

AN INTEGRATIVE REVIEW OF ANATOMICAL CHANGES IN *GULPHA SANDHI* IN
AMAVATA ACCORDING *AYURVEDA* AND MODERN SCIENCEKashiwar Shweta Pandhari*¹, Choudhari Vinod Mahadeorao², Yadav Janvi Bhimshing³¹P.G. Scholar, Department of Rachana Sharir, Shri Ayurved Mahavidyalaya Nagpur.²Professor and HOD, Department of Rachana Sharir, Shri Ayurved Mahavidyalaya Nagpur.³P.G. Scholar, Department of Rachana Sharir, Shri Ayurved Mahavidyalaya Nagpur.***Corresponding Author: Kashiwar Shweta Pandhari**

P.G. Scholar, Department of Rachana Sharir, Shri Ayurved Mahavidyalaya Nagpur.

DOI: <https://doi.org/10.5281/zenodo.20961867>**How to cite this Article:** Kashiwar Shweta Pandhari*¹, Choudhari Vinod Mahadeorao², Yadav Janvi Bhimshing³ (2026). An Integrative Review Of Anatomical Changes In Gulpha Sandhi In Amavata According Ayurveda And Modern Science. World Journal of Pharmaceutical and Medical Research, 12(7), 24-26.

This work is licensed under Creative Commons Attribution 4.0 International license.



Article Received on 26/05/2026

Article Revised on 15/06/2026

Article Published on 01/07/2026

ABSTRACT

This review focuses on the structural and functional alterations in *Gulpha Sandhi Sharir* (ankle joint) with particular reference to *Amavata*. In Ayurvedic science, the *Gulpha Sandhi* represents the ankle joint, a vital component responsible for locomotion and stability. *Amavata* is a long-standing inflammatory disorder that shows strong similarity to rheumatoid arthritis and mainly affects joints, producing symptoms such as pain, swelling, stiffness, and restricted movement. The present study evaluates important anatomical elements of the *Gulpha Sandhi*, including bones, ligaments, tendons, and synovial membranes, and elaborates on how these are affected during *Amavata*. By correlating descriptions from classical *Ayurvedic* literature with modern medical understanding, the study explains the pathogenesis of *Amavata*, particularly emphasizing the accumulation of *Ama* (toxic metabolites) and its interaction with *Vata Dosha*. Key pathological features such as joint tissue degeneration, synovial fluid abnormalities, and inflammatory processes are discussed. The study aims to integrate *Ayurvedic* concepts with modern anatomical perspectives to provide deeper insight into the effective management of this condition.

KEYWORDS: *Gulpha Sandhi*, *Sharir*, *Amavata*, Synovial Fluid.**INTRODUCTION**

Ayurveda, regarded as the science of life, aims to maintain health and prevent disease. It is one of the most ancient traditional medical systems, emphasizing preventive care and longevity. This system follows a holistic approach, focusing on natural therapies and lifestyle modifications for both prevention and treatment.

According to *Acharya Sushruta*, a physician must possess comprehensive knowledge of *Ashtanga Ayurveda* along with clarity of its principles to diagnose and treat diseases effectively. Without such knowledge, proper understanding and management of diseases become difficult.

Sharir Rachana (anatomy) holds prime importance, as stated by *Acharya Sushruta*, because it enables understanding of disease pathology and helps in treating conditions at their root cause. The *Sushruta Samhita* describes anatomy in great detail. The firmness and

structure of the human body depend mainly on *Asthi* (bones) and *Sandhi* (joints). *Asthi* provides structural support (*Dharana Karma*), while *Sandhi* facilitates movement. Injury to joints hampers daily activities and leads to discomfort and disability.

Gulpha Sandhi is described as an *Adhoshakhagata Sandhi*^[1] and plays a crucial role in locomotion and maintaining body balance. Although classical texts mention *Gulpha Sandhi* at various places, detailed anatomical understanding is necessary to comprehend disease conditions affecting it and to improve management strategies.

Acharya Madhavakara was the first to identify *Amavata* as a distinct disease entity affecting the heart, *Marma* (vital points), and joints. It is classified under *Madhyama Rogamarga*.

Modern lifestyle factors such as improper diet, stress, and sedentary habits weaken digestive fire (*Agni*), leading to the formation of *Ama*. Simultaneously, *Vata Dosha* carries *Ama* to *Kapha*-dominant regions such as joints, where it accumulates and produces severe pain.^[2]

The primary sites of symptoms include bones and joints, where manifestations such as joint pain (*Sandhishoola*), swelling (*Sandhishotha*), and stiffness (*Sandhigraha*) occur.^[3]

Clinically, *Amavata* closely resembles rheumatoid arthritis, a chronic autoimmune inflammatory disorder.^[4] characterized by progressive joint destruction, swelling, and disability. Modern medicine mainly offers symptomatic relief with potential side effects, whereas *Ayurveda* provides a holistic approach aimed at root cause elimination.^[5] Since the disease commonly affects young and middle-aged individuals, it has significant socioeconomic impact. Hence, there is a need to scientifically validate *Ayurvedic* treatments through research.

MATERIALS AND METHODS

Objective

To study the anatomical changes in *Gulpha Sandhi* with reference to *Amavata*.

Concept of *Sandhi* (Joints)

Sandhis are structural junctions present at various sites such as *Anguli* (interphalangeal joints), *Manibandha* (wrist), *Gulpha* (ankle), *Janu* (knee), and *Kurpara* (elbow), corresponding to hinge joints in modern anatomy.

Classification of *Sandhi* (Based on Structure)^[6]

According to *Acharya Sushruta*, joints are classified into eight types.

1. *Kora: Anguli, Manibandha, Gulpha, Janu, Kurpara.*
2. *Ulukhala: Kaksha, Vanshana, Danta.*
3. *Samudga: Amsapeeda, Guda, Bhaga.*
4. *Pratara: Greeva, Prishtavamsksha.*
5. *Vayasatunda: Hanu.*
6. *Tunnasevini: Shira, Kati, Kapala.*
7. *Mandala: Netra, Hridaya, Kanda, Yakrut, Pleeha.*
8. *Sankhavartha: Srotra, Sringhataka.*

Gulpha Sandhi^[7-8]

Gulpha Sandhi is one of the most important joints of the lower limb, primarily responsible for movement and weight-bearing. It is a *Kora* type *Chala Sandhi* and is present bilaterally.

Definition of *Ama*

Ama is formed due to impaired digestive fire (*Agni*) in the stomach (*Amashaya*), leading to incomplete digestion of food.^[9] This results in the formation of improperly processed *Rasa Dhatu*, which circulates in the body and blocks channels (*Srotas*). It is considered a toxic

metabolic byproduct and a fundamental cause of disease.^[10]

Pathogenesis of *Amavata*

Amavata develops when *Ama* combines with aggravated *Vata Dosha*.^[11] The pathological process begins in the *Annavaha Srotas* and progresses through *Madhyama Rogamarga*, predominantly affecting *Kapha* sites like joints.^[12]

DISCUSSION

Acharya Madhavakara provided a comprehensive description of *Amavata* as a disorder resulting from vitiated *Vata Dosha* along with accumulated *Ama* affecting multiple joints. This condition closely resembles rheumatoid arthritis, a well-known debilitating disease.^[13]

Ama behaves like toxic metabolic waste that localizes in connective tissues and circulates within joints, producing symptoms such as severe pain, stiffness, swelling, and tenderness.^[14]

When *Ama* combines with *Vata*, it spreads rapidly to *Kapha*-dominant regions, especially joints, leading to obstruction in channels (*Dhamanis*). This results in impaired circulation and tissue dysfunction, affecting vital organs including the heart. In advanced stages, major joints such as *Gulpha* (ankle), *Janu* (knee), and *Trika* (hip) become involved, with severe symptom aggravation.^[15]

Clinically, *Amavata* resembles rheumatoid arthritis, an autoimmune disease marked by chronic inflammation and symmetrical joint involvement.^[16]

Anatomical Changes in *Amavata*

In the early stage, inflammation of the synovial membrane occurs, leading to joint pain, warmth, swelling, and stiffness.

In the second stage, synovial cell proliferation becomes excessive, causing thickening and bulging of the synovium along with systemic symptoms such as fever.

In the advanced stage, inflammatory cells release enzymes that destroy cartilage and bone, resulting in structural deformities, joint misalignment, increased pain, and restricted mobility.

Rheumatoid arthritis is a systemic inflammatory disorder that damages cartilage and bone.^[17,18,19] causing joint dysfunction. The disease typically affects synovial joints in a characteristic pattern.

Commonly involved joints include.

- Metacarpophalangeal (MCP)
- Proximal interphalangeal (PIP)
- Thumb interphalangeal joints

Distal interphalangeal joints are rarely involved unless associated with other joint pathology.

Additional manifestations include.

Tenosynovitis of flexor tendons

Reduced finger movement

Weak grip strength

Trigger finger due to nodular thickening of tendon sheath.^[20]

CONCLUSION

The evaluation of *Gulpha Sandhi Sharir* in relation to *Amavata* provides significant understanding of the anatomical and pathological changes occurring in this chronic inflammatory condition. By integrating *Ayurvedic* principles with modern medical knowledge, the study highlights the importance of a holistic approach in managing *Amavata*, which closely parallels rheumatoid arthritis.

Key Findings

Anatomical Changes

Amavata causes swelling, stiffness, and pain in the ankle joint due to *Ama* accumulation and *Vata* imbalance.

Pathogenesis

The interaction of *Ama* and *Vata* plays a crucial role in disease progression, leading to joint damage and reduced mobility, similar to rheumatoid arthritis.

Holistic Management

Ayurveda emphasizes treatment approaches targeting both symptoms and root causes, with a need for further scientific validation.

In summary, this review successfully bridges classical *Ayurvedic* knowledge with modern medical science and highlights *Ayurveda's* potential in managing *Amavata* effectively. Future studies should focus on clinical validation and therapeutic evaluation of *Ayurvedic* interventions.

REFERENCES

1. Chaurasia B. D., Human Anatomy, vol. 2; Seventh edition, 2016; Page No. 150.
2. Shastri Sudarshan, Madhavanidanam Purvardh, Amavatanidan adhyaya 25/1-5, Choukhamba Sanskrit, Sansthan Varanasi, 2010; Page No.509.
3. Shastri Sudarshan, Madhavanidanam Purvardh, Amavatanidanam adhyaya 25/8, Choukhamba, Sanskrit Sansthan Varanasi, 2010; Page No. 511.
4. Walker Brian R, Colledge Nicki R., Ralston Stuart H., Penman Ian D... Davidsons- Principles & practice of Medicine. Rheumatology & bone disease, Edition- 22nd, Page No. 1097.
5. API Textbook of Medicine, 11th Edition, Association of Physicians of India; Rheumatology Section, pp. 1850–1865.
6. Sushruta, Sushrutha Samhitha with Nibandha Sangraha commentary of Dalhanacharya and Nyaya, Chandrika Panjika commentary of Gayadasacharya; Edited by Vaidya Jadavji Trikamji Acharya and Narayana Ram Acharya; 8th edition; Chaukambha Orientalia; Varanasi, 2010; Pp.367.
7. Sushruta, Sushrutha Samhitha with Nibandha Sangraha commentary of Dalhanacharya and Nyaya, Chandrika Panjika commentary of Gayadasacharya; Edited by Vaidya Jadavji Trikamji Acharya and Narayana Ram Acharya; 8th edition; Chaukambha Orientalia; Varanasi, 2010; Page No.: 366- 367.
8. Sushruta, Sushrutha Samhitha with Nibandha Sangraha commentary of Dalhanacharya and Nyaya, Chandrika Panjika commentary of Gayadasacharya; Edited by Vaidya Jadavji Trikamji Acharya and Narayana Ram Acharya; 8th edition; Chaukambha Orientalia; Varanasi, 2010; Page No.: 366.
9. Charaka Samhita, Sutrasthana, with commentary by Chakrapani Datta; Chaukhambha Orientalia, Varanasi; Reprint 2011; Chapter 13 (Ama concept).
10. Tripathi B, editor, (1sted.). Ashtangahridaya of Vagbhata, Sutrasthan; Chapter 13, Verse 251. Varanasi: Chowkhambha Sanskrit Series, 2009; 145.
11. Vagbhata, Ashtanga Hridaya, Nidanasthana, Chapter 12; Chaukhambha Sanskrit Pratishthan, Varanasi; 2012 Edition.
12. Acharya Madhavakara, Madhava Nidana with Madhukosha commentary and Vidyotini Hindi Tika by Shri Sudarshana Shashtri revised and edited by Pro. Yadunandana Upadhyaya, Published by Chaukhambha Prakashana, Reprint Edition, 2009; Chapter No. 25, Verse No.2 page no.508.
13. Tripathi B, editor. Madhav Nidana of Madhavkar, Vol. 1, Ch. 25, Ver. 1-5. Reprint Ed. Varanasi: Chaukhambha Sanskrit Sanshtan, 2006; 571.
14. Tripathi B, editor. Madhav Nidana of Madhavkar, Vol. 1, Ch. 25, Ver. 6. Reprint ed. Varanasi: Chaukhambha Sanskrit Sanshtan, 2006; p. 572.
15. Prof. K. R. Srikantha Murthy with English translation, Madahava nidhana, Chaukhambha orientalia, edition 5TH, 2003; 95-96.
16. Boon NA, Colledge NR, Walker BR, Hunter JA. Mus-culoskeletal disorders. Davidson's Principles and Prac-tice of Medicine. 20th ed., Ch. 25. Edinburgh: Churchill Livingstone-Elsevier, 2006; 1101-4.
17. Harrison's Principles of Internal Medicine, 21st Edition, McGraw Hill Education; Chapter on Rheumatoid Arthritis, 2510–2525.
18. Robbins and Cotran Pathologic Basis of Disease, 10th Edition, Elsevier; Chapter on Inflammation and Autoimmune Disorders, 130–155.
19. Firestein GS, Budd RC, Gabriel SE, McInnes IB, O'Dell JR. Kelley and Firestein's Textbook of Rheumatology, 10th Edition, Elsevier, 1100–1150.
20. Ian Y Y Tsou, Rheumatoid Arthritis Hand Imaging, cited from <http://emedicine.medscape.com/article/401271-overview> (Accessed on 3/3/2017).