# Shoulder Magnetic Resonance Imaging Part 1: Descriptive Frequency and Outcome in a Teaching Hospital.

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**Abstract**

**Aim**: To evaluate the experience of Jordan University Hospital regarding shoulder magnetic resonance imaging and to compare our findings with those published in the medical literature.
**Methods**: In our study 986 shoulder MRI exams performed over a period of 4 years and 3 months were reviewed. 267 of the exams were normal, in which 106 (39.7%) were females and 161 (60.3%) were males (27%). The normal cases were excluded, while the remaining 719 patients (73%) with variable abnormalities were included in our study.
**Results**: A total of 719 patients' MRIs were included with a mean age of 52.8 years (±13.2), with an age range of 18-81 years. Supraspinatus tendon is the most common muscle tendon affected by both full thickness tear (87 cases) (12.1%) and partial thickness tear (608 cases) (84.6%). We found a significant mean difference in age between patients with supraspinatus full thickness tear and normal tendon, with a mean difference of 11.5 years (CI 4.44 to 19.5), $p< 0.001$.
**Conclusion**:
Our patients' shoulder MRI findings surprisingly showed the frequency of acromioclavicular joint degenerative changes to be much higher than those in the published literature, while the gleno-labral pathologies were much less in frequency. Other MRI shoulder pathologies were more or less in concordance with the published literature.

**Keywords**: Shoulder MRI, Shoulder pathologies, bone marrow signal abnormalities, rotator cuff muscles, acromioclavicular joint.

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## Introduction

Magnetic resonance imaging (MRI) has revolutionized the diagnosis of different pathologies of the musculoskeletal system. Shoulder magnetic resonance imaging has emerged as an important modality in the evaluation of osseous and soft tissue structures

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and became progressively important in daily clinical use. MRI is painless and non-invasive, without ionizing radiation and without any significant adverse biological effects on humans. It also can provide high sensitivity, specificity and accuracy in the diagnosis of ligamentous injuries, cartilage tears and bone marrow pathologies. Furthermore, it has proven to be useful in the diagnosis of bursae, intra-articular and osteochondral lesions [1,2]. Shoulder MRI is equal to clinical diagnosis in detecting shoulder internal derangement with MR-arthrography and with the increasing use of 3 Tesla magnets, MRI became the gold standard for examining rotator cuff and MR-arthrogram for partial thickness rotator cuff tears, in addition to approaching diagnostic arthroscopy. It also has an essential contribution in the decision making of the patients' treatments [3,4].

Many previous international studies described MRI findings of different shoulder pathologies including rotator cuff tears, joints pathologies and bone marrow signal abnormalities. Our aim is to compare our results with the published international literature to reveal if there is any difference and its impact on our society. To the best of our knowledge, this is the first national and probably regional retrospective study that includes this large sample of patients that compares such findings with the published international literature.

**Materials and Methods:**

In our retrospective study conducted at Jordan University Hospital, we reviewed shoulder MRIs for all patients referred form orthopedic, rheumatology and family medicine outpatient clinics complaining of shoulder pain between January 2014 and April 2018 (4 years and 3 months). We excluded patients younger than 18 years, shoulder trauma and previous history of shoulder surgery.

A total of 986 patients' examinations were reviewed, from which 267 (27%) patients with normal shoulder MRI were excluded from further analysis (mean age 39.2 ±15 years). They comprised of 106 (39.7%) females and 161 (60.3%) males. The remaining 719 patients with abnormal shoulder MRI were included in our study with a mean age of 52.8 years (range18-81 years). A total of the 429 patients, (59.7%) were female and 290 were males (40.3%), with male to female ratio of 1:1.5. The mean age for females was 54.6 years (standard deviation ±11.7) and for males 50.2 years (standard deviation ±14.9). 387 patients had done right shoulder MRIs (53.8%), while 320 patients had done left shoulder MRIs (44.5%), and twelve were bilateral MRI examinations (1.7%) as shown in (table 1).

The Institutional Ethics Committee approval was obtained, but informed consent was not required for reviewing patient reports and images.

**Table 1: Description of the MRIs for all patients.**

| | Male | Female | All patients |
|---|---|---|---|
| Number | 290 (40.3%) | 429 (59.7%) | 719 |
| Mean age | 50.2 | 54.6 | 52.8 |
| Standard deviation | 14.9 | 11.7 | 13.2 |
| Right | 162 (41.2%) | 231 (58.8%) | 393 (54.6%) |
| Left | 128 (39.3%) | 198 (60.7%) | 326 (45.4%) |
| Bilateral | 3 (25%) | 9 (75%) | 12 (1.7%) |

**Techniques**

Shoulder MRIs were performed using 3 Tesla superconducting MRI units (Magnetom Vario, Siemens, Erlangen, Germany). A predesigned protocol was done using shoulder coil. The

shoulder joint was imaged using T1WI, PD with fat saturation and STIR (table 2). In our Radiology Department, coronal images were acquired routinely; anterior to posterior, axial images; from superior to inferior and sagittal images; from lateral to medial.

Images were reviewed by two consultant radiologists experienced in MRI, followed by a consensus to resolve any difference in interpretation. Shoulder MRIs were studied thoroughly for rotator cuff tendon tears, long head of biceps tendon, glenolabral lesions, joint effusion, bone marrow signal abnormalities and acromioclavicular joint degenerative changes.

**Table 2. Shoulder MRI Protocol**

| | Oblique coronal PD fat sat | Oblique coronal STIR | Oblique coronal T1WI | Oblique Sagittal PD fat sat | Axial T1WI | Axial STIR |
|---|---|---|---|---|---|---|
| Average | 2 | 2 | 2 | 2 | 1 | 2 |
| TR,ms | 3000 | 4000 | 583 | 3000 | 700 | 3700 |
| TE,ms | 9.7 | 32 | 23 | 8.3 | 23 | 30 |
| Reciever Band Width, Hz/pixel | 241 | 220 | 250 | 240 | 260 | 219 |
| FA, degrees | 136 | 140 | 150 | 136 | 150 | 140 |
| FOV,mm | 160 | 160 | 160 | 160 | 160 | 160 |
| Matrix | 342*384 | 282*320 | 342*384 | 265*320 | 288*384 | 192*256 |
| Slice thickness,mm | 3 | 3 | 3 | 3 | 3 | 3 |
| Distance factor | 10% | 10% | 10% | 10% | 23% | 23% |
| TI,ms | | 215 | | | | 215 |

**Statistical Analysis**

We used SPSS 21.0 (Chicago, USA) in our analysis, using mean (± standard deviation) to describe the age and frequency (percentage) to describe other categorical variabilities (e.g. gender and side).

We used a One-way ANOVA to analyze the mean difference in age with muscle tears, and we reported the results in mean difference with 95% confidence interval. We used the Chi-square test to determine the difference in gender or side and muscle tears. A p value of 0.05 was used as the statistical threshold.

**Results**

A total of 986 patient MRIs were reviewed in this study, of which 267 MRIs were normal and excluded. We included 719 patient MRIs with a mean age of 52.8 years (±13.2), with an age range of 18-81 years. They were 290 (40.3%) males with a mean age of 50.2 years (±14.9) and 429 (59.7%) females with a mean age of 54.6 years (±11.7), of those 387 (53.8%) were right shoulder MRI while 320 (44.5%) were left shoulder MRIs. Twelve patients had bilateral MRIs (1.7%) with positive findings, they were 3 males and 9 females with a mean age of 58.1 (±4) years.

Supraspinatus tendon is the most common muscle tendon affected by both full thickness tear 87 (12.1%) and partial thickness tear 608 (84.6%). (Table 3) details frequency of full and partial thickness tears for rotator cuff muscle tendons and long head of biceps tendon.

**Table 3: Frequency and percentages (%) of full and partial thickness tear for rotator cuff muscle tendons and long head of biceps tendon.**

| Muscle | Status | Frequency (%) |
|---|---|---|
| Supraspinatus | Normal | 24 (3.3%) |
| | Partial thickness tear | 608 (84.6%) |
| | Full thickness tear | 87 (12.1%) |
| Infraspinatus | Normal | 644 (89.6%) |
| | Partial thickness tear | 73 (10.2%) |
| | Full thickness tear | 2 (0.3%) |
| Subscapularis | Normal | 679 (94.4%) |
| | Partial thickness tear | 39 (5.4%) |
| | Full thickness tear | 1 (0.1%) |
| Teres Minor | Normal | 718 (99.9%) |
| | Partial thickness tear | 1 (0.1%) |
| | Full thickness tear | 0 |
| Long head of Biceps Tendon | Normal | 701 (97.5%) |
| | Partial thickness tear | 17 (2.4%) |
| | Full thickness tear | 1 (0.1%) |

We found a significant mean difference in age between patients with supraspinatus full thickness tendon tear (mean age 60.0 ±11.3 years) and normal tendon with other abnormalities (mean age of 48.5 ±15.5 years), with a mean difference of 11.5 years (CI 4.44 to 19.5), $p < 0.001$. No other significant differences in side or gender regarding tendon tear were found. In (Tables 4,5) the age groups, mean age, and gender for full and partial thickness muscle tears for all rotator cuff muscles and long head of biceps tendon are detailed. The mean age for patients with both full and partial thickness tears is higher than those without tear in the same group.

**Table 4: Number and percentage of patients with each type of tear in each age group of full and partial thickness tears for rotator cuff muscles tendons and long head of biceps tendon.**

| | | Age | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 18-29 | | 30-39 | | 40-49 | | 50-59 | | 60-69 | | 70-81 | |
| | | # | % | # | % | # | % | # | % | # | % | # | % |
| Supraspinatus | Normal | 4 | 16.7% | 3 | 12.5% | 3 | 12.5% | 9 | 37.5% | 2 | 8.3% | 3 | 12.5% |
| | Partial thickness tear | 35 | 5.8% | 69 | 11.3% | 144 | 23.7% | 168 | 27.6% | 140 | 23.0% | 52 | 8.6% |
| | Full thickness tear | 0 | 0.0% | 3 | 3.4% | 13 | 14.9% | 30 | 34.5% | 19 | 21.8% | 22 | 25.3% |
| Infraspinatus | Normal | 34 | 5.3% | 74 | 11.5% | 145 | 22.5% | 190 | 29.5% | 140 | 21.7% | 61 | 9.5% |
| | Partial thickness tear | 5 | 6.8% | 1 | 1.4% | 15 | 20.5% | 16 | 21.9% | 20 | 27.4% | 16 | 21.9% |
| | Full thickness tear | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 1 | 50.0% | 1 | 50.0% | 0 | 0.0% |

| | | Age | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 18-29 | | 30-39 | | 40-49 | | 50-59 | | 60-69 | | 70-81 | |
| | | # | % | # | % | # | % | # | % | # | % | # | % |
| Subscapularis | Normal | 37 | 5.4% | 72 | 10.6% | 153 | 22.5% | 194 | 28.6% | 154 | 22.7% | 69 | 10.2% |
| | Partial thickness tear | 2 | 5.1% | 3 | 7.7% | 7 | 17.9% | 13 | 33.3% | 7 | 17.9% | 7 | 17.9% |
| | Full thickness tear | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 1 | 100.0% |
| Teres_Minor | Normal | 39 | 5.4% | 75 | 10.4% | 160 | 22.3% | 206 | 28.7% | 161 | 22.4% | 77 | 10.7% |
| | Partial thickness tear | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 1 | 100.0% | 0 | 0.0% | 0 | 0.0% |
| | Full thickness tear | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| Biceps_Tendon | Normal | 38 | 5.4% | 73 | 10.4% | 159 | 22.7% | 202 | 28.8% | 154 | 22.0% | 75 | 10.7% |
| | Partial thickness tear | 1 | 5.9% | 2 | 11.8% | 1 | 5.9% | 5 | 29.4% | 6 | 35.3% | 2 | 11.8% |
| | Full thickness tear | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 1 | 100.0% | 0 | 0.0% |

**Table 5: Mean age, gender and side for full and partial thickness tears for all rotator cuff muscles tendons and long head of biceps tendon .**

| | | Age | | Gender | | | | Side | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Male | | Female | | Right | | Left | |
| | | Mean | Standard Deviation | Count | Column N % | Count | Column N % | Count | Column N % | Count | Column N % |
| Supraspinatus | Normal | 49 | 15 | 13 | 4.5% | 11 | 2.6% | 11 | 2.8% | 13 | 4.0% |
| | Partial thickness tear | 52 | 13 | 240 | 82.8% | 368 | 85.8% | 333 | 84.7% | 275 | 84.4% |
| | Full thickness tear | 60 | 11 | 37 | 12.8% | 50 | 11.7% | 49 | 12.5% | 38 | 11.7% |
| Infraspinatus | Normal | 52 | 13 | 261 | 90.0% | 383 | 89.3% | 345 | 87.8% | 299 | 91.7% |
| | Partial thickness tear | 57 | 14 | 28 | 9.7% | 45 | 10.5% | 47 | 12.0% | 26 | 8.0% |
| | Full thickness tear | 62 | 9 | 1 | 0.3% | 1 | 0.2% | 1 | 0.3% | 1 | 0.3% |
| Subscapularis | Normal | 53 | 13 | 275 | 94.8% | 404 | 94.2% | 365 | 92.9% | 314 | 96.3% |
| | Partial thickness tear | 56 | 14 | 15 | 5.2% | 24 | 5.6% | 28 | 7.1% | 11 | 3.4% |
| | Full thickness tear | 78 | . | 0 | 0.0% | 1 | 0.2% | 0 | 0.0% | 1 | 0.3% |
| Teres Minor | Normal | 53 | 13 | 290 | 100.0% | 428 | 99.8% | 392 | 99.7% | 326 | 100.0% |
| | Partial thickness tear | 54 | . | 0 | 0.0% | 1 | 0.2% | 1 | 0.3% | 0 | 0.0% |
| | Full thickness tear | . | . | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| Long head of | Normal | 53 | 13 | 281 | 96.9% | 420 | 97.9% | 383 | 97.5% | 318 | 97.5% |
| Biceps Tendon | Partial thickness tear | 54 | 14 | 9 | 3.1% | 8 | 1.9% | 9 | 2.3% | 8 | 2.5% |
| | Full thickness tear | 64 | . | 0 | 0.0% | 1 | 0.2% | 1 | 0.3% | 0 | 0.0% |

Regarding degenerative changes of the acromioclavicular joint, 617 patients (85.8%) had degenerative changes of the joint with a mean age of 54.6 years (± 12.6). They were 246 (40%) males and 371 (60%) females in frequency but without statistical significant gender difference because of the predominance of females in our sample. Out of those, 337

patients (54.6%) were on the right side and 280 patients (45.4%) were on the left side, without a significant difference.

Joint effusion occurred in 292 patients (40.6%) with a mean age of 55.8 years (±12.9). They were 115 (39.4%) males and 177 (60.6%) females, illustrating more commonality in females. Out of those 292 patients, 138 (47.3%) were on the right side and 154 (52.7%) were on the left side, without a significant difference.

Regarding bone marrow signal abnormalities; (Table 6) details the mean age and gender difference for each finding with 35% frequency, male to female ratio 1:1.3 and majority seen on right side (63%) and left 37% while RT: LT ratio was 1.7:1.

Non-traumatic gleno-labral pathologies (3.6 %) were found more prominent in males with the ratio of 2:1, but without difference in side, gender, or age groups. Detailed analysis for gleno labral pathologies will be the subject of future research.

**Table 6: The mean age, gender and side for each bone marrow finding and the presence or absence of glenolabral lesions .**

| | | Age | | Gender | | | | Side | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Male | | Female | | Right | | Left | |
| | | Mean | Standard Deviation | Count | Column N % | Count | Column N % | Count | Column N % | Count | Column N % |
| Bone Marrow | Normal | 52 | 13 | 178 | 61.8% | 281 | 65.8% | 229 | 58.6% | 230 | 71.0% |
| | Edema | 51 | 15 | 31 | 10.8% | 46 | 10.8% | 43 | 11.0% | 34 | 10.5% |
| | Cyst | 55 | 12 | 72 | 25.0% | 91 | 21.3% | 109 | 27.9% | 54 | 16.7% |
| | Both | 60 | 12 | 7 | 2.4% | 9 | 2.1% | 10 | 2.6% | 6 | 1.9% |
| Gleno-labral lesion | Yes | 50 | 17 | 15 | 5.2% | 11 | 2.6% | 13 | 3.3% | 13 | 4.0% |
| | No | 53 | 13 | 275 | 94.8% | 418 | 97.4% | 380 | 96.7% | 313 | 96.0% |

**Discussion**

The shoulder joint is a synovial multi-axial spheroidal (ball-and-socket). Skeletally, the joint is weak, and depends for support on surrounding muscles more than it does on its shape and ligaments. Muscles producing the movement may be divided into muscles acting on the pectoral girdle, muscles acting at the glenohumeral joint and Rotator cuff muscles. The glenoid labrum forms a fibro cartilaginous rim to the glenoid fossa increasing the area of its articular surface [5].

Descriptive epidemiological studies are important as they show variation in frequency and prevalence on the studied abnormalities associated with time, age and gender. This study evaluated the prevalence of different shoulder pathologies in a teaching hospital (Jordan University Hospital) as revealed by shoulder MRIs.

Advancing age is one of the risk factors for the development of shoulder pathologies, especially the rotator cuff tears, as patients older than 60 years are twice as likely to develop tear with prevalence ranging between 20%-30% and touches 62% in individuals aged 80 and more, with increase of 2.7 folds in rotator cuff tear every 10 years increase in age[6].

In literature [7, 8, 9,10] the reported patients' age is 40-65 years (52% -78%), and the

majority of patients were females (58%) while males were 42% and mean age was 61years (8,10) and only Amandeep Singh [11] reported the majority in males 56% and 44% in females . On the other hand, our patients' results were in concordance with the majority of the published data (Table 1). Normal MRI in (7%-37%) was reported [12,13], while it was 27% in our patients.

In literature (11,8,6), the right shoulder was respectively involved in 65%-77%, the left in (23%-35%), and bilaterally in 30%. Our results showed that the right shoulder was involved in (53.8%) and the left shoulder in (44.5 %), this was concordant with the published literature. The right-to-left ratio was 1:1.2. Bilateral shoulder MRI was performed in 12 patients (1.7%) with a lower frequency compared to the published literature.

The reported sensitivity and specificity of non-contrasted MRI for shoulder pathologies are (92%) and (93%) respectively (14), while for rotator cuff full thickness tears and partial thickness tears MRI respectively showed sensitivity of (89.6% and 100 %), specificity of (100% and 86.6%), and accuracy (93.1 and 91.1%) (9). However, in literature [11,12 ,13] frequency of rotator cuff full thickness tears was (5-24%) and partial thickness tears was (11-56%). Frequency of partial thickness and full thickness tears for the supraspinatus (52.5% and 27.5%), infraspinatus (5% and 0%), Subscapularis (10% and 2.5 %) and teres minor (0%and0%) respectively [11], whereas Magdalena Freygant et al [7] reported a frequency for partial thickness tear and complete tear for supraspinatus (57%and 11%), infraspinatus (26% and 2%). Subscapularis (31% and 1%) respectively, however teres minor tendon tears are rare (15).

Our results showed that rotator cuff muscles are the most commonly involved, in comparison with other muscles acting on the pectoral girdle and muscles acting at the glenohumeral joint. Also, partial thickness tears are more common than full thickness tears. Furthermore, partial tears are more common in female (61%) compared to male patients (39%), (82%) of whom were between 40-80 years.

Our data demonstrated that the supraspinatus is the most common to be involved in partial thickness tears (97%), while the percentages of tears in the other rotator cuff muscles were involved in (10%) for infraspinatus, 10% for subscapularis, (5.4%) and teres minor (0.1%). We also noticed that the right side (57%) is slightly more frequently involved in partial thickness tears compared to the left (43%). Partial thickness tears of the supraspinatus were seen in (82%) of patients aged between 40-80 years. Although the number of patients with partial thickness tears in other rotator cuff tendons is much less than in the supraspinatus, we noticed that it is in infraspinatus more common between 40-80 years of age (92%), in subscapularis between 40-80 years (87%), while only one patient with partial thickness tear of teres minor was above 70 years of age.

Concerning full thickness tears observed in our patients, the supraspinatus is the most commonly involved (84.5%) and was more common in females (57.5%) than males (42.5%), also the right side (56%) is slightly more frequently involved than the left side (44%). Full thickness tears of the supraspinatus were seen in patients aged between 50-80 years (82%), while in infraspinatus more frequently seen at the age between 50-70 years (2.2%), and in subscapularis between 70-80 years (1.1%).

No patients had full thickness tear in teres minor.

Jonathan et al [3] series had a poor detection rate of subscapularis tears because MRI scans of the shoulder do not reliably predict subscapularis tendon tears, unless the tears extend at least half the thickness of the tendon. However, others [16] showed Subscapularis tears are evident in up to 40%, while our data showed a lower frequency of subscapularis partial thickness tear with a frequency of (5.4%) (39 patients) and full thickness tears (0.1% ) (1 patient) of tendon tears.

In asymptomatic individuals, the overall prevalence for tears of rotator cuff in all ages was (34%), full thickness tears (15%) and partial thickness tears (20%). While frequency increased significantly above the age of sixty (54%), with frequency of full thickness (28%) and partial thickness tears (26%) as reported in literature [17]. None of our patients were in this group because our national medical insurance does not cover investigations for asymptomatic individuals.

MRI has a low sensitivity (22%) and high specificity (98%) and accuracy (71%) for detection of lesions of long head of biceps tendon even when it is associated with partial and complete (small and medium) rotator cuff injuries and (SLAP) lesions. But the higher the severity of these structures injuries the lower the sensitivity of MRI in diagnosing lesions of the long head of the biceps tendon [18]. Long head of Biceps tendon effusion was reported in (54%), while in (8%) long head of biceps was not visualized in the inter-tubercle sulcus [11], but others reported long head of biceps pathology in (1%) only [13]. In our data, the long head of biceps tendon tear was seen in 18 patients (2.6%), 17 of whom had partial tear (95%) without difference in gender or side. The majority (75%) was seen between the age of 50 -80 years.

MRI is considered the technique of choice for demonstrating location, extent and relationships of fluid collections and cystic lesions of the shoulder and joint fluid, which tends to increase with age and degenerative osteoarthritis [19].

In the presence of a rotator cuff tear, fluid can escape from the glenohumeral joint into a subacromial-subdeltoid bursa and into acromioclavicular joint and presence of fluid in the subcoracoid bursa should alert physicians to carefully check the rotator cuff tendons for tear [20]. The reported joint and subacromial bursal effusion [12] was 56%, while our data showed lower frequency of joint fluid (40%) without significant age, gender or side difference.

Regarding humeral head regional bone marrow intensity alteration on MRI, Wilson et al. demonstrated that progression or new development of bone marrow signal abnormalities are associated with an increased risk of cartilage loss [21], while Kothari et al. found Bone marrow signal abnormality at baseline predicated cartilage loss in the same region 2 years later [22,23].

We, on the other hand, found bone marrow signal abnormality in 256 (35%) of our patients (M: F 1:1.3); only (63%) had cysts, with a mean age of 55 (±12) years and (30%) had bone marrow edema with a mean age 51 (±15) years and (7%) had both findings with a mean age of 60 (±12) years, 63% were on the right and (37%) were on the left with a ratio of 1.7:1.

The acromioclavicular joint is a diarthrodial joint with a fibro-cartilaginous disc that has been shown to involute with age and begin to degenerate by the age of 40 years (24). There is strong association between acromioclavicular joint cysts and rotator cuff tears[20].

Bone marrow edema was present in (43%) patients. The presence of bone marrow edema also predicted a (100%) probability for clinically symptomatic acromioclavicular joint osteoarthritis [(25)]. Regarding acromioclavicular joint pathologies in our patients, the frequency of acromioclavicular joint degenerative changes is significantly higher than the reported frequency (2%-71%) in literature (11,12,13), compared to (85.8%) in our study (617 patients) with a mean age of 54.6 (±12) years without statistically significant differences among gender.

In detection in pan-labral lesions, MRI has sensitivity of (76%), and specificity of (87%), while for capsule-ligamentous complex sensitivity was (44%-100%) and specificity (66%-95%) and glenoid labral injuries were reported in (20%) of patients (4,11). Gleno-labral detailed findings will be the main topic for part II of our research. However, our results regarding non traumatic glenolabral lesions showed a lower frequency of (3.6 %) with a male: female ratio of 2:1 without side difference.

The advantage that our paper offers pertains to being the first national and probably regional study that involves this large sample size using 3 Tesla MRI, which allows a higher signal-to-noise ratio with better accuracy compared to 1.5 Tesla MRI. But unfortunately, it remains a retrospective study as it merely reviews MRI images and reports without clinical correlation. Furthermore, no MRI arthrography was performed.

**Conclusion:**

The increasing use of (3-Tesla) MRI scanners has improved the ability of appreciating different shoulder pathologies. Our results showed that the most common abnormality detected being acromioclavicular joint degenerative changes with frequency higher than that published in the literature. Glenolabral lesions are much less frequently encountered in our patients in comparison to the published literature, probably related to the low athletic activity among our population. Supraspinatus partial thickness tear is the most common rotator cuff tendon tear, followed by Supraspinatus full thickness tear, then infraspinatus partial thickness tear. The prevalence of shoulder pathologies -other than acromioclavicular joint degenerative changes and glenolabral lesions- among our patients as revealed by shoulder MRI was in concordance with that published in the international literature.

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# الرنين المغناطيسي للكتف: نتائج دراسة وصفية وبائية في مستشفى تعليمي

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**الملخص**

**الهدف:** تهدف الدراسة إلى مقارنة نتائج الرنين المغناطيسي للركبة عند المرضى المراجعين لمستشفى تعليمي في الأردن مع النتائج العالمية بهدف معرفة ما إذا كانت هنالك خصوصية لهؤلاء المرضى.

**الطرق:** شملت الدراسة 986 مريضاً أجري لهم فحص الرنين المغناطيسي للكتف خلال 4 سنوات وثلاثة أشهر، تم استثناء نتائج 267 مريض (106 ذكر و161 أنثى) لعدم وجود تغيرات في مفصل الكتف وتم تحليل نتائج 719 مريضا من الجنسين.

**النتائج:** يظهر تحليل الصور وجود عدة تغيرات في مفصل الكتف عند هؤلاء المرضى، حيث كان أكثرها شيوعا تمزق جزئي (84.6%) وكلي (12.1%) في العضلة الشوكية العليا وقد لوحظ أن الرنين المغناطيسي هو الفحص الأفضل للعضلة المدروة للكتف.

**الخلاصة:** خلصت الدراسة إلى أن نتائج الرنين المغناطسي عند مرضانا تماثل النتائج العالمية باستثناء أن هنالك ارتفاعاً واضحاً في اعتلال المفصل الأخرمي الترقوي وانخفاض في اعتلال الغضروف الكتفي مقارنة مع النتائج العالمية.

**الكلمات الدالة:** أمراض الكتف، الرنين المغناطيسي للكتف، اعتلالات النخاع العظمي، العضلة المدورة للكتف، المفصل الأخرمي الترقوي.