RESEARCH PAPER

Complete Recovery of Avascular Necrosis (AVN) with Ayurveda without Surgery: A Case Study

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Received: 16th Dec, 2025; Revised: 26th Jan 2026; Accepted: 12th Feb, 2026; Available Online: 28th Feb, 2026

ABSTRACT
A disorder known as Avascular Necrosis (AVN), which causes bone cells to die, is brought on by an interruption in the blood flow to a particular area of bone tissue. The terms osteonecrosis, ischemic necrosis, aseptic necrosis, bone necrosis, and bone infarction are also used to refer to AVN. The current study aims to evaluate how Ayurvedic medicines & treatments help patients recover from Avascular Necrosis safely and effectively without requiring surgery.
A thorough search was conducted using electronic databases such as Google Scholar, PubMed, and Scopus. To refine the findings, search terms such as "non-surgical treatment," "herbal medicine," "Osteonecrosis," "Avascular Necrosis," and "Ayurveda" were used. Case studies and review articles discussing ayurvedic treatment for AVN in human patients were included in the inclusion criteria. Excluded sources included surgical procedure studies, animal research studies, and non-peer-reviewed literature.
Taken together, six examples met the inclusion criteria. Ayurvedic treatments included food and lifestyle changes, a few procedures of Panchakarma therapy, and herbal medications. Most studies found that significant pain reduction enhanced radiographic bone density, joint function, and quality of life. In many situations, it also reduced necrotic regions and improved joint function. In the non-surgical treatment of AVN, ayurvedic medications help to alleviate pain, enhance joint function, and improve the overall quality of life.
Keywords: *AVN, Ayurveda, bone necrosis, Panchakarma therapy, non-surgical treatment.*
How to cite this article: Chauhan AS, Complete Recovery of Avascular Necrosis (AVN) with Ayurveda without Surgery: A Case Study. Int J Drug Deliv Technol. 2026;16(5s): 201-212. DOI: 10.25258/ijddt.16.5s.24
Source of support: Nil.
Conflict of interest: None

1. INTRODUCTION

A medical condition known as Avascular Necrosis (AVN) is brought on by blockage of the blood arteries that supply the bones. Most people with this illness are in their second, third or fifth decade of life. Other terms for AVN include aseptic necrosis, ischemic necrosis, and osteonecrosis. It is caused by ischemia brought on by reduced blood supply, which accelerates the death of bone marrow cells. Usually confined to the long bone's epiphysis, AVN most commonly affects the femur.

The femur is the most commonly damaged bone when it comes to the epiphysis of long bones. In the early stages of the condition, most patients do not experience any symptoms. However, as the condition progresses, pain can become a significant issue. X-rays and MRIs are the most reliable methods for diagnosing avascular necrosis (AVN). In the later stages of the condition, imaging may reveal the "crescent sign," which indicates flattening of the articular surface and loss of joint space. However, changes may not be visible on plain X-rays in the early stages (Pawar, 2023).

AVN of the femoral head is the most common kind of bone necrosis. It can be roughly classified into two categories: 1) post-traumatic, and 2) idiopathic. Due to their tiny size, the arteries supplying the femoral head are easily injured, which can result in a simple dislocation or a fracture of the femoral neck. This leads to insufficient nutrition for the femoral head, which causes necrosis. At first, there might not be any symptoms, but eventually, different levels of pain and gait abnormalities have been noticed (Gauttam et al., 2019).

When the subchondral blood supply is cut off, bone cells, especially those in the epiphyseal area of weight-bearing joints, perish. This condition is known as avascular necrosis (AVN) (Konarski et al., 2022). Patients typically affected by the condition are between the ages of 35 and 65, with the capital epiphysis of the femur. Patients typically affected by the condition are between the ages of 35 and 65, with the capital epiphysis of the femur frequently involved. AVN was shown to be prevalent in 8% of cases, with diagnosis for AVN occurring between the ages of 18 and 54 (Kunyakham et al., 2012). AVN of the femoral head is more common in men than in women. Biological agents, vascularised bone grafts, and joint-salvaging techniques such as core decompression, stem cell therapy, and bone grafting have variable outcomes,

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and many patients ultimately require hip arthroplasty, which carries several risks.

This case involves a patient with avascular necrosis in both hips, who, after undergoing Ayurvedic therapy, exhibited noteworthy clinical recovery and a reduction in the radiological grade of the condition.

Studies have demonstrated the use of Ayurveda for treatment purposes. In the study by Gupta and Srivastava (2023), the diagnosis of the patient was *Asthimajjagata-vata*, a disease that affects both *Asthi* and *Majja* due to the vitiation of *Vata dosha* in bone and bone marrow tissues. He received treatment by the *Vatavyadhi* protocol, which addresses various musculoskeletal conditions associated with the *vata dosha*.

Epiphysis of the long bones is the typical manifestation of AVN, especially in weight-bearing joints. For this problem, potential medical therapy is necessary to avoid joint collapse or subchondral bone degeneration, which can both cause morbidity Gupta et al., (2023). With a prevalence rate of 0.135 per 1000 persons, most affected individuals are under 50 years of age (Ranjan and Paltye, 2019). Avascular necrosis of the femoral head is primarily divided into two types: idiopathic and post-traumatic. Due to their small size, the arteries that feed blood to the femoral head are vulnerable to damage Meena et al.,(2017). Therefore, the hip joint is most frequently affected, while AVN can occur in any bone. Avascular Necrosis of the bones can be brought on by radiation, glucocorticoids, alcohol, smoking, trauma, steroid intake and illnesses such as Gaucher's disease, sickle cell anaemia, and Caisson disease (Weinstein, 2012). Most cases of AVN are asymptomatic in their early stages. Hip joint and groin discomfort are frequently presenting complaints that show how the illness is progressing. Most patients have pain while at rest, which is linked to a change in gait. There are visible restricted ranges of motion, including flexion, extension, internal and exterior rotations, and adduction and abduction (Kabra et al., 2020). Diagnosing AVN cannot be done with a single test; therefore, speaking and consulting with healthcare professionals is essential. In conservative medicine, there is never a guarantee of a full recovery from medical or surgical management (Hsu and Nallamothu, 2018).

If this illness is detected early enough, it can be better addressed in Ayurveda. It is explicitly stated in the *Charaka Samhita*, *Chikitsa Samhita*, and *Vatashonita Chikitsita Adhyaya* that *Abhighata* is one of the *nidana* (causes) for *Vata Rakta's* appearance Lahari and Prasad (2024). *Charaka* discusses symptoms like *ruk* (pain), *sphurna akunchane*, and *sphurana* while describing *gambhira vatarakta*. Pain travels through the *majja*, *Asthi*, and *Sandhi* at a fast speed when the *prakupita vata* creates it. In addition to causing *khanja* and *pangu*, this may rupture the bone Kumar et al., (2017). The symptoms of AVN are closely related to these descriptions. There is poor blood circulation in AVN.

Figure 1 shows the causes of AVN Shah et al., (2015).

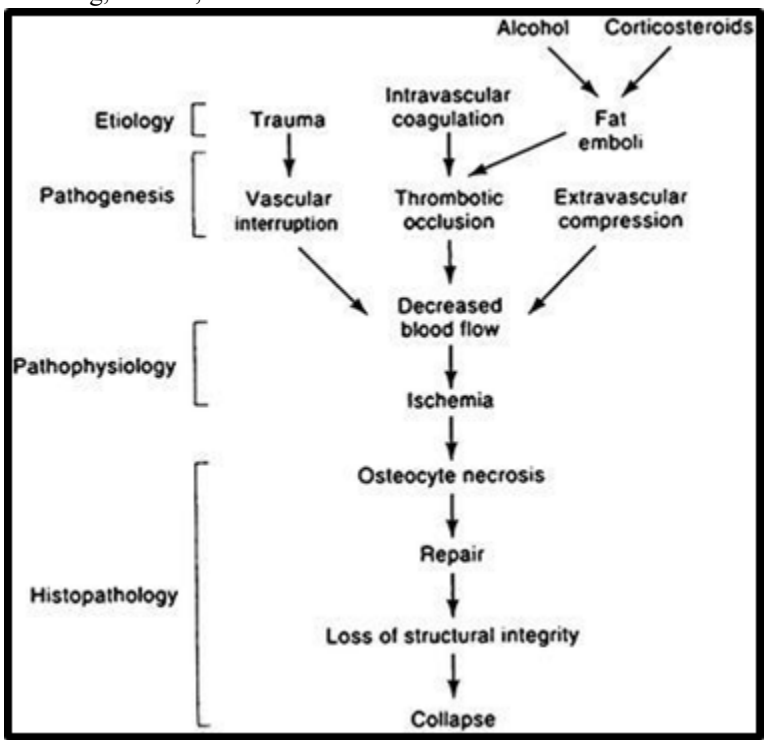

Figure 1: The causes of avascular necrosis (Shah et al., 2015)

The purpose of this work is to report on the effective use of Ayurveda in the management of AVN with the help of already published case reports and reveal how Ayurveda can be of value in reversing avascular necrosis completely. The goal of this review study is to explain the AVN case

history, diagnosis, treatment, and likely mechanism of action.

LITERATURE REVIEW

Avascular necrosis (AVN), or osteonecrosis, is a degenerative condition caused by impaired blood supply to bone tissue, most commonly affecting the femoral head. If untreated, it can lead to joint collapse and often requires surgical intervention. Conventional treatments—such as bisphosphonates, core decompression, and total hip replacement—are associated with high costs, varying success rates, and long recovery periods, prompting interest in alternative therapies.

India's ancient medical system, Ayurveda, offers a holistic approach using herbal formulations, *Panchakarma* therapies, diet, and lifestyle modifications. Its treatments aim to stop the progression, improve circulation, detoxify the body, and promote tissue regeneration. Ayurvedic methods like *Basti*, *Abhyanga*, and *Rasayana* have shown potential in managing early-stage AVN, offering a non-invasive and sustainable solution.

Despite this promise, scientific documentation of AVN treatment in Ayurveda remains limited. Most available literature comprises isolated case reports lacking standardised radiological or functional assessments. This highlights a significant research gap in evidence-based Ayurvedic management of AVN.

The first three cases referenced herein are derived from existing published sources and help establish a baseline understanding of Ayurveda's potential role in AVN management. The last three cases, however, are based on real-time patients treated directly by our clinical team, wherein Ayurvedic treatment protocols were carefully administered and documented. These cases contribute unique insights into the practical application and observed outcomes of Ayurveda in AVN reversal, both clinically and radiologically.

1.1. Study Objective

- Explain and assess the several Ayurvedic treatments for AVN.
- Review the recorded outcomes of different therapies concerning joint function, pain relief, and quality of life.
- Examine how Ayurvedic medicine might affect the expression and emergence of AVN.
- Offer recommendations for other research areas to expand the corpus of data bolstering Ayurvedic therapy of AVN.
- Examine the methodological soundness and quality of the research included, highlighting both its benefits and drawbacks.

2. METHODOLOGY

The review employed a methodical process to locate, choose out, and assess pertinent material. We searched electronic databases such as PubMed, Scopus, and Google Scholar, using terms like "herbal medicine," "non-surgical treatment," "Ayurveda," "Osteonecrosis," and "Avascular Necrosis." To improve the examination, Boolean operators were applied. To find more research, the reference lists of pertinent papers were manually searched. Extracted data included study design, sample size, treatment regimens, results, and conclusions.

2.1. Inclusion and Exclusion Criteria

2.1.1. Inclusion Criteria

- Research that concentrates on treating AVN with Ayurveda.
- Clinical trials, case studies, review articles, and peer-reviewed publications.
- Articles that are written in English.
- Research with human participants.

2.1.2. Criteria for Exclusion

- Research on surgical interventions.
- Research on animals.
- Unreviewed sources by peers.
- Studies that don't go into enough depth about the results and treatment plans.

3. RESULTS AND DISCUSSION

The review synthesised findings from six case reports, each documenting Ayurvedic treatments for Avascular Necrosis. The treatments incorporated a combination of herbal medications, *Panchakarma* therapies, dietary modifications, and lifestyle interventions.

Case 1

An investigation from 2019 that was published in the "International Journal Of Ayush Case Reports" described the case of a 50-year-old man who visited the outpatient department (OPD) with the main complaint of discomfort in both of his hip joints (the right more than the left) for three years, which had been getting worse for eight months (Ranjan and Paltye, 2019). Additionally, for about the last six months, the patient was not able to walk farther than 100 metres. The patient took an allopathic medication (ibuprofen, a Nonsteroidal Anti-Inflammatory Drug) and experienced a brief improvement in symptoms. Despite this, the patient experienced a progressive and intense increase in pain in the left knee joint. Eight months ago, the persistent nociceptive discomfort became much more intense. To receive Ayurvedic treatment, he went to Ashwini Ayurvedic Hospital, Tumkur, and Panchakarma OPD. No history of diabetes, hypertension, or other metabolic problems was present. Bilateral femoral head AVN, Grade II on the left and Grade III on the right, was discovered during a hip joint MRI. Limited hip angle flexion, forward bending, and lateral rotation were seen during the hip joint evaluation. Additionally, the right leg was 5 cm shorter than the left. It was advised that the

patient check into a hospital in accordance with the *Kala Basti* schedule for the *Tikataka Ksheera Basti*.

Case 2

A paper published in the "International Research Journal of Ayurveda & Yoga" in 2023 focused on a 56-year-old patient with an AVN diagnostic who had been to the D.Y. Patil School of Ayurveda in Navi Mumbai (Negi and Padavi, 2023). The patient had complained of pain in both hip regions for the previous year, which she said was related to walking, sitting, and sleeping in a supine position.

Case 3

A study from 2023 that was published in the "World Journal of Pharmaceutical Research" described a case where a 25-year-old male patient who had been diagnosed with AVN visited the National Institute of Ayurveda in Jaipur (Solanki et al., 2023). The patient complained of pain in the bilateral hip region for the previous six months, along with difficulty performing daily activities like sitting, squatting, and walking. The cold weather, pain in the abdomen, and lying down were aggravating factors. Comforting foods and pleasant weather were soothing aspects.

Case 4

A 42-year-old came with pain in his right hip that has been bothering him for the past six months and began to feel slight discomfort while walking initially. The initial diagnosis, from a local doctor, mistook it for a pulled nerve and gave medication for two weeks. However, the pain continued, leading to difficulty in walking. He later visited a specialist in Chandigarh who recommended further evaluation. An MRI scan has indicated that the hip joint is affected by a condition known as Avascular Necrosis (AVN). The individual was instructed to adhere to bed rest for two to three months and refrain from engaging in activities that may stress the joint condition. Following the three-month mark, a subsequent MRI scan revealed slight improvement without any satisfactory progress noted in the recovery process. The patient sought advice from another professional who advised stem cell therapy as a treatment option, with the promising ability to repair damaged tissues. However, the doctor also warned him that if the treatment did not produce the desired outcomes, hip replacement surgery would be necessary, which prompted the patient to look into methods to handle his situation.

Case 5

A 34-year-old patient came in with pain and limited movement in his hip for about eight months. The medical report from the MRI scan diagnosed him with Stage I AVN with bone marrow edema on his right hip, showing signs like joint space reduction along with bone swelling and fluid buildup in the joint cavity. Instead of going for surgery, he decided to go for an Ayurvedic treatment at Shivaya Hospital in Unnao, Uttar Pradesh.

Case 6

A 32-year-old, from Delhi, was diagnosed with Avascular Necrosis (AVN) of the femoral head at Stage II during an MRI on May 30, 2020. He was first presented with persistent and severe hip pain; however, financial limitations and apprehension about surgery caused him to depend only on painkillers for relief. Instead of seeking surgical treatment, he initially sought treatment solely through pain medication due to financial constraints and fear of surgery. As time went on, his condition deteriorated further, as indicated by an MRI in October 2020, revealing progression to Stage III B/L. He consulted with doctors in Delhi but found no relief from the treatments they offered him, which left him feeling hopeless about his chances of getting better. Both physically and emotionally drained, he came to *Shivaya Hospital*, Unnao, UP looking for a non-surgical solution.

4. DIAGNOSTIC ASSESSMENT

In **case 1**, the evaluation was completed as per the Grading System of Ranjan and Paltye (2019). For Ache in the groin and hips was graded as 0 - No discomfort, 1 - Occasional discomfort that is unimportant, 2 - Obstruct the task, 3 - Obstruct necessities, 4 - Bed rest is necessary. Hip joint stiffness was graded as 0 - No stiffness, 1 - There is occasional stiffness, 2 - The stiffness lasts for thirty minutes, 3 - Stiffness during extended periods of standing and sitting, and 4 - Stiffness during the entire day or night. Limited hip joint range of motion was graded as, 0 - No limitations (130° of flexion), 1 - Initially restricted (90°–130° flexion), 2 - Partially limited (70°–90° flexion), 3 - Painfully limited (flexion 45°–70°), 4 - No mobility of the joints (flexion 0°–45°). Gait was graded as, 0 - Pain-free and normal, 1 - Pain occasionally experienced when walking, 2 - Mild pain when walking with assistance, 3 - When in excruciating discomfort, walk with support., 4 - Incapable of moving and Ficat rating for a plain radiograph as 0 - Normal, 1 - Mild or normal osteopenia, 2 - Mixed osteopenia/sclerosis, 3 - Crescent sign and eventual collapse of the cortex, 4- Additional degenerative modifications. Table 1 shows the evaluation of clinical features before and following intervention.

Table 1: Assessment of Clinical Features Before and After Intervention (Ranjan and Paltye, 2019)

Features	After Treatment	Before Treatment
Stiffness	0	3
Gait	0	2
Pain	1	3
Radiography	3	3
MovementRestricted Range	1	3

In **Case 2**, the goniometer measures the hip joint's flexion, extension, abduction, internal rotation, and external rotation, according to Meena et al. (2017).

According to **Case 3**, the assessment criteria encompassed an examination of the degree of difficulty in walking, limited range of motion in the hip joint, hip pain, leg limping, and hip joint pain (Solanki et al., 2023).

In **Case 4**, the diagnostic method correctly pinpointed the root cause after an initial misdiagnosis of the situation. The advice to rest in bed and limit activity was intended to reduce strain on the impacted joint. However, a subsequent MRI scan three months later revealed enhancement, underscoring the slight improvement in cases of Avascular Necrosis (AVN) when depending solely on non-invasive measures. Moreover, there was a mention of the possibility of resorting to intervention (like hip replacement) in case the therapy doesn't yield the desired results. This underscores the complexities involved in addressing AVN, where timely and precise identification plays a role in selecting the treatment strategy.

The MRI scan in **Case 5**, on July 26th, 2023, gave an evaluation of the bone alterations detected during the examination. The report indicated inflammation in the bone marrow surrounding the neck and the left femoral head. There was also mention of a region with density changes below the surface of the femoral head, portraying early necrotic alterations in line with Ficat Arlet Stage I adjustments. It was observed that there were no indications of the surface becoming flat or the structure collapsing at this stage of the condition's development, which suggests an opportunity for intervention is available. Before deciding to go for surgery as a treatment option for his condition, the patient decided to explore treatment at Shivaya Hospital in Unnao, Uttar Pradesh.

The patient in **Case 6** had an AVN history that was documented. Based on the MRI, it became apparent that there was degeneration in the hip joint of the patient, leading to a collapse of the head. This has resulted in a decline in his ability to move around and an increase in his pain level. Despite seeking advice from orthopaedics in Delhi, no substantial improvement or alternative to surgery was found, leaving the patient feeling hopeless and distraught. Feeling the pressing need for help quickly, he looked for a non-surgical option at Shivaya Hospital and underwent a thorough evaluation to check on the development of his condition before receiving a treatment strategy.

5. TREATMENT PROTOCOL

Case 1: Given Treatment

Poorva Karma:
Consent was obtained in writing. The patient was examined to check vital signs and determine whether *Basti Karma* was necessary Gabhane (2020). In *Basti* preparation: *Madhu* - 1 *Prasurta*, *Sneha* - *Bala Ashwagandha*, *Saindhava* - ½ *Aksha Prasruta*, *Lakshadi Taila* - 1.5, *Kalka* - *Ashwagandha Kwatha*, *Pancha Tiktaka*; *Kalka Churna* ½ *Prasruta Ksheera*: 1 *Prasruta*, 2 *Prasruta*. The total dosage was six *pransruta* Patient preparations involved using *Abhyanga* and *Swedana* on an empty stomach following the passage of faeces, urine, and flatus.

Pradhana Karma:
The patient was placed on his left side and given *Niruha Basti* (6*prasruta* ~600 ml) on an empty stomach (*Niranna*) every morning for 10 days as part of the *Kala Basti* procedure. That same day, after dinner, *MatraBasti* was given until the *Kala Basti* treatment was completed (Bana et al., 2023).

Paschata Karma:
Following the administration of *Basti*, *Basti Pratyagamana Kala* and *Samyaka Lakshana* were observed. During the *Tiktaka Ksheera Basti* process, *Matra Basti* with *Panchtikta Guggulu Ghrita* 1 *pala* (48ml) was administered Bohra. On the twenty-first day following treatment completion, a follow-up was conducted. The trial ran for thirty-one days. Kaishor After meals, take one or two times a day, *Guggulu* (weight) along with *UshnaJala*. For fifteen days, *Ushna Jala* and 10 ml of Cardorium plus syrup (*Alakananda Herbals*) were given as an internal treatment, to be taken three times a day before meals.

Case 2: Given Treatment

Following the evaluation, the patient was given the following medications: Oral medication (*Abhyanthara chikitsa*) was given together with *Triphala guggul*, *Sanshmani vati*, *Ashwagandha churna tikdi Maharasnadi kwath*, and *Koshna jala* for 28 days. Before the *Panchtiktaka ksheer basti* method, the *Panchakarma* Method involved *abhyanga* with Sahchar *Taila* and 28 days of *Swedana* (*Shashti shali pinda sweda*).

Case 3: Treatment Plan

Patients were given *Panchatikta Kshira Basti* for sixteen days in addition to drugs such as *Guggulu Tiktaka Ghrita*, *Shilajatwadi Lauha*, *Laksha Guggulu*, *Agnitundi Vati*, and *Dashmoola Kwatha*.

Case 4: Treatment Plan

Before the admission, the patient was encouraged to start with *Deepan Pachan Chikitsa* preparations, which aim to boost digestion and enhance metabolic activity. This initial phase plays a role in strengthening the body's capacity to absorb treatments successfully.

It was advised that *Chitrakadi Vati* be taken for two to three days before coming to the hospital to boost his digestive fire (*Agni*) and ensure efficient processing of nutrients.

Upon admission to the hospital, a detailed treatment plan was started that involved therapies aimed at reducing symptoms, making joints more mobile and stopping any additional bone damage from occurring.

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a. *Abhyanga* included the use of medicated tailam to improve blood circulation and to balance the vitiated Vata dosh.

b. *Swedana* involved the use of *Dashamoola Kwath* to accumulate the doshas towards the *Jatharagni*.

c. *Marma Chikitsa* paid attention to balancing the *'vata doshas*' while helping in tissue recovery.

d. *Aachana* relieved pressure on the weight-bearing area of the hip joint to improve mobility.

e. *Alabu Chikitsa* used *'Ghatikayantra'* to enhance blood circulation by decreasing inflammation levels and joint stiffness.

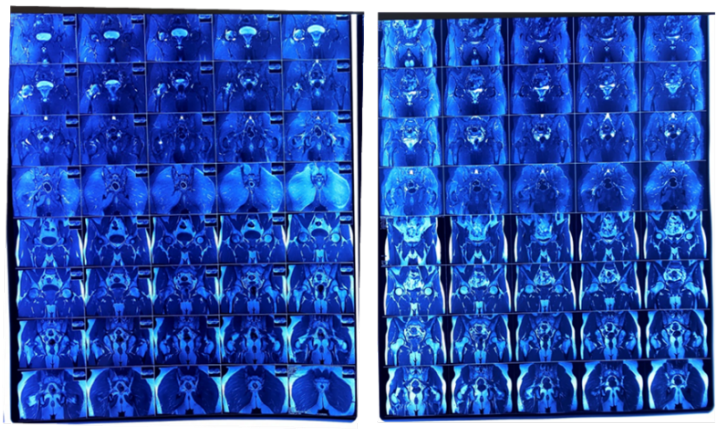
f. Different types of *Vastis* such as *Matra Vasti* and *Kwath Vasti* were done to detoxify the body by removing accumulated toxins.

g. *Kaal Vasti* and *Yapna Vasti* were used to enhance the regeneration of the necrosed bone and remove the obstruction in the blood capillaries and reduce inflammation & pain along with *Rakta Mokshan* treatment.

Alongside there were remedies and adjustments to the diet to achieve better blood circulation and tissue healing while addressing inflammation concerns. The treatment also included exercises, yoga and physical therapy to boost flexibility and strength.

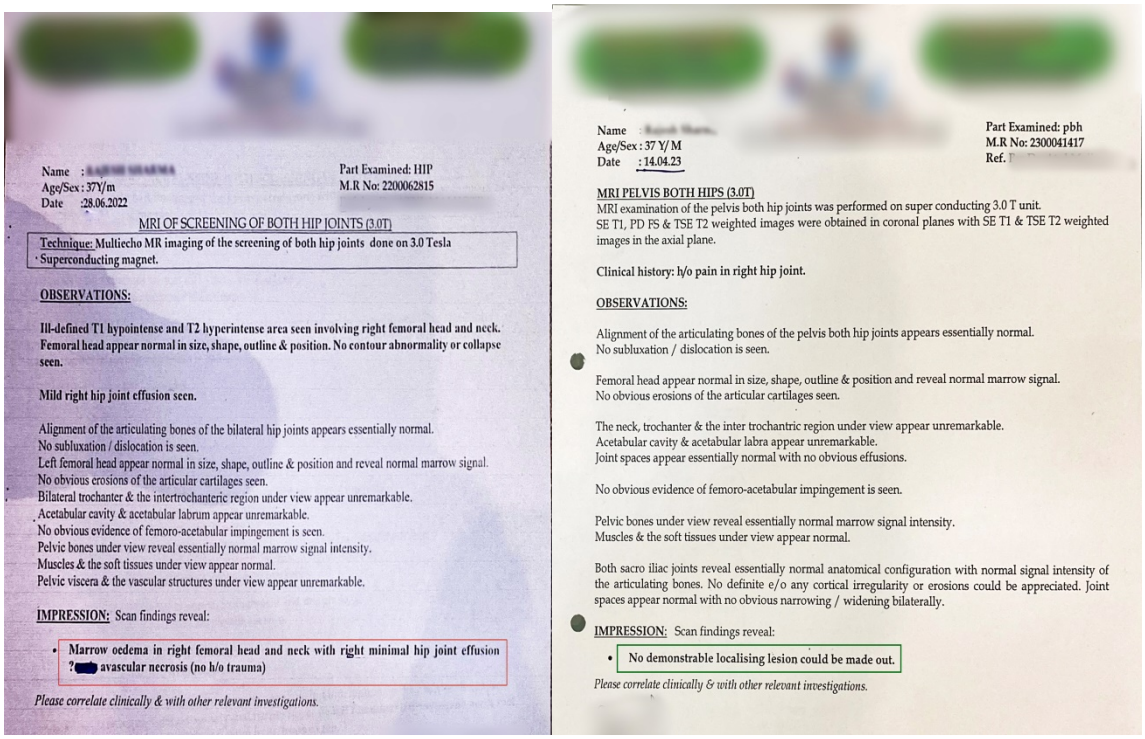
After seven to eight days, the patient felt much better with pain (from 8, out of 10 to 2, out of 10) and was able to move more easily and go back to his usual routine activities as before. Further examination through an X-ray showed some improvement in the joint spaces and blood circulation, in the hip joint area. Oral medications were monitored for 8 weeks (about 2 months) with various drugs like *Rasrajras*, *Kaishore Guggulu*, *Lakshadi Guggulu*, *Panchatikta Guggulu Ghrita* and *Dhanvantaram tailum* capsules in different doses.

After undergoing treatment and medications for a few months, on 14th April 2023 a follow-up MRI showed normal signal intensity in both femoral hip regions and upper shaft marrow of the femoral head. The alignment of both hip joints was found to be well preserved with no signs of swelling or damage such as erosion or hardening. The structure of the pelvis bones looked fine with no abnormalities. The MRI films and reports of the patients before and after treatment are attached below.



a) Before Treatment (AVN) b) After Treatment (Normal Study)

Case Study : 4 | Normal MRI Film of AVN Patient:



Name : [redacted]
Age/Sex : 37Y/m
Date :28.06.2022
Part Examined: HIP
M.R No: 2200062815

MRI OF SCREENING OF BOTH HIP JOINTS (3.0T)

Technique: Multiecho MR imaging of the screening of both hip joints done on 3.0 Tesla Superconducting magnet.

OBSERVATIONS:

Ill-defined T1 hypointense and T2 hyperintense area seen involving right femoral head and neck. Femoral head appear normal in size, shape, outline & position. No contour abnormality or collapse seen.

Mild right hip joint effusion seen.

Alignment of the articulating bones of the bilateral hip joints appears essentially normal.
No subluxation / dislocation is seen.
Left femoral head appear normal in size, shape, outline & position and reveal normal marrow signal.
No obvious erosions of the articular cartilages seen.
Bilateral trochanter & the intertrochanteric region under view appear unremarkable.
Acetabular cavity & acetabular labrum appear unremarkable.
No obvious evidence of femoro-acetabular impingement is seen.
Pelvic bones under view reveal essentially normal marrow signal intensity.
Muscles & the soft tissues under view appear normal.
Pelvic viscera & the vascular structures under view appear unremarkable.

IMPRESSION: Scan findings reveal:

- Marrow oedema in right femoral head and neck with right minimal hip joint effusion ?[redacted] avascular necrosis (no h/o trauma)

Please correlate clinically & with other relevant investigations.

Name : [redacted]
Age/Sex : 37 Y/ M
Date : 14.04.23
Part Examined: pbh
M.R No: 2300041417
Ref. [redacted]

MRI PELVIS BOTH HIPS (3.0T)

MRI examination of the pelvis both hip joints was performed on super conducting 3.0 T unit.
SE T1, PD FS & TSE T2 weighted images were obtained in coronal planes with SE T1 & TSE T2 weighted images in the axial plane.

Clinical history: h/o pain in right hip joint.

OBSERVATIONS:

Alignment of the articulating bones of the pelvis both hip joints appears essentially normal.
No subluxation / dislocation is seen.

Femoral head appear normal in size, shape, outline & position and reveal normal marrow signal.
No obvious erosions of the articular cartilages seen.

The neck, trochanter & the inter trochantric region under view appear unremarkable.
Acetabular cavity & acetabular labra appear unremarkable.
Joint spaces appear essentially normal with no obvious effusions.

No obvious evidence of femoro-acetabular impingement is seen.

Pelvic bones under view reveal essentially normal marrow signal intensity.
Muscles & the soft tissues under view appear normal.

Both sacro iliac joints reveal essentially normal anatomical configuration with normal signal intensity of the articulating bones. No definite e/o any cortical irregularity or erosions could be appreciated. Joint spaces appear normal with no obvious narrowing / widening bilaterally.

IMPRESSION: Scan findings reveal:

- No demonstrable localising lesion could be made out.

Please correlate clinically & with other relevant investigations.

Case Study : 4 Before & After MRI Report of AVN Patient:

Case 5: Treatment Plan

The first seven to eight days of integrative treatment included *Abhyanga* with medicated Tailam to reduce inflammation and improve circulation, followed by *Swedana* with *Dashamoola Kwath* for detoxification and stiffness relief. Marm *Chikitsa* targeted vital points to restore energy balance, while *Aachana* relieved hip joint pressure and enhanced mobility. *Vastis* like *Matra Vasti*, *Kaal Vasti* & *Qwath Vasti* were performed for detoxification, blood cleansing, and pain reduction.

A week later, the patient experienced significant pain relief (VAS score reduced from 7/10 to 0/10), improved mobility, and resumed daily activities. Follow-up diagnosis demonstrated partial restoration of joint space and revascularization.

After oral medications and a tailored regimen of yoga and exercises for eight weeks, a follow-up MRI on April 1st, 2024, showed that there were normal signals in both the upper shaft and femoral head. No signs of joint effusion or abnormalities like erosions or sclerosis were found. The bones in the pelvis area appeared normal, including iliac blades, and the soft tissues around the joints did not show any signs of inflammation or irregularities. The MRI report stated that there were no issues with the roof, and no signs of Avascular Necrosis were found either in the study results indicating a remarkable improvement, from the initial abnormalities seen in the left femur.

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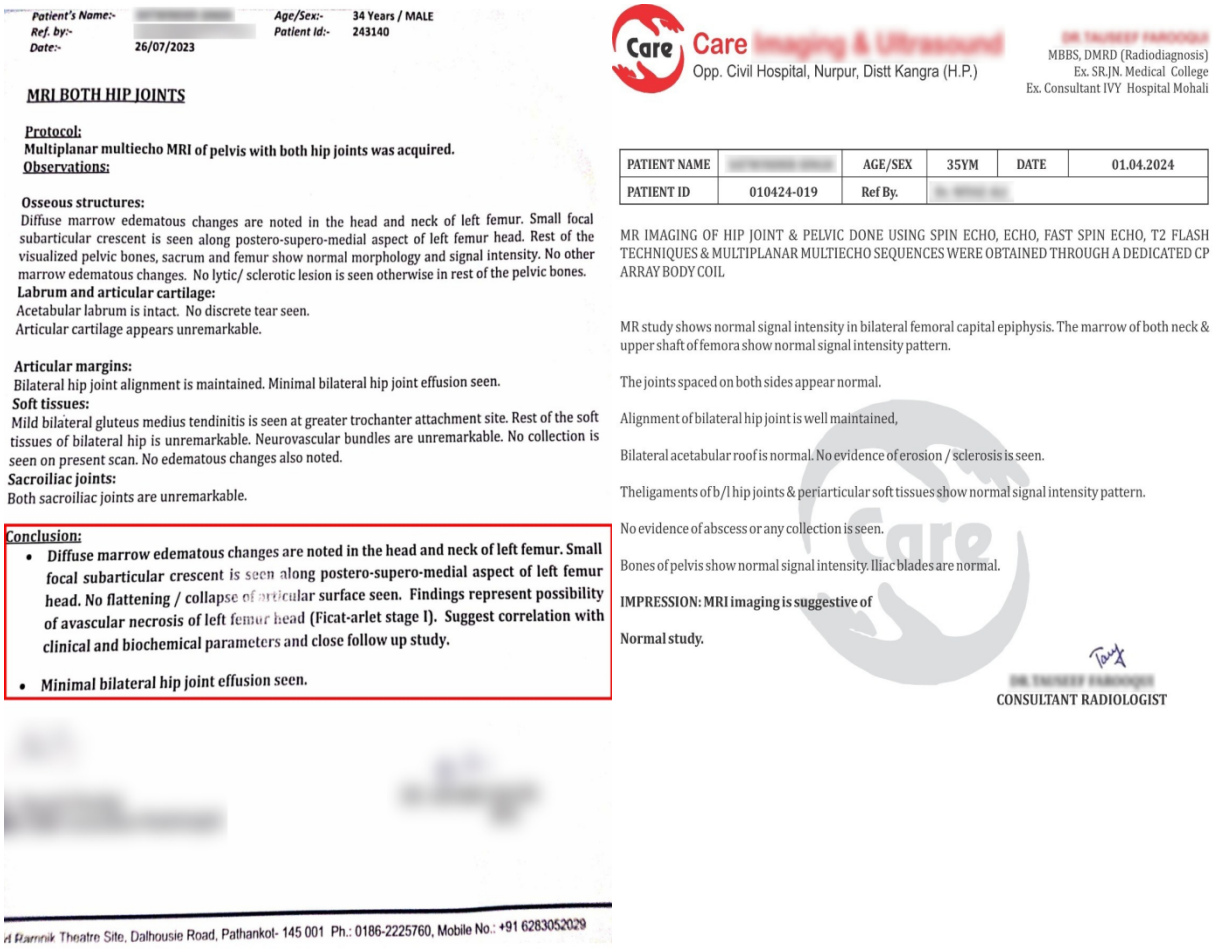


Patient's Name:- [redacted] Age/Sex:- 34 Years / MALE
Ref. by:- [redacted] Patient Id:- 243140
Date:- 26/07/2023

MRI BOTH HIP JOINTS

Protocol:
Multiplanar multiecho MRI of pelvis with both hip joints was acquired.
Observations:

Osseous structures:
Diffuse marrow edematous changes are noted in the head and neck of left femur. Small focal subarticular crescent is seen along postero-supero-medial aspect of left femur head. Rest of the visualized pelvic bones, sacrum and femur show normal morphology and signal intensity. No other marrow edematous changes. No lytic/ sclerotic lesion is seen otherwise in rest of the pelvic bones.
Labrum and articular cartilage:
Acetabular labrum is intact. No discrete tear seen.
Articular cartilage appears unremarkable.

Articular margins:
Bilateral hip joint alignment is maintained. Minimal bilateral hip joint effusion seen.
Soft tissues:
Mild bilateral gluteus medius tendinitis is seen at greater trochanter attachment site. Rest of the soft tissues of bilateral hip is unremarkable. Neurovascular bundles are unremarkable. No collection is seen on present scan. No edematous changes also noted.
Sacroiliac joints:
Both sacroiliac joints are unremarkable.

Conclusion:
- **Diffuse marrow edematous changes are noted in the head and neck of left femur. Small focal subarticular crescent is seen along postero-supero-medial aspect of left femur head. No flattening / collapse of articular surface seen. Findings represent possibility of avascular necrosis of left femur head (Ficat-arlet stage I). Suggest correlation with clinical and biochemical parameters and close follow up study.**
- **Minimal bilateral hip joint effusion seen.**

[redacted]

[redacted] Theatre Site, Dalhousie Road, Pathankot- 145 001 Ph.: 0186-2225760, Mobile No.: +91 6283052029

Care Imaging & Ultrasound
Opp. Civil Hospital, Nurpur, Distt Kangra (H.P.)

[redacted]
MBBS, DMRD (Radiodiagnosis)
Ex. SR.JN. Medical College
Ex. Consultant IVY Hospital Mohali

PATIENT NAME	[redacted]	AGE/SEX	35YM	DATE	01.04.2024
PATIENT ID	010424-019	Ref By.	[redacted]		

MR IMAGING OF HIP JOINT & PELVIC DONE USING SPIN ECHO, ECHO, FAST SPIN ECHO, T2 FLASH TECHNIQUES & MULTIPLANAR MULTIECHO SEQUENCES WERE OBTAINED THROUGH A DEDICATED CP ARRAY BODY COIL

MR study shows normal signal intensity in bilateral femoral capital epiphysis. The marrow of both neck & upper shaft of femora show normal signal intensity pattern.

The joints spaced on both sides appear normal.

Alignment of bilateral hip joint is well maintained,

Bilateral acetabular roof is normal. No evidence of erosion / sclerosis is seen.

Theligaments of b/l hip joints & periarticular soft tissues show normal signal intensity pattern.

No evidence of abscess or any collection is seen.

Bones of pelvis show normal signal intensity. Iliac blades are normal.

IMPRESSION: MRI imaging is suggestive of

Normal study.

[redacted]
CONSULTANT RADIOLOGIST

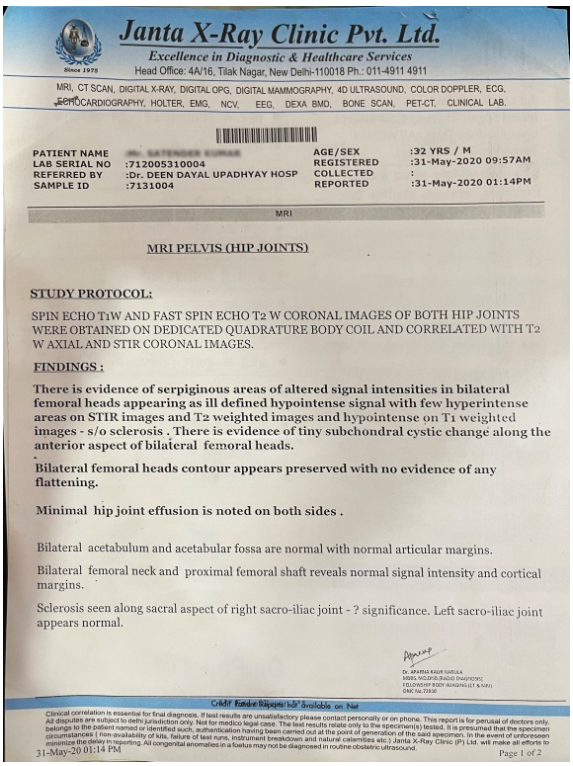
Case Study: 5 | Before & After MRI Reports of AVN Patient

Case 6: Treatment Plan

A customised treatment plan was created for the patient for a week to stay at our hospital to stabilise his health and get him ready as he was using the stick (support) for walking. The initial approach focused on stopping the progression of 3rd Stage Avascular Necrosis and regaining his ability to move his joint.

Vatavyadhi's administration order was embraced. The line of the board for any Vatavyadhi incorporates snehana (inner and outer oleation), swedana (sudation), basti (cured enema treatment), nasya (nasal treatment), abhyanga (massage), utsadana (specific massage with medicated paste), parisheka (sprinkling of cured fluid), and so on Patange. Hence, Panchatikta-ksheera basti as Yapana basti and Shalishastika pinda swedana, which is the Mridu type of Snehana and Swedana, were controlled as per this line of the executives. Both Rasayana and Yapanabasti are suggested for the treatment of tenacious Vatavyadhi. As an outcome, oral medications that influence the vitiated Vatadosha, Asthi (bone), and Majja (bone marrow) as well as impact Rasayana (invulnerable balance) were likewise utilised. A week afterwards, the patient experienced significant pain relief (VAS score reduced from 8/10 to 3/10), improved mobility, and resumed daily activities. Upon his second visit after two months, further improvement was noted, with the pain score nearing 0/10. By this stage, the patient had achieved a near-complete functional recovery. Subsequently, medications were discontinued, and he continued to follow the advised lifestyle practices. A follow-up MRI conducted in October 2021 confirmed complete resolution of Avascular Necrosis, with no evidence of necrotic changes or bone marrow edema.

*Author for Correspondence: dravinashsingh@shivayahospital.com



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MRI, CT SCAN, DIGITAL X-RAY, DIGITAL OPG, DIGITAL MAMMOGRAPHY, 4D ULTRASOUND, COLOR DOPPLER, ECG, ECHOCARDIOGRAPHY, HOLTER, EMG, NCV, EEG, DEXA BMD, BONE SCAN, PET-CT, CLINICAL LAB.

PATIENT NAME	[redacted]	AGE/SEX	:32 YRS / M
LAB SERIAL NO	:712005310004	REGISTERED	:31-May-2020 09:57AM
REFERRED BY	:Dr. DEEN DAYAL UPADHYAY HOSP	COLLECTED	:
SAMPLE ID	:7131004	REPORTED	:31-May-2020 01:14PM

MRI

MRI PELVIS (HIP JOINTS)

STUDY PROTOCOL:

SPIN ECHO T1W AND FAST SPIN ECHO T2 W CORONAL IMAGES OF BOTH HIP JOINTS WERE OBTAINED ON DEDICATED QUADRATURE BODY COIL AND CORRELATED WITH T2 W AXIAL AND STIR CORONAL IMAGES.

FINDINGS :

There is evidence of serpiginous areas of altered signal intensities in bilateral femoral heads appearing as ill defined hypointense signal with few hyperintense areas on STIR images and T2 weighted images and hypointense on T1 weighted images - s/o sclerosis . There is evidence of tiny subchondral cystic change along the anterior aspect of bilateral femoral heads.

Bilateral femoral heads contour appears preserved with no evidence of any flattening.

Minimal hip joint effusion is noted on both sides .

Bilateral acetabulum and acetabular fossa are normal with normal articular margins.

Bilateral femoral neck and proximal femoral shaft reveals normal signal intensity and cortical margins.

Sclerosis seen along sacral aspect of right sacro-iliac joint - ? significance. Left sacro-iliac joint appears normal.

Dr. APARNA KAUR SARULA
MBBS, MD(RADIO DIAGNOSIS)
FELLOWSHIP BODY IMAGING (CT & MRI)
DMC No.73930

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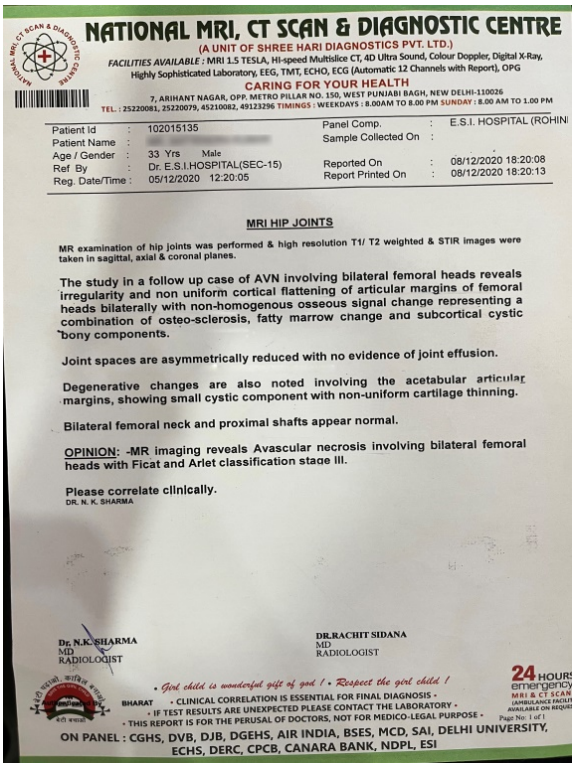
31-May-20 01:14 PM Page 1 of 2

MRI Report 2020 (Stage II)



NATIONAL MRI, CT SCAN & DIAGNOSTIC CENTRE

(A UNIT OF SHREE HARI DIAGNOSTICS PVT. LTD.)

FACILITIES AVAILABLE : MRI 1.5 TESLA, Hi-speed Multislice CT, 4D Ultra Sound, Colour Doppler, Digital X-Ray, Highly Sophisticated Laboratory, EEG, TMT, ECHO, ECG (Automatic 12 Channels with Report), OPG

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TEL. : 25220081, 25220079, 45210082, 49123296 TIMINGS : WEEKDAYS : 8.00AM TO 8.00 PM SUNDAY : 8.00 AM TO 1.00 PM

Patient Id	: 102015135	Panel Comp.	: E.S.I. HOSPITAL (ROHINI
Patient Name	: [redacted]	Sample Collected On	:
Age / Gender	: 33 Yrs Male		
Ref By	: Dr. E.S.I.HOSPITAL(SEC-15)	Reported On	: 08/12/2020 18:20:08
Reg. Date/Time	: 05/12/2020 12:20:05	Report Printed On	: 08/12/2020 18:20:13

MRI HIP JOINTS

MR examination of hip joints was performed & high resolution T1/ T2 weighted & STIR images were taken in sagittal, axial & coronal planes.

The study in a follow up case of AVN involving bilateral femoral heads reveals irregularity and non uniform cortical flattening of articular margins of femoral heads bilaterally with non-homogenous osseous signal change representing a combination of osteo-sclerosis, fatty marrow change and subcortical cystic bony components.

Joint spaces are asymmetrically reduced with no evidence of joint effusion.

Degenerative changes are also noted involving the acetabular articular margins, showing small cystic component with non-uniform cartilage thinning.

Bilateral femoral neck and proximal shafts appear normal.

OPINION: -MR imaging reveals Avascular necrosis involving bilateral femoral heads with Ficat and Arlet classification stage III.

Please correlate clinically.

DR. N. K. SHARMA

Dr. N.K.SHARMA
MD
RADIOLOGIST

DR.RACHIT SIDANA
MD
RADIOLOGIST

• *Girl child is wonderful gift of god ! • Respect the girl child !*

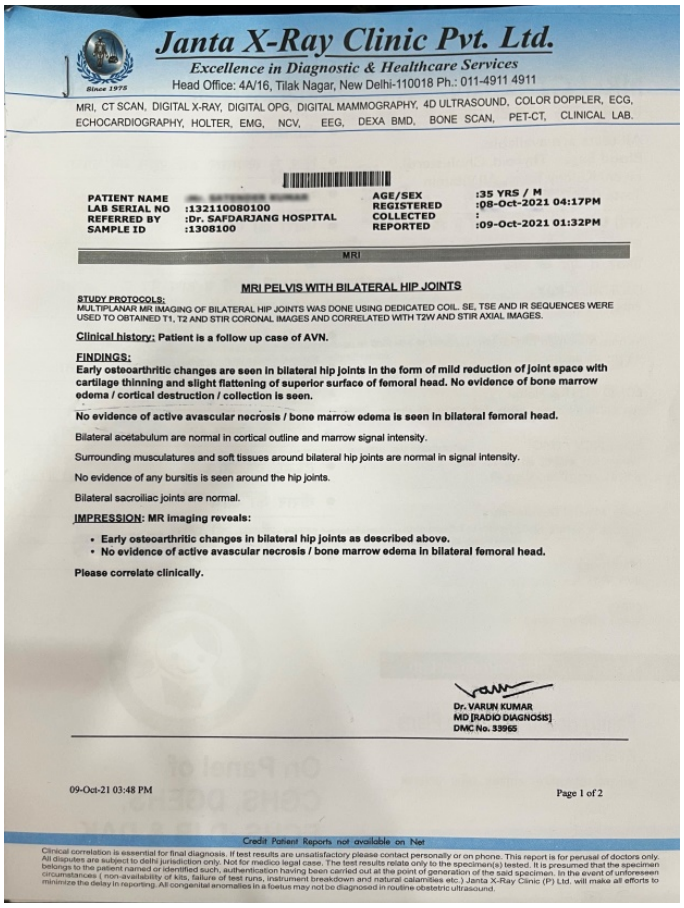
BHARAT • CLINICAL CORRELATION IS ESSENTIAL FOR FINAL DIAGNOSIS •
• IF TEST RESULTS ARE UNEXPECTED PLEASE CONTACT THE LABORATORY •
• THIS REPORT IS FOR THE PERUSAL OF DOCTORS, NOT FOR MEDICO-LEGAL PURPOSE •

24 HOURS emergency MRI & CT SCAN (AMBULANCE FACILITY AVAILABLE ON REQUEST)

Page No. 1 of 1

ON PANEL : CGHS, DVB, DJB, DGEHS, AIR INDIA, BSES, MCD, SAI, DELHI UNIVERSITY, ECHS, DERC, CPCB, CANARA BANK, NDPL, ESI

MRI Report 2020 (Stage III)



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PATIENT NAME	[redacted]	AGE/SEX	:35 YRS / M
LAB SERIAL NO	:132110080100	REGISTERED	:08-Oct-2021 04:17PM
REFERRED BY	:Dr. SAFDARJANG HOSPITAL	COLLECTED	:
SAMPLE ID	:1308100	REPORTED	:09-Oct-2021 01:32PM

MRI

MRI PELVIS WITH BILATERAL HIP JOINTS

STUDY PROTOCOLS:
MULTIPLANAR MR IMAGING OF BILATERAL HIP JOINTS WAS DONE USING DEDICATED COIL. SE, TSE AND IR SEQUENCES WERE USED TO OBTAINED T1, T2 AND STIR CORONAL IMAGES AND CORRELATED WITH T2W AND STIR AXIAL IMAGES.

Clinical history: Patient is a follow up case of AVN.

FINDINGS:
Early osteoarthritic changes are seen in bilateral hip joints in the form of mild reduction of joint space with cartilage thinning and slight flattening of superior surface of femoral head. No evidence of bone marrow edema / cortical destruction / collection is seen.

No evidence of active avascular necrosis / bone marrow edema is seen in bilateral femoral head.

Bilateral acetabulum are normal in cortical outline and marrow signal intensity.

Surrounding musculatures and soft tissues around bilateral hip joints are normal in signal intensity.

No evidence of any bursitis is seen around the hip joints.

Bilateral sacroiliac joints are normal.

IMPRESSION: MR imaging reveals:

- Early osteoarthritic changes in bilateral hip joints as described above.
- No evidence of active avascular necrosis / bone marrow edema in bilateral femoral head.

Please correlate clinically.

Dr. VARUN KUMAR
MD [RADIO DIAGNOSIS]
DMC No. 33965

09-Oct-21 03:48 PM Page 1 of 2

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**Author for Correspondence: dravinashsingh@shivayahospital.com*

MRI Report 2021 (Normal Study)

The above cases highlight the efficacy of integrative Ayurvedic treatment in not only providing symptomatic relief but also reversing AVN, offering a viable, non-surgical alternative even for patients with advanced-stage conditions and limited financial resources.

The MRI scans revealed that the abnormal marrow signals and joint alignment had completely resolved. This underscores the effectiveness of non-surgical holistic approaches in treating and potentially reversing AVN. The patient's improved clinical condition serves as further evidence of the benefits of Ayurvedic interventions, in such cases.

In summary, non-surgical holistic treatments could be effective in treating and reversing AVN and enhance overall well-being.

6. DISCUSSION

Avascular necrosis, which impairs the patient's day-to-day activities, is the death of osteocytes brought on by blockage of the blood arteries supplying the femoral head (Padmawar et al., 2021). Acute compartment syndrome (AVN) causes hip discomfort, destroys joints, and ultimately necessitates surgery. Early diagnosis of this disease is crucial since, later on, it results in a lack of blood flow, which deprives *Ashtidhatu* of nutrients and causes *AsthiMajjakshaya*. The remedial methodology of *Mridu Samshodhana* followed by *Brahamana* (supporting) appears to work in such a way. *Bhramyastu Mridu Langhyeta* has been explicitly mentioned by *Acharaya Vagabhatta.* Prior to *Brahamana*, gentle *Rukshana/langhana* should be performed using therapeutic techniques such as powder massage, or *Udvartana*, which aids in the removal of *Srotorodha* (Joshi et al., 2011). One of the *Pañcakarmas* therapies, basti, demonstrates its effectiveness in treating chronic illnesses caused by an aggravation of *Vata Dosha*. Acharayas has proactively referred to *Tikta Dravya Sadhita Ksheera Basti* in *Asthikshayaja Vikara* and it very well might be gainful for the neovascularisation of the impacted region (Yadav et al., 2024). *Abhyanga*, *Swedana*, and *Basti* have completed their *Poorva karma*. The karma of *Abhyanga* is *Snehana*, *Kledakara*, and *Jarahara*. The *Abhyanga* medicinal oils from *Vatahara* help to lessen *Vata*, strengthen the wounded joint and promote blood flow to the muscles (Sawarkar and Sawarkar, 2018), whereas *Swedana* induces *Mriduta* in the body and reduces stiffness. One of *Swedana Karma's Samyak lakshana* is *Shola Shanti*. Additionally, *swedana* has a vasodilator action that aids in enhancing blood flow to the afflicted joint (Tike et al., 2023).

Tiktaka Kṣheera Basti, as *Manjisthadi Kṣheera Basti* and *Panchtikta Kṣheera Basti*, ought to be arranged to support *Asthi Dhātu*. Drugs with *Tikta rasa*, such as *Guduchi* (Tinospora cordifolia), *Musta* (Cyperus rotundus), and *Ashwagandha* (Withania somnifera), aid in balancing the exacerbated *Vata Dosha* (Nair and Ashwini, 2019). Hence, *Ksheera's* unctuous *Snigdha* and sweet *Madhura Gunas* act as a nourishing *Brimhana*, age-defying *Jeevaniya*, revitalising *Rasayana*, and fortifying *Balya*, all while balancing *Pitta* and *Vata Dosha*. *Saindhava's Sukshma Guna* allows it to reach the body's minute *Srotasas* and aid in clearing blockages so that new blood can flow to the *Asthi*, *Sandhi*, and other areas (Goud 2014). As the regular functioning of *Dhatvagni* (digestive fire) is supported by *Sneha* with *Tikta Rasa* (astringent), *Guggulutikta Ghrita* and *Balaguduchyadi taila*, *Ushna virya*, *Madhura*, and *Katu Vipaka*, the *Asthi dhatu* can receive improved nourishment. With the properties of *Pitta shamaka*, *Rakta prasadaka*, *Balya*, *Agnivardhaka*, *Madhura*, and *Shita virya*, *ghrita* calms *Vata*, *fortifies Dhatu upachaya*, and goes about as a *Rasayana*. Also, in light of the fact that vitamin D3 is fat solvent, it is promptly consumed from the flow, helps with osteogenesis, and may try and have the option to treat Avascular Necrosis Bartl and Bartl (2019). Additionally, it helps in the *Asthi kshaya's Samprapti vighatana*, or disintegration of pathology. Because of its *uṣṇa Guna*, *manjistha* can function at the cellular level of tissues, supporting healthy blood flow and assisting in *Rakta Shodhana* (blood purification and vascular system cleansing). The other *kalka dravya*, like *Arjuna*, have *Sheeta Vīrya* (cooling) and *Kaṣāya Rasa* (astringent). *Pitta* and *Kapha* are calmed by it. The *Karma* of *Kaṣāya rasa* is *Sandhānakara* (that is, it enhances compactness). The *Acharyas* refer to its *Ksheerapak* as *Asthi Sandhānakara*. As a result, it stops fat from building up in the femoral head, which makes arteries more permeable and increases blood flow to the injured bone (Chaganti et al., 2013). Therefore, it appears that the entire *Mridu Shodhana* and *Brihmana* treatment regimen is beneficial in treating Avascular Necrosis.

7. CURRENT TREND OF PREDICTING AND FUTURE DIRECTION

7.1. Current Trend

Expanded Interest in Integrative Medication:

- **Developing Acknowledgment:** There is a rising interest in integrative medication, joining customary Ayurvedic approaches with regular clinical practices.
- **Comprehensive Methodology:** Ayurveda's attention on all-encompassing treatment, underlining side effects help as well as generally speaking prosperity, lines up with the latest things in quiet-focused care.

Utilisation of Home-grown Meds:

- **Famous Herbs:** Usually utilised spices like *Guggulu*, *Ashwagandha*, and *Guduchi* are broadly read up for their possible advantages in treating AVN.
- **Normalization and Quality Control:** Endeavors are being made to normalise homegrown details and guarantee quality control, which is critical for their acknowledgement in standard medication.

Panchakarma Treatment:

- **Detoxification and Revival:** *Panchakarma* treatments, which incorporate techniques like *Virechana*, *Basti*, and *Abhyanga*, are acquiring notoriety for their detoxifying and restoring impacts.
- **Altered Medicines:** Medicines are progressively custom-fitted to individual patient necessities, considering their particular dosha irregular characteristics and ailments.

Clinical Exploration and Preliminaries:

- **Arising Proof:** Limited scope clinical preliminaries and contextual analyses are giving arising proof on the adequacy of Ayurvedic medicines for AVN.
- **Interdisciplinary Exploration:** Cooperative examination endeavours between Ayurvedic experts and ordinary clinical specialists are expanding.

7.2. Future Direction

Future directions for the treatment of Avascular Necrosis (AVN) with Ayurvedic medicines include conducting large-scale randomised controlled trials to establish robust evidence regarding their efficacy and safety. There is a need to compare Ayurvedic interventions with traditional surgical and non-surgical treatments to evaluate their relative effectiveness. Developing standardised treatment protocols within Ayurveda will be crucial to ensure consistency and reproducibility in clinical practice. Researchers should explore the biological mechanisms behind the therapeutic effects of Ayurvedic medicines, focusing on aspects such as blood circulation, inflammation reduction, and bone rehabilitation. Advancing integrative care models that combine Ayurvedic therapies with conventional medical treatments can enhance patient outcomes. Moreover, prioritising patient-reported outcomes and quality of life metrics will be essential for assessing the real-world impact of Ayurvedic treatments. Efforts should be made to achieve global recognition and acceptance of Ayurvedic practices through comprehensive research and standardisation initiatives. Lastly, leveraging data analysis and machine learning techniques will help identify patterns and improve the prediction of treatment outcomes in patients undergoing Ayurvedic therapy for AVN.

8. CONCLUSION

Avascular necrosis is a complex disease. Stopping the disease from progressing requires preventing its etiological causes. Compared to Panchkarma, Ayurveda is a holistic therapy that can greatly lessen discomfort, increase range of motion, and prolong survival in patients with advanced stages of AVN. The treatment is reasonably priced. Snehana Swedana Virechana, Nasya and Basti, together with Ayurvedic principles, when used in conservative management of AVN, improve quality of life and offer significant alleviation and reversing it completely if diagnosed in the early stages.

REFERENCES

1. Pawar, A. (2023). Management of Avascular Necrosis through Ayurveda-A Case Study. Journal of Ayurveda and Holistic Medicine (JAHM), 11(2).
2. Gauttam, J., Jamir, A., Verma, P., Dharmarajan, P., & Bhatted, S. (2019). Management of Asthi-Majjagata Vata wsr to Avascular Necrosis (AVN) of Femoral Head Stage 3 By Panchakarma-A Case Study.
3. Konarski, W., Poboży, T., Śliwczyński, A., Kotela, I., Krakowiak, J., Hordowicz, M., & Kotela, A. (2022). Avascular necrosis of femoral head—overview and current state of the art. International Journal of Environmental Research and Public Health, 19(12), 7348.
4. Kunyakham, W., Foocharoen, C., Mahakkanukrauh, A., Suwannaroj, S., & Nanagara, R. (2012). Prevalence and risk factor for symptomatic avascular necrosis development in Thai systemic lupus erythematosus patients. Asian Pacific journal of allergy and immunology, 30(2), 152.
5. Gupta, S., & Srivastava, S. (2023). An Ayurvedic approach for the management of Avascular Necrosis (AVN)-A Case Study. Journal of Ayurveda and Integrated Medical Sciences, 8(5), 265-270.
6. Gupta, R., Bansal, P., & Khaire, U. (2023). Ayurvedic management of Asthimajja gata vatarakta (Avascular necrosis of head of the femur)–A case report. International Journal of Ayurvedic Medicine, 14(2), 588-593.
7. Ranjan, M., & Paltye, P. (2019). Ayurvedic management of Avascular Necrosis (AVN) of femoral head: A case study. International Journal of AYUSH Case Reports, 3(3), 201-205.
8. Meena, R. L., Bhatted, S., Dharmarajan, P., Meena, N., Kumar, J., & Nirmal, H. (2017). Management of avascular necrosis through ayurveda-a case study. Journal of Research in Traditional Medicine, 3(4), 123-123.
9. Weinstein, R. S. (2012). Glucocorticoid-induced osteonecrosis. Endocrine, 41, 183-190.
10. Kabra, D., Jena, S., Bhatted, S. K., & Dharmarajan, P. (2020). Avascular Necrosis of Femoral Head-Ayurveda Management: A Case Study. Int J Heal Sci Res, 10(11), 22-7.
11. Hsu, H., & Nallamothu, S. V. (2018). Hip osteonecrosis.
12. Lahari, C., & Prasad, V. L. (2024). Clinical Approach To Gambhira Vatarakta (Avascular Necrosis Of Femoral Head) Through Ayurveda: A Case Study.

13. Kumar, A., Rajoria, K., & Singh, S. K. (2017). Ayurvedic Management of Avascular Necrosis of Neck of Femur wsr to Asthi Majja Gata Vata. Research & Reviews: Journal of Surgery, 6(1), 12-16p.
14. Shah, K. N., Racine, J., Jones, L. C., & Aaron, R. K. (2015). Pathophysiology and risk factors for osteonecrosis. Current reviews in musculoskeletal medicine, 8, 201-209.
15. Negi, S., & Padavi, D. M. (2023). Ayurveda's Approach to Avascular Necrosis: A Case Study. International Research Journal of Ayurveda and Yoga, 6(9), 21-25.
16. Solanki, A., Khatri, B., Bhakuni, H., & Garg, G. K. (2023). ROLE OF AYURVEDA IN THE MANAGEMENT OF MAJJA KSHAYA W.S.R TO AVASCULAR NECROSIS-A CASE STUDY.
17. Kuchewar, V. V. (2015). Management of Avascular necrosis through Ayurveda–A case study. Journal of Ayurveda and Holistic Medicine (JAHM), 3(2), 41-44.
18. Singh, S. K., Rajoria, K., & Sharma, S. (2023). An Ayurveda approach in the management of avascular necrosis of bilateral hip joint-A case report. Journal of Ayurveda and Integrative Medicine, 14(5), 100792.
19. Jawad, M. U., Haleem, A. A., & Scully, S. P. (2012). In brief: Ficat classification: avascular necrosis of the femoral head. Clinical Orthopaedics and Related Research®, 470(9), 2636-2639.
20. Mont, M. A., Cherian, J. J., Sierra, R. J., Jones, L. C., & Lieberman, J. R. (2015). Nontraumatic Osteonecrosis of the femoral head: where do we stand today?: a ten-year update. JBJS, 97(19), 1604-1627.
21. Kang, J. S., Moon, K. H., Kwon, D. G., Shin, B. K., & Woo, M. S. (2013). The natural history of asymptomatic osteonecrosis of the femoral head. International orthopaedics, 37, 379-384.
22. Bana, P., Mogra, A., Sharma, S., Ojha, A., & Sharma, M. K. (2023). Efficacy of Ayurvedic treatment in the management of Avascular Necrosis-A Case Study. Journal of Ayurveda and Integrated Medical Sciences, 8(1), 189-193.
23. Bohra, V. C. A. G. M. Avascular Necrosis of Femoral Head–Ayurveda Management: A Case Study.
24. Patange, B. A Comperative Study Between Leech Applications Andlocal Application Of Corticosteroids In The Management Of Eczema With Spcial Reffernce To Vicharchika.
25. Shetty, S. K. (2015). A Clinical Study of Vamana and Astanga Lavana in the Management of Madatyaya (Doctoral dissertation, Rajiv Gandhi University of Health Sciences (India)).
26. Gabhane, S., Sathavane, G., Zade, D., Wankhede, A., & Chakole, S. (2020). Basti chikitsa for healthy life in present scenario: A review. Int J Curr Res Rev, 12, 142-8.
27. Joshi, A., Mehta, C. S., Dave, A. R., & Shukla, V. D. (2011). Clinical effect of Nirgundi Patra pinda sweda and Ashwagandhadi Guggulu Yoga in the management of Sandhigata Vata (Osteoarthritis). AYU (An International Quarterly Journal of Research in Ayurveda), 32(2), 207-212.
28. Yadav, T., Kuchewar, V., & Yadav, P. (2024). Ayurvedic Management of Avascular Necrosis of head of Femur: A Case Report. Journal of Clinical & Diagnostic Research, 18(6).
29. Tike, S. G., Pathan, R. I., & Kamble, M. C. (2023). AYURVEDIC MANAGEMENT OF AVASCULAR NECROSIS OF FEMORAL HEAD–A CASE STUDY.
30. Bartl, R., & Bartl, C. (2019). The osteoporosis manual: prevention, diagnosis and management. Springer.
31. Chaganti, S., Sanipeti, R. V., & Joshi, S. S. (2013). An approach to avascular necrosis by Saghrta kṣīrabasti. Ancient science of life, 33(1), 45-48.
32. Nair, D. K., & Ashwini, B. N. (2019). AYUSH Cancer Conclave 2019 Accepted Posters Papers with Abstracts. AYU (An International Quarterly Journal of Research in Ayurveda), 40(Suppl 1), S35-S64.
33. Goud, D. K. M. (2014). Efficacy of Dashamoola Kwatha Swedana and Ushna Jala Swedana for Nasya Karma in Cervical Spondylosis-A Comparative Study (Doctoral dissertation, Rajiv Gandhi University of Health Sciences).
34. Padmawar, S., Landge, D. S., Upadhyay, P., & Madhusmita, M. (2021). A Functional and Radiological Outcome Analysis of Hip Forage Procedure, Done for Early Stages (Ficat and Arlet Grade 1 and 2A) of Avascular Necrosis of Head of Femur. Journal of Pharmaceutical Research International, 33(54B), 97-105.
35. Sawarkar, P., & Sawarkar, G. (2018). Management of scapular dyskinesia through comprehensive approach-A case study. Journal of Indian System of Medicine, 6(4), 218-224.