

**AN ANATOMICO-CLINICAL STUDY OF JANU SANDHI MARMA (KNEE JOINT) IN
RESPECT TO RADIOGRAPH****Dr. Nishchal Sharma^{*1}, Prof. Sunita Kumari², Dr. Arvind Kumar³, Dr. Ajay Kumar Yadav⁴**¹P.G. Scholar, P.G. Department of Rachana Sharir, State Ayurvedic College & Hospital, Lucknow, Mahayogi Guru Gorakhnath AYUSH University, Gorakhpur, Uttar Pradesh, India.²Professor & HOD, P.G. Department of Rachana Sharir, State Ayurvedic College & Hospital, Lucknow.³Assistant Professor, P.G. Department of Rachana Sharir, State Ayurvedic College & Hospital, Lucknow.⁴Orthopedic Consultant, Balrampur District Hospital, Lucknow.***Corresponding Author: Dr. Nishchal Sharma**P.G. Scholar, P.G. Department of Rachana Sharir, State Ayurvedic College & Hospital, Lucknow, Mahayogi Guru Gorakhnath AYUSH University, Gorakhpur, Uttar Pradesh, India. DOI: <https://doi.org/10.5281/zenodo.22253325>**How to cite this Article:** Dr. Nishchal Sharma^{*1}, Prof. Sunita Kumari², Dr. Arvind Kumar³, Dr. Ajay Kumar Yadav⁴ (2026). An Anatomico-Clinical Study Of Janu Sandhi Marma (Knee Joint) In Respect To Radiograph. World Journal of Pharmaceutical and Medical Research, 12(9), 252–256.

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ABSTRACT

Background: Janu Sandhi Marma is described by Acharya Sushruta as a Vaikalyakara Marma, the injury of which may result in functional impairment and disability. The anatomical description of Janu Sandhi can be correlated with the modern knee joint complex, which comprises bones, ligaments, menisci, muscles, capsule and other supporting structures. **Objective:** To establish an anatomico-clinical correlation between Janu Sandhi Marma and the modern knee joint using clinical examination and radiological investigations, and to evaluate the classical Viddha Lakshana of Janu Marma injury. **Materials and Methods:** An observational, cross-sectional, hospital-based study was conducted at Balrampur District Hospital, Lucknow. Twenty-five patients aged 20–55 years presenting with knee joint trauma were evaluated. Clinical assessment included pain, swelling, tenderness, instability, range of motion and functional impairment along with special tests such as Lachman, anterior drawer, McMurray and valgus stress tests. Radiological assessment included X-ray and MRI. Ayurvedic clinical manifestations were correlated with modern clinical and radiological findings. **Results:** Twenty-five patients were included, comprising 18 males (72%) and 7 females (28%), with a mean age of 37.2 ± 9.4 years. The maximum number of patients belonged to the 31–40-year age group. Among 17 patients with ACL tears, 13 (76.47%) had complete tears and 4 (23.53%) had partial tears. Proximal-third ACL involvement was most frequent (64.71%). Meniscal injuries were associated with 35.29% and MCL injuries with 17.65% of ACL tear cases. Bone contusions were observed in 70.59% of ACL tear cases. Clinical-radiological agreement was highest for joint effusion ($\kappa = 1.00$), followed by Lachman test ($\kappa = 0.82$), McMurray test ($\kappa = 0.75$), anterior drawer test ($\kappa = 0.71$) and valgus stress test ($\kappa = 0.68$). All 25 patients exhibited at least three classical Viddha Lakshanas of Janu Sandhi Marma injury. **Conclusion:** The findings demonstrate a clinically meaningful correlation between the classical description of Janu Sandhi Marma and the anatomical, clinical and radiological features of knee joint injuries. The classical manifestations such as Vedana, Shotha, Khanjata, Kriya Ashakti and Sparshasahyata show recognizable modern clinical correlates. Integration of Ayurvedic clinical assessment with modern radiological evaluation may provide a comprehensive approach to the assessment of Janu Sandhi Marma trauma.

KEYWORDS: Janu Sandhi Marma, Marma, Viddha Lakshana, Knee Joint, ACL, MRI, Radiograph, Anatomico-Clinical Correlation.**INTRODUCTION**

Marma Sharira is an important component of Ayurvedic anatomy and surgery. Acharya Sushruta describes Marma as the anatomical site where Mamsa, Sira, Snayu, Asthi and Sandhi converge and where Prana is specially situated. Among the 107 Marmas, Janu Sandhi Marma is

classified as a Vaikalyakara Marma, indicating that injury may result in disability or functional impairment.

Janu Sandhi, situated between Uru and Jangha, corresponds anatomically to the knee joint. It is a complex synovial joint formed primarily by the femur,

tibia and patella, with menisci, ligaments, capsule, synovial membrane and surrounding musculature contributing to its stability and function. The classical description of Janu Sandhi therefore provides a conceptual basis for correlation with modern anatomical structures.

Trauma to Janu Sandhi may produce Vedana (pain), Shotha (swelling), Khanjata (lameness/instability), Kriya Ashakti (loss of function) and Sparshasahyata (tenderness). These manifestations can be compared with modern findings such as ligamentous injury, hemarthrosis, joint effusion, restricted range of motion and instability.

Although the classical description of Janu Sandhi Marma is detailed, systematic correlation with modern clinical examination and radiological imaging remains limited. The present study was therefore undertaken to evaluate the anatomical and clinical relevance of Janu Sandhi Marma through radiological assessment.

MATERIALS AND METHODS

Study Design

An observational, cross-sectional, non-interventional, hospital-based study was conducted at Balrampur District Hospital, Lucknow.

Study Population

A total of **25 patients** with knee joint injuries were included. Patients aged 20–55 years with symptoms of knee trauma, including pain, swelling, restricted

movement, tenderness and instability, were assessed. Patients with systemic debilitating disorders, degenerative/inflammatory arthritis, congenital knee abnormalities, previous knee surgery or unwillingness to provide consent were excluded.

Clinical Assessment

A standardized clinical proforma incorporating Ayurvedic and modern parameters was used. Assessment included Vedana, Shotha, Khanjata, Kriya Ashakti, Sparshasahyata and other clinical features. Examination included inspection, palpation, range-of-motion assessment and special tests for ligamentous and meniscal integrity.

Radiological Assessment

All patients underwent plain radiography and MRI evaluation. Radiological findings were correlated with clinical findings and classical Viddha Lakshanas.

Ethical Consideration

Institutional ethical approval was obtained before patient enrollment and written informed consent was taken from all participants.

OBSERVATIONS AND RESULTS

The study included 25 patients with a mean age of **37.2 ± 9.4 years**. Eighteen patients (72%) were male and seven (28%) were female, giving a male-to-female ratio of 2.57:1. The highest proportion of patients (32%) belonged to the 31–40-year age group.

Table 1. Demographic Profile of Study Participants (n = 25)

Parameter	Category	n (%)
Age	20–30 years	6 (24%)
	31–40 years	8 (32%)
	41–50 years	7 (28%)
	51–55 years	4 (16%)
Sex	Male	18 (72%)
	Female	7 (28%)

Mean age: 37.2 ± 9.4 years; Male:Female ratio = 2.57:1.

Table 2: Ayurvedic Viddha Lakshana and Modern Clinical Correlation.

Ayurvedic Lakshana	Modern Clinical Correlation
Vedana	Acute knee pain
Shotha	Joint effusion / hemarthrosis
Khanjata	Lameness, gait abnormality, instability
Ayurvedic Lakshana	Modern Clinical Correlation
Kriya Ashakti	Restricted ROM / functional impairment
Sparshasahyata	Localized tenderness
Twak Vivarnta	Ecchymosis / bruising

These correlations are based on the clinical correlation table in the thesis.

Table 3: MRI Findings in ACL Tear Cases (n = 17)

MRI Finding	n	Percentage
Complete ACL tear	13	76.47%
Partial ACL tear	4	23.53%
Proximal-third involvement	11	64.71%

Associated meniscal tear	6	35.29%
Associated MCL injury	3	17.65%
Bone contusion	12	70.59%
Kissing contusion pattern	8	47.06%

The thesis reports a significant association between bone contusion and complete ACL tear ($\chi^2 = 8.4$, $p < 0.01$).

Table 4: Clinical–Radiological Agreement.

Clinical Parameter	MRI/Radiological Correlation	Kappa (κ)	Agreement
Lachman test	ACL tear	0.82	Almost perfect
McMurray test	Meniscal injury	0.75	Substantial
Anterior drawer test	ACL injury	0.71	Substantial
Valgus stress test	MCL injury	0.68	Substantial
Clinical joint effusion	Radiological effusion	1.00	Perfect

Table 5: Ayurvedic–Modern Anatomico-Clinical Framework.

Ayurvedic Concept	Modern Correlation	Assessment
Janu Sandhi Marma	Knee joint complex	X-ray / MRI
Vedana	Pain and inflammatory response	Clinical examination
Shotha	Effusion / hemarthrosis	Clinical + MRI
Khanjata	Gait abnormality / instability	Clinical examination
Sandhi Shaithilya	Ligamentous laxity	Lachman + MRI

Ayurvedic Concept	Modern Correlation	Assessment
Kriya Ashakti	Restricted ROM / mechanical block	ROM +clinical
Vaikalyakara Marma	Long-term functional disability	Clinical + follow-up

All 25 patients demonstrated at least three of the five classical Viddha Lakshanas of Janu Sandhi Marma injury. The principal Ayurvedic manifestations showed recognizable clinical correlations: Vedana with acute

traumatic pain, Shotha with hemarthrosis/effusion, Khanjata with gait abnormality and instability, Kriya Ashakti with functional restriction, and Sparshasahyata with localized tenderness.

1. SPECIAL LIGAMENTOUS TEST INTEGRITY

Clinical Test	Positive	Negative	Percentage Positive (%)
Lachman Test	17	8	68 %
Anterior Drawer Test	14	11	56%
Valgus Stress Test	03	22	12%
Varus Stress Test (30°)	01	24	04%
McMurray Test(med)	05	20	20%
McMurray Test (Lateral)	02	23	08%
Posterior Drawer Test	00	00	00%
Joint Effusion (Clinical)	23	02	92%

2.RADIOLOGICAL FINDING		
X-ray Findings (n = 25)		
X-ray Finding	Number	Percentage (%)
Normal bony alignment	15	60%
Joint effusion (soft tissue shadow)	18	72%
Segond fracture	04	16%
Marginal osteophytes	05	20%
Joint space narrowing	03	12%
Tibial eminence avulsion	01	04%
Patellar fracture	01	04%

MRI FINDING-Overall mri finding

MRI Finding	Number	Percentage of MRI Patients (%)
ACL Tear (any grade)	17	68%
Medial Meniscus Tear	05	20%
Lateral Meniscus Tear	02	08%
MCL Injury	03	12%
PCL Tear	00	0%
Bone Contusion	12	48%
Joint Effusion	18	72%
LCL Injury	01	04%

Among the **17 ACL tear cases**, 13 (76.47%) were complete tears and 4 (23.53%) were partial tears. Proximal-third ACL injury was the most frequent pattern, occurring in 11 cases (64.71%). Meniscal tears were associated with 6 cases (35.29%), while MCL injuries were present in 3 cases (17.65%). Bone contusions were observed in 12 cases (70.59%), with a kissing-contusion pattern in 8 cases (47.06%).

Clinical examination showed strong agreement with MRI findings. The **Lachman test** demonstrated almost perfect agreement with MRI for ACL injury ($\kappa = 0.82$). The anterior drawer test ($\kappa = 0.71$), McMurray test ($\kappa = 0.75$) and valgus stress test ($\kappa = 0.68$) demonstrated substantial agreement. Clinical assessment of joint effusion showed perfect agreement with radiological findings ($\kappa = 1.00$).

AYURVEDIC-MODERN CORRELATION

Ayurvedic concept	Modern clinical/radiological correlation
Vedana	Acute traumatic pain due to tissue injury and inflammation
Shotha	Hemarthrosis or joint effusion
Khanjata	Lameness, gait abnormality and instability
Kriya Ashakti	Restricted ROM, inability to bear weight or functional limitation
Sparshasahyata	Localized joint-line or ligamentous tenderness
Sandhi Shaithilya	Ligamentous laxity
Vaikalyakara nature	Persistent instability and functional disability

These correlations indicate that the classical Viddha Lakshanas describe clinically recognizable consequences of structural knee injury.

DISCUSSION

The findings of the present study support the anatomical relevance of Janu Sandhi Marma as a functional complex rather than merely a single isolated structure. The modern knee joint consists of multiple tissues, including bone, menisci, ligaments, capsule and muscles, corresponding conceptually to the structural components described in the classical Marma definition.

The consistent presence of classical Viddha Lakshanas among the study participants and their correspondence with objective clinical and MRI findings suggest that the Ayurvedic description has potential clinical relevance in the assessment of knee trauma. In particular, the association of Khanjata with instability, Kriya Ashakti with functional limitation, and Shotha with joint effusion provides a clinically meaningful bridge between Ayurvedic and contemporary terminology.

The high agreement between clinical tests and MRI, particularly the Lachman test and clinical assessment of effusion, further demonstrates the value of systematic physical examination alongside imaging. The study's integrative framework suggests that Ayurvedic parameters can contribute to clinical characterization, while modern imaging provides objective structural documentation.

CONCLUSION

The present study establishes a meaningful anatomico-clinical correlation between **Janu Sandhi Marma and the modern knee joint complex**. The classical Viddha Lakshanas—Vedana, Shotha, Khanjata, Kriya Ashakti and Sparshasahyata—showed recognizable correlations with pain, effusion, instability, functional restriction and tenderness in patients with knee trauma.

The findings support the classical classification of Janu Sandhi as a **Vaikalyakara Marma**, as injuries involving the knee joint may produce significant functional impairment and structural instability.

The present study clearly demonstrates that among all structures constituting Janu Sandhi Marma, the ACL is the most vulnerable and most frequently damaged structure in traumatic knee injuries.

Out of 25 patients, 17 (68%) sustained ACL tears, with complete ruptures being the most common.

The ACL lies precisely within the central dimension of Janu Sandhi Marma and its injury produces the most disabling consequences — Khanjata, recurrent instability, and progressive Vaikalya (disability).

The correlation between the three Angula dimension of the Marma (4.5 to 5 cm) and the anatomical location of the ACL (3.8 cm length within the intercondylar region) confirms that the ACL is situated within the critical zone of Janu Sandhi Marma.

Integration of Ayurvedic clinical assessment with modern radiological evaluation may therefore provide a more comprehensive approach to the diagnosis and understanding of Janu Sandhi Marma injury. However, the findings should be interpreted in light of the study's small sample size, single-center design, cross-sectional nature and absence of long-term follow-up.

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