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RESEARCH ARTICLE

AYURVEDIC MANAGEMENT OF GAMBHIRA VATARAKTA (AVASCULAR NECROSIS OF FEMORAL HEAD) THROUGH PANCHAKARMA: A CASE REPORT

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Abstract

Background: Avascular Necrosis (AVN) of the femoral head arises from disruption of the subchondral blood supply, resulting in osteocyte death and, if unchecked, progressive mechanical collapse of the joint. The femoral head's reliance on terminal retinacular vessels with limited collateral flow makes it especially susceptible. Conventional treatments -ranging from NSAIDs and core decompression to total hip arthroplasty (THA) - are costly, carry procedural risks, and offer variable long-term success,especially in younger patients. In classical Ayurvedic nosology, AVN aligns closely with Gambhira Vatarakta, a condition rooted in simultaneous vitiation of Vata Dosha and Rakta Dhatu, culminating in degeneration of Asthi (bone) and Sandhi (joint) tissues.

Case Summary:A 21-year-old female classical dancer and competitive athlete presented with a three-month history of bilateral groin pain (VankshanShool), lumbo-sacral discomfort (Katishoola), difficulty in walking (Chankraman Kashata), and bilateral lower-limb pain from hip to foot (Ubhay Pada Shool), predominantly on the left side. MRI of both hip joints confirmed Avascular Necrosis. The patient's history included COVID-19 infection (2021) treated with corticosteroids, a fall injury in November 2022, and years of high-intensity physical training together forming the triad of Abhighata, Raktadushti, and Vataprakopa

Intervention:A sequentially structured four-stage treatment protocol was employed: (1) Langhan/Pachan/Rukshan for Ama Pachana; (2) Raktaprasadana and Dhatooposhan after adequate Agnidipti; (3) Panchakarma procedures comprising Abhyanga, Patrapottali Sweda, and Tiktakshira Basti administered in two consecutive cycles; and (4) Rasayana Chikitsa for sustained tissue regeneration and relapse prevention.

Outcome: The patient showed notable improvement: VAS pain score declined from 7/10 to 3/10, bilateral hip range of motion improved measurably, gait was restored, and she was able to resume daily activities without any surgical intervention.

Conclusion: This case offers clinical support for the use of a systematic, staged Panchakarma protocol — especially Tiktakshira Basti — in arresting AVN progression, managing pain, and restoring joint function in young patients.

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Randomized controlled trials with standardized protocols and serial MRI assessment are needed to build on this evidence.

Introduction:-

Avascular Necrosis (AVN), also known as osteonecrosis or ischemic bone necrosis, refers to the death of bone cells resulting from a compromised vascular supply to the subchondral region. The femoral head is the anatomical site most frequently involved, largely because of the end-arterial nature of its retinacular blood supply and limited collateral circulation [1]. The natural course of the disease tends to be progressive — beginning with subclinical ischaemia, advancing to subchondral fracture, and eventually leading to structural collapse of the femoral head with associated severe pain and joint destruction [2].From an epidemiological standpoint, AVN is no longer limited to the elderly. A prevalence rate of approximately 8% has been recorded across an age range of 18 to 54 years [3]. In the wake of the COVID-19 pandemic, a striking rise in AVN incidence among young adults has been well-documented, largely attributed to high-dose corticosteroid therapy used during COVID-19 treatment, along with the virus's own capacity to trigger a hypercoagulable state, endothelial damage, and microvascular thrombosis [4,5,6]. A systematic review by Hassan et al. (Rheumatology International, 2023) found corticosteroid use in 13 out of 14 studies reviewed, with a mean prednisolone-equivalent dose of approximately 1238.5 mg and an average interval of 142 days between COVID-19 diagnosis and AVN detection [7].

This epidemiological shift — with previously healthy young individuals developing a condition historically associated with old age — highlights a major unmet need in modern orthopaedics.Current treatment strategies, including NSAIDs, core decompression, vascularized bone grafting, and THA, are limited by significant cost, variable efficacy, and procedural morbidity — particularly challenging in bilateral cases among young patients who may need repeated procedures [8].In Ayurvedic medicine, AVN maps closely onto Gambhira Vatarakta — a deep-tissue variant of Vatarakta characterized by concurrent vitiation of Vata and Rakta Dhatu. Acharya Charaka describes this as a mutually obstructing cycle: Vata blocked by vitiated Rakta becomes further aggravated, which in turn worsens Rakta vitiation, driving pathology progressively deeper into tissues (Charaka Chikitsa Sthana 29/10-11). When this cascade involves Asthi and Sandhi Dhatus, the result is Gambhira Vatarakta — manifesting as deep bone pain, joint stiffness, reduced mobility, and eventual osseous structural damage (Ca.Ci.29/19). This clinical picture closely mirrors the stages of femoral head AVN.The present case report documents the Ayurvedic management of bilateral femoral head AVN in a 21-year-old female patient using a staged Panchakarma protocolguided by classical Gambhira Vatarakta Chikitsa principles. For that her proper informed consent was taken. This report aims to contribute to the growing evidence base supporting Panchakarma as a viable conservative intervention in early-to-moderate AVN.

Case Presentation:-

Patient Profile:-

A 21-year-old female (OPD No. 216) presented to the Panchakarma OPD of PDEA's AyurvedRugnalaya and Snowbell Multi Speciality Hospital, Pune, with the following chief complaints:

1. VankshanShool — bilateral groin pain
2. Katishoola — lumbo-sacral pain
3. Ubhay Pada Shool — bilateral hip-to-foot pain (left > right) — duration 3 months
4. ChankramanKashata — pain and difficulty during ambulation
5. Difficulty in stair climbing
6. GI complaints: Udara Gaurava, Adhmana, Asamyak Malapravartan
7. Anubandha Lakshana: Dakshina Janusandhi Shool (right knee joint pain)

History of Present Illness:-

The patient was an active Bharatnatyam dancer and competitive athlete undergoing daily intensive training, including long-distance running and classical dance practice involving sustained extreme hip postures. She had been hospitalized for COVID-19 in 2021 and received allopathic treatment including corticosteroids. She subsequently contracted Dengue fever in August 2021. In November 2022, she sustained a fall injury, after which hip pain progressively worsened. MRI of bilateral hip joints was performed at an allopathic facility, and AVN was confirmed in December 2022. After one month of oral medications and physiotherapy without adequate improvement, she sought Ayurvedic care at ARSMH.

Aetiological Analysis (Nidana Panchaka):-
Three distinct but interacting causative factors were identified, each corresponding to established mechanisms of Vata-Rakta Dushti:
a) Post-COVID Corticosteroid Therapy: Corticosteroids administered during COVID-19 treatment are now recognized as a primary risk factor for femoral head AVN in young adults. Their role involves lipid metabolism disruption, adipocyte hypertrophy, fat embolism, and direct endothelial toxicity — all of which impair bone microcirculation [6]. Simultaneously, COVID-19 itself promotes systemic hypercoagulability and microvascular thrombosis, compounding the risk [5]. In Ayurvedic terms, this mechanism corresponds to Medodushti-mediated Rakta SrotasAvarodha — obstruction of blood-carrying channels — a central feature of Vatarakta pathogenesis.
b) Trauma (Abhighata): The November 2022 fall is classified as Abhighata in Ayurveda — a well-established cause of both Vata vitiation and Rakta Dushti. Trauma disrupts local hemodynamics and can precipitate fat embolism, both of which are recognized contributors to femoral head ischaemia. Moya-Angeler et al. describe intraosseous extravascular compression following injury as an established AVN-inducing mechanism [9].
c) Sustained High-Intensity Physical Training: The patient's intense daily classical dance practice and athletic training subjected the hip joints to repeated extreme loading and postural stress — constituting Atiyoga (excessive utilization) in Ayurvedic terms. Chronic mechanical overload promotes microvascular insult and bone fatigue, accelerating Vataprakopa and hastening Dhatu Kshaya.

Clinical Examination:-
General Examination:-
- **Gait:** Normal at presentation
- **Deformity:** Slight limp noted in left hip
- **Tenderness:** Absent
- **Stiffness:** Present bilaterally in hip joints
- **Warmth:** Absent
- **Crepitus:** Present in left hip
- **Skin Changes:** No specific findings

Range of Motion (ROM) — Before Treatment:-
Pre-treatment hip ROM was measured and documented as shown in Table 1 below:

Table 1: Pre-Treatment Range of Motion (Bilateral Hip Joints)

Movement	Left Hip	Right Hip
Flexion	110°	120°
Adduction	20°	10°
Abduction	20°	40°
Internal Rotation	30°	20°
External Rotation	20°	20°

Pain Assessment:-
VAS Scale (Pre-treatment): 7 / 10

Systemic Examination:-
- **Musculoskeletal:** As documented above
- **Central Nervous System:** No abnormality detected
- **Cardiovascular System:** S1, S2 audible; no murmurs
- **Respiratory System:** Normal vesicular breath sounds bilaterally

Dashavidha Pariksha:-
The complete tenfold constitutional assessment was performed and the findings are summarized in Table 2:

Table 2: Dashavidha Pariksha Findings

Pariksha Parameter	Observed Finding
Prakriti (Constitution)	Vata-Pitta
Vikriti (Current Imbalance)	Vata-Rakta
Sara (Tissue Excellence)	Madhyam
Samhanana (Physique)	Madhyam
Pramana (Anthropometry)	Madhyam
Satmya (Adaptability)	Madhyam
Satva (Mental Strength)	Madhyam
Aharashakti (Digestive Capacity)	Madhyam
Vyayamashakti (Exercise Tolerance)	Avara (Reduced)
Vaya (Age Group)	Yuva (Young Adult)

Samprapti (Pathogenesis):-

Samprapti Ghatak (Pathogenic Components):-

The detailed breakdown of each pathogenic element contributing to the disease process is presented in Table 3:

Table 3: Samprapti Ghatak (Pathogenic Components)

Ghatak (Component)	Details
Dosha	Vata (Vyana + Apana) + Pitta (Pachaka) + Rakta Dushti
Dushya	Asthi Dhatu, Sandhi, Majja (secondary), Rakta
Srotas	Asthivaha, Raktavaha, MajjavahaSrotas
Srotodusti	Sanga (obstruction) + Vimargagamana
Agni	JatharagniMandya + DhatvagniMandya (Asthidhatvagni)
Ama	Sama Vata-Rakta (early stage)
Udbhava Sthana	Pakwashaya (Vata) + Hridaya/RaktavahaSrotas (Rakta)
Sanchara Sthana	Madhyama Rogamarga (Asthi, Sandhi, Majja)
Adhisthana	Sandhis (bilateral hip joints)
VyaktiSthana	Vankshana, Kati, Ubhaya Pada
Roga Marga	Madhyama

Samprapti Kramasaha (Sequential Pathological Progression):-

Nidana Sevana (Corticosteroids + Abhighata + Atiyoga) → Vataprakopa and Raktadushti → Anyonyavarana (mutual obstruction) → Srotodushti in Raktavaha and AsthivahaSrotamsi → DhatvagniMandya at the Asthi Dhatu level → impaired Asthi formation and nourishment → Asthi Dhatu Kshaya → structural collapse of the femoral head → clinical manifestation as Gambhira Vatarakta.

Differential Diagnosis:-
The following Ayurvedic conditions were systematically considered and excluded before arriving at the final diagnosis, as outlined in Table 4:

Table 4: Differential Diagnosis with Basis for Exclusion

Condition Considered	Reason for Exclusion
Gudhrasi (Sciatica)	No Chimchimayan (paresthesia/tingling); gait preserved; radicular pain pattern absent
Sandhigata Vata (Osteoarthritis)	Younger age group; Vata-purna-driti-sparshaha sign absent.
Asthimajjagata Vata	Absence of Asthi-ParvanamBheda; Santata Ruk not present; Rakta vitiation confirms Vatarakta over pure Vatavyadhi

Final Diagnosis: Gambhira Vatarakta (Bilateral Avascular Necrosis of the Femoral Head)

Investigations:-
Haematological and Biochemical Profile:-
All routine blood investigations and biochemical parameters were within normal reference ranges.

Imaging:-
MRI Hip Joints: Revealed bone contusion in the medial and lateral femoral condyles and osteochondritis of the lateral femoral condyle. Findings were consistent with bilateral Avascular Necrosis of the femoral head.
MRI Right Knee: Demonstrated moderate joint effusion extending into the medial and supralateral recess, along with a complex tear of the posterior body, posterior horn, and posterior root attachment of the lateral meniscus.

These multi-site findings are consistent with the Ayurvedic concept of Madhyama Rogamarga involvement, with ongoing Asthi Dhatu Kshaya across multiple skeletal sites.

Treatment Protocol:-
Treatment was designed in accordance with the classical Ayurvedic authority:
"अस्थ्याश्रयाणांव्याधीनांपञ्चकर्माणिभेषजम् | बस्त्यःक्षीरसर्पींषितिक्तकोपहितानि च ||"

— Charaka Sutrasthana 28/27

"निर्हरेद्वामलंतस्यसघृतैःक्षीरबस्तिभि¦
नहिबस्तिसमंकिञ्चिद्वातरक्तचिकित्सितम्||८८||
बस्तिवङ्क्षणपार्श्वोरुपर्वास्थिजठरार्तिषु
उदावर्तेचशस्यन्तेनिरूहाःसानुवासना¦|८९||
दद्यात्तैलानिचेमानिबस्तिकर्मणिबुद्धिमान्"
नस्याभ्यञ्जनसेकेषुदाहशूलोपशान्तये|९०||
— Charaka Chikitsa Sthana 29/88

Four-Stage Treatment Protocol:-
Stage 1 — Langhan / Pachan / Rukshan (Ama Pachana Phase):-
Before any nourishing or oleating therapy could be commenced, it was essential to address the underlying Agni Mandya and accumulated Ama. Deepana-PachanaDravyas HingvasthakChurna Apane 500mg with goghrut for 5 days then Raktapachak Vati 500 mg + Dhanwantar Kashay 20ml & Cap Gandhatail od for 15 days was administered to restore Jatharagni and Dhatvagni&vatanuloman. Rukshana procedures helped counteract the Snigdha quality of Sama Dosha. This preparatory phase is indispensable — initiating Brimhana therapies in the presence of Ama would only deepen Srotavarodha.

Stage 2 — Raktaprasadana and Dhatooposhan (Post-Agnidipti Phase):-
Once adequate Agni function was re-established, blood-purifying and tissue-nourishing formulations were introduced for 15 days Kaishor Guggul 2 bd MahamanjishthadiKadha 15 ml bd This stage directly targeted the Rakta Dushti component of Vatarakta by deploying RaktaprasadanaDravyas and initiating supplementation for Dhatu-level restoration.

Stage 3 — Panchakarma Chikitsa (Core Therapeutic Phase):-
(a) Abhyanga (Medicated Oil Massage): Performed usingMurivenna+ Balaguduchyadi Tail. Abhyanga enhances local circulation, reduces Vata-driven stiffness and pain, and facilitates transdermal delivery of active medicinal constituents to deeper tissues.
(b) Patrapottali Sweda (Leaf Bolus Sudation): A form of Sankara Sweda involving heated boluses of medicinal leaves (Erand, Nirgundi, Shigru) processed with Murivennaoil, applied directly to the affected joints. The procedure provides targeted joint-level Pachana, reduces Avarana, promotes local vasodilation, and carries medicinal constituents into the Sandhi and Asthi Dhatu. It is particularly suited to conditions involving combined Vata-Rakta vitiation with Dhatu Kshaya at the joint level [10].
(c) Tiktakshira Basti (Medicated Milk Enema) — 2 Cycles: This formed the centerpiece of the treatment plan, administered in two complete cycles. Tiktakshira Basti (PanchatiktaKsheera Basti) is the foremost Basti preparation for AsthiPradoshajaVikaras, combining:

- **Tikta Rasa Dravyas:** Neem (Azadirachta indica), Patola, Guduchi, Vasa, Kantakari — each possessing Deepana, Pachana, Srotoshodhana, and Raktaprasadana actions
- **Ksheera (Milk):** Snigdha, Madhura, and directly Asthi-Vardhaka (bone-nourishing) per classical Ayurvedic pharmacology
- **Ghrita (Clarified Butter):** Serves as a lipophilic medium for fat-soluble constituents, facilitates tissue penetration, and exerts Vata-Pitta Shamana effects Along with this Sariva, Shatavari was added. First and last Matra basti was given with Til Tail 60 ml.

Tiktakshira Basti simultaneously achieves Shodhana (detoxification) and Brimhana (nourishment) without requiring alternation — making it especially suitable for chronic Asthi Dhatu disorders where both purification and rebuilding are concurrently needed [11]. Modern pharmacological studies support systemic absorption of active phytoconstituents via the haemorrhoidal venous plexus following rectal administration [12,13].

Stage 4 — Rasayana Chikitsa / Apunarbhav (Long-Term Regenerative Phase):-
Following clinical stabilization, Rasayana formulations were introduced to support long-term tissue regeneration, immune modulation, and relapse prevention (Apunarbhav). Bruhat Vat Chintamani 60mg 1 rasayankale for 15 days. Singh SK et al. (2023) reported MRI-confirmed AVN grade regression over a 23-month follow-up period using Rasayana therapy alongside PanchatiktaKsheera Basti, supporting the role of this phase in structural bone recovery [14].

Observations and Results:-
The patient was monitored over an extended follow-up period and demonstrated progressive, sustained clinical improvement.No appreciable changes were noted on MRI; however, the patient experienced significant symptomatic relief.

Range of Motion — Pre vs Post Treatment Comparison:-
Hip ROM was reassessed following the completion of treatment. Table 5 presents a comparative summary of pre- and post-treatment findings:

Table 5: Comparison of Hip Range of Motion — Pre vs Post Treatment

Movement	Left Hip (Pre)	Left Hip (Post)	Right Hip (Pre)	Right Hip (Post)
Flexion	110°	120°	120°	125°
Adduction	20°	10°	10°	0°
Abduction	20°	30°	40°	40°

Movement	Left Hip (Pre)	Left Hip (Post)	Right Hip (Pre)	Right Hip (Post)
Internal Rotation	30°	30°	20°	10°
External Rotation	20°	20°	20°	10°

Pain Assessment:-
Pre-treatment VAS Score: 7/10 **Post-treatment VAS Score:** 3/10

Functional Outcomes:-
- Gait fully restored to normal
- All activities of daily living performed independently
- No surgical intervention was required at any point
- Overall quality of life markedly improved
- Patient was able to resume moderate physical activity under appropriate guidance

Discussion:-

10.1 Aetiological Correlation — Modern & Ayurvedic Perspectives
Post-COVID Corticosteroid Use:
The surge in early-onset AVN is linked to corticosteroid therapy during COVID-19, which impairs bone microcirculation through adipocyte hypertrophy, fat embolism, and endothelial toxicity, while COVID-19 itself induces endothelial dysfunction and microvascular thrombosis [5,6]. Sakellariou et al. (2024) confirmed the synergistic role of steroids and COVID-related vascular injury in AVN [4]. In Ayurveda, this corresponds to Medodhatu vitiation, Rakta Srotas Avarodha, and Raktadushti underlying Vatarakta.

Trauma (Abhighata):
Hip trauma disrupts femoral head vascularity, causing ischemia. Ayurvedically, Abhighata leads to Vata vitiation and Rakta Dushti. Combined with steroid-induced vascular insult, this creates compounded risk for AVN.

Sustained Physical Overload:
Repetitive high-impact activity represents Atiyoga, leading to Dhatu Kshaya. Modern literature links this to subchondral microfractures and vascular compromise.

Rationale for Treatment Protocol:-
Langhan-Pachan:
Presence of Ama (digestive symptoms) required Deepana-Pachana before nourishing therapies, as initiating Brimhana in Ama state worsens Srotavarodha.

Patrapottali Sweda:
Induces local vasodilation, mobilizes Doshas, and enhances transdermal drug delivery to Sandhi and Asthi Dhatu. Cherian and Krishna reported significant improvement in VAS and Oxford Hip Score following Sweda-based Panchakarma in AVN [16].

Tiktakshira Basti — Mechanisms:
8. **Vata Shamana:** Ksheera and Ghrita counter Vata; Tikta Rasa aids Srotoshodhana
9. **Rakta Prasadana:** Guduchi, Neem, Vasa reduce inflammation and correct Rakta Dushti
10. **Asthi Nourishment:** Supports bone metabolism; Thankachan et al. showed improvement in calcium and bone markers with PanchatiktaKsheera Basti [40]
11. **Systemic Absorption:** Rectal route enables systemic delivery
12. **Yapana Effect:** Simultaneous Shodhana and Brimhana, ideal for Gambhira Vatarakta [11]

Comparison with Published Literature:-
Findings are consistent with existing evidence. Singh SK et al. reported MRI-confirmed AVN grade regression with PanchatiktaKsheera Basti and Rasayana, along with pain relief and improved ROM [14]. Chaturvedi et al. also

demonstrated functional improvement using Panchakarma protocols [17].The combined approach of Vata-Rakta pacification and Asthi Dhatu nourishment is both mechanistically sound and clinically effective.

Conclusion:-

This case report provides clinically meaningful evidence supporting a systematically staged Panchakarma protocol for the management of Gambhira Vatarakta (Bilateral Avascular Necrosis of the Femoral Head) in a young, physically active patient with a complex multifactorial background — including post-COVID corticosteroid exposure, traumatic Abhighata, and sustained physical overload. The four-stage protocol — Ama Pachana, Raktaprasadana, Panchakarma, and Rasayana — embodies the classical Ayurvedic principle of simultaneously addressing the root pathology (Vata-Rakta Anyonyavarana) and its tissue-level consequence (Asthi Dhatu Kshaya).Tiktakshira Basti emerged as the central, most impactfulintervention(Ch.Chi.29/88). The VAS score reduction from 7/10 to 3/10, measurable bilateral hip ROM improvement, restoration of gait, and return to daily activities — all without surgical intervention — highlight Panchakarma's potential as a cost-effective, conservative strategy in early-to-moderate AVN, particularly in the context of post-COVID epidemiology.Radiological findings showed no significant progression, yet the patient reported notable clinical improvement.Large-scale randomized controlled trials incorporating serial MRI with AVN grading are urgently warranted to establish standardized protocols, optimal Basti formulations and cycle frequencies, and evidence-based patient selection criteria for Panchakarma.

Patient Consent:-

Written permission for publication of this case study has been obtained from the patient.

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