluation for shoulder discomfort, between March 2011 and September 2013.	Interval between MR and arthroscopy >30 days, history of previous surgery on ipsalateral shoulder, revision surgery for infection	Group A was comprised of 46 men (age range, 22-80 years; mean age, 55.6 years) and 50 women (age range, 29 -74 years; mean age, 61.4 years), while group B was comprised of 114 men (age range, 17 -77 years; mean age, 51.0 years) and 123 women (age range, 21 -78 years; mean age, 61.0 years). The mean interval between MR examination and arthroscopic surgery was 9 days for group A (range, 0 -29 days) and less than 1 day for group B (range, 0 -23 days). Primary patient complaints were shoulder pain with or without limitation of movement, shoulder dislocation, and motor weakness.	MRI diagnosis, MRA diagnosis, surgical diagnosis, tendon tear severity, tendon location	In comparison with group B, patients in the group A had higher prevalence of tears in SSP-ISP tendon (p=0.032). The prevalence of full-thickness SSP-ISP tendon tear was also higher in group A (59 %) than group B (48 %); however, difference between groups was not statistically significant (p=0.053). There was no significant difference in prevalence of partial-thickness of SSP-ISP tendon tear, SSC tendon tear, or age and sex of the patients, between groups A and B. With regard to diagnosis of articular-surface partial- thickness tear of SSP-ISP tendon, sensitivities were generally higher in group B than in group A (80 % vs. 60 % for reader I, and 70 % vs. 40 % in reader II, respectively), but the difference was not statistically significant (p values>0.05. However, multivariable analysis using the generalized estimating equation, after adjusting patient age and sex, revealed that sensitivity was higher in group B than in group A (p=0.046). In reader I, the specificity for diagnosing SSC tendon tear was higher in group B than in group A (85 % vs. 68 %; p=0.012. Univariable analysis using the generalized estimating equation demonstrated that the accuracy for diagnosing SSC tendon tear was higher in group B than in group A (p=0.042). There was no statistically significant difference in any of the other parameters relating to the diagnoses of SSP-ISP and SSC tendon tears. Concordance rate of SSC tendon tears by reader I was higher in group B compared with group A (57 % vs. 40 %, p=0.005). Concordance rate of SSC tendon tears by reader II was also higher in group B than in group A, but this difference was not statistically significant (47 % vs. 40 %, p=0.228). There was no other statistically significant differences in concordance rates between the two groups. Regarding interobserver agreement for the presence of SSP-ISP tendon tears, the agreement for group A was substantial (0.78; 95 % CI, 0.603 0.966), while that for group B was excellent (0.87; 95 % CI, 0.799 0.946); however, there was no statistically significant difference between the two groups (p=0.381). Weighted k values for evaluating the grade of SSP-ISP tendons showed excellent agreement between the two readers in group A (0.83; 95 % CI, 0.743 0.921) and in group B (0.85; 95 % CI, 0.794 0.898). Similarly there were also no statistically significant differences between the two groups (p=0.796). Interobserver agreements relating to the presence of SSC tendon tears were substantial in group A (0.69; 95 % CI, 0.544 0.831) and group B (0.73; 95 % CI, 0.643 0.817). Agreements relating to the grade of SSC tendons were also substantial in groups A (0.66; 95 % CI, 0.556 0.758) and B (0.63; 95 % CI, 0.562 0.689). There were no significant differences between the two groups for the tear presence (p= 0.619) and grade (p=0.599) in SSC tendons.	In conclusion, indirect MR arthrography was not superior to noncontrast MRI for the diagnosis of SSP-ISP tendon tears, except for a tendency for a slightly higher sensitivity for diagnosing articular-surface partial-thickness tears. However, improved accuracy may be expected for preoperative diagnosis and for the grading SSC tendon tears using indirect MR arthrography.	There were several limitations of the study. Firstly, the MR images were analyzed retrospectively in this non-randomized study, and the surgeon was not blinded to the MRI findings. Secondly, direct comparison between the two techniques in the same patient was not possible because noncontrast MRI and indirect MR arthrography were performed on different patient populations. Also, the number and type of sequences were different besides the addition of postcontrast fatsaturated T1WI sequences. In particular, the lack of axial T2WI for noncontrast MRI may underscore the accuracy of this technique, especially for subscapularis tendon evaluation. Thirdly, the overall prevalence of SSP-ISP tendon tears was significantly higher in the noncontrast MRI group than in the indirect MR arthrography group, which may overestimate the diagnostic performance of noncontrast MRI. In addition, the mean interval between MR examination and arthroscopic surgery was shorter in the indirect MR arthrography group although only patients who underwent surgery within the 30- day period after MR examination were included in this study. Fourthly, as this study was conducted entirely with patients who underwent arthroscopic surgery, the possibility of selection bias, which may result in overestimation of sensitivities and underestimation of specificities, cannot be excluded. Fifthly, intratendinous tears were not evaluated. Although they cannot be scored on arthroscopy, it is an important drawback of assessing the potential added value of indirect arthrography as intratendinous tears are clinically relevant. One final limitation is that there were relatively few patients with articular-surface partial-thickness tear of SSP-ISP tendon, particularly in the noncontrast MRI group (only five patients).
Omoumi P, Rubini A, Dubuc JE, Vande Berg BC, Lecouvet FE. Diagnostic performance of CT-arthrography and 1.5T MR-arthrography for the assessment of glenohumeral joint cartilage: A comparative study with arthroscopic correlation. European Radiology 2015; 25(4):961-969.	moderate	prospective consecutive	all consecutive patients who presented with chronic shoulder pain or shoulder instability requiring an arthroscopic treatment, based on clinical and imaging findings. Radiograph, ultrasound and/or conventional MRI had been obtained in all patients.	The exclusion criteria were the presence of severe shoulder osteoarthritis (Kellgren Lawrence 3 or 4) or history of previous shoulder surgery.	Fifty-six consecutive patients (mean age ±standard deviation, 46 ±15 years; range, 16 71 years; 32 men) rotator cuff tendon tears in 59%of patients (n=33), rotator cuff tendinosis in 18 % of patients (n=10), rotator cuff calcifications in 14 % of patients (n=8) and labroligamentous instability lesions in 29 % of patients (n=16) (more than one diagnosis per patient was possible).	Sensitivity, specificity, accuracy- of CTA and MRA in detecting both grade ≥2 and grade 4 tears of all cartilage, glenoidal cartilage areas and humeral head cartilage areas, interobserver agreement, intraobserver agreement	1) When considering all cartilage lesions with substance loss (grade ≥2), diagnostic performance of CTA was statistically significantly better than MRA for both readers, and both glenoidal and humeral areas (p ≤0.04). 2) When considering grade 4 cartilage lesions only, diagnostic performance of CTA was better than MRA for all comparisons, but only reached statistical significance for the evaluation of all cartilage areas, as well as humeral head cartilage lesions for reader 1 (both p<0.01, all other p ≤ 0.05). 3) Intraobserver agreement was almost perfect with both CTA (k=0.94 0.95) and MRA (k=0.83 0.87).	In conclusion, this prospective study comparing CTA and MRA in the same patients with arthroscopic correlation showed that the diagnostic performance in detecting glenohumeral cartilage lesions was moderate with both techniques, although statistically significantly better with CTA.	Our study has some limitations. First, to avoid compromising patient care, the orthopaedic surgeon was aware of the findings of preoperative imaging, but unaware of the exact topography of the cartilage lesions. Second, the authors did not obtain any cadaveric correlation, which could represent a better standard than arthroscopy. A cadaveric study would also have the advantage of overcoming the limitation as to the accurate correlation of the topography of cartilage lesions. However, the patient population provided a wider and probably more representative sample of the general population than cadaveric studies, which are generally limited to elderly patients.
Pessis E, Mlhoubi F, Feydy A, et al. Usefulness of intravenous contrast-enhanced MRI for diagnosis of adhesive capsulitis. Eur Radiol. 2020; 30(11):5981-5991.	low	retrospective consecutive	patients with a clinical diagnosis of AC who underwent MRI of the shoulder with IV injection of a gadolinium-based contrast and diagnostic and therapeutic arthrography	patients with an incomplete medical record, incomplete MRI protocol, or lack of arthrography	total of 42 patients in the AC group (mean age 53.1; age range 35-68; 69% women) and 42 patients in the control group (mean age 50.6; age range 18-82; 54.8% women)	Reliability and performance of MRI findings were compared between IV contrast-enhanced measures and non-enhanced MRI measures in T2-weighted fat-saturated and T1-weighted images. MRI findings were correlated with clinical stage, etiology, and pain.	Sensitivity (97.6%) and specificity (97.6%) of axillary-recess capsule signal enhancement for AC diagnosis were significantly superior (p = 0.02) to hyperintense signals on T2-weighted fat-suppressed images (sensitivity 90.5%, specificity 92.7%). Measures of the intensity signal in the area of the rotator interval were less performant for AC diagnosis but could be improved with joint capsule enhancement. Moreover, we found very high specificity (100%) of enhancement of the coracohumeral ligament signal for AC diagnosis. The early stage of adhesive capsulitis was positively correlated with joint capsule enhancement in the rotator interval. Secondary etiology of capsulitis was correlated with joint capsule hyperintensity signals of the rotator interval on T2-weighted fat-suppressed images.	IV contrast injection with MRI can be helpful for AC diagnosis in difficult cases. The stage of AC seems related to joint capsule enhancement in the rotator interval.	insufficient number of patients and controls
Raymond AC, McCann PA, Sarangi PP. Magnetic resonance scanning vs axillary radiography in the assessment of glenoid version for osteoarthritis. Journal of Shoulder and Elbow Surgery 2013; 22(8):1078-1083.	Low	retrospective consecutive	Inclusion criteria was a diagnosis of end-stage glenohumeral osteoarthritis.	Excluded were patients who had previous surgery that would alter the anatomy of the glenoid, such as an open stabilization with bone block, or those whose images could not be accurately assessed because the quality was too poor	There were 26 women and 17 men who were a mean age of 68 years (range, 44-88 years) at the initial assessment. There were 19 right shoulders and 29 left shoulders. Primary glenohumeral osteoarthritis was the pathology in all shoulders.	Interobserver reliability, intraobserver reliability, glenoid version, Walch glenoid morphology	The mean retroversion measured on AXR was significantly greater than that measured on MRI, with the mean difference of glenoid version of -7.36 degrees (P < .001), whereas the interobserver and intraobserver reliabilities for MRI were greater than that of AXR. The largest difference between MRI and AXR of the same shoulder was -33 degrees. Glenoid retroversion was greater compared with MRI in 73% of AXRs.	This study confirms that AXRs should be interpreted with caution when assessing the pattern and extent of posterior glenoid wear in osteoarthritis. The authors suggest that plain radiographs should not be used for preoperative templating in isolation but concede that they provide an easily accessible and economically sound modality for basic diagnostic purposes. MRI represents a precise and accurate technique for evaluating glenoid wear, without exposure to ionizing radiation, in addition to its established role in the assessment of the rotator cuff.	This work has some limitations. Firstly, the observers were not blinded to patient identity when assessing the MRIs and AXRs. This limitation was minimized by performing AXR observations consecutively, followed by the MRI observations. The initial AXR readings were hidden to prevent influence on subsequent MRI readings. Secondly, calculations were performed in only the axial plane. It is feasible that 3-dimensional MRI assessments would be even more accurate. Multiplanar analysis of the pattern of glenoid wear would prove useful in the planning of glenoid reaming and prosthetic alignment, and future work comparing MRI and CT modalities would be particularly informative.
Razmjou H, Fournier-Gosselin S, Christakis M, Pennings A, ElMaraghy A, Holtby R. Accuracy of magnetic resonance imaging in detecting biceps pathology in patients with rotator cuff disorders: Comparison with arthroscopy. Journal of Shoulder and Elbow Surgery 2016; 25(1):38-44.	Low	retrospective non-consecutive	patients with impingement syndrome or rotator cuff tear, with (study group) or without (control group) biceps disease, who had participated in previous studies from 2003 to 2014 were reviewed. For the purpose of consistency, only patients whose noncontrast MRI study was performed in the institution were included.	Patients with an unknown response for the extent of biceps disease on the MRI report were excluded.	183 (130 study and 53 control) patients (73 women [40%], 110 men [60%]; mean age, 62 years [standard deviation (SD), 9; range, 41-84])	Sensitivity and specificity of MRI at finding partial-thickness biceps tear; Sensitivity and specificity of MRI at finding full-thickness biceps tear;	• Full thickness tear accuracy .76, sensitivity .54, specificity .98, LR+ 26 LR- .47 • Partial thickness tear accuracy .57 sensitivity .27 specificity .96 LR+ 2 and LR- .84 • Dislocation accuracy .92 sensitivity 1.00 specificity .83 LR+ 6 LR- .92	98% specificity for biceps tendon tears, 100% sensitibity for biceps subluxation/dislocations	The study was retrospective in nature with deficiencies inherent in such studies. However, missing data applied only to the MRI findings, as the research database had details on biceps disease that was completed prospectively. In addition, patients with unknown responses were detected and excluded from analysis. In this study, MRI reports were interpreted by radiologists trained in musculoskeletal pathology, which limits the generalizability of the results, considering level of training does influence diagnostic accuracy
Scalise JJ, Codsi MJ, Bryan J, et al. The influence of three-dimensional computed tomography images of the shoulder in preoperative planning for total shoulder arthroplasty. J Bone Joint Surg Am. 2008;90(11):2438-45.	low	retrospective consecutive	Each patient was required to have end-stage glenohumeral OA and a preoperative CT	Patients with previous shoulder surgery, a history of glenohumeral trauma, or infection	The patients included seventeen men and six women with an average age of sixty-two years (range, forty-nine to seventy-eight years).	Intraclass correlation coefficients were used to evaluate interrater agreement for continuous data. The kappa coefficient was used to evaluate inter-rater agreement for nominal data (zone of glenoid bone loss, glenoid implant fit, surgical decision).	1. inter-rater reliability was high for both 2D and 3D CT (> .96) 2. Assessment of glenoid version lower for 2D than 3D (0 <0.05, absolute difference less than 2 degrees). 3. magnitude of bone loss assessment did not differ between 2d and 3d . 4. For anterior bone loss there was marginally significantly more assessment reliability for 3D versus 2D. 5. Increased assessment reliability for glenoid prosthesis fit for 3D versus 2D (p < 0.006). 6 surgical decision making changed 39% of the time in the 3D vs 2D assessment most common management change from accept a reamed position other than physiologic" to "ream to physiologic glenoid version" on 3D	The use of three-dimensional data provided greater agreement among observers with regard to the zone of glenoid bone loss, glenoid prosthetic fit, and surgical decision-making	Retrospective design cases selected by surgeon increase likelihood of imaging utility (spectrum bias). Hemiarthroplasty is often performed for the treatment of shoulder arthritis but was excluded from the management options assessed conflict of interest - reviewers involved in software generation used in the study no gold standard to compare 2D/3D outcomes, no post operative outcomes measured. Not blinded, no gold standard.
Spencer BA, Dolinskas CA, Seymour PA, Thomas SJ, Abboud JA. Glenohumeral articular cartilage lesions: prospective comparison of non-contrast magnetic resonance imaging and findings at arthroscopy. Arthroscopy 2013; 29(9):1466-1470.	low (downgrade 2 levels for small sample size, partial non blinding to arthroscopy results, no confidence intervals)	prospective consecutive	Inclusion criteria were a clinical diagnosis of subacromial impingement or rotator cuff tendinopathy who failed conservative management , a non-contrast MRI study obtained in a closed scanner at 1.5 T or greater, and a surgical arthroscopy performed by the senior author	Exclusion criteria were any revision surgery or inflammatory arthropathy or an MRI study of insufficient strength. Patients with radiographic evidence of glenohumeral osteoarthritis including joint space narrowing, inferior osteophyte formation, subchondral sclerosis, or posterior glenoid wear were also excluded. Fifteen patients were excluded from the study		The sensitivity, specificity, accuracy, PPV, and NPV of detecting articular cartilage lesions on MRI were calculated as a percent (ranging from 0% to 100%, with 0% being the worst and 100% being perfect) and compared with arthroscopic findings as the gold standard. Detection of partial- versus full-thickness cartilage lesions was also evaluated.	The 2 readers combined read 11 of 34 humeral lesions as positive and 44 of 54 normal humeral cartilage surfaces as negative: sensitivity, 32%; specificity, 80%; accuracy, 63%; PPV, 57%; and NPV, 66%. Combined, the 2 readers read 5 of 16 glenoid lesions as positive and 62 of 72 normal glenoid cartilage surfaces as negative: sensitivity, 31%; specificity, 86%; accuracy, 76%; PPV, 33%; and NPV, 85%. In detecting partial- versus full-thickness lesions on MRI, the 2 readers combined correctly read only 2 of 28 partial-thickness lesions (7%) as partial thickness and 8 of 22 full-thickness lesions (36%) as full thickness.	Effect sizes detected were small; In the study the overall accuracy of detecting articular cartilage lesions on MRI was 69%. The accuracy of detecting humeral lesions was 62% (sensitivity, 36%; specificity, 80%), and the accuracy of detecting glenoid lesions was 73% (sensitivity, 28%; specificity, 82%).	This study had several limitations. The authors used various MRI scanners from the community rather than one MRI scanner, which introduced inter-scanner variability. However, The authors believed that the use of different MRI scanners throughout the community better simulated clinical practice. Another limitation is that a single surgeon prospectively identified and graded all lesions at the time of arthroscopy. The inclusion of multiple surgeons and readers would have allowed us to assess interobserver reliability. Finally, although the sample size is similar to comparable reports, on the basis of the low prevalence, a larger sample size would be necessary to draw stronger conclusions regarding the statistical measures of detecting glenohumeral cartilage lesions with the use of non-contrast MRI.

Tadros ASH, B. K.: Wymore, L.: Hoenecke, H.: Fronek, J.: Chang, E. Y. Long head of the biceps brachii tendon: unenhanced MRI versus direct MR arthrography. Skeletal Radiol. 2015;44(9):1263-72.	Low (downgrade for non comparability of populations with significant differences - no case control)	retrospective consecutive	The study cohort included all patients who underwent arthroscopy. Although there were a variety of indications for shoulder arthroscopy in the cohort, in general, pain that was not responsive to conservative treatment was the most common indication. Patients with suspected internal derangements, including abnormalities of the labrum with or without instability, rotator cuff disease with or without subacromial impingement, adhesive capsulitis, glenohumeral arthritis, and biceps tendon lesions were all included	Patients were excluded if 12 months elapsed between MR imaging and arthroscopy or prior surgical procedure on the LHBT had been performed.	199 patients (66 females, 133 males). The mean age of patients was 50.5 years (SD= 16.5 years). There were 132 unenhanced MRIs and 67 direct MRAs. Mean age of patients who underwent unenhanced MRI versus direct MRA was 56.4 years (SD=14.3 years) and 38.8 years (SD=14.4 years), respectively (p<0.001). The median number of days between MR imaging and arthroscopy was 61 (range=1 336). Median days from imaging to surgery for unenhanced MRI versus direct MRA was 63 (range, 1 336) and 56 (range, 7 313), respectively (p=0.621). Arthroscopic surgery diagnosed 89/199 (45 %) of LHBTs as normal, 46/199 (23 %) with tendinosis, 28/199 (14 %) with partial thickness tears less than 50 %, 21/199 (11 %) withpartial thickness tears greater than 50 %, and 15/199 (8 %) with complete tears.	Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy for tendinosis and tear detection using unenhanced MRI and direct MRA were calculated.	Sensitivity, specificity, PPV, NPV, and accuracy were reported in Table 3, Table 4, Table 5 for independent raters; For tendinosis, MRI versus MRA showed 18 36 % and 15 38 % sensitivity, 69 79 % and 83 91 % specificity, 22 28 % and 18 50 % PPV, 74 76 % and 80 86 % NPV, and 61 64 % and 70 81 % accuracy; respectively. For tears, MRI versus MRA showed 75 83 % and 64 73 % sensitivity, 73 75 % and 82 91 % specificity, 66 69 % and 41 62%PPV, 82 87%and 92 94%NPV, and 74 78%and 79 88 % accuracy; respectively.	Both unenhanced MRI and direct MRA are fairly accurate for the diagnosis of LHBT pathology. No significant difference was found between unenhanced MRI and direct MRA for the detection of tendinosis and tears of LHBTs, and therefore the addition of intra-articular contrast may not add any significant benefit to unenhanced MRI for the evaluation of LHBT pathology. Both MR techniques show poor sensitivity and PPV for detecting tendinosis, which may be related to differences in grading criteria on imaging versus arthroscopy. Knowledge of potential pitfalls and strategies for improving evaluation of the LHBT may allow the radiologist to be confident when appropriate.	There are several limitations to this study. First, the study was a retrospective review rather than a prospective design. Second, there may have been a bias related to inclusion of only patients with arthroscopy performed. Indeed, the prevalence of LHBT disease was relatively high in the series of patients (55 % compared to 21 25 %). Third, the study included a variable and sometimes lengthy time between MR imaging and arthroscopy. However, other radiology-surgical comparison studies have utilized similar methods with similar average number of days between imaging and surgery. Of the 199 enrolled subjects, 169 had less than 180 days time lapse between imaging and arthroscopy. Fourth, there was a higher frequency of abnormal LHBTs among patients who underwent unenhanced MRI compared to direct MRA. Given the institution's referring physician preference to perform unenhanced MRI over direct MRA in older patients (56.4 years versus 38.8 years of age, respectively), these findings are consistent with previous work showing a direct relationship between abnormal histologic LHBT findings and patient age. Fifth, arthroscopy was used as a reference standard and recent studies have suggested that the LHBT near the pulley region cannot be entirely evaluated by pulling the tendon into the joint. As previously discussed, arthroscopy may also have been subject to diagnostic error as the macroscopic appearance of the LHBT has been shown to unreliably reflect its histopathologic grade. Finally, the results from this study likely represent one of the best-case scenarios. Unlike prior studies in which MRIs were prospectively interpreted in routine practice, the interpretations in this current study were performed without interruptions or time constraints, used all three imaging planes to score the LHBT, and only evaluated the LHBT rather than all structures in the field of view.
VanBeek CL, B. J.: Narzikul, A.: Gordon, V.: Rasiej, M. J.: Kazam, J. K.: Abboud, J. A. Diagnostic accuracy of noncontrast MRI for detection of glenohumeral cartilage lesions: a prospective comparison to arthroscopy. J Shoulder Elbow Surg. 2014;23(7):1010-6.	moderate (downgrade for small number of events , no reporting of confidence intervals,	prospective consecutive	Consecutive patients undergoing shoulder arthroscopy for rotator cuff tendinopathy by the senior author were prospectively enrolled preoperatively. To be included, patients had to have a noncontrast shoulder MRI study performed in a closed scanner of 1.5T or 3.0T, and all MRI sequences were available for review. None of the enrolled patients had prior shoulder surgery on the affected side.	none stated	There were 46 (55%) male patients, with a mean age 54.8 years (range, 17-82 years). There were 59 right and 25 left shoulders in the study cohort.	Sensitivity, specificity, accuracy, PPV, NPV of MRI in detection of bot all glenohumeral cartilage lesions (ICRS grades 1-4) and of high grade lesions (ICRS grade 3 and 4) when compared to arthroscopy, interobserver agreement, intraobserver agreement	1) In evaluating the humeral articular cartilage, reader 1 correctly diagnosed lesions in 64 of 84 cases (76% accuracy). Reader 2 made the correct diagnosis in 67 of 84 cases (80% accuracy). 2) For the glenoid cartilage, reader 1 correctly diagnosed lesions in 69 of 84 cases (82% accuracy). Reader 2 correctly diagnosed the presence of a cartilage lesion in 71 of 84 glenoid cases (85% accuracy). 3) For detection of a humeral lesion on MRI, accuracy was 76% and 80%, sensitivity was 61% and 26%, and specificity was 82% and 100% for reader 1 and reader 2, respectively. 4) For detection of glenoid lesions on MRI, the accuracy was 82% and 85%, the sensitivity was 55% and 50%, and the specificity was 91% and 95% for reader 1 and reader 2, respectively. 5) Low-grade lesions (ICRS grades 1 and 2) of the glenoid and humerus were read as negative on MRI in 63% and 86% of cases, respectively. Interobserver agreement for the detection of humeral and glenoid lesions with noncontrast MRI was fair (k 0.24) and moderate (k 0.41), respectively. Intraobserver reliability for detection of humeral head lesions was very good (k 1) for reader 1 and moderate (k 0.53) for reader 2. 6) For glenoid lesions, intraobserver agreement was very good (k 0.81) for reader 1 and moderate (k 0.49) for reader 2. Agreement on size of the humeral head lesions for all observations was fair (ICC 0.27), whereas the ICC for glenoid lesion size was 0.47, indicating a moderate level of agreement.	Overall accuracy of noncontrast MRI in detecting glenohumeral articular cartilage lesions is good. However, detection of cartilage lesions is reader dependent. Furthermore, accurate characterization of a lesion by MRI, including location, depth, and size, is difficult, probably secondary to the relatively thin glenohumeral articular cartilage. On the basis of these findings, the authors recommend that patients with rotator cuff tendinopathy undergoing arthroscopy be informed that the presence and severity of cartilage lesions may be underestimated on MRI. Orthopedic surgeons must exercise caution when relying on noncontrast MRI for the detection and characterization of cartilage lesions. Whereas shoulder arthroscopy remains the gold standard, future studies should aim to better define the most useful MRI sequences for identification and characterization of articular cartilage lesions and to determine a critical lesion size for detection.	This study did have a few notable limitations. Shoulder MRI studies were performed at multiple institutions and thus lacked a standardized protocol. Despite this variability, all studies were performed with at least a 1.5T magnet and overall were regarded as high-quality images. To further substantiate the findings, additional analysis evaluating the cause for disagreement in the findings among the radiologists and orthopedic surgeon (i.e., imaging artifact read as cartilage lesion) would have provided additional insight. Frequently, orthopedic surgeons read magnetic resonance images before receiving the radiologist's report, and thus having the treating orthopedic surgeon blindly evaluate the MRI study preoperatively would have proved beneficial. Lastly, the results suggest a trend that larger cartilage lesions are more likely to be accurately detected. However, the authors were unable to determine a critical lesion size below which lesions are less likely to be identified. This information could then be used to better inform patients preoperatively about the likelihood of additional necessary treatment.