



## Radio-Diagnosis

## A STUDY OF 3T MRI SCAN AND PLAIN RADIOGRAPH IN THE EVALUATION OF PAINFUL HIP JOINT

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**ABSTRACT** **Context:** The Digital Radiography & Magnetic Resonance Imaging scan is a Non-Invasive, Advanced Imaging Technique, which is a used in Clinical Radiology for the Assessment of Various Hip Joint Pathologies. **Aims:** To correlate the 3D DESS sequence with routine sequence & To evaluate accuracy of 3D DESS sequence in different hip joint pathologies. **Settings And Design:** Prospective research study. **Material And Methods:** A total of 60 patients (35 males, 15 females) were selected as a participant. **Statistical Analysis:** The data were analyzed by using of STATA program 14.2 version. **Results:** In our 60 patients Research study, There were 21 (42%) Cases of Avascular Necrosis (AVN), 7 (14%) Cases of arthritis, 3 (6%) and 1 (2%) cases were of femoral fracture and acetabular fracture, respectively our findings showed that MEDIC, 3D-DESS and PDFS were significantly better than (PD) & STIR sequences in the assessment of all the hip pain pathologies. **Conclusion:** The 3T MRI is a Modality of Choice for Various Hip Joint Pathologies and more Advantages than Digital Radiograph.

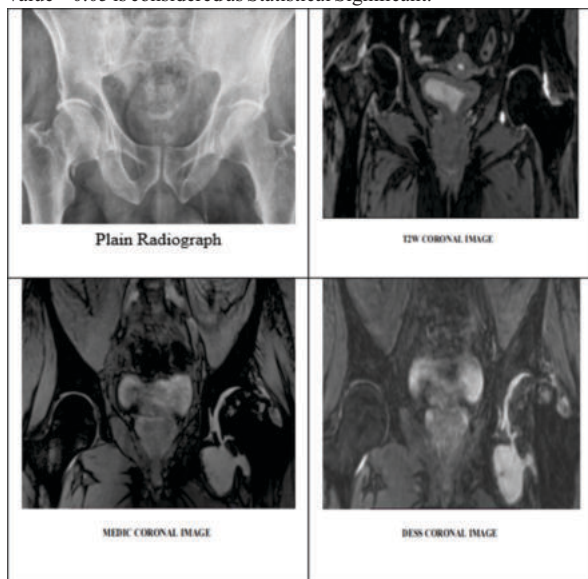
**KEYWORDS :** Plain Radiograph, MRI of Hip Joint, Different Hip Joint Pathologies, 3D-DESS, MEDIC & PDFS Sequence.

## INTRODUCTION

MRI is a vital tool for assessing the hip joint disorders. However, the choice of MRI sequence may be influenced by the specific clinical question being addressed. In addition, specific protocols and techniques for MRI imaging, including the use of sequences like MEDIC, 3D DESS and PDFS may vary from one institution to another. Hence, there is a need to have clinical evidence for diagnostic distinctiveness of these sequences in assessing hip Joint pain pathologies.

## MATERIALS &amp; METHODS –

It is a prospective type Research study, Where 60 patients presenting with a painful hip from OPD, IPD and referred for MRI scan of hip joint to the Radio-diagnosis department, Shree Krishna Hospital, Karamsad. Patients presenting with the history of hip pain, including both the sexes and of all age groups, were included in this Research Study. Ethical Clearance was granted by the Institutional Human Research Ethics Committee (IEC – II), Pramukh Swami Medical College, Karamsad. Demographic characteristics of the study patients such as age, sex, potential risk factors were also recorded. Descriptive statistics [Mean (SD)], Frequency (%) etc. were used to present profile of the study participants. One-way analysis of variance (ANOVA) was used to compare continuous variables among different sequences. P-value < 0.05 is considered as Statistical Significant.



## RESULTS -

In our 60 patients Research study, 10 patients with normal findings were taken as control and rest of the 50 patients taken as cases with mean age of 42 years; of them 35 (70%) were males and 15 (30%) were females. There were 21 (42%) Participants of Avascular Necrosis (AVN), 7 (14%) Participants of arthritis, 3 (6%) and 1 (2%) cases were of femoral fracture and acetabular fracture, respectively. Our findings showed that MEDIC, 3DDESS and PDFS were significantly better than Proton Density (PD) and Short Tau Inversion Recovery (STIR) sequences in the assessment of all the hip pain pathologies. Statistically significant differences ( $p < 0.05$ ) were observed in acetabular cartilage thickness as well as femoral cartilage thickness between the left and right sides in right AVN cases for the MEDIC, DESS and PDFS sequences. The Mean thickness was significantly lower for the right side. Similar findings were reported for the cases of right-side arthritis.

Pathology	With Normal Articular Cartilage Thickness (In Both Hip)	With Articular Cartilage Thinning			Number of Cases
		Right	Left	Both	
AVN	8	6	3	4	21
OA	1	1	1	1	4
Infective Arthritis	3	-	-	-	3
Benign Bone Tumor	3	-	-	-	3
Benign Intramuscular Tumor	2	-	-	-	2
Femoral Neck, Intertrochanteric & Acetabulum Fracture	2	-	-	-	2
Osteomyelitis	4	-	-	-	4
Synovial Effusion	2	-	-	-	2
fatty degeneration of gluteal muscles	2	-	-	-	2
Bone Marrow Edema	2	-	-	-	2
Transient osteoporosis	1	-	-	-	1
Sacroilitis	1	-	-	-	1
Osteitis pubi	1	-	-	-	1

Post-operative change	1	-	-	-	1
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**DISCUSSION-**

In our study, we observed diverse range of hip pathologies, with AVN being the most prevalent condition, followed by arthritis, fractures, tumors, osteomyelitis and other miscellaneous cases. Comparing diagnostic modalities, the study highlighted the superior sensitivity of MRI over X-ray in detecting various hip pathologies. Furthermore, the study evaluated the Mitchell classification for AVN staging and found significant distribution across different stages. The distribution of patients based on identified risk factors for AVN revealed a diverse array of etiological contributors like trauma, Steroid use, alcohol consumption and diabetes. While specific MRI sequences demonstrated noticeable differences, the overall findings underscored the potential relevance of these sequences in detecting subtle alterations associated with AVN pathology. The findings of this study regarding the diagnostic performance of MRI sequences in hip pathology assessment are consistent with previous research across various anatomical regions. In Summary, PD and STIR sequences might not be as sensitive in detecting subtle differences for the condition being studied as compared to MEDIC, DESS (3D) and PDFS sequences. Overall, the DESS sequence emerges as a valuable tool in MRI imaging across various anatomical regions, offering high-resolution images and diagnostic accuracy in assessing soft tissue structures and cartilage lesions

**CONCLUSION –**

Overall, the findings of this study regarding the diagnostic performance of MRI sequences in hip pathology assessment are consistent with previous research across various anatomical regions. These sequences offer highresolution imaging and diagnostic accuracy, making them valuable tools in clinical practice for assessing soft tissue structures and cartilage lesions. Future research could focus on leveraging MEDIC, DESS (3D) and PDFS sequences as potential diagnostic markers for differentiating the underlying hip pathology. Further studies exploring larger cohorts or employing advanced imaging techniques may provide deeper insights into the nuanced changes in acetabular and femoral cartilage associated with AVN, arthritis and other hip pain pathology.

**REFERENCES:**

[1] Akshit Gakhar, Sanjay Sethi, Ranjana Gupta, Puneet Mittal, Kunal Singh Ahluwalia, Dharna Sharma. Role of plain radiograph and MRI in the evaluation of painful hip joint. International Journal of Contemporary Medicine Surgery and Radiology. 2021;6(1):A59-A63

[2] Thakur, R., & Aluka, S. K. R. (2020). A study on plain radiograph & MR evaluation of painful HIP joint. International Journal of Health and Clinical Research, 3(11), 67- 74.

[3] Schmaranzer F, Kheterpal AB, Bredella MA. Best Practices: Hip Femoroacetabular Impingement. AJR Am J Roentgenol. 2021 Mar;216(3):585-598. doi: 10.2214/AJR.20.22783. Epub 2021 Jan 21. PMID: 33474984; PMCID: PMC8116615.

[4] Pinglikar SB, Seth ND, Joshi PC, et al. Screening of painful hip joint with radiography and MRI. J. Evolution Med. Dent. Sci. 2020;9(15):1286-1290, DOI: 10.14260/jemds/2020.

[5] Thoenen, J., Stevens, K. J., Turmezei, T. D., Chaudhari, A., Watkins, L. E., McWalter, E. J., Hargreaves, B. A., Gold, G. E., MacKay, J. W., & Kogan, F. (2021). Non-contrast MRI of synovitis in the knee using quantitative DESS. European radiology, 31(12), 9369–9379. <https://doi.org/10.1007/s00330-021-08025>.