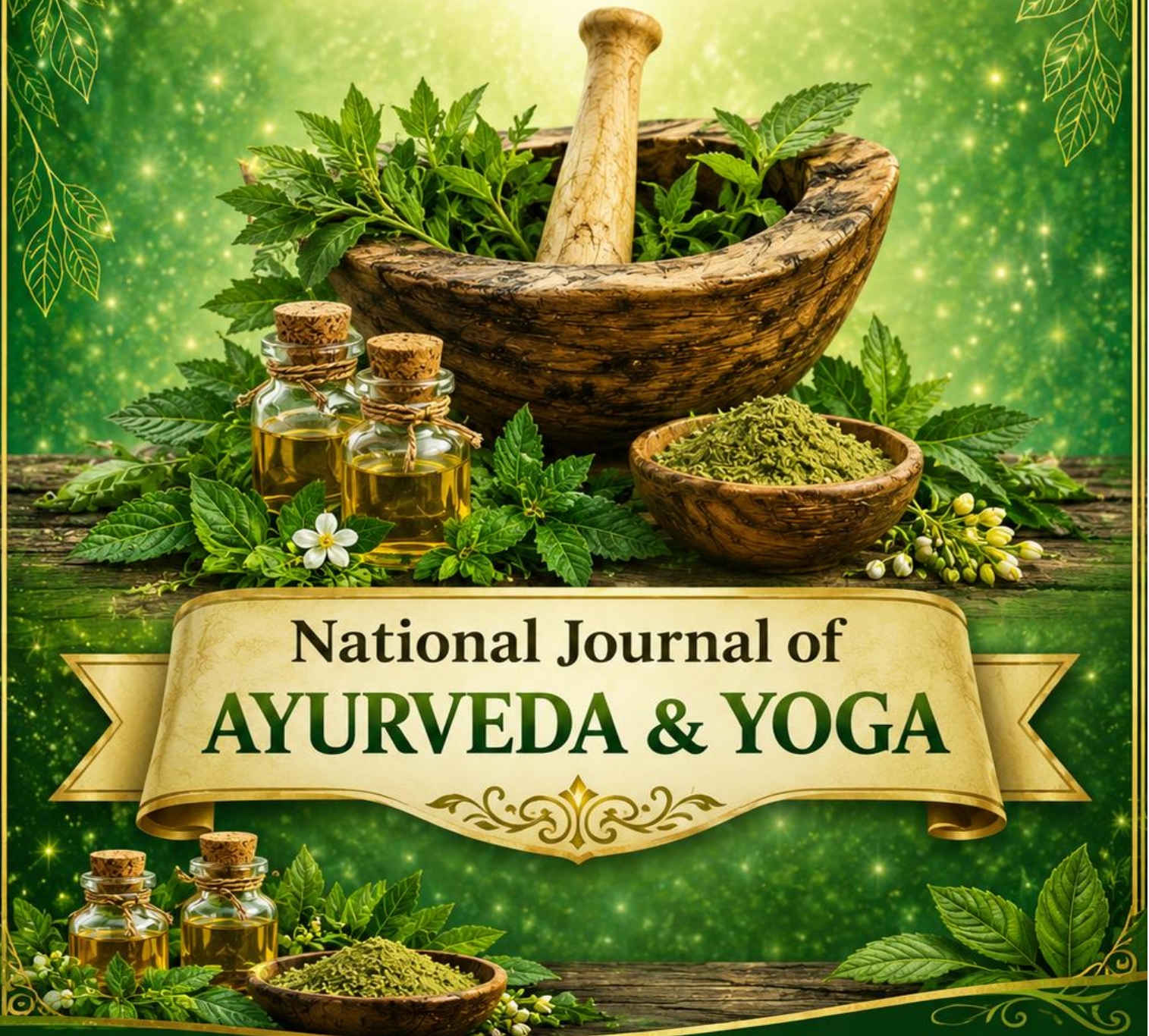




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“AYURVEDIC MANAGEMENT OF BILATERAL AVASCULAR NECROSIS OF THE FEMORAL HEAD: A CASE STUDY”**Dr. Kavita Bhagat¹, Dr. Archana Dachewar-Singam²**

1. PG Scholar of Kayachikitsa department of Shri Ayurved Mahavidyalaya, Nagpur.
2. HOD and Professor Kayachikitsa department of Shri Ayurved Mahavidyalaya, Nagpur.

ABSTRACT:

Introduction: Avascular necrosis (AVN), also known as osteonecrosis, is a condition characterized by the death of bone tissue due to inadequate blood supply. It may lead to microfractures, structural collapse, and progressive destruction of the affected bone. Trauma, including fracture or dislocation, prolonged use of high-dose corticosteroids, and excessive alcohol consumption are recognized risk factors. In Ayurveda, the clinical presentation of AVN may be correlated with Asthimajjagata Vata due to the involvement of Asti and Marja Dhatu with predominance of Vata Dosha. This case report presents the Ayurvedic management of bilateral AN of the femoral heads. **Methods:** A 42-year-old male diagnosed with bilateral AN of the femoral heads was evaluated clinically and radiologically. The left femoral head was classified as FICAT stage III and the right femoral head as FICAT stage I. The patient was assessed from both Ayurvedic and contemporary clinical perspectives. Ayurvedic management consisted of Shamans Chikitsa and Shodhana Chikitsa, along with appropriate supportive care. The patient was monitored clinically for changes in pain, walking ability, and functional status during the course of treatment. **Results:** The patient showed gradual clinical improvement following Ayurvedic management, particularly in terms of pain and difficulty in walking. Functional status improved during the treatment period, and the patient was monitored regularly for disease progression and clinical response. The findings suggest a possible role of an individualized Ayurvedic therapeutic approach in the symptomatic and functional management of bilateral AN. **Discussion:** The present case demonstrates the clinical complexity of bilateral AN of the femoral heads, particularly when the two hips are at different stages of disease progression. Correlation with Asthimajjagata Vata provides an Ayurvedic framework for understanding the involvement of Asti and Marja Dhatu and the role of Vata Dosha. The case emphasizes the importance of early diagnosis, timely intervention, regular monitoring, and multidisciplinary care in managing AN. However, as this is a single case report, larger clinical studies with objective radiological and functional outcomes are required to establish the efficacy and safety of Ayurvedic interventions in AN.

KEY WORDS:- Avascular necrosis, Osteonecrosis, Femoral head, Bilateral AVN, Asthimajjagata Vata, Vata Dosha, Shamana Chikitsa, Shodhana Chikitsa

Corresponding Details:**Dr. Kavita Bhagat**

Shri Ayurved Mahavidyalaya, Nagpur

Mobile No. 9423018358

E-Mail: bhagatkavitar@gmail.com

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INTRODUCTION

Avascular necrosis (AVN), also known as osteonecrosis, is a condition characterized by the death of bone tissue due to inadequate blood supply. Progressive vascular insufficiency may result in microfractures, structural collapse of the affected bone, and subsequent joint dysfunction. The disease may develop gradually over several months to years. Trauma, including fracture or dislocation, can disrupt the blood supply to the affected bone. Non-traumatic factors such as prolonged use of high-dose corticosteroids and excessive alcohol consumption are also recognized risk factors. AVN can occur at any age but is more commonly observed in adults between 30 and 50 years of age. In the early stages, patients may remain asymptomatic. With disease progression, pain may initially occur during weight-bearing activities and may later become persistent, including at rest. Involvement of the hip commonly produces pain in the groin, thigh, or buttock. Although the femoral head is one of the most frequently affected sites, AVN may also involve the shoulder, knee, hand, and foot. Bilateral involvement, particularly of the femoral heads, may also occur [1]. The pathogenesis of AN involves interruption or reduction of the blood supply to the bone. The etiological factors may broadly be classified as traumatic and non-traumatic. Traumatic causes include fractures and joint dislocations, which may damage or compress the blood vessels supplying the affected bone. Radiation therapy may also cause vascular and osseous injury, increasing the risk of osteonecrosis. Vascular obstruction due to fatty deposits may further compromise the microcirculation of bone [2,3]. Medical conditions such as sickle cell disease and Gaucher disease may also impair bone perfusion. In some cases, particularly non-traumatic AN, the underlying cause remains unidentified. Genetic predisposition, excessive alcohol consumption, prolonged corticosteroid therapy, certain medications, and systemic disorders may contribute to its development. If left untreated, AVN may progress to collapse of the affected bone. Involvement of the femoral head can result in loss of its normal spherical contour and may subsequently lead to secondary osteoarthritis of the hip joint. Early diagnosis and appropriate intervention are therefore important to limit disease progression, preserve joint function, and reduce disability [4]. From an Ayurvedic perspective, the clinical features of AVN may be interpreted in relation to Asthimajjagata Vata, considering the involvement of Asti and Marja Dhatu and the predominance of Vata Dosha. However, the correlation between AVN and Asthimajjagata Vata is a clinical interpretation rather than a direct one-to-one equivalence between the two diagnostic systems. The present case report describes the clinical presentation and Ayurvedic management of a patient with bilateral AN of the femoral heads and explores its clinical correlation with Asthimajjagata Vata.

CASE REPORT:

A 42-year-old male patient presented to Pakwasa Samanvaya Rugnalaya, Nagpur, on March 5, 2026, with complaints of bilateral hip joint pain and difficulty in walking. The patient reported an inability to walk for prolonged periods due to pain and discomfort. On clinical and radiological evaluation, the patient was diagnosed with bilateral avascular necrosis (AN) of the femoral heads, with FICAT stage III involvement on the left side and FICAT stage I involvement on the right side.

PATIENT INFORMATION:

A 42-year-old male patient, who had been apparently healthy until one year prior to presentation, developed sudden-onset bilateral hip joint pain associated with difficulty in walking and reduced walking tolerance. The symptoms progressively affected his ability to walk for prolonged periods. The patient was evaluated and diagnosed with bilateral avascular necrosis (AN) of the femoral heads, with FICAT stage III involvement on the left side and FICAT stage I involvement on the right side. Subsequently, he presented to Pakwasa Samanvaya Rugnalaya, Nagpur, for further management and was admitted for Ayurvedic treatment.

The patient underwent Ayurvedic management during the hospital stay and was subsequently discharged with documented clinical improvement.

PAST HISTORY

No H/O Hypertension, Diabetes Mellitus, Bronchial Asthma, IHD, Thyroid disorders.

Personal History:

Habit - Drinking Alcohol, Tobacco chewing

Diet - Mixed diet (non-veg 1-2 times, weekly)

Bowel - regular

Sleep - Disturbed

General Examination:

BP:130/80mmHG

PR:74/min

RR:20times/min

Temp: 98.2F

Edema- No

Pallor- No

Icterus- No

Clubbing-No

AsthaVidha Parikshana:

Nadi: Vata Pittaja

Mala: samyak

Mutra: samyak

Jihva: Saam

Shabda: Spastha

Sparsha: Anushnasheeta

Druka: Spects present

Akruti : Madhyam

SYSTEMIC EXAMINATION:

Respiratory System

On auscultation, air entry was equal bilaterally (AEBE), with no added or abnormal breath

sounds detected.

Cardiovascular System

S1 and S2 were heard normally, with no abnormal cardiac sounds detected.

Gastrointestinal System

The abdomen was soft and non-tender, with no organomegaly detected.

Central Nervous System

- Consciousness: Patient was conscious.
- Orientation: Patient was fully oriented to time, place, and person.
- Motor function: No obvious motor deficit was noted.
- Gait: Limping Gait.

EXAMINATION OF PATIENTS:

A straight leg rise test was done before and after treatment as shown in table (1)

Table 1: Straight Leg Raise Test

	Before Treatment (In Degree)	After Treatment (In Degree)
Right Leg	80 ⁰ (Painful)	90 ⁰ (Painful)
Left Leg	80 ⁰ (Painful)	90 ⁰ (Painful)

Table 2: VAS for hip joint

BT	Left	Right
VAS for Hip joint pain	5/10	4/10

Investigation MRI:

MRI hip done on 4/02/2026 shows Avascular necrosis of head of femur on either side (FICAT stage III on left side and stage I on right) Case was diagnosed as Asthimajjagatvata (AVN).

TREATMENT ADVISED:

1. Shamana Chikitsa

Shamana Chikitsa refers to palliative Ayurvedic management aimed at alleviating the clinical manifestations and balancing the aggravated Doshas without eliminating them from the body. In the present case, Shamana Chikitsa was planned with the objective of reducing Vata-predominant symptoms such as pain, stiffness, and restricted movements and supporting functional recovery. The medicines prescribed, along with their dose, route of administration, frequency, and duration of treatment, should be documented in detail in the case report as shown in Table 3.

Table 3: Shaman chikitsa:

Sr No	Name of Medicine	Dose	Kaal	Anupana
1	Panchatikta ghrut guggul	250 mg	Vyana Udana kaala	Koshna jal
2	Raktashodhak kashaya	20 ml	Vyana Udana kaala	Koshna jal
3	Asthiposhak yog	30 ml	Vyana Udana kaala	Milk
4	Mustadi marma kashaya	20 ml	Vyana Udana kaala	Koshna jal
5	Guduchi+ amalaki+Mushta	30 ml	Vyana Udana kaala	Koshna jal

2. Shodhana Chikitsa

Shodhana Chikitsa refers to Ayurvedic bio-purificatory procedures intended to eliminate aggravated Doshas from the body through appropriate therapeutic procedures. In a Vata-predominant condition, Baste Karma is traditionally considered an important Shoshana modality.

In the present case, the selected Shodhana Chikitsa was administered according to the patient's clinical condition, Dosha predominance, Agni, Koshtha, strength, and tolerance. The specific procedure, formulation used, dose, duration, and schedule should be reported to allow proper documentation and reproducibility of the treatment as given in Table 4.

Table 4: Shodhana chikitsa

Sr No	Procedure	Dose	No of Days
1	Snehan kati te ubhaya pad with Bala taila	20 mins	25 days
2	Kal Basti Anuvasan Basti (Panchatikta Ghrita (30 ml) +Bala Guduchyadi taila(50 ml)) Niruha Basti (Panchatikta ksheer basti)	80 ml 60 ml	16 days
3	Shashtishali pind swed	30 mins	25 days
4	Jaloukavacharan	Alternate days at hip joint	10 days

Pathya and Apathya

Pathya: Warm water, easily digestible food, Mudga Dal Khichadi, Puran Godhuma, Dhanyaamla, Laja, Jowar Roti, Ghrita, Dugdha.

Apathya: Diwaswapna, Ativyayam, Abhishyanada Ahara, exposure to cold air (AC, Cooler), maintaining one posture for a longer duration, jerky movement, lifting weights.

DISCUSSION

AVG of the femoral head is a progressive condition in which compromised blood supply may eventually result in structural collapse and secondary joint degeneration. Bilateral involvement and differences in disease stage between the two femoral heads can make clinical management particularly challenging. In Ayurveda, the clinical presentation may be

considered in the context of Asthimajjagata Vata, with the involvement of Asti and Marja Dhatu and the role of aggravated Vata Dosha. The treatment approach in the present case was therefore planned using both Shaman and Shoshana principles, with the objective of addressing the clinical manifestations and functional impairment. The gradual improvement in pain and walking ability observed in this case is clinically relevant; however, these observations should be interpreted cautiously because this is a single case report. Objective radiological assessment and longer follow-up would be necessary to determine whether Ayurvedic treatment has any effect on the structural progression of AVN. The primary objective of the treatment was conservative management aimed at reducing pain, improving mobility, preserving functional capacity, and enhancing the patient's quality of life. The patient's chief complaint was bilateral hip joint pain, which, from an Ayurvedic perspective, may be considered indicative of Vata Dosha's involvement with predominant infections of Asti Dhatu and Asthivaha Srotas.[5] Avascular necrosis (AN) occurs due to impaired or interrupted blood supply to the affected bone, resulting in progressive bone tissue damage. From an Ayurvedic perspective, the clinical presentation of AVN may be correlated with Asthimajjagata Vata, in which aggravated Vata affects Asti and Marja Dhatu. The concept of Marga Avarodha may be used to interpret obstruction or impairment of the normal pathways associated with the circulation and nourishment of the affected tissues. However, this Ayurvedic interpretation should be considered a clinical correlation rather than a direct equivalence between AVN and Asthimajjagata Vata.[6] Prolonged aggravation of Vata may contribute to Asti Dhatu Khaya and manifestations such as pain, stiffness, and restricted movement. Therefore, the treatment protocol was planned with consideration of Vata Dosha, Asti Dhatu, and the nourishment of the affected tissues. Measures aimed at improving local circulation and supporting tissue nourishment were incorporated into the treatment plan.[7] Jalaukavacharana (leech therapy) was included as part of the treatment protocol based on its traditional Ayurvedic indication in conditions involving localized vascular congestion and for its Rata Prasadana effect. Its use in this case was intended as an adjunctive measure rather than as a direct treatment for the underlying vascular pathology of AN. The specific clinical effects observed in the present patient should be interpreted in relation to the documented outcomes.[8]

According to Acharya Charaka, the management of Asti Dhatu Khaya includes Panchakarma, with particular importance given to Baste therapy. Medicated Baste preparations containing Ksheera, Ghrita, and Tikta Dravyas are described in the Ayurvedic literature in the context of disorders involving Asti Dhatu. Based on this principle, Panchatikta Ksheera Basti was incorporated into the treatment protocol. [9,10] The ingredients and therapeutic principles of Panchatikta Ksheera Baste may provide Tikka and other relevant Rasa properties, while Ksheera is described as Jeevaniya and Brimhana. Ghrita is traditionally considered supportive of tissue nourishment and is used in Vata-predominant conditions. Guggulu Katikati Ghrita, where used, may be considered in the context of Vata management and Dhatu Roshan. These Ayurvedic concepts provide the rationale for incorporating such formulations into the treatment protocol. [11,12] Bastin is traditionally regarded as an important therapeutic modality for the management of Vata Dosha. Therefore, in the present case, Bastin was selected with the objective of addressing Vata predominance and supporting the nourishment

and functional integrity of Asti Dhatu. The proposed Ayurvedic mechanism should not be interpreted as proving that Basti directly restores the blood supply to the femoral head; rather, it represents the Ayurvedic rationale underlying its use in the present case [13,14]. In addition to Baste, the treatment protocol included Snehana, Shashtika Shali Pinda Sweda, Jalaukavacharana, and appropriate internal medications. These therapies were planned with the objectives of alleviating pain and stiffness, improving local mobility, providing Snehana and Swedana, supporting Vata management, and improving functional status.

CONCLUSION

Pakshaghata is a Vataja Nanatmaja Vyadhi considered among the Mahavatavyadhis, and Vata is regarded by all Acharyas as the predominant Dosha in its manifestation. A clear understanding of the physiological and pathological aspects of Vata is therefore essential before initiating treatment. In this case, a combination of Shamans Aushadhis, Panchakarma procedures (Snehana, Swedana, Baste, Nasha) and physiotherapy — planned according to the patient's Dosha and Shana Dashti — resulted in a measurable improvement in right-sided muscle power and in gait, speech and sleep by the time of discharge. The results were encouraging and support the continued documentation of integrative Ayurveda-physiotherapy protocols in post-stroke hemiplegia; controlled studies using validated outcome scales are recommended to substantiate these observations.

MODE OF ACTION OF PANCHAKARMA CHIKITSA

1. Snehana Abhyanga

Abhyanga is an Ayurvedic procedure in which medicated oil is applied to the body with a gentle massage. In the present case, Bala Tail was used for Abhyanga. The mechanical effect of massage may promote local circulation, relaxation of soft tissues, and reduction of muscle stiffness. The warmth and pressure generated during massage may also contribute to local vasodilatation and improved tissue perfusion. From an Ayurvedic perspective, Tail possesses predominantly Snigdha and Guru properties and is traditionally used for Vata Shaman. Bala Tail is considered particularly suitable for Vata-predominant musculoskeletal conditions because of the Vata-Shamaka and Balsa properties attributed to its ingredients. Therefore, Abhyanga with Bala Tail was incorporated with the objective of reducing Vata's predominant pain and stiffness, supporting soft-tissue nourishment, and improving mobility.[15]

2. Swedana Shashtika Shall Panda Swede

Shashtika Shall Panda Swede is a form of Snigdha Sankara Swede in which a bolus prepared with Shashtika Shall, traditionally processed with milk and Bala moola Katha, is applied to the body with controlled warmth. It provides the combined effects of Swedana, Snehana, and Brimhana and is traditionally used particularly in Vata-predominant disorders.

The therapeutic warmth may produce local vasodilatation and increase local blood flow, while the massage component may help reduce muscle stiffness and improve mobility. From an Ayurvedic perspective, its Snigdha and Brimhana properties may be relevant in conditions associated with Vata aggravation and Dhātu Khaya. Therefore, in the present case, Shashtika Shall Panda Swede was administered with the objective of reducing pain and stiffness, improving local circulation and mobility, and providing a nourishing effect to the affected musculoskeletal tissues.

The proposed mechanism should be interpreted as a supportive symptomatic and functional effect. It should not be stated that the procedure directly restores the blood supply to the necrotic femoral head, as this has not been established in AVN [16].

3. Baits

Panchatikta Ksheera Basti

Basti is traditionally considered an important therapeutic modality for Vata Dosha. In Karaka Samhita, Panchakarma and Basti containing Ksheera, Ghrita, and Tikka Dravyas are described in the management of disorders involving Asti. This provides the classical Ayurvedic rationale for considering Tikka Ksheera Basti in conditions involving Asti Dhātu.

In the present case, Panchatikta Ksheera Basti was administered with the intention of managing Vata predominance and supporting Asti Dhātu. The selected ingredients, including Ashwagandha, Shariat, and Asthishrinkhala, were considered according to their Ayurvedic properties and intended therapeutic actions. Ashwagandha is traditionally regarded as Bala and Ramayana, while Shatavari is traditionally used for Brimhana and Ramayana purposes. Asthishrinkhala (*Cissus quadrangularis*) is traditionally used in Ayurvedic practice in relation to musculoskeletal and bone health. Therefore, the combination was selected with the objective of supporting tissue nourishment, reducing Vata-predominant symptoms, and promoting functional recovery. However, statements such as “these drugs directly heal the necrotic femoral head” or “restore the vascular supply” should be avoided unless supported by appropriate clinical or experimental evidence. The role of these medicines in the present case should be described as a probable therapeutic rationale.[17]

Anuvasana Basti Anuvasana Basti was administered using Panchatikta Ghrita (30 mL) combined with Bala Guduchyadi Taila (50 mL). The use of an oil and ghrita-based basti was intended primarily for Vata Shaman and Snehana. The unctuous nature of the preparation may support the Ayurvedic objective of counteracting Ruksha and Vata-predominant features. The treatment was therefore incorporated as part of the overall protocol aimed at reducing pain and stiffness and supporting functional recovery [18]

4. Jalaukavacharana

Jalaukavacharana is an Ayurvedic form of Raktamokshana using medicinal leeches. In the present case, it was included as an adjunctive procedure based on the Ayurvedic concept of Rata Prasadana and the traditional use of Jalaukavacharana in localized disorders.

From a modern biomedical perspective, medicinal leech saliva contains several

biologically active substances, including anticoagulant and anti-inflammatory compounds. These substances can influence coagulation and local inflammatory processes and may enhance local blood and lymphatic circulation. Clinical research on medicinal leech therapy has demonstrated symptomatic benefits in some musculoskeletal conditions, particularly knee osteoarthritis, although the evidence is condition-specific and should not be directly extrapolated to AVN [19]. Therefore, in the present case, Jalaukavacharana may be considered a supportive adjunctive therapy aimed at local symptomatic relief and improvement of microcirculation conditions. The claim that it directly promotes angiogenesis, reverses femoral-head necrosis, or produces bone regeneration should not be made without direct evidence in AN.

INTERNAL MEDICATIONS AND THEIR PROBABLE MODE OF ACTION

1. Panchatikta Ghrita Guggulu

Panchatikta Ghrita Guggulu is an Ayurvedic formulation traditionally used in disorders involving Asti Dhatu, Vata Dosha, and inflammatory musculoskeletal conditions. The formulation contains predominantly Tikka Dravyas along with Ghrita and Guggulu. The Tikka Rasa is traditionally considered useful in Asti Dhatu disorders, while Ghrita provides Snigdha and nourishing properties. Guggulu is traditionally used for its Vata-Shamaka, anti-inflammatory, and Medohara properties. In the present case, it was administered with the objective of reducing Vata-predominant symptoms, supporting Asti Dhatu nourishment, and reducing pain and stiffness [20].

2. Raktashodhak Kashaya

Raktashodhak Kashaya was included in the treatment protocol with the Ayurvedic objective of supporting Rata Dhatu and maintaining Rata Prasadana. The constituent herbs of the formulation may possess properties traditionally described as Rata Prasadaka and Panache. In the present case, it was used as supportive therapy with the intention of maintaining proper Rata Dhatu quality and supporting tissue nourishment. The exact mechanism should be interpreted according to the individual ingredients of the formulation.

3. Asthiposhak Yoga

Asthiposhak Yoga was prescribed with the primary objective of supporting Asti Dhatu Roshan. In Ayurvedic physiology, adequate nourishment of successive Dhatus is considered important for maintaining the structural integrity and function of Asti Dhatu. In the present case, the formulation was included to support Asti Dhatu, particularly in view of the degenerative changes associated with AN. Its role should be described as supportive rather than as a proven treatment for reversal of osteonecrosis [21].

4. Mustadi Maria Kashaya

Mustadi Marma Kashaya was incorporated into the treatment protocol for its traditional application in conditions involving Maria, Mama, Snafu, and musculoskeletal structures. The formulation may be useful for addressing pain, stiffness, and functional restriction

according to Ayurvedic principles. In the present case, it was administered as supportive therapy with the objective of reducing musculoskeletal symptoms and improving functional mobility [22].

5. Guduchi + Amalaki + Musta

A combination of Guduchi (*Tinospora corylifolia*), Malakin (*Phyllanthus emblica*), and Must (*Cyperus rotundus*) was also included in the treatment protocol. Guduchi is traditionally described as Ramayana, Tridosha-Shamaka, and supportive of Agni and immunity. Malakin is considered Ramayana and is traditionally used for tissue nourishment and antioxidant support. Must is traditionally used for Deepana, Pachanga, and Amapachana. The combination was therefore used as supportive therapy with the objective of maintaining Agni, supporting Ramayana effects, and promoting overall tissue nourishment. The individual therapeutic effects depend on the dose, formulation, route, and duration of administration [23,24].

RESULTS:

Following the Ayurvedic management, the patient demonstrated gradual clinical improvement. A reduction in bilateral hip pain and improvement in walking ability and functional status were observed during the treatment period. The patient was monitored regularly to assess clinical response and functional improvement. The observed clinical improvement indicates a possible beneficial role of an individualized Ayurvedic approach in the symptomatic and functional management of AN. However, the findings from a single case cannot establish treatment efficacy or determine whether the intervention altered the underlying structural progression of AVN. The patient's clinical condition improved gradually during the course of treatment. A progressive reduction in bilateral hip joint pain and improvement in walking ability and functional mobility was observed. The patient reported better tolerance for walking and a reduction in difficulty during routine activities. Overall, the treatment was associated with improvement in the patient's clinical symptoms and functional status. The patient was discharged after completion of the planned treatment with clinical improvement and was advised regular follow-up for assessment of symptoms, functional status, and disease progression as given in Table 5.

Table 5:

Sign and symptoms	BT	AT (25 days)
Pain	VAS –left 5/10 Right 4/10	Left 1/10 Right 1/10
Difficulty in Walking	Present	Normal
SLRT (For Lt side)	Active – 80 degree (Painful) Passive- 90 degree (Painful)	Active – 90 degree (Painless) Passive- 90 degree (Painless)
SLRT (For Rt side)	Active – 80 degree (Painful) Passive- 90 degree (Painful)	Active – 90 degree (Painless) Passive- 90 degree (Painless)

CONCLUSION:

This case highlights the clinical challenges associated with bilateral AN of the femoral heads and presents its possible Ayurvedic correlation with Asthimajjagata Vata. The patient showed gradual improvement in pain and functional ability following individualized Ayurvedic management. Early diagnosis, timely intervention, regular clinical and radiological monitoring, and appropriate multidisciplinary care remain important in the management of AVN. Further prospective studies with larger sample sizes, standardized treatment protocols, objective functional measures, and radiological outcomes are required to evaluate the role of Ayurvedic interventions in AN. In the present case, a combination of Tikka Ksheera Basti, Jalaukavacharana, Shashtika Shali Pinda Sweda, Shamana Chikitsa, and other supportive Ayurvedic therapies was associated with gradual improvement in clinical symptoms, particularly pain, difficulty in walking, and functional mobility. The observed improvement suggests that the treatment protocol may provide symptomatic and functional benefits in a patient with AN. However, as this report is based on a single case, the findings cannot be generalized to the wider population, and it is not possible to establish the efficacy of the treatment or determine whether it alters the natural course of AVN. Further studies involving larger sample sizes, appropriate study designs, standardized outcome measures, longer follow-up periods, and radiological assessment are required to evaluate the effectiveness and safety of Ayurvedic interventions in AN. Serial MRI or other appropriate imaging modalities may be considered during follow-up to assess structural changes in the femoral head. Any radiological improvement or reversal should be demonstrated objectively through comparative imaging rather than assumed from symptomatic improvement alone.

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