Scientific Research Publishing

Open Journal of Radiology, 2026, 16(1), 1-10
https://www.scirp.org/journal/ojrad
ISSN Online: 2164-3032
ISSN Print: 2164-3024

The Diagnostic Value of Arthroscopic CT Scans in Knee Pathologies in Mali: Complementarity with MRI and Arthroscopy in Modern Practice

Koné Abdoulaye[1,2*], Diakité Diakaridia[2], Coulibaly Youlouza[1], Sidibé Kassim[3], Kouma Alassane[4], Sanogo Souleymane[4], Mody Abdoulaye Camara[5], Traoré Moussa[6], Konaté Moussa[1], Koné Youssouf[7], Diallo Mahamadou[6], Keita Adama Diaman[1], Sidibé Siaka[1,2]

[1]Medical Imaging Department, Point G University Hospital, Bamako, Mali
[2]Medical Imaging Department, Pasteur Polyclinic, Bamako, Mali
[3]Malian Armed Forces Health Services Directorate, Bamako, Mali
[4]Medical Imaging Department, Mère-Enfant University Hospital, Luxembourg, Luxembourg
[5]Medical Imaging Department, Mali Hospital, Bamako, Mali
[6]Radiology Department, Gabriel Touré University Hospital, Bamako, Mali
[7]Radiology Department, Jacques Boutard Hospital, Saint-Yrieix-la-Perche, France
Email: *achok83@yahoo.fr

How to cite this paper: Koné, A., Diakité, D., Coulibaly, Y., Sidibé, K., Kouma, A., Sanogo, S., Camara, M.A., Traoré, M., Konaté, M., Koné, Y., Diallo, M., Keita, A.D. and Sidibé, S. (2026) The Diagnostic Value of Arthroscopic CT Scans in Knee Pathologies in Mali: Complementarity with MRI and Arthroscopy in Modern Practice. *Open Journal of Radiology*, **16**, 1-10.
https://doi.org/10.4236/ojrad.2026.161001

Received: August 31, 2025
Accepted: January 10, 2026
Published: January 13, 2026

Abstract

Introduction: Osteoarticular pathologies of the knee are a major public health problem in Mali. For a long time, these pathologies have been investigated using arthroscopic scanning. **Objective:** To determine the contribution of arthroscopic scanning to the diagnosis of knee joint pathologies in the era of MRI. **Materials and Methods:** A retrospective cross-sectional study surveyed 103 patients over a five-year period, each of whom underwent knee arthroscopy in the radiology department of the CMCR Pasteur in Bamako, Mali. **Results:** Joint noises and trauma with knee instability were the most common indications for arthroscopy, in 31.1% and 29.1% of cases, respectively. The results of the arthrography were pathological in 79.6% of cases. The left knee was the most affected, with 41.5%, but there was no statistically significant difference (P = 0.52). The medial meniscus was the most affected, with 68.2%. Tears were the main type of meniscal lesion (50%), and the posterior horn was the most common site in 68.2% of cases. The ACL was affected in 68.4% of cases, with complete tears being the most common at 47.4%. Stage 4 chondropathy was observed in 54.5% of cases. A few false negatives were observed on arthroscopic scanning with regard to meniscal and ligament damage. Some of these patients underwent MRI, which was abnormal in 80% of cases, or arthroscopy, which was abnormal in 90% of cases. **Conclusion:** Arthroscopy is

an effective method for detecting cartilage and menisco-ligamentous lesions communicating with the joint cavity. False negatives may be encountered in cases of menisco-ligamentous damage. MRI and arthroscopy performed as complementary tests can provide guidance when arthroscopy results are normal.

Keywords

Knee, Arthroscopic Scan, MRI, Arthroscopy

1. Introduction

The knee joint is a complex joint comprising articular surfaces, menisci, joint capsule, bursae and ligaments [1]. It can be affected by numerous pathologies, including traumatic, degenerative, inflammatory, infectious and tumour-related conditions [2]-[4]. In Mali, osteoarticular pathologies are a major public health problem. The morphological examination of these joint pathologies involves several imaging modalities, including arthrography, magnetic resonance imaging and diagnostic arthroscopy [5]-[7]. Knee CT arthrography is an examination that combines computed tomography with the injection of a contrast agent directly into the knee joint. CT arthrography (also referred to as arthrographic CT scan in this paper) is a post-contrast tomodensitometric technique allowing intra-articular evaluation of cartilage, menisci and ligaments. This provides highly detailed images of the internal structures of the knee, such as the cartilage, ligaments, joint capsule, menisci and bone. MRI has revolutionised the diagnosis of knee pathologies [1]. Thanks to its excellent tissue resolution, this imaging modality allows for precise examination of the osteochondral, meniscal-ligamentous and synovial structures. Arthroscopy is a minimally invasive surgical procedure that has revolutionised the treatment of joint disorders. The precision of this technique, which allows intra-articular damage to be diagnosed and repaired while reducing postoperative complications, is undeniably a boon for patients.

In Africa, there is little data on the radiological aspects of knee pathologies except for that of Adeline in 2016 in Burkina Faso [8]. To our knowledge, given the lack of data on arthroscopy in the diagnosis of meniscal, ligamentous and cartilaginous pathologies of the knee in Mali, and with a view to improving the early management of these conditions, we proposed this study to describe the role of arthroscopy in the era of MRI and arthroscopy in the diagnosis of meniscal, ligamentous and cartilaginous pathologies of the knee.

2. Materials and Method

Over a five-year period (January 2018 to January 2022), 103 patients meeting the inclusion criteria were retrospectively included. All underwent CT arthrography for suspected internal derangements of the knee at the Pasteur Polyclinic Imaging Department in Bamako, Mali. Inclusion criteria were patients of all ages who un-

derwent CT arthrography of the knee between January 2018 and January 2022 for suspected meniscal, ligamentous or cartilage injury, with complete clinical and imaging records. Exclusion criteria were incomplete imaging data, prior knee surgery, and non-traumatic or infectious joint conditions. Helical CT was performed with 5-mm slices under 15˚ - 20˚ flexion, with subsequent 1.25-mm multiplanar reconstructions following intra-articular injection of 10 mL of Iopamiron 200. MRI was additionally performed in patients with negative CT arthrography findings using a 1.5 T GE system with T1-weighted and STIR sequences in three planes.

All CT arthrography images were independently reviewed by two radiologists specializing in musculoskeletal imaging, with 8 and 12 years of experience respectively. In cases of disagreement, a consensus reading was reached. The readers were blinded to MRI and arthroscopy.

Arthroscopy was also performed in cases of negative arthrography, when meniscal-ligament damage was suspected in a small number of patients.

Patient information was collected from imaging request forms and patient records. The variables studied in our study were sociodemographic data (age and gender), clinical information (knee pain, swelling, trauma, joint locking, or other) and data from arthroscopic scans, MRIs and arthroscopy. Data entry and analysis were performed using Microsoft Excel 2016, SPSS version 20.0, and Epi Info version 7.2.1.0. Pearson's chi-square test or Fischer's exact test was used to compare proportions, and data were collected confidentially.

3. Results

In our series, 103 patients who underwent arthro-CT were included in the study out of a total of 24,000 scans performed in the department, representing 0.43% of all scans. There were 63 men (61.2%) and 40 women (38.8%) (**Figure 1**), with a mean age of 39.4 years ± 16.5 years and extremes of 11 and 78 years (**Table 1**). Joint noises and traumas with knee instability were the most frequent indications for arthroscopy, at 31.1% and 29.1% respectively (**Table 2**) (**Table 3**). The arthro-CT results were pathological in 79.6% of cases (**Figure 2**). The left knee was the most affected, with 41.5%, but there was no statistically significant difference ($p = 0.52$) (**Figure 2**). The medial meniscus was the most affected, with 68.2% (**Table 4**). Tears were the main type of meniscal lesion (50%), and the posterior horn was the most frequent site in 68.2% of cases. The ACL was affected in 68.4% of cases (**Table 5**), with complete ruptures being the most frequent (47.4%). A stage 4 chondropathy (image A **Figure 3**) (images B and C **Figure 4**) was observed in 54.5% of cases. A few false negatives were observed on arthro-CT regarding meniscal and ligamentous lesions (**Figure 5**). Some of these patients underwent MRI, which was abnormal in 80% of cases, or arthroscopy, which was abnormal in 90% of cases (**Table 6**). For meniscal (**Figure 3** and **Figure 6**) and ligamentous lesions, the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of arthro-CT were calculated using arthroscopy as the reference standard

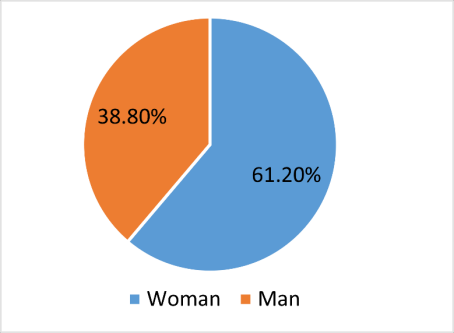


Figure 1. Distribution of the study population according to sex.

Table 1. Distribution of the study population according to age groups.

Age groups	Number (%)
11 - 20	19 (18.4)
21 - 30	18 (17.5)
31 - 40	16 (15.5)
41 - 50	21 (20.4)
51 - 60	18 (17.5)
61 - 70	07 (06.8)
71 - 80	04 (03.9)
Total	103 (100)

Average age = 39.4 years ± 16.5.

Table 2. Distribution of arthroscopic scan results according to clinical information.

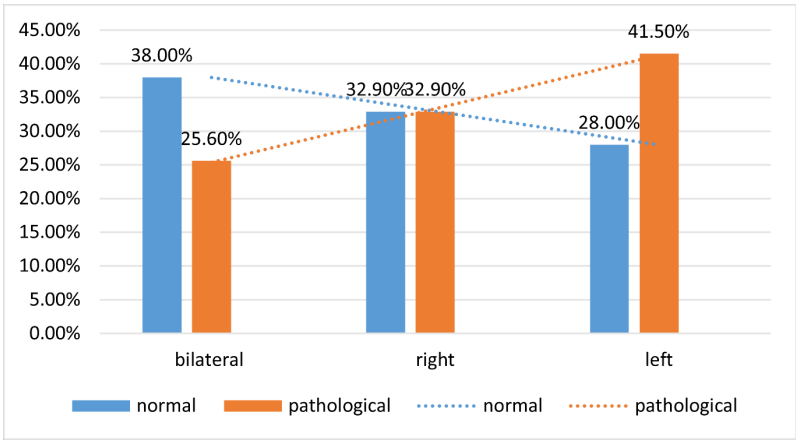
Clinical information	Workforce n (%)
Joint blockage	05 (04.9)
Joint noise	32 (31.1)
Knee pain	27 (26.2)
Trauma + Instability	30 (29.1)
Swelling	09 (08.7)
Total	103 (100)

Joint noise was the most common symptom, accounting for 31.1%, followed by trauma with knee instability, which accounted for 29.1%.

Table 3. Distribution of bone damage on arthroscopic scans according to frequency.

Type of bone lesion	Workforce n (%)
Degenerative	32 (66.7)
Fracture	13 (27.1)
Tumour	03 (06.2)
Total	48 (100)

The most common bone lesion was degenerative damage, accounting for 66.7%.



The left knee was the most affected in 41.5% of the examinations performed (p = 0.52).

Figure 2. Distribution of arthroscopic scan results according to the knee affected.

Table 4. Frequency of meniscal lesions on arthroscopic examination in the study population.

Meniscus affected	**Workforce n (%)**
Medial meniscus	15 (68.2)
Lateral meniscus	7 (31.8)
Total	22 (100)

The medial meniscus was the most affected in the arthroscopic scan, with 68.2%.

Table 5. Frequency of ligament damage in the study population.

Ligament injury	**Staff numbers n (%)**
Collateral ligaments	4 (21.1)
ACL	13 (68.4)
PCL	2 (10.5)
Total	19 (100)

Injury to the anterior cruciate ligament (ACL) was more common, at 68.4%.

Table 6. Distribution of MRI results in the study population.

MRI results	**Workforce n (%)**
Normal	03 (20.0)
Pathological	12 (80.0)
Total	15 (100)

The MRI results were abnormal in 80% of the examinations.

Table 7. Comparison of results for patients who underwent both arthroscopy and knee arthrography (n = 10).

Arthroscopy results	**Arthroscopic scan results**		**Total**
	Normal	**Pathological**	
Normal	1 (10.0)	0 (00.0)	1 (10.0)

Continued

Pathological	9 (90.0)	0 (00.0)	9 (90.0)
Total	10 (100.0)	0 (00.0)	10 (100.0)

Arthroscopy revealed pathology in 90% of examinations performed after a normal arthrograph (P = 0.01).

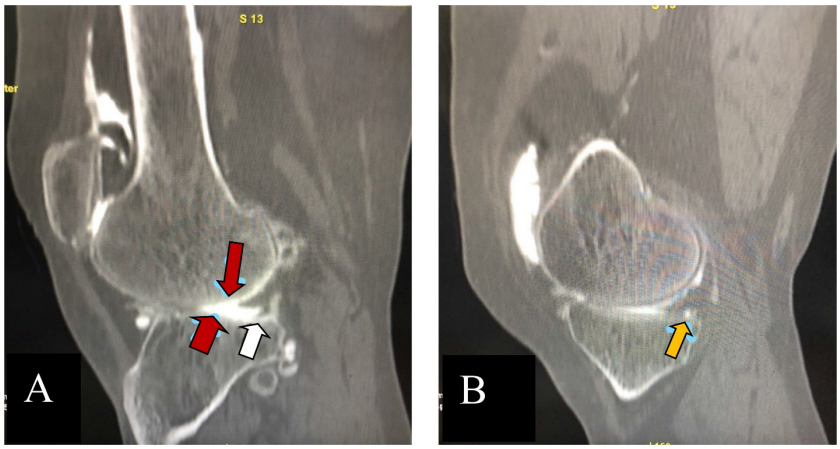


Figure 3. Knee arthroscope scan in sagittal reconstruction showing in A stage 4 chondropathy with exposure of the tibial plateau (upward red arrow) and femoral condyle (downward red arrow). Horizontal tear in the posterior horn of the external meniscus (white arrow). Radial tear in the posterior horn of the internal meniscus (arrow in image B).

(Table 3 and Table 7). The sensitivity and specificity for meniscal tears were 85% and 80%, respectively, while for ligamentous lesions they were 88% and 75%.

4. Discussion

This study has several limitations. First, its retrospective and single-center design may introduce selection bias. Second, not all patients underwent arthroscopy, resulting in partial verification bias. Third, the number of patients who underwent

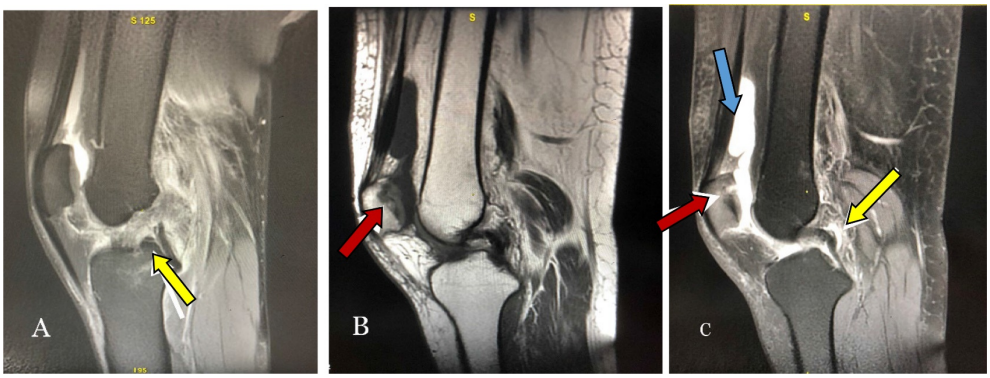


Figure 4. MRI images of the knee in sagittal sections, T2 sequence passing through the ruptured anterior cruciate ligament marked with a yellow arrow (A), T1 sequence (B) and T2 (C) sequences passing through the patella showing stage 4 chondropathy (red arrow B and C) with subchondral geodes and intra-articular effusion in hypo signal T1 and hyper signal T2 (C: blue arrow). Ruptured posterior cruciate ligament (C: yellow arrow).

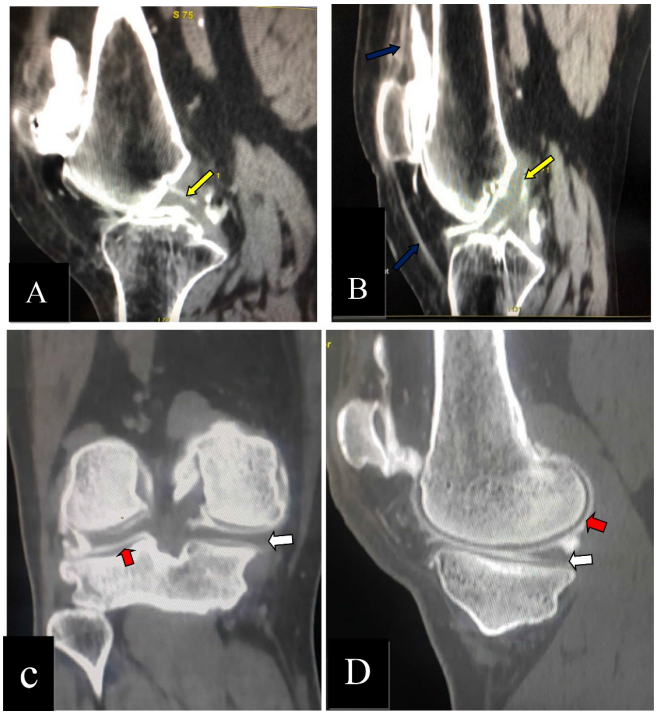


Figure 5. Knee arthroscope scan showing normal anatomical features: normal posterior cruciate ligament marked with yellow arrow (B); normal anterior cruciate ligament marked with yellow arrow (A); normal meniscus marked with white arrow (C) and (D) and normal encrusting cartilage marked with red arrow (C) and (D). Patellar ligaments marked with blue arrow.

both MRI and arthroscopy was relatively small, which may limit the statistical power of subgroup comparisons.

In our series, 103 patients who underwent arthroscopic scanning were included in the study out of a total of 24,000 scans performed in the department, representing 0.43% of all scans. This low rate can be explained by the widespread use

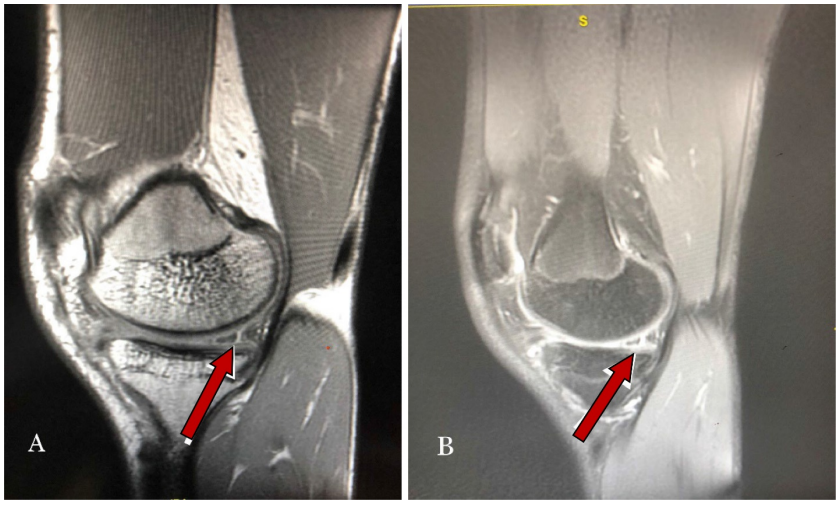


Figure 6. MRI reconstruction of the knee in T1 sequence (A) and T2 sequence (B) showing a radial tear of the posterior horn of the medial meniscus.

of MRI in recent years in our countries, which remains the gold standard for knee joint examination.

The average age in our study was 39 years, with extremes of 11 and 78 years (**Table 1**). A similar result is found in the literature [9] [10]. This can be explained by the onset of ageing of the osteochondral structures after a long period of physical activity during youth. It can also be explained by frequent sports practice among young people, which is a contributing factor to these injuries.

The sex ratio was 1.6, with no statistically significant difference between the two sexes (P = 0.56) (**Figure 1**). This male predominance is also observed in the literature [8].

The arthroscopic scan results were pathological in 79.6% of examinations, with the left knee being the most affected at 41.5% (**Table 2**). There was no statistically significant difference (P = 0.52) between the knees affected (right or left) in our study. However, the right knee is most often mentioned in the literature because most participants are right-handed. This difference can be explained by the size of our sample or by chance.

A few false negatives were observed on arthroscopic scans with regard to meniscal and ligament damage (**Table 2**). Some of these patients underwent MRI scans, which were abnormal in 80% of cases, or arthroscopy, which was abnormal in 90% of cases.

This study has several limitations. First, its retrospective and single-center design may introduce selection bias. Second, not all patients underwent arthroscopy, resulting in partial verification bias. Third, the number of patients who underwent both MRI and arthroscopy was relatively small, which may limit the statistical power of subgroup comparisons.

In our series, 103 patients who underwent arthroscopic scanning were included in the study out of a total of 24,000 scans performed in the department, representing 0.43% of all scans. This low rate can be explained by the widespread use of MRI in recent years in our countries, which remains the gold standard for knee joint examination.

The average age in our study was 39 years, with extremes of 11 and 78 years (**Table 1**). A similar result is found in the literature [8] [10]. This can be explained by the onset of ageing of the osteochondral structures after a long period of physical activity during youth. It can also be explained by frequent sports practice among young people, which is a contributing factor to these injuries.

The sex ratio was 1.6, with no statistically significant difference between the two sexes (P = 0.56). This male predominance is also observed in the literature [8].

The arthroscopic scan results were pathological in 79.6% of examinations, with the left knee being the most affected at 41.5% (**Figure 2**). There was no statistically significant difference (P = 0.52) between the knees affected (right or left) in our study. However, the right knee is most often mentioned in the literature because most participants are right-handed. This difference can be explained by the size of our sample or by chance.

A few false negatives were observed on arthroscopic scans with regard to meniscal and ligament damage. Some of these patients underwent MRI scans, which were abnormal in 80% of cases Table 6, or arthroscopy, which was abnormal in 90% of cases. Arthrography is a very useful method for detecting cartilage and menisco-ligamentous lesions communicating with the joint cavity [5] [9] [11]-[13]. However, false negatives may be encountered in cases of menisco-ligamentous damage

5. Conclusion

Knee injuries are common and varied. The best treatment depends on the diagnosis. Several imaging techniques are available to detect these injuries, including arthroscopy, MRI and arthroscopy. Arthrography is a very useful method for detecting cartilage and menisco-ligamentous lesions communicating with the joint cavity. However, false negatives may be encountered in cases of menisco-ligamentous damage. MRI and arthroscopy performed as complementary tests can provide guidance when arthrography is normal.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Etoundi, A.C., Semasinghe, C.L., Agrawal, S., Dobner, A. and Jafari, A. (2021) Bio-inspired Knee Joint: Trends in the Hardware Systems Development. *Frontiers in Robotics and AI*, **8**, Article 613574. https://doi.org/10.3389/frobt.2021.613574

[2] Khella, C.M., Asgarian, R., Horvath, J.M., Rolauffs, B. and Hart, M.L. (2021) An Evidence-Based Systematic Review of Human Knee Post-Traumatic Osteoarthritis (PTOA): Timeline of Clinical Presentation and Disease Markers, Comparison of Knee Joint PTOA Models and Early Disease Implications. *International Journal of Molecular Sciences*, **22**, Article 1996. https://doi.org/10.3390/ijms22041996

[3] Cieza, A., Causey, K., Kamenov, K., Hanson, S.W., Chatterji, S. and Vos, T. (2020) Global Estimates of the Need for Rehabilitation Based on the Global Burden of Disease Study 2019: A Systematic Analysis for the Global Burden of Disease Study 2019. *The Lancet*, **396**, 2006-2017. https://doi.org/10.1016/s0140-6736(20)32340-0

[4] Ngantchui, M.T. (2021) Rheumatic Diseases: Experiences and Treatment Pathways in Koulouba, Sogonafing and Point G (Bamako, Mali). Master's Thesis, Université des Sciences, des Techniques et des Technologies. https://www.bibliosante.ml/handle/123456789/4774

[5] Wang, S., Xiao, Z., Lu, Y., Zhang, Z. and Lv, F. (2021) Radiographic Optimization of the Lateral Position of the Knee Joint Aided by CT Images and the Maximum Intensity Projection Technique. *Journal of Orthopaedic Surgery and Research*, **16**, Article No. 581. https://doi.org/10.1186/s13018-021-02740-8

[6] Jerban, S., Chang, E.Y. and Du, J. (2020) Magnetic Resonance Imaging (MRI) Studies of Knee Joint under Mechanical Loading: Review. *Magnetic Resonance Imaging*, **65**, 27-36. https://doi.org/10.1016/j.mri.2019.09.007

[7] Jiang, T., Yang, T., Zhang, W., Doherty, M., Zhang, Y., Wei, J., *et al.* (2021) Prevalence of Ultrasound-Detected Knee Synovial Abnormalities in a Middle-Aged and Older

General Population—The Xiangya Osteoarthritis Study. *Arthritis Research & Therapy*, **23**, Article No. 156. https://doi.org/10.1186/s13075-021-02539-2

[8] Atiogbe, A.W. (2016) Contribution of Arthroscopic Scanning to the Diagnosis of Knee Pathologies in Adults at the Sourô Sanou University Hospital in Bobo-Dioulasso: A Review of 46 Cases. 1-138.

[9] Ahoury, N., Salami, F., Ognami, J., Touré, A., Zi, K., Kanga, K. and Camara, Y. (2015) Knee Arthroscopy: A Review of 68 Cases Collected at the Abidjan Military Hospital (HMA). *Journal Africain d Imagerie Médicale*, **3**, 116-124.

[10] Dougbu, R.K. (2015) Contribution of MRI to the Diagnosis of Knee Pathologies. *Revue du CAMES-Série A*, *Sciences et Médecine*, **3**, 84-88.

[11] Li, X., *et al.* (2023) Comparative Diagnostic Performance of CT Arthrography and MRI in Meniscal and ACL Injuries. *European Radiology*, **33**, 1234-1245.

[12] Park, J.H., *et al.* (2022) CT Arthrography versus MRI for Knee Cartilage Assessment: A Prospective Comparative Study. *Skeletal Radiology*, **51**, 970-971.

[13] Otten, P., *et al.* (2024) Modern Imaging Strategies for Post-Traumatic Knee Lesions. Insights Imaging, **15**, 16.