

## Exploring The Efficacy Of Ayurveda And Panchakarma In Femoral Head Avn: A Critical Integrative Review

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### ABSTRACT

Avascular necrosis (AVN) of the femoral head is a debilitating condition caused by compromised blood supply, leading to osteocyte death and progressive joint degeneration. Conventional treatments such as bisphosphonates, core decompression, and arthroplasty often provide limited long-term efficacy and are associated with high recurrence or complications. This necessitates the exploration of integrative approaches. Ayurveda provides a unique perspective on such degenerative bone conditions through the concepts of *Dhatu Kshaya* (tissue depletion), *Vata Prakopa* (vitiation of Vata), and *Asthi-Majja Dushti* (derangement of bone and marrow tissues). The present review critically explores Ayurvedic management strategies for femoral head AVN, with a focus on Panchakarma therapies (*Basti*, *Abhyanga*, *Swedana*, etc.) and Rasayana interventions using classical formulations and herbs like *Ashwagandha*, *Guduchi*, *Shilajatu*, and *Guggulu*. A comparative analysis of classical references, modern scientific studies, and reported clinical experiences is undertaken to formulate an integrative model for AVN management. This review highlights the potential of Ayurvedic interventions in not only halting the progression of the disease but also supporting regeneration and functional improvement. The findings suggest that Panchakarma and Rasayana, when administered appropriately, can enhance bone metabolism, improve vascular perfusion, reduce inflammation, and support overall joint health. Thus, Ayurveda may offer a safe and sustainable therapeutic approach in femoral head AVN, especially in early to moderate stages, warranting further scientific validation.

**Keywords:** Avascular necrosis, Femoral head, Ayurveda, Panchakarma, Rasayana, Asthi Majja, Vata Vyadhi

### 1. INTRODUCTION

Avascular necrosis (AVN), also known as osteonecrosis, is a progressive, degenerative disorder resulting from compromised blood flow to bone tissue, leading to ischemia-induced osteocyte death, structural collapse, and eventual joint dysfunction. The femoral head is most commonly affected due to its precarious vascular supply. The disease predominantly affects individuals between 30 and 50 years of age, leading to significant morbidity, disability, and reduced quality of life [1]. Known etiologies include traumatic insult (fracture/dislocation), prolonged corticosteroid use, chronic alcoholism, hypercoagulable states, and idiopathic causes, with steroid-induced AVN being the most frequent non-traumatic variant.

Modern medical interventions such as bisphosphonate therapy, core decompression, osteotomy, and ultimately total hip arthroplasty (THA) are considered based on staging (Ficat-Arlet or ARCO classification). However, these interventions are either palliative, associated with limited regenerative capacity, or invasive with potential complications and high costs. Moreover, younger patients undergoing joint replacement often require revision surgeries within two decades, thus necessitating alternative, non-invasive, and regenerative modalities.

Ayurveda, the traditional system of Indian medicine, offers a unique paradigm for understanding and managing degenerative bone disorders. The pathology of AVN may be correlated with *Asthigata-Vata* (Vata affecting bone tissue), *Majja Kshaya*

(depletion of bone marrow), and *Dhatu Kshaya* (tissue depletion). The aggravation of *Vata Dosha*, either due to trauma, improper lifestyle, or *Agni* dysfunction, leads to dryness (*Rukshata*), brittleness (*Katinyata*), and degeneration of *Asthi* (bone) and *Majja Dhatu* (marrow), manifesting as pain, restricted mobility, and functional loss—akin to the clinical presentation of AVN. In Ayurveda, therapeutic strategies such as *Panchakarma*, *Rasayana*, and *Asthi-Majja Dhatu Pushtikara* herbs are indicated in such degenerative conditions. Procedures like *Basti* (medicated enema), *Abhyanga* (oleation), *Swedana* (sudation), and oral administration of formulations such as *Ashwagandha Churna*, *Guggulu Kalpa*, *Shilajatu*, and *Guduchi* are used to pacify *Vata*, nourish tissues, and enhance *Srotas* (microchannel) function.

This review critically explores the Ayurvedic approach to femoral head AVN, integrating classical texts, contemporary clinical studies, and emerging scientific data to evaluate the potential of Ayurveda and Panchakarma as sustainable, regenerative options for early-to-moderate stages of AVN.

2. PATHOPHYSIOLOGY OF AVN: MODERN AND AYURVEDIC INSIGHTS

Modern View

AVN occurs when blood flow to the subchondral bone is disrupted, leading to cell death, marrow necrosis, microfractures, and eventual collapse of the femoral head [2]. Risk factors include:

- Corticosteroid use
- Chronic alcohol consumption
- Sickle cell disease
- Trauma
- Radiation
- Coagulopathies

MRI is the gold standard for early diagnosis, with histopathology revealing empty lacunae and fat cell necrosis.

Ayurvedic Correlation

AVN can be conceptually correlated with:

- **Asthi-Majjagat Vata:** Vitiated Vata affecting bones and marrow
- **Majjakshaya:** Degeneration of bone marrow
- **Asthi-Kshaya:** Loss or depletion of bone tissue
- **Sandhigata Vata:** Vata disorder localized in joints, characterized by pain, swelling, and restriction of movement
- **Srotorodha:** Obstruction in microchannels leading to impaired nutrition

Vata dosha is predominantly responsible for degenerative and dry changes, whereas Dushti (vitiation) of *Asthi* and *Majja Dhatu* signifies the failure of tissue nourishment and regeneration [3].

Classical Ayurvedic Concepts Related to AVN

Ayurvedic Term	Modern Interpretation
Asthi-Kshaya	Osteopenia/necrosis
Majja-Kshaya	Marrow cell apoptosis
Sandhigata Vata	Osteoarthritis/joint collapse
Srotorodha	Vascular blockage leading to ischemia

According to Charaka Samhita, *Asthi* and *Majja* are nourished by successive *Dhatu*s and governed by *Vata*. Any obstruction in their nourishment due to impaired metabolism (*Agnimandya*) or *Vata* aggravation can result in necrosis-like pathology [4].

3. PANCHAKARMA IN AVN MANAGEMENT: A DETAILED REVIEW

Panchakarma is the cornerstone of Ayurvedic therapeutic detoxification, aiming to eliminate vitiated doshas, restore *dhatu* balance, and rejuvenate tissues. In AVN, where there is *Asthi-Majja Kshaya* (degeneration of bone and marrow) predominantly due to *Vata vitiation*, Panchakarma plays a vital role in halting disease progression, improving function, and

supporting regeneration.

### 1. Snehana (Oleation Therapy)

Snehana is the administration of unctuous substances to mitigate Vata, which is dry and rough by nature. It nourishes *Asthi* (bone) and *Majja* (marrow), improving lubrication and flexibility of joints.

- **Internal Snehana (Abhyantar Snehapana):**

- **Drugs used:** *Ashwagandha Ghrita*, *Panchatikta Ghrita Guggulu*, *Mahatikta Ghrita*
- These formulations are chosen for their Rasayana (rejuvenative), Vatashamaka (Vata-pacifying), and Asthi-Majja-poshaka (bone and marrow nourishing) properties.
- *Ashwagandha Ghrita* supports bone metabolism, increases strength, and reduces anxiety associated with chronic diseases.
- *Tikta Ghrita* helps in deep tissue detoxification and supports regeneration.
- Dosage is decided based on Agni (digestive power) and Koshtha (bowel nature), usually administered over 3–7 days.

- **External Snehana (Abhyanga):**

- **Oils used:** *Balashwagandhadi Taila*, *Mahanarayan Taila*, *Dhanwantaram Taila*
- Daily massage improves local blood circulation, reduces stiffness, and pacifies *Vata*.
- Focus is on hip region and lower back, aiding in better absorption through transdermal penetration.
- Abhyanga followed by Swedana gives synergistic effects.

**Effect:** Improves synovial lubrication, corrects Vata vitiation, enhances cellular nutrition, and prepares body for deeper Panchakarma procedures [5].

### 2. Swedana (Sudation Therapy)

Swedana is the process of inducing sweat to dilate the channels, soften tissues, and eliminate toxins. It is always preceded by Snehana.

- **Types:**

- **Nadi Sweda (tube fomentation):** Localized steam therapy using a medicated decoction.
- **Patra Pinda Sweda:** Bolus of herbal leaves (*Eranda*, *Nirgundi*, *Arka*) heated and applied to affected region.

- **Commonly used herbs:**

- *Dashamoola*, *Eranda* (*Ricinus communis*), *Nirgundi* (*Vitex negundo*), *Devdaru*, *Arka*

**Effect:** Reduces joint stiffness, improves peripheral circulation, relieves pain, facilitates penetration of medicinal oils, and helps in early mobilization. In AVN, it improves blood supply to the femoral head and may slow necrosis progression.

### 3. Basti (Medicated Enema Therapy)

Basti is considered the most effective treatment for *Vata Vyadhi*. Since *Asthi Dhatu* is under the influence of Vata, Basti directly targets the root cause of AVN.

- **Anuvasana Basti (Oil Enema):**

- Oils used: *Ashwagandha Taila*, *Balashwagandhadi Taila*, *Dhanwantaram Taila*
- Administered on alternate days or daily in a schedule like *Kala Basti* (16 days) or *Yoga Basti* (8 days).
- It nourishes *Majja Dhatu*, strengthens bones, and rejuvenates tissues.

- **Niruha Basti (Decoction Enema):**

- Decoctions include *Dashamoola*, *Guduchi*, *Eranda*, *Punarnava*, *Rasna*
- Combined with honey, oil, rock salt, and other ingredients as per classical formulation.
- Detoxifies deeper tissues, removes *Avarana* (obstruction of channels), and regulates Vata.

**Effect:** Corrects Apana Vata function, promotes tissue regeneration, and delays degeneration in bone structures. Basti therapy shows promising results in early stages of AVN [6].

#### 4. Raktamokshana (Bloodletting Therapy)

Although not routinely used in degenerative disorders, Raktamokshana is indicated when inflammation or localized swelling is present due to *Vata-Pitta* aggravation.

- **Indication in AVN:**
  - In inflammatory presentations or acute pain phase of AVN, localized *Siravedha* or *Jalaukavacharana* (leech therapy) can be performed.
- **Benefits:**
  - Alleviates congestion, reduces inflammation, and improves microcirculation in ischemic zones.
  - Enhances nutrient delivery to necrosed areas.
  - Often used as a supportive therapy alongside Snehana and Basti.

#### PANCHAKARMA APPROACH IN AVN

Panchakarma offers a multi-targeted approach in managing AVN by:

- Detoxifying cellular waste
- Enhancing circulation to the necrotic bone
- Nourishing and regenerating bone and marrow tissues
- Correcting systemic Vata disorders

When integrated with Rasayana therapy and supportive internal medications, this Ayurvedic protocol may potentially reverse early AVN changes and delay surgical intervention.

#### Integrated Panchakarma Protocol for AVN:

Day	Procedure	Medicines Used
1–3	Abhyantar Snehapana	Ashwagandha Ghrita / Panchatikta Ghrita
4–6	Abhyanga + Nadi Sweda	Balashwagandhadi Taila + Dashamoola decoction
7–14	Basti (Anuvasana and Niruha)	Alternating schedule with prescribed drugs
15	Raktamokshana (if inflammatory)	Leech therapy on affected site (optional)

#### Ayurvedic Internal Medications in AVN (Avascular Necrosis)

Ayurveda emphasizes the management of bone and marrow-related disorders (Asthi-Majjagat Vyadhi) through internal Rasayana (rejuvenative) therapy and Vata-pacifying measures. In the context of Avascular Necrosis (AVN), the primary pathological involvement is of Asthi Dhatu Kshaya (bone tissue depletion) and Majja Dushti (bone marrow vitiation), usually underlined by Vata predominance. Therefore, internal medications focus on nourishing the depleted tissues, pacifying aggravated Vata, and stimulating osteogenesis.

##### 1. Herbs Promoting Asthi and Majja Dhatu (Bone and Marrow Tissues)

Several Ayurvedic herbs have been traditionally prescribed for restoring bone strength, enhancing marrow function, and controlling inflammation, many of which are supported by modern pharmacological research.

Herb	Ayurvedic Action	Modern Pharmacological Correlate
<b>Ashwagandha</b> ( <i>Withania somnifera</i> )	Rasayana, Balya, Vatahara	Adaptogen, anti-inflammatory, promotes osteoblastic activity [7]
<b>Shatavari</b> ( <i>Asparagus racemosus</i> )	Majjavardhaka, Rasayana	Immunomodulator, anabolic, supports hormonal balance
<b>Guduchi</b> ( <i>Tinospora cordifolia</i> )	Rasayana, Tridoshaghna	Immunomodulator, antioxidant, hepatoprotective

Herb	Ayurvedic Action	Modern Pharmacological Correlate
<b>Guggulu</b> ( <i>Commiphora mukul</i> )	Lekhana, Shothahara, Vata-Kapha Shamaka	Anti-lipidemic, anti-inflammatory, anti-arthritis [8]
<b>Hadjod</b> ( <i>Cissus quadrangularis</i> )	Asthisandhanakara, Shothahara	Accelerates bone fracture healing, stimulates osteoblasts [9]

These herbs are often administered as single drugs or in compound formulations like Trayodashanga Guggulu, Yograj Guggulu, and Lakshadi Guggulu, which provide synergistic action on bone tissue regeneration and pain relief.

### Medicated Ghee (Ghrita) and Taila Preparations

In Ayurveda, medicated ghee (Ghrita) and oil (Taila) are used both internally and externally to deliver fat-soluble phytoconstituents to the Dhatus (tissues), particularly to Majja (marrow) and Asthi (bone), which are primarily Snigdha (unctuous) in nature.

#### Panchatikta Ghrita

- **Composition:** Prepared from the decoction of five bitter herbs – Nimba, Patola, Kantakari, Guduchi, and Vasa.
- **Action:** Deepana (enhances metabolism), Ropana (healing), and Vatahara.
- **Indications:** Widely indicated in Asthi-Majja Gata Vikara, especially in inflammatory and degenerative bone disorders like AVN.

#### Ashwagandha Ghrita

- **Key Ingredient:** Ashwagandha processed with ghee.
- **Action:** Rasayana, Balya (strengthening), Majjavardhaka.
- **Clinical Use:** Beneficial in patients with chronic fatigue, muscle wasting, and bone marrow insufficiency.

#### Bala Taila and Ashwagandhadi Taila

- **Administration:** Used for internal administration (Pana) and external massage (Abhyanga).
- **Action:** Improves muscle strength, nourishes joints, and supports locomotor function.

These lipid-based preparations aid in cellular regeneration, Vata pacification, and improving the supply of nutrients to the deep tissues, particularly in sclerotic and ischemic bone areas affected by AVN.

#### Clinical Rationale in AVN

- **Ashwagandha and Guggulu** act synergistically to reduce inflammation, enhance osteoblast activity, and prevent osteoclast-induced bone resorption.
- **Hadjod** has been shown to increase cortical bone thickness and improve fracture healing, which is of significance in AVN stages involving subchondral collapse.
- **Rasayana herbs** like Guduchi and Shatavari help in improving immune responses and systemic health, supporting long-term tissue regeneration.
- Use of Ghrita-based formulations enhance bioavailability and facilitates transport of actives to deeper tissues, especially Majja Dhatu, which is difficult to reach through ordinary aqueous decoctions.

#### Integrative Outlook

Modern research supports the osteogenic and chondroprotective properties of many Ayurvedic herbs and formulations. When used judiciously with Panchakarma therapies and lifestyle modifications, these internal medications may help slow down or reverse AVN progression, particularly in early to moderate stages, and improve the quality of life by reducing pain and enhancing joint function.

#### Case Studies and Clinical Trials

Several anecdotal and clinical reports support the efficacy of Ayurvedic approaches:

- A pilot study using Panchatikta Ksheera Basti with internal Rasayana reported improvement in pain, mobility, and MRI grading of AVN [10].
- Patients undergoing Matra Basti with Ashwagandha Taila showed enhanced joint space and bone density over 3–6

months [11].

- Guggulu-based formulations such as Yogaraja Guggulu and Kaishore Guggulu have demonstrated anti-inflammatory effects and symptomatic relief in degenerative bone diseases [12].

#### Integrative Mechanism: Ayurveda to Modern

Ayurvedic Concept	Modern Biomedical Equivalent
Vata Prakopa	Neurovascular compromise
Asthi-Majjagata Vata	Osteonecrosis of femoral head
Basti	Drug delivery via rectal mucosa, anti-inflammatory systemic effect
Rasayana	Antioxidant, cytoprotective, adaptogenic
Srotoshodhana	Microvascular detoxification

#### 4. DISCUSSION

Avascular necrosis (AVN) of the femoral head represents a progressive musculoskeletal disorder that often affects individuals in their productive age group. It results in ischemia and subsequent necrosis of bone tissue, eventually leading to joint destruction and disability. In modern medicine, early-stage AVN is managed conservatively, while advanced stages often require surgical intervention such as core decompression or total hip replacement. However, these invasive measures may not be suitable for all patients due to age, financial constraints, or associated surgical risks. This has led to an increasing interest in complementary and alternative therapies like Ayurveda, which offer holistic and minimally invasive solutions for AVN management.

##### Ayurvedic Viewpoint:

From an Ayurvedic standpoint, AVN can be correlated to a Majja Dhatu Kshaya or Asthi-Majja-Gata Vata condition. The vitiation of Vata Dosha, especially in the context of Dhatu Kshaya (tissue depletion) and Srotorodha (obstruction in microchannels), is considered the primary pathology. The therapeutic aim in Ayurveda is not only symptomatic relief but also rejuvenation (Rasayana) and Dhatu Pushti (nourishment of tissues). Ayurveda thus focuses on restoring the integrity of Asthi and Majja Dhatus, which are severely compromised in AVN.

##### Role of Panchakarma:

Among the various treatment modalities available in Ayurveda, Panchakarma therapies—particularly Basti (medicated enema)—are considered pivotal in managing diseases of the Majja and Asthi Dhatu. Basti therapy, especially Matra Basti and Ksheera Basti, is effective in Vata pacification, enhancing Srotas patency, and nourishing deeper Dhatus such as Majja. Clinical and anecdotal evidence suggest that when used judiciously with proper internal medications, these interventions can slow the progression of AVN, improve joint mobility, and reduce pain.

Similarly, Snehana (internal and external oleation) using medicated ghee like Panchatikta Ghrita and oils like Mahanarayan Taila provides lubrication and cellular regeneration. Swedana (fomentation) helps to enhance circulation and reduce stiffness, thereby aiding in the resolution of Avarana. In inflammatory cases or where localized Pitta-Vata aggravation is suspected, Raktamokshana (bloodletting) may also help reduce congestion and promote oxygenation of the affected area.

##### Efficacy of Ayurvedic Medications:

Herbal drugs such as Ashwagandha, Guduchi, Hadjod, and Guggulu have shown anti-inflammatory, osteogenic, and Rasayana properties. These herbs may stimulate osteoblast activity, enhance blood supply, and inhibit pro-inflammatory mediators, aligning well with modern objectives of AVN management. Panchatikta Ghrita and Ashwagandha Ghrita act as nutrient carriers (Yogavahi), delivering herbal actives into deeper tissues, thus promoting regeneration.

##### Scientific and Clinical Evidence:

Although modern scientific validation is still limited, preliminary studies and case reports indicate that Ayurvedic management can lead to clinical improvement in pain, range of motion, and gait, especially in stages I–III of AVN. However, challenges persist due to heterogeneity in protocols, small sample sizes, lack of control groups, and insufficient radiological follow-up.

Some integrative studies have demonstrated delayed progression of necrosis, improvement in VAS (Visual Analog Scale) pain scores, and better Harris Hip Scores in patients treated with combined Panchakarma and herbal therapies. However,



larger, randomized controlled trials (RCTs) with MRI-based outcome measures are warranted for establishing the efficacy and mechanisms of Ayurvedic therapies in AVN.

### Integrative Perspective:

The bio-psycho-social-spiritual framework of Ayurveda offers a comprehensive approach to managing chronic degenerative disorders like AVN. While modern medicine focuses on structural and surgical correction, Ayurveda aims at functional restoration, tissue regeneration, and Dosha Samyata (homeostasis). Integrating Ayurvedic interventions early in the course of AVN may delay the need for surgery, reduce morbidity, and enhance quality of life.

### CONCLUSION

Avascular necrosis (AVN) of the femoral head is a degenerative condition marked by progressive bone death due to impaired blood supply. In the Ayurvedic framework, it can be correlated with Asthi-Majja Dushti and Vata Prakopa, involving Dhatu depletion and aggravated Vata leading to structural instability and pain. Ayurvedic management, particularly through Panchakarma therapies such as *Basti* and internal administration of Rasayana herbs like *Ashwagandha* (*Withania somnifera*), *Guggulu* (*Commiphora mukul*), and *Hadjod* (*Cissus quadrangularis*), offers a promising, non-invasive, and holistic approach. These therapies aim not only to pacify Vata and remove Avarana but also to nourish Dhatus and promote regeneration. While existing scientific studies show encouraging subjective and functional outcomes, the lack of large-scale, radiologically correlated clinical trials limits widespread acceptance. Nonetheless, integrative approaches that combine Ayurvedic wisdom with modern diagnostic monitoring have shown potential in early-stage AVN management. Future interdisciplinary research should prioritize robust clinical designs, biomarker assessment, and radiographic evaluation to validate the efficacy and safety of Ayurvedic interventions. With further evidence, Ayurveda could emerge as a valuable adjunct or alternative in the conservative management of femoral head AVN, reducing dependence on surgical interventions and improving quality of life.

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### 6. CONFLICT OF INTEREST

None declared.

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