AYUSHDHARA
ISSN: 2393-9583 (P)/ 2393-9591 (O)
An International Journal of Research in AYUSH and Allied Systems

Review Article

ASTHIDHATU KSHAYA AND OSTEOPOROSIS: A COMPREHENSIVE REVIEW OF AYURVEDIC AND MODERN PERSPECTIVES

Harsh Dhingra[1]*, Pratibha Bahuguna[2]
*[1]Associate Professor, [2]Assistant Professor, Dept. of Kriya Shareer, Dronacharya Ayurvedic Educational Institute and Hospital, Saharanpur, UP, India.

Article info
Article History:
Received: 12-01-2025
Accepted: 11-02-2025
Published: 20-03-2025
KEYWORDS:
Asthidhatu, Vata Roga, Osteoarthritis, *Rasayana, Panchakarma.*

ABSTRACT

Asthidhatu Kshaya, a condition described in Ayurveda, exhibits similarities with osteoporosis in modern medicine. This review aims to provide a comprehensive comparison of these conditions, analyzing their pathophysiology, etiology, symptoms, diagnostic methods, and treatment approaches. Osteoporosis, a major public health concern, is associated with increased fracture risk and reduced quality of life, particularly in aging populations. Ayurveda offers a unique perspective on bone health, emphasizing balance in bodily humors (*Doshas*) and metabolic factors influencing bone tissue formation and degeneration. Understanding the correlation between *Asthidhatu Kshaya* and osteoporosis through an integrative lens may contribute to the development of more holistic, individualized, and preventive treatment strategies. Additionally, this review highlights the potential of combining traditional Ayurvedic wisdom with modern scientific advancements to optimize bone health management and improve patient outcomes.

INTRODUCTION

Bone health plays a crucial role in preserving structural integrity, facilitating movement, and enhancing overall quality of life. Bones act as the framework of the body, offering mechanical support, allowing us to move, and safeguarding our vital organs. Yet, the inevitabilities of aging, lifestyle choices, and genetic factors can contribute to conditions that weaken bone strength. This precarious state raises the likelihood of fractures and various skeletal problems. Among these concerns is osteoporosis, a progressive disorder that affects the skeletal system by diminishing bone mass and compromising its microarchitecture.[1] This condition elevates the risk of fractures, particularly for older individuals, especially postmenopausal women. As a significant global health issue, osteoporosis leads to considerable suffering and imposes heavy burdens on healthcare systems. With its rising prevalence, there is an urgent need for effective prevention measures, early detection, and management strategies to mitigate its effects on individuals and communities alike. [2]

In the realm of Ayurveda, there exists a concept known as *Asthidhatu Kshaya*, which describes a worrying decline in bone tissue. This depletion is largely attributed to an imbalance in *Vata Dosha*, a vital force within the body. Such an imbalance can arise from various factors, including poor dietary choices, lifestyle habits, and ineffective digestion. As a result, individuals may find themselves facing the challenges of weakened bones, persistent joint pain, and an increased risk of fractures.[3]

Traditional Ayurvedic manuscripts offer a deep and insightful exploration of how bone tissue functions, advocating for a holistic approach to preserving bone health. This approach underscores the significance of proper nutrition, lifestyle adjustments, and the use of herbal remedies. In an effort to create a dialogue between ancient wisdom and modern medical insights, this review seeks to unite these two differing realms of knowledge.[4]

By embracing an integrative strategy that incorporates preventive measures, evidence-based treatments, and thoughtful lifestyle changes, one can establish a more thorough framework for addressing

Access this article online
Quick Response Code
https://doi.org/10.47070/ayushdhara.v12i1.1941

and averting conditions like osteoporosis. The review will delve into the various root causes, diagnostic techniques, and treatment options from both Ayurvedic and contemporary perspectives. In doing so, it will highlight the promising advantages of merging time-honored practices with the innovations of modern medicine. [5]

AIM AND OBJECTIVE

Aim

To analyze and compare the Ayurvedic concept of *Asthidhatu Kshaya* with modern osteoporosis, emphasizing their pathophysiology, diagnostic methods, and treatment approaches.

Objectives

- To study the Ayurvedic perspective on *Asthidhatu Kshaya* and its correlation with osteoporosis.
- To examine the etiology, symptoms, and diagnostic methods of osteoporosis in modern medicine.
- To compare Ayurvedic and modern treatment approaches for osteoporosis management.
- To explore the potential of an integrative approach incorporating both traditional and modern treatments for improved bone health.
- To provide recommendations for future research on evidence-based Ayurvedic treatments for osteoporosis.

MATERIALS AND METHODS

This review is based on an extensive literature survey from both Ayurvedic and modern medical sources. The study incorporates data from ancient Ayurvedic texts, such as Charaka Samhita and Sushruta Samhita, along with contemporary scientific research articles on osteoporosis.

Data Sources: Ayurvedic classical texts, peer-reviewed journals, PubMed, Google Scholar, and clinical trial reports.

Inclusion Criteria: Studies and texts discussing the pathophysiology, symptoms, diagnosis, and management of *Asthidhatu Kshaya* and osteoporosis.

Exclusion Criteria: Non-relevant articles and studies that lack scientific validation.

Methodology

- Comparative analysis of Ayurvedic and modern concepts.
- Review of scientific publications on osteoporosis management.
- Examination of integrative treatment approaches combining Ayurveda and modern medicine.
- Evaluation of clinical studies demonstrating the efficacy of Ayurvedic treatments for osteoporosis.

Ayurvedic Perspective on *Asthidhatu Kshaya*

In Ayurveda, *Asthidhatu* refers to bone tissue and is classified as one of the seven *Dhatus*, primarily influenced by *Vata Dosha. Asthidhatu Kshaya* occurs due to imbalances in the metabolic processes that impact bone tissue.[6] Several factors contribute to its development, including:

Etiology: An inadequate diet lacking calcium-rich foods, a high consumption of *Vata*-aggravating items such as dry, cold, and rough foods, excessive physical exertion, chronic stress, aging, frequent sexual activity, genetic factors, and pre-existing chronic diseases that lead to depletion of tissue. [7]

Pathophysiology: A disturbance in *Agni*, or digestive fire, results in compromised digestion and metabolism, leading to insufficient nourishment of *Asthidhatu*. This deficiency ultimately causes a gradual decline in bone integrity, resulting in increased brittleness and weakness. Additionally, an accumulation of excess *Vata* in the bones contributes to dryness, porosity, and fragility.[8]

Symptoms

Initial signs include dryness of skin and hair, brittle nails, joint discomfort, and a sensation of bone weakness. As the condition progresses, symptoms may escalate to include significant bone pain, fragile nails, compromised teeth, recurrent fractures, decreased height, joint rigidity, and physical deformities. Additionally, systemic manifestations may consist of fatigue, muscle atrophy, sleep disruptions attributed to bone pain, and a general sense of weakness. [9]

Diagnosis[10]

Ayurvedic diagnosis is based on clinical symptoms, pulse diagnosis *(Nadi Pariksha),* tongue examination, *Prakriti* (body constitution) analysis, and assessment of *Agni* (digestive fire). The presence of excessive *Vata* symptoms and degeneration in the body is indicative of *Asthidhatu Kshaya*.

Management and Treatment

Dietary Interventions: Consumption of *Asthi*-enhancing foods such as sesame seeds, milk, ghee, almonds, dates, leafy greens, and bone broths.

Herbal Treatments

***Rasayanas* (Rejuvenating Therapies):** *Ashwagandha*, *Bala, Shatavari, Guduchi*, and *Hadjod* (Cissus quadrangularis) to promote bone health and strength.

Mineral-Based Preparations: *Pravala Bhasma* (coral calcium), *Godanti Bhasma* (gypsum), *Mukta Shukti* (pearl shell calcium), and other calcium-rich formulations.

Lifestyle Modifications:

Regular oil massage *(Abhyanga)* with sesame or *Mahanarayana* oil to balance *Vata*, practicing Yoga

(especially poses that strengthen bones and improve flexibility), and meditation to manage stress.

Panchakarma Therapies

Basti (Medicated enema): Helps to pacify *Vata* and nourish tissues.

Nasya (Nasal administration): Improves overall metabolism and helps strengthen bones indirectly.

Swedana (Sudation therapy): Aids in pain management and stiffness reduction.

Preventive Measures

Maintaining a balanced diet with sufficient calcium and vitamin D, avoiding excessive intake of dry and rough foods, staying active with weight-bearing exercises, and ensuring good digestion and absorption of nutrients.

Modern Medical Perspective on Osteoporosis

Osteoporosis is a complex condition defined by a reduction in bone mineral density (BMD) and the weakening of bone architecture. This condition is divided into two main types: primary osteoporosis, which occurs due to aging or hormonal changes after menopause, and secondary osteoporosis, which arises as a result of other medical issues or the use of specific medications. [11]

Etiology: Factors contributing to osteoporosis include hormonal imbalances such as decreased estrogen and reduced testosterone levels in men, along with deficiencies in calcium and vitamin D. A sedentary lifestyle, smoking, excessive alcohol intake, lengthy use of corticosteroids, and genetic factors also play a role. Additionally, certain medical conditions, including rheumatoid arthritis, chronic kidney disease, and thyroid disorders, can further increase the risk of developing osteoporosis. [12]

Pathophysiology: Osteoporosis arises from a disruption in the equilibrium between the processes of bone resorption and formation, which is attributable to improper functioning of osteoclasts- cells responsible for bone resorption- and osteoblasts- cells tasked with bone formation. In the context of aging and subsequent hormonal changes, the rate of bone resorption begins to exceed that of bone formation. This shift results in a decrease in bone density, deterioration in the structural integrity of bone microarchitecture, and an overall increase in susceptibility to fractures and injuries. [13]

Symptoms: In its initial phases, osteoporosis typically shows no symptoms. However, as the condition advances, individuals may experience an increased occurrence of fractures, particularly in the hip, spine, and wrist areas. Additional signs include a gradual decrease in height, kyphosis or a hunched posture, back pain stemming from compression fractures in the vertebrae, and limited mobility. Persistent pain and changes in skeletal structure can greatly impact one's overall quality of life. [14]

Diagnosis [15]

The gold standard for diagnosing osteoporosis is dual-energy X-ray absorptiometry (DXA), which measures bone mineral density (BMD). Other diagnostic tools include:

- Biochemical Markers: Serum calcium, phosphorus, alkaline phosphatase, vitamin D levels, and parathyroid hormone levels to assess metabolic bone health.
- Bone Turnover Markers: Urinary N-telopeptide and C-telopeptide levels indicate the rate of bone resorption.
- Imaging: X-rays and MRI scans to detect fractures and bone structural changes.

Risk Factors

Women, especially those who are postmenopausal, face an increased risk due to decreasing estrogen levels that help safeguard against bone loss. While men can also develop osteoporosis, it typically occurs later in life. Additional risk factors encompass family medical history, low body weight, inadequate nutrition, and prolonged lack of movement. [16]

Comparative Analysis

Feature	*Asthidhatu Kshaya* (Ayurveda)	Osteoporosis (Modern Medicine)
Governing Factor	*Vata Dosha*	Hormonal & metabolic imbalances
Pathophysiology	*Agni* dysfunction affecting *Asthidhatu* metabolism	Osteoblast-osteoclast imbalance
Symptoms	Bone pain, brittle nails, weak teeth	Fractures, height loss, kyphosis
Diagnosis	*Nadi Pariksha*, clinical symptoms	DXA scan, biochemical markers
Treatment	Ayurvedic herbs, *Panchakarma*, *Rasayana* therapy	Calcium, vitamin D, bisphosphonates, lifestyle changes

Integrated Treatment Approaches

A multidisciplinary approach combining Ayurveda and modern medicine can offer effective management strategies:

Dietary Interventions

Ayurveda: Inclusion of *Asthi*-enhancing foods like sesame seeds, milk, ghee, and herbal preparations *(Shatavari, Guduchi).*

Modern: Calcium and vitamin D supplementation, high-protein diet.

Herbal and Pharmacological Treatments

Ayurveda: Use of *Rasayanas (Ashwagandha, Bala, Hadjod)* to strengthen bones.

Modern: Bisphosphonates, hormone replacement therapy (HRT) for postmenopausal women.

Lifestyle and Exercise

Ayurveda: Yoga, *Abhyanga* (oil massage) to balance *Vata*.

Modern: Weight-bearing exercises, resistance training.

Detoxification and Rejuvenation

Ayurveda: *Panchakarma* therapies like *Basti* (medicated enema) for *Vata* balance.

Modern: Monitoring bone turnover markers and avoiding risk factors.

DISCUSSION

As the tale of bone health unfolds, a harmonious blend of Ayurvedic wisdom and modern medical practices emerges as a beacon of hope. In the ancient tradition of Ayurveda, the delicate balance of *Doshas*, particularly *Vata*, is revered as essential to warding off *Asthidhatu Kshaya*- the deterioration of bone tissue. Simultaneously, the realm of contemporary medicine delves into the intricacies of diagnosing and managing osteoporosis, employing both medicinal and lifestyle interventions.[17] This union of ancient and modern philosophies paves the way for a more rounded approach to bone health, encompassing preventive measures, treatment methods, and rehabilitation techniques. From the Ayurvedic perspective, embracing lifestyle changes, utilizing herbal remedies, and engaging in *Panchakarma* therapies are vital to fortifying bone resilience and vitality. On the other hand, advancements in modern science bring forth validated techniques for monitoring bone density and effective pharmacotherapy to combat osteoporosis.[18] Looking into the future, the journey of discovery beckons researchers to delve deeper, investigating the clinical effectiveness of Ayurvedic treatments through rigorous scientific trials. Such endeavors hold the promise of validating these traditional practices, potentially enriching the arsenal of strategies aimed at preventing and addressing osteoporosis, thus contributing to the overall narrative of bone health management.[19] The integration of personalized medicine, which combines various approaches, shows promise for improving outcomes for those at risk of developing bone diseases. By utilizing genetic information, metabolic data, and diagnostics based on Ayurvedic *Prakriti*, healthcare providers can create customized treatment plans for individuals. Collaborative efforts between Ayurvedic practitioners and contemporary healthcare professionals may enhance the overall management of bone health. Additionally, raising public awareness about osteoporosis and overall bone health through educational initiatives and preventive measures can play a crucial role in alleviating the global impact of fractures and mobility challenges. Promoting proactive measures, such as early interventions, consistent exercise, balanced nutrition, and the thoughtful application of both traditional and modern medical practices, can empower individuals to sustain optimal bone health throughout their lives. [20]

CONCLUSION

Asthidhatu Kshaya and osteoporosis share common features, with both conditions leading to bone fragility and increased fracture risk. Ayurveda provides a unique perspective emphasizing holistic balance, while modern medicine offers evidence-based diagnostic and therapeutic methods. Integrating these systems may yield a comprehensive approach to bone health, addressing both prevention and treatment strategies. A holistic approach that blends Ayurvedic practices with modern medical interventions can create a well-rounded strategy for individuals at risk. Future research should explore evidence-based validation of Ayurvedic treatments, while practitioners from both fields should collaborate to establish a unified, effective protocol for bone health. Additionally, raising awareness through education and preventive programs will be vital in reducing the incidence of osteoporosis. A patient-centered approach considering genetic, metabolic, and lifestyle factors can further enhance the efficacy of treatment. By embracing the strengths of both systems, healthcare providers can offer better care and improve long-term outcomes in osteoporosis management.

REFERENCES

1. Falaschi P, Marques A, Giordano S. Osteoporosis and fragility in elderly patients. Orthogeriatrics: The management of older patients with fragility fractures. 2021: 35-52. oapen.org
2. Sobh MM, Abdalbary M, Elnagar S, Nagy E, Elshabrawy N, Abdelsalam M, Asadipooya K, El-Husseini A. Secondary osteoporosis and metabolic

bone diseases. Journal of Clinical Medicine. 2022 Apr 24; 11(9): 2382. mdpi.com
3. Giri NP, Paul SD, Jain AK. Pathophysiological understanding of Asthivaha Srotas Dushti WSR to the osteoarthritis and osteoporosis. Journal of Pharmacognosy and Phytochemistry. 2023; 12(5): 229-35. phytojournal.com
4. Yazdi N, Salehi M, Ghorat F, Hashempur MH. Exploring Traditional and Complementary Medicine Approaches for Fractured Bones: A Systematic Review: Traditional and Complementary Medicine for Fractured Bones. Galen Medical Journal. 2024 Mar 1; 13: e3227-. salviapub.com
5. Khan H, Jan Z, Ullah I, Alwabli A, Alharbi F, Habib S, Islam M, Shin BJ, Lee MY, Koo J. A deep dive into AI integration and advanced nanobiosensor technologies for enhanced bacterial infection monitoring. Nanotechnology Reviews. 2024 Aug 16; 13(1): 20240056. degruyter.com
6. Rotti K, Poornima B, Walikar M. Conceptual study on the etiopathogenesis of Asthikshaya wsr to Postmenopausal Osteoporosis. Journal of Ayurveda and Integrated Medical Sciences. 2022 Nov 3; 7(9): 105-14. jaims.in
7. Shukla RK, Nagpal S, Panigrahi PR, Sharma S, Sharma V. Ayurvedic Management of Avascular Necrosis of Femoral Head wsr to Asthimajjagata vata: A Case Study. researchgate.net
8. Kapoor R, Chauhan S, Manglesh RK. A review article on types of Dhatu-Kshaya (depletion) and its clinical significance. Journal of Ayurveda and Integrated Medical Sciences. 2023; 8(12): 141-4. jaims.in
9. Polra RV, Tandel JJ, Shah MM, Nair PA. Signs in Dermatology: Clinical, Dermoscopic, and Histopathological. Clinical Dermatology Review. 2024 Jul 1; 8(3): 273-89. lww.com
10. Hanudha NK D. Community based study on ayurveda diagnostic methods–nadi (pulse) and jihva (tongue) for screening of metabolic risk factors. 2022. sctimst.ac.in
11. Gao Y, Patil S, Jia J. The development of molecular biology of osteoporosis. International journal of molecular sciences. 2021. mdpi.com
12. Sharma H, Kumar AN, Sharma BA, Purwar NA, Mathur SK, SARAN S. Endocrine causes of secondary osteoporosis in adults: mechanisms and evaluation. J. Clin. Diagn. Res. 2021 Jan 1; 15(1). researchgate.net
13. Song S, Guo Y, Yang Y, Fu D. Advances in pathogenesis and therapeutic strategies for osteoporosis. Pharmacology & therapeutics. 2022. [HTML]
14. LeBoff MS, Greenspan SL, Insogna KL, Lewiecki EM, Saag KG, Singer AJ, Siris ES. The clinician's guide to prevention and treatment of osteoporosis. Osteoporosis international. 2022 Oct; 33(10): 2049-102. springer.com
15. Cerdas Pérez S, Herrera LE, González E. Clinical impact of misinterpretation of dual-energy X-ray absorptiometry during the evaluation of osteoporotic patients. Climacteric. 2021. copospanama.org
16. Jamshaid M, Heidari A, Hassan A, Mital D, Pearce O, Panourgia M, Ahmed MH. Bone Loss and Fractures in Post-Menopausal Women Living with HIV: A Narrative Review. Pathogens. 2024 Sep 19; 13(9): 811. mdpi.com
17. Kizhakkeveettil A, Parla J, Patwardhan K, Sharma A, Sharma S. History, Present and Prospect of Ayurveda. In History, Present and Prospect of World Traditional Medicine 2024 (pp. 1-72). worldscientific.com
18. Krishnan A, Jayadevan CV, Somakumar V, Blessymol EV. Concept of Medas- A Deciphering Gateway. Kerala Journal of Ayurveda. 2022 Dec 31; 1(2). keralajournalofayurveda.org
19. Mukherjee S, Bera S, Banerjee S, Mitra A, Mukherjee PK. Ayurveda- Translational approaches towards validation as sustainable healthcare practices. In Evidence-Based Validation of Herbal Medicine 2022 Jan 1 (pp. 463-485). Elsevier. [HTML]
20. Guthridge JM, Wagner CA, James JA. The promise of precision medicine in rheumatology. Nature medicine. 2022. nih.gov

Cite this article as:
Harsh Dhingra, Pratibha Bahuguna. Asthidhatu Kshaya and Osteoporosis: A Comprehensive Review of Ayurvedic and Modern Perspectives. AYUSHDHARA, 2025;12(1):80-84.
https://doi.org/10.47070/ayushdhara.v12i1.1941
Source of support: Nil, Conflict of interest: None Declared

***Address for correspondence**
Dr. Harsh Dhingra
Associate Professor,
Dept. of Kriya Shareer, Dronacharya Ayurvedic Educational Institute and Hospital, Saharanpur.
Email: harsh_star59@rediffmail.com
Cell: 8218480892