

**CONCEPT OF SANDHI MARMA WITH SPECIAL REFERENCE TO JANU MARMA:
CLASSICAL AND MODERN ANATOMICAL CORRELATION*****¹Dr. Rajeev Agnihotri, ²Dr. O. P. Dwivedi, ³Dr. Vikas Khare**^{*1}Lecturer, Rachana Sharir Government Ayurved College, Rewa, M.P.²Professor & HOD, Rachna Sharir, Government Ayurved College, Rewa,³Reader, Shalya Tantra, Government Ayurved College, Rewa, M.P.***Corresponding Author: Dr. Rajeev Agnihotri**

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ABSTRACT

Marma are vital anatomical points described in Ayurvedic literature where multiple structural elements of the body converge. These sites hold great clinical importance because trauma to them may lead to severe functional impairment or even fatal outcomes. Classical Ayurvedic texts describe 107 Marma points distributed throughout the body, among which Sandhi Marma are located at joints and play a significant role in movement and weight transmission. Janu Marma, situated at the knee joint, is classified as a Vaikalyakara Marma, indicating that injury to this region results in deformity or functional disability. The knee joint is also one of the most commonly affected joints in both traumatic and degenerative conditions. The present study aims to explore the concept of Sandhi Marma with special reference to Janu Marma based on classical Ayurvedic literature and to correlate it with modern anatomical structures of the knee joint. A conceptual review was conducted using classical Ayurvedic texts and contemporary anatomical literature. The findings suggest that the classical description of Janu Marma corresponds to a structurally complex anatomical region comprising bones, ligaments, cartilage, muscles, and neurovascular elements of the knee joint. Integrating Ayurvedic principles with modern anatomical knowledge provides a deeper understanding of the clinical relevance of this Marma and highlights its significance in musculoskeletal disorders such as Sandhigata Vata and knee osteoarthritis.

KEYWORDS: Marma, Sandhi Marma, Janu Marma, Knee joint, Ayurveda anatomy, Sandhigata Vata.**INTRODUCTION**

Ayurveda presents a comprehensive understanding of the human body through an integrated framework of anatomy and physiology. One of the distinctive concepts in Ayurvedic anatomy is the concept of Marma. Marma are defined as vital anatomical points where important structural components of the body converge. Injury to these sites may result in serious consequences such as pain, deformity, disability, or even death.

A systematic description of Marma is provided in the classical surgical treatise Sushruta Samhita, which describes 107 Marma distributed throughout the body. These vital points represent areas where muscles, blood vessels, ligaments, bones, and joints intersect. Due to this structural complexity, trauma at these locations can disturb normal physiological functions.

Marma are classified based on structure, location, and the effect of injury. Structurally, they are categorized into five types: Mamsa Marma, Sira Marma, Snayu Marma, Asthi Marma, and Sandhi Marma. Among these, Sandhi Marma are located at joints and are responsible for facilitating movement and maintaining structural stability.

Janu Marma is one of the important Sandhi Marma located at the knee joint. The knee joint is a major weight-bearing articulation essential for locomotion and posture. Because of its complex biomechanics and mechanical stress, the knee joint is highly susceptible to trauma and degenerative disorders. In Ayurveda, degenerative joint diseases affecting the knee are commonly described under Sandhigata Vata.

Understanding the anatomical and clinical relevance of Janu Marma requires a correlation between classical Ayurvedic descriptions and modern anatomical knowledge. Such integration not only strengthens theoretical understanding but also contributes to improved clinical interpretation of knee joint disorders.

AIM AND OBJECTIVES

Aim- To analyze the concept of Sandhi Marma with special reference to Janu Marma and correlate it with modern anatomical structures of the knee joint.

Objectives

1. To review classical descriptions of Sandhi Marma in Ayurvedic texts.
2. To analyze the anatomical features of Janu Marma according to Ayurveda.
3. To correlate classical descriptions of Janu Marma with modern knee joint anatomy.
4. To evaluate the clinical significance of Janu Marma in musculoskeletal disorders.

MATERIALS AND METHODS

Study Design - This study is a conceptual and literary review.

Sources of Data - Primary data were collected from classical Ayurvedic texts including:

- Sushruta Samhita
- Charaka Samhita
- Ashtanga Hridaya

Secondary data were obtained from standard modern anatomical textbooks and peer-reviewed scientific literature.

METHODOLOGY

Relevant references related to Marma, Sandhi Marma, and Janu Marma were systematically reviewed. Classical descriptions were analyzed and compared with modern anatomical knowledge of the knee joint to identify structural and functional correlations.

Concept of Marma in Ayurveda

Marma are vital anatomical points where important structures converge. Classical texts describe these points as regions where five fundamental structures intersect:

- Mamsa (muscle)
- Sira (blood vessels)
- Snayu (ligaments or tendons)
- Asthi (bones)
- Sandhi (joints)

These structures collectively form functionally significant anatomical regions in the body.

A total of 107 Marma are described in Ayurvedic literature. Based on structural predominance, they are classified as shown in Table 1.

Table 1: Structural Classification of Marma in Ayurveda.

Type of Marma	Predominant Structure	Number	General Characteristics
Mamsa Marma	Muscle tissue	11	Injury causes severe bleeding and soft-tissue damage
Sira Marma	Blood vessels	41	Injury leads to hemorrhage and circulatory disturbance
Snayu Marma	Ligaments / tendons	27	Damage results in deformity and restricted movement
Asthi Marma	Bone structures	8	Trauma leads to fracture and structural instability
Sandhi Marma	Joints	20	Injury causes deformity, loss of movement, or disability

Marma are also classified based on the effect of injury (Table 2).

Table 2: Classification of Marma Based on Effect of Injury.

Category	Number	Effect
Sadyapranahara	19	Immediate death
Kalantarapranahara	33	Death after a certain period
Vishalyaghna	3	Death after removal of foreign body
Vaikalyakara	44	Deformity or disability
Rujakara	8	Severe pain

Janu Marma belongs to the Vaikalyakara category, indicating that trauma leads to deformity or functional impairment.

Sandhi Marma

Sandhi Marma are located at joints where bones articulate

and movement occurs. These joints consist of bones, ligaments, cartilage, synovial membranes, and muscles that collectively maintain structural integrity and mobility. Injury to Sandhi Marma may result in loss of movement, deformity, or long-term disability due to damage to these essential structures.

Table 3: Correlation of Sandhi Marma with Modern Anatomical Joints.

Sandhi Marma with number	Classical Location	Anatomical Correlation	Involved Structures	Functional Importance
Janu Marma 2	Knee region	Knee joint (tibiofemoral and patellofemoral joint)	Femur, tibia, patella, cruciate ligaments, menisci	Flexion, extension, weight bearing
Kurpara Marma 2	Elbow region	Elbow joint	Humerus, radius, ulna, collateral ligaments	Flexion and extension of forearm
Manibandha Marma 2	Wrist region	Radiocarpal joint (wrist joint)	Radius, carpal bones, ligaments	Wrist movement and hand function
Gulpha Marma 2	Ankle region	Talocrural joint (ankle joint)	Tibia, fibula, talus, ankle ligaments	Stability and locomotion
Kurcha Marma 4	Base of thumb and big toe	Carpometacarpal and tarsometatarsal joints	Metacarpals, metatarsals, ligaments	Grip and weight distribution
Kurchashira Marma 4	Distal part of Kurcha region	Metacarpophalangeal and metatarso-phalangeal joints	Phalanges, tendons, ligaments	Fine movements of digits
Urvi Marma 4	Thigh region near femoral vessels	Hip joint region and surrounding neuro-vascular structures	Femur, acetabulum, femoral vessels	Hip stability and locomotion

Janu Marma in Classical Literature

Janu Marma is situated at the knee joint and is classified under Sandhi Marma. Classical texts describe the following characteristics:

- Number: Two
- Location: Knee region

- Type: Sandhi Marma
- Size: Approximately three Angula
- Effect of injury: Vaikalyakara (causing deformity or disability)

Table 4: Morphometric Interpretation for Janu Marma.

Parameter	Classical Description	Modern Anatomical Interpretation
Location	Janu Sandhi	Knee joint
Dimension	3 Angula	~5–6 cm region
Structures included	Asthi, Snayu, Mamsa, Sira	Patella, ligaments, muscles, vessels
Functional region	Weight-bearing articulation	Tibiofemoral and patellofemoral joints

Table 5: Comparative Description of Janu Marma in Classical Ayurvedic Texts.

Parameter	Sushruta Samhita	Charaka Samhita	Ashtanga Hridaya
Description of Marma	Detailed classification and anatomical description of 107 Marma	Marma concept mentioned mainly in relation to trauma and clinical consequences	Follows the Marma classification similar to Sushruta with concise descriptions
Total number of Marma	107	Mentions vital points but does not elaborate full classification	107
Location of Janu Marma	Knee joint region	Knee region considered important for locomotion and trauma	Knee joint region
Number	2	Not specifically enumerated separately	2
Type of Marma	Sandhi Marma	Indirectly related to Sandhi involvement	Sandhi Marma
Size	3 Angula	Not clearly specified	3 Angula
Effect of Injury	Vaikalyakara (causes deformity or disability)	Injury to vital joints leads to functional impairment	Vaikalyakara Marma
Structural Components	Combination of Mamsa, Sira, Snayu, Asthi, Sandhi	Emphasizes structural importance of joints in body movement	Similar structural concept as Sushruta
Clinical Significance	Injury causes deformity, pain, and difficulty in movement	Trauma to joints affects locomotion and stability	Injury leads to functional disability of the limb

Modern Anatomy of the Knee Joint

The knee joint is the largest synovial joint of the human body and plays a crucial role in weight bearing and

locomotion. It is formed by articulation between: Femur, Tibia and Patella. Major stabilizing structures include the anterior and posterior cruciate ligaments, medial and

lateral collateral ligaments, medial and lateral menisci, surrounding quadriceps femoris group muscles, and fibrous joint capsule lined by synovial membrane. These structures collectively maintain stability, absorb mechanical stress, and facilitate joint movement such as flexion, extension, and limited rotation.

Anatomical Correlation of Janu Marma

The classical description of Janu Marma corresponds to a complex anatomical region where several important structures converge. **Snayu and Ligaments-** The Snayu mentioned in Ayurveda can be correlated with ligaments of the knee joint such as the cruciate and collateral

ligaments. **Asthi and Articulating Bones-** The femur, tibia, and patella represent the Asthi component of the Marma. **Sandhi-** The articulation between these bones forms the knee joint, corresponding to the Sandhi component. **Mamsa-** Muscles surrounding the knee joint correspond to the Mamsa component described in Ayurvedic texts. **Neurovascular Structures-** Important nerves and blood vessels pass around the knee joint, contributing to the sensitivity and functional importance of this region. Thus, Janu Marma represents a structurally complex region containing multiple tissues essential for joint stability and movement.

Table 5: Anatomical Structures Involved in Janu Marma.

Structure	Function	Clinical Relevance
Femur	Upper articulating bone	Transmits body weight
Tibia	Lower articulating bone	Supports weight during movement
Patella	Sesamoid bone	Improves leverage of quadriceps
Ligaments	Stabilize the joint	Prevent abnormal movements
Menisci	Shock absorption	Maintain joint congruity
Muscles	Movement and stability	Flexion and extension of knee

Clinical Significance

The concept of Janu Marma is clinically relevant in both traumatic and degenerative conditions. **Trauma** -Trauma to the knee joint may result in ligament injuries, fractures, or meniscal tears, leading to instability and

functional impairment. **Degenerative Disorders** - Degenerative diseases such as osteoarthritis affect the knee joint frequently. In Ayurveda, these conditions are described under Sandhigata Vata.

Table 6: Clinical Correlation of Janu Marma Injury.

Condition	Modern Explanation	Ayurvedic Interpretation
Ligament injury	ACL/PCL tear	Snayu damage
Osteoarthritis	Cartilage degeneration	Sandhigata Vata
Meniscal injury	Fibrocartilage tear	Functional impairment of Sandhi
Joint inflammation	Synovitis	Vata-Kapha involvement
Fracture around knee	Structural damage	Asthi bhagna

DISCUSSION

The concept of Marma demonstrates the advanced anatomical insights present in classical Ayurvedic literature. Sandhi Marma represent joints where structural elements essential for movement converge. Janu Marma holds particular importance because the knee joint is a major weight-bearing articulation responsible for locomotion. The classical classification of this Marma as Vaikalyakara indicates that injury leads to deformity or disability. Comparative evaluation of classical texts shows that the detailed anatomical description of Janu Marma is mainly available in the Sushruta Samhita, whereas the Charaka Samhita focuses more on clinical implications of trauma. The Ashtanga Hridaya largely follows the classification provided by Sushruta. Modern anatomical knowledge supports these classical descriptions. The knee joint contains multiple structures such as ligaments, cartilage, muscles, and neurovascular elements that collectively maintain joint stability and function. Damage to these components may lead to instability and restricted movement, which corresponds with the classical description of Vaikalyakara Marma.

Thus, the Marma concept can be interpreted as an early recognition of clinically significant anatomical regions.

CONCLUSION

Janu Marma is an important Sandhi Marma located at the knee joint and plays a vital role in locomotion and weight transmission. Classical Ayurvedic texts describe it as a Vaikalyakara Marma, indicating that injury to this region may lead to deformity or disability. Modern anatomical analysis reveals that the knee joint contains several essential structures responsible for stability and movement. The correlation between Ayurvedic descriptions and modern anatomical understanding highlights the clinical relevance of the Marma concept.

Integrating classical Ayurvedic knowledge with contemporary anatomical science may provide valuable insights for understanding and managing knee joint disorders.

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