



Asthi–Majja Dhatu Kshaya in Degenerative Spine Disorders: A Samprapti-Based Evaluation

Authors

1. Dr.Nandini.R

Associate Professor/PhD Scholar,in the Department of Kayachikitsa,
Dr. N. A. Magadhum Ayurvedic Medical College and Hospital, Ankali.

Corresponding Author:

1. Dr. Hemantkumar Patil , Deputy Medical Superintendent
Dr. N. A. Magadhum Ayurvedic Medical College and Hospital, Ankali.

Abstract

Background

Degenerative spine disorders are common chronic musculoskeletal conditions characterized by progressive structural and functional changes in the vertebral column, intervertebral discs, and associated spinal structures. Ayurveda conceptualizes degenerative conditions predominantly through the principles of Vata Dosha Prakopa, Dhatu Kshaya, impaired tissue nourishment, and localization of pathological processes at vulnerable sites.

Aim

To critically evaluate degenerative spine disorders through an Ayurvedic Samprapti-based framework with clinical correlation.

Materials and Methods

A conceptual and analytical review of classical Ayurvedic texts including Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya was undertaken. Ayurvedic principles of Dosha, Dhatu, Srotas, Samprapti, and Chikitsa were analyzed and conceptually correlated with contemporary understanding of spinal degeneration.

Results

Degenerative spine disorders can be conceptually understood through Asthi–Majja Dhatu Kshaya with predominant Vata involvement, impaired Dhatvagni, Srotodushti, and Khavaigunya. The proposed Samprapti provides an Ayurvedic framework for understanding chronic pain, stiffness, restricted movement, and neurological manifestations associated with degenerative spinal disorders. Modern literature describes degenerative disc disease as a multifactorial process involving ageing, mechanical stress, extracellular-matrix alteration, inflammation, and cellular changes.

Conclusion

A Samprapti-based Ayurvedic evaluation provides a structured framework for understanding degenerative spine disorders. The concepts of Vata Prakopa, Dhatu Kshaya, Srotodushti, and Khavaigunya may be used for conceptual correlation with selected features of modern degenerative spinal pathology. Further clinical and

translational research is required to evaluate these correlations and the effectiveness of Samprapti-based Ayurvedic interventions.

Keywords

Asthi Dhatu, Majja Dhatu, Degenerative spine disorders, Samprapti, Vata Vyadhi, Ayurveda, Dhatu Kshaya

Introduction

Degenerative spine disorders include conditions such as cervical spondylosis, lumbar spondylosis, and intervertebral disc degeneration. Modern literature describes intervertebral disc degeneration as a multifactorial process influenced by ageing, mechanical loading, genetic factors, and other environmental and systemic influences.[1,2] Age-related changes in the extracellular matrix, particularly alterations in proteoglycans and collagen, contribute to progressive structural and functional changes in the disc.[3]

From an Ayurvedic perspective, degenerative disorders may be examined through the principles of Vata Prakopa and Dhatu Kshaya. The relationship between Vata and Asthi Dhatu described in classical Ayurvedic literature provides a conceptual basis for considering skeletal degeneration in relation to aggravated Vata.[4]

Asthi and Majja Dhatus are structurally and functionally related within the Ayurvedic framework. Therefore, disorders involving progressive degeneration of the skeletal system may be examined through the combined concepts of Asthi–Majja Dhatu Kshaya, Vata Prakopa, Srotodushti, and Khavaigunya.

Degenerative spinal disorders can adversely affect pain, mobility, physical functioning, and quality of life. Contemporary management includes conservative measures such as medication and physiotherapy, with surgical intervention being considered in selected advanced conditions. Modern research also demonstrates that disc degeneration involves complex biological mechanisms rather than simple mechanical “wear and tear.”[1,2,5]

Ayurveda emphasizes identification of Nidana and understanding of Samprapti before selecting Chikitsa. Therefore, a Samprapti-based evaluation may provide a useful conceptual framework for examining degenerative spine disorders.

Aim and Objectives

Aim

To evaluate degenerative spine disorders through the concept of Asthi–Majja Dhatu Kshaya and Samprapti.

Objectives

1. To analyze Nidana responsible for Asthi–Majja Dhatu Kshaya.
2. To explain the Samprapti of degenerative spine disorders in Ayurvedic terms.
3. To establish a conceptual correlation between Ayurvedic and modern perspectives.
4. To discuss Ayurvedic management principles in relation to the proposed Samprapti.

Materials and Methods

This study is a conceptual and literary review based on:

- Classical Ayurvedic texts including Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya.
- Relevant Ayurvedic commentaries.
- Published contemporary literature concerning degenerative spine disorders and intervertebral disc degeneration.
- Conceptual analysis of Dosha, Dhatu, Srotas, Agni, Samprapti, and Chikitsa.
- Comparative interpretation of Ayurvedic concepts and selected modern pathological features.

The present work is conceptual and does not constitute a clinical trial or systematic review.

Overview of Asthi Dhatu

Asthi Dhatu provides structural support and stability to the body. Classical Ayurvedic descriptions associate Asthi with structural integrity and establish an important relationship between Vata and Asthi Dhatu.[4]

Asthi Kshaya is described in classical Ayurvedic literature through characteristic manifestations of depletion. These classical features should be distinguished from modern radiological findings. In the present paper, vertebral and other degenerative changes are therefore considered conceptual clinical correlations rather than direct equivalents of Asthi Kshaya.

Overview of Majja Dhatu

Majja Dhatu is described within the classical Ayurvedic framework in relation to Asthi and is associated with nourishment and strength.[6]

Clinical manifestations attributed to Majja Kshaya in classical literature may provide a conceptual basis for discussing neurological and weakness-related features. However, Majja Dhatu should not be equated directly with a single modern anatomical tissue. The relationship is used here as an Ayurvedic conceptual framework.

Relationship Between Asthi and Majja Dhatu

Asthi and Majja Dhatus have a close structural and functional relationship in Ayurvedic physiology. Asthi provides the structural framework, while Majja is described in relation to the internal component of Asthi and its nourishment.[6]

In degenerative spinal disorders, structural changes of vertebrae and intervertebral discs may coexist with pain, weakness, paresthesia, and radicular symptoms. These modern clinical findings may be discussed alongside the Ayurvedic Asthi–Majja framework, but such correlation should remain conceptual rather than being presented as anatomical equivalence.

Dhatu Kshaya and Vata Prakopa

Dhatu Kshaya and Vata Prakopa are closely related concepts in Ayurvedic pathology. Depletion of tissue qualities may contribute to Vata aggravation, while aggravated Vata may further contribute to dryness, instability, and progressive depletion.[4]

This reciprocal relationship can be represented as a conceptual cycle:

Dhatu Kshaya → Vata Prakopa → further Dhatu depletion → progression of degenerative changes.

Modern research similarly describes degenerative disc disease as a progressive process involving age-related changes, abnormal mechanical loading, extracellular-matrix degradation, cellular senescence, and inflammatory mechanisms.[1–3,5]

The Ayurvedic and modern models should therefore be regarded as different explanatory frameworks that may be conceptually compared, rather than as identical pathological descriptions.

Role of Khavaigunya in Degenerative Spine Disorders

Khavaigunya refers to vulnerability of a particular tissue or site in which a pathological process can become established.[7]

Ageing, repetitive mechanical stress, occupational loading, trauma, and abnormal biomechanics may contribute to vulnerability of spinal structures. Modern studies indicate that mechanical and age-related factors play important roles in disc degeneration.[1,2]

Within the Ayurvedic framework, such local vulnerability may be interpreted through Khavaigunya, facilitating localization of aggravated Vata at the affected spinal region.

Ayurvedic Explanation of Degeneration

Degenerative pathology may be interpreted through the combined concepts of Agni Vaishamya, impaired tissue nourishment, Vata Prakopa, and Dhatu Kshaya.

Ageing is considered an important factor in progressive degenerative change. Modern research demonstrates that ageing is accompanied by alterations in extracellular-matrix composition, cellular function, hydration, and mechanical properties of the intervertebral disc.[3,5]

Recent literature further identifies extracellular-matrix imbalance, cellular senescence, oxidative stress, and inflammatory signalling as important components of intervertebral disc degeneration.[8,9]

These modern findings may be conceptually discussed alongside Ayurvedic descriptions of progressive Dhatu deterioration, while avoiding direct one-to-one equivalence.

Nidana (Etiological Factors)

According to the Ayurvedic framework adopted in this review, factors potentially contributing to Vata aggravation and Dhatu depletion include:

- Excessive physical exertion (Ativyayama)
- Repetitive mechanical strain
- Improper posture
- Sedentary lifestyle
- Vata-aggravating dietary factors such as Ruksha, Sheeta, and Laghu Ahara
- Ageing (Kala)
- Psychological stress
- Trauma
- Occupational stress

Modern evidence supports the contribution of ageing, mechanical stress, and other biological and environmental factors to disc degeneration.[1,2,8]

These factors may therefore be incorporated into the proposed Ayurvedic Samprapti as potential contributors to Vata Prakopa and localization in vulnerable spinal structures.

Samprapti of Asthi–Majja Dhatu Kshaya in Degenerative Spine Disorders

Samprapti Varnana

Nidana Sevana such as ageing, repetitive strain, excessive physical exertion, stress, trauma, and Vata-provoking dietary and lifestyle factors may contribute to Vata Dosha Prakopa.

Aggravated Vata, together with impaired Agni and tissue nourishment, is proposed to contribute to progressive Asthi–Majja Dhatu Kshaya.

Srotodushti and Khavaigunya may provide the conditions for localization of the pathological process in the spinal region.

The resulting clinical manifestations may include chronic pain, stiffness, restricted movement, crepitus, radiating pain, paresthesia, weakness, and neurological symptoms.

Modern degenerative disc literature describes a progressive cascade involving matrix degradation, altered disc hydration, cellular dysfunction, inflammation, and structural changes.[3,5,8,9] These findings provide an opportunity for conceptual comparison with the Ayurvedic Samprapti described above.

Samprapti Ghataka

Samprapti Ghataka	Description
Dosha	Vata – Pradhana
Dushya	Asthi, Majja
Srotas	Asthivaha, Majjavaha
Agni	Dhatvagni Mandya
Udbhava Sthana	Pakvashaya
Sanchara	Through relevant Srotas
Vyakti Sthana	Spinal region
Rogamarga	Madhyama

Conceptual Samprapti Flow

Nidana Sevana → Vata Prakopa → Agni Vaishamya → Dhatvagni Mandya → Asthi–Majja Dhatu Kshaya → Srotodushti/Khavaigunya → Localization in Spine → Degenerative Spine Disorder Manifestation

This sequence provides the central conceptual model of the present review.

Clinical Correlation and Symptomatology

The proposed Ayurvedic framework may be clinically correlated with:

- Chronic pain (Shoola)
- Stiffness (Stambha)
- Restricted spinal movements
- Crepitus
- Tingling and numbness
- Weakness
- Radiating pain
- Neurological manifestations

These manifestations may occur in conditions such as cervical spondylosis, lumbar spondylosis, spinal stenosis, and degenerative disc disease. Modern literature indicates that structural degeneration and associated inflammatory, mechanical, and neural changes can contribute to pain and functional impairment.[5,8,9]

These correlations should be interpreted as conceptual associations rather than diagnostic equivalences.

Ayurvedic Management (Samprapti Vighatana)

Management is directed toward interruption of the proposed pathological sequence through Nidana Parivarjana, Vata Shamana, Dhatu Poshana, and Rasayana principles.

Nidana Parivarjana

- Avoidance of Vata-provoking dietary and lifestyle factors
- Correction of posture and ergonomics
- Avoidance of excessive repetitive strain
- Appropriate physical activity
- Prevention of avoidable mechanical stress

Shodhana Chikitsa

Basti is traditionally regarded as an important therapeutic approach in Vata disorders.[10]

Depending on individual assessment and classical indications, approaches described in Ayurvedic practice may include:

- Anuvasana Basti
- Niruha/Asthapana Basti
- Tikta-Ksheera Basti

The choice of procedure should be individualized according to Prakriti, Bala, Dosha, Dushya, age, disease stage, and other clinical factors.

Shamana Chikitsa

Potential Shamana approaches may include:

- Vatahara formulations
- Asthi-Majja Poshaka approaches
- Appropriate Ghrita preparations
- Classical formulations selected according to individual Samprapti

Specific drugs should not be generalized without considering their classical indications, dosage, contraindications, and patient-specific factors.

Bahya Chikitsa

Depending on clinical indication, Ayurvedic external therapies may include:

- Abhyanga

- Swedana
- Katibasti
- Grivabasti

These approaches may be considered supportive measures for pain, stiffness, and functional limitation.

Rasayana Therapy

Rasayana is traditionally associated with preservation of health, tissue nourishment, and promotion of longevity.[11]

In the present conceptual framework, Rasayana may be considered as a supportive strategy in individuals with Dhatu Kshaya and age-associated degenerative tendencies.

However, claims that Rasayana or Basti directly “regenerate” degenerated intervertebral discs should not be made without appropriate clinical and biological evidence.

Discussion

Degenerative spine disorders are multifactorial conditions involving structural, biochemical, mechanical, and cellular changes. Modern literature indicates that ageing and mechanical factors contribute substantially to degeneration, while extracellular-matrix imbalance, cellular senescence, oxidative stress, and inflammatory processes may participate in disease progression.[1–3,5,8,9]

Ayurveda approaches disease through a different conceptual framework. In the present review, Vata Prakopa, Dhatu Kshaya, Srotodushti, and Khavaigunya are proposed as major components of the Samprapti of degenerative spinal disorders.

The Ashraya–Ashrayi relationship between Vata and Asthi provides an important classical basis for considering Vata involvement in disorders characterized by skeletal depletion.[4] The concepts of Rukshata, Kshaya, and impaired tissue nourishment further contribute to the proposed explanation of chronic degenerative change.

The relationship between the Ayurvedic framework and modern pathology should, however, be interpreted cautiously. Asthi, Majja, Dhatu Kshaya, and Vata are Ayurvedic theoretical constructs and cannot be directly equated with vertebral bone, bone marrow, intervertebral disc tissue, or specific molecular mechanisms.

Modern degeneration involves extracellular-matrix degradation, altered proteoglycan content, changes in hydration, cellular senescence, inflammatory signalling, and progressive structural failure.[3,5,8,9] These findings may be conceptually correlated with the Ayurvedic description of progressive tissue depletion and altered tissue function, but they do not establish biomedical equivalence.

The proposed Samprapti therefore has value primarily as an Ayurvedic explanatory and therapeutic framework. It may assist in organizing Nidana, Dosha, Dushya, Srotas, and treatment principles for patients presenting with chronic degenerative spinal conditions.

From the management perspective, Ayurvedic treatment emphasizes Samprapti Vighatana rather than merely symptomatic suppression. Nidana Parivarjana, Vata Shamana, Basti, supportive external therapies, and Rasayana may be considered according to individual assessment and classical indications.

An integrative clinical approach may be useful in which modern diagnostic tools such as radiography or MRI are used where clinically indicated, while Ayurvedic assessment guides individualized management. Such an approach requires prospective clinical research rather than assuming therapeutic equivalence between the two systems.

Conclusion

Degenerative spine disorders may be conceptually evaluated in Ayurveda through the combined principles of Vata Prakopa, Asthi–Majja Dhatu Kshaya, Srotodushti, and Khavaigunya.

The proposed Samprapti provides a structured Ayurvedic framework for understanding the chronic and progressive nature of degenerative spinal manifestations.

Modern literature describes degeneration as a multifactorial process involving ageing, mechanical factors, extracellular-matrix alterations, cellular dysfunction, and inflammation. These findings may be used for

conceptual comparison with Ayurvedic principles, while maintaining the distinction between the two explanatory systems.

Ayurvedic management may be planned according to Samprapti Vighatana through Nidana Parivarjana, Vata Shamana, appropriate Basti, supportive external therapies, and Rasayana principles.

Further clinical, observational, and translational studies are required to evaluate the validity, reproducibility, safety, and clinical effectiveness of Samprapti-based Ayurvedic interventions in degenerative spine disorders.

Future Research Scope

Future research should focus on:

1. Clinical studies evaluating Samprapti-based Ayurvedic interventions in degenerative spine disorders.
2. Evaluation of Basti and other Ayurvedic interventions using validated pain and functional outcome measures.
3. Correlation of Ayurvedic clinical parameters with radiological findings.
4. Investigation of possible associations between Ayurvedic concepts of Dhatu Kshaya and measurable biological markers.
5. Longitudinal studies assessing disease progression and quality of life.
6. Development of standardized, evidence-based Ayurvedic protocols for chronic degenerative spinal disorders.

Such studies may help establish a stronger evidence base for the clinical application of Ayurvedic concepts in degenerative spine disorders.

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