



## Asthimajjagata Vatamanagement - Avascular Necrosis (AVN) Through Majjabasti and Shaman Chikitsa- A Case Study

<sup>1</sup>Dr. Mahesh Dodiya, Shweta Parwe<sup>2\*</sup>, Milind Nisargandha<sup>3</sup> and Punam Sawarkar<sup>4</sup>

<sup>1</sup>P.G. Scholar, Department of Panchakarma, Mahatma Gandhi Ayurved College Hospital & Research Centre, Salod (H.), Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra

<sup>2</sup>Professor, Department of Panchakarma, Mahatma Gandhi Ayurved College Hospital & Research Centre, Salod (H.), Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra.

<sup>3</sup>Associate professor Saveetha Medical College and Hospital, Chennai – 602105

<sup>4</sup>Associate Professor, Department of Panchakarma, Mahatma Gandhi Ayurved College Hospital & Research Centre, Salod (H.), Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra.

**Abstract:** In clinical practice, the number of Avascular Necrosis cases is increasing due to lifestyle changes, heavy workload, degenerative changes, and improper dietary habits. It is a progressive degenerative condition of the hip joint due to a lack of blood supply to the bone. Modern practice shows a significantly lower prognosis as per the studies. With the help of cardinal features of the AVN (Avascular Necrosis), it may correlate with Ashthi Majjagata Vikarain Ayurveda. Vata Vyadhi can treat at the clinical level with the help of Ayurvedic Shamana (palliative treatment) and Shodhana Chikitsa (Purification treatment). According to Ayurveda Acharyas, the Basti karma is the best line of treatment in Vata Vyadhi and is also called Ardha-Chikitsa. Ayurvedic Treatment gives long-term relief from the disease, helps to enhance the inner strength of the body tissues, and stops the progression. A 36-year-old male patient complained of Breaking Pain in the femur bone, Pain in the right hip joint, difficulty walking, and radiating Pain from the lumbar to thigh region. Associated with restricted movement of the right leg and disturbed sleep. He was treated with Shamana Aushadhis, followed by Abhyanga, Swedana, and Majjabasti with the combination of Majja (goat bone marrow) and Goksheer for 12 days. The patient was assessed with M.R.I. and grading of the symptoms; significant changes and improvements were observed in symptoms before and after the treatment. This study has been conducted to evaluate the efficacy of Majjabasti in managing Asthimajjagata Vatavikar based on Ayurvedic management. It shows that Majjabasti can be used in clinical practice for managing AVN, along with all precautionary measures described in Ayurveda classics in the form of Parihard Vishayas during Bastikarma should be followed.

**Keywords:** Asthimajjagata Vatavikar, Avascular Necrosis, AVN, Majjabasti, Shamana Chikitsa

---

### \*Corresponding Author

Shweta Parwe , Professor, Department of Panchakarma, Mahatma Gandhi Ayurved College Hospital & Research Centre, Salod (H.), Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra.

Received On 10 December 2022

Revised On 20 February 2023

Accepted On 01 March 2023

Published On 01 May 2023

---

**Citation** Dr. Mahesh Dodiya, Shweta Parwe, Milind Nisargandha and Punam Sawarkar , Asthimajjagata Vatamanagement - Avascular Necrosis (AVN) Through Majjabasti and Shaman Chikitsa- A Case Study.(2023).Int. J. Life Sci. Pharma Res.13(3), L8-L15  
<http://dx.doi.org/10.22376/ijlpr.2023.13.3.SP1.L8-L15>

This article is under the CC BY- NC-ND Licence (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)



Copyright @ International Journal of Life Science and Pharma Research, available at [www.ijlpr.com](http://www.ijlpr.com)

## I. INTRODUCTION

According to Ayurved Acharyas, there are seven *Dhatus* in the human body that helps in nourishment and functioning of the body. *MajjaDhatu* is among them; according to Acharyas, *Majja Dhatu* is *Saarabhag* of *AsthiDhatu* as it is derived from *AsthiDhatu*.<sup>1</sup> Acharyas has explained three *Nyayas* to Understand the *DhatuposhanaKrama*, i.e., *Kedarkulyanyaya*, *Khalekapotnyaya*, and *Ksheerdadhinyaya*. *Majja* is derived from the Sanskrit word "*MajjototiMajja*," divided into *Majj* + *Ach* + *Tap* word *Majja*. *MajjaDhatu* is "*Majja* steam *Balam* *shukra* *pushtim* *pooranamastinaamchakaroti*" it provides unctuousness, strength, nourishment of reproductive organs, and filling of bone.<sup>2</sup> In this case, the patient is diagnosed with *AsthimajjagataVikar* as per Ayurved. It may correlate with Avascular necrosis of its similar characteristics feature. Avascular necrosis is a condition that affects 16,000 people in India each year and will eventually necessitate complete hip replacement surgery. The typical age of avascular necrosis patients is about 32 years old, "explained Sancheti. "The Hip is the joint that experiences avascular necrosis the most frequently.<sup>3</sup> The main aim of this study is to evaluate the efficacy of *Majjabasti* in the management of *Asthimajjagata Vatavikar* based on Ayurvedic management.

### I.1 SIGNS AND SYMPTOMS OF AVN

According to *CharakAcharya*, if *VataDosha* gets vitiated and situated in *Asthi* and *Majja*, it shows symptoms like *Asthibheda*(breaking Pain in bones), *Poorvabhedha*(Pain in all the joints), *SandhiShoola*(Joint Pain), *Mashakhsya*, *Balakshya*(body weakness), *Anidra*, *Asthishosh*(osteoporosis), *Asthishoola*. *Majjashosha*, also the *Kshayalakshana* of *AsthiDhatu*, is *Sandhishaithilyam* (looseness in joints), and *Kshayalakshana* of *MajjaDhatu* is *Asthidourbalyata*, *Laghuta*, and it causes *Vatarogas*.<sup>4</sup> Avascular necrosis is a pathological condition resulting from lack of blood supply to the bone by Traumatic or non-traumatic Factors. It causes Ischemic changes, tiny breaks in the bone, and the bone's eventual collapse. It is also caused due to prolonged use of steroid medications, alcoholism, and other rare pathological condition like hypertension and sickle cell anemia. If avascular necrosis involves the bones of a joint, it often destroys the joint articular surfaces. The sites involved are the femoral head, scaphoid bone, lunate bone, talus, lower 1/3rd of the tibia, and rarely the head of the humerus. The AVN of the head of the femur is commonly seen in daily practice. It forms the symptoms like gradual Pain, stiffness, difficulty walking, etc.

### I.2 SAMANYA SAMPRAPTI (Pathogenesis)

Several etiological factors cause *Vata* vitiation and vitiated *Vata* spreads throughout the body. It causes various symptoms, including *Rukshata* (dryness), *Parushata*, and *Kharata* (roughness) in *Strotasa* and *Sthanasanshraya* at the *Asthi* and *Majjadhatu*, which results in *AsthimajjagataVata*.<sup>1</sup> *HetuSevana*, 2. *VataPrakopa*, 3. *Rukshata*, *Parushata*, *Kharata* at *Strotasa*, 4. *Sthanasanshraya* at *Asthi*&*Sandhi* *Pradesh*, 5. *AsthimajjagataVata*.

### I.3 PATHOPHYSIOLOGY OF AVN

As per the present research, pathogenesis is caused by mechanical interruptions of venous or arterial flow, emboli, elevated intramedullary pressure, vasculitis, or venous blockages. The medial circumflex femoral is the main blood vessel that supplies the femoral head and artery. However, several known environmental exposures and predisposing factors can raise the risk of developing AVN. Following the initial injury to the bone, marrow components and bone cells start to die. This process causes the joint surface to collapse and involves the bone in the joint. The most vulnerable cells are hematopoietic cells, which can pass out within 6–12 hours of exposure. In 12–48 hours, osteoblasts, osteoclasts, and fat cells all undergo destruction, which can take 2–4 days. After weeks or months of necrosis, an inflammatory reaction occurs. The inflammatory cuff causes subchondral weakening and reactive revascularization. They are the root reasons for the collapsed articular cartilage. Articular disturbances ultimately bring on degenerative joint problems.<sup>5</sup> According to Ayurveda Acharyas, the *Basti* is the *Ardhachikitsa* (half treatment) in the diseases of predominant *VataDosha*.<sup>6</sup> *Basti* is indicated explicitly in *Vatajvikaras*. As *Vatajvikaras* has *Ashraya* – *Ashrayisambandha* with *AsthiDhatu*, which is helpful in the *Asthimajjovahavikara*. The function of *Basti* is nourishing the body and elevating the predominant *VataDosha* from the body. Ayurvedic herbal and herbal-mineral preparations at the correct dose and *Anupana* to boost their efficacy have also been recommended for *ShamanaChikitsa* in this condition. The basic principle of Ayurveda for treating any condition begins with *NidanaParivarjana*, *Shamana Chikitsa*, *Shodhana Chikitsa*, and *Pathya-Apathya* are Advice to Breakdown the pathology of the Diseases. In this case study, the same treatment protocol was Advised to treat the patient with the help of *Shamana* and *ShodhanaChikitsa*, which showed excellent results for the patient. Hence, this case study may help further research scope and globalization of the Ayurveda Treatment principles.

### I.4 CASE REPORT

A single case study of 36 years-old male patient had complaints, e.g., Breaking Pain in the femur bone, Pain in the right hip joint, difficulty walking, and radiating Pain from the lumbar to thigh region. Details of the rest of the chief complaints & associated complaints are given in Table I.

### I.5 PROGRESSION OF DISEASE

The patient was regular for ten days, then gradually started complaining of Pain in the lumbar region, hip joint pain, difficulty walking, and radiating Pain from the lumbar to thigh region; hence he visited *Panchakarma O.P.D.*, MGACH&RC for further *Panchakarma* Treatment.

### I.6 PATIENT'S HISTORY

Details of the patient's medical and family history are given in Table 2.

## 1.7 CLINICAL EXAMINATIONS

**Table 1: General examination**

1	Pulse	76/ min
2	Blood pressure	130/80 mm hg
3	R.R.	18/ min
4	Temperature	98 F
5	Weight	72 kg
6	Height	172 cm
7	BMI	24.3 kg/m <sup>2</sup>

### 1.8 Systemic examination with a Modern perspective

- C.N.S.: Normal functional activity, well oriented
- CVS:- SI & S2 heard
- Respiratory:- Air Entry Bilaterally Equal

### 1.9 P/A

1. Inspection:- Normal, No Scar marks
2. Palpation:- Distended
3. Percussion:-No any thrill sound.
4. Auscultation:-No Abdominal sound.

### 1.10 SPECIFIC INVESTIGATION FOR AVN

1. X-Ray ( Hip joint A.P. – Lateral view)
2. M.R.I. (Bilateral Hip with Pelvis)
3. C.T. – Scan
4. Bone scan

### 1.11 INVESTIGATION

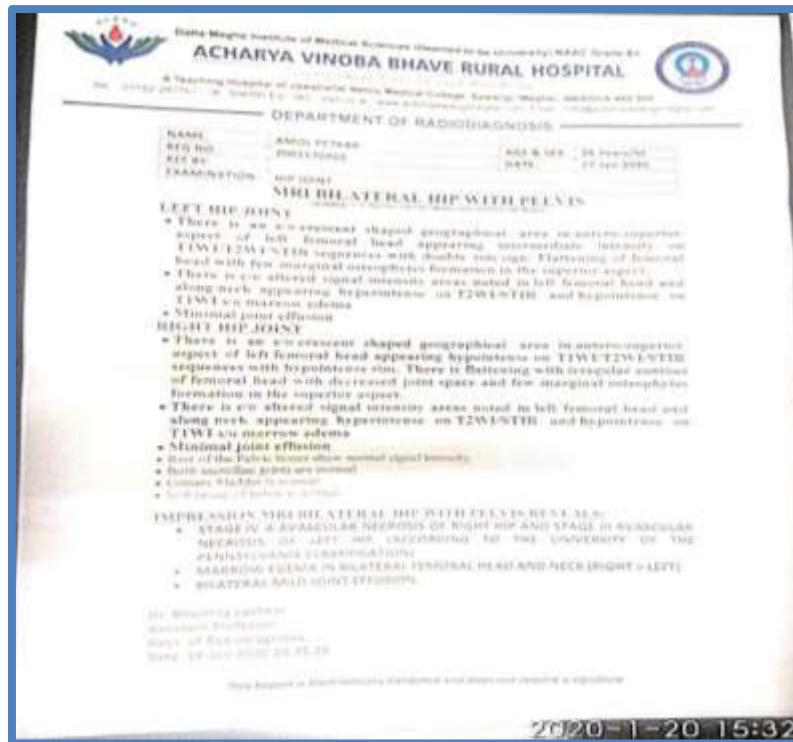
- 1.11.1 **X-RAY** ( Hip joint A.P.- Lateral View)Figure.1  
Findings: Stage 4 Avascular necrosis right femoral head.



*This figure shows degenerative changes over the right hip joint, and the impression of the X-Ray shows that the patient is having Stage 4 Avascular necrosis over the right femoral head.*

**Fig 1- Radiological investigation AP and Lateral view (A- AP View, B- Lateral view)**

### I.II.2 M.R.I.(Bilateral hip with Pelvis) [ Before treatment ]Figure.2



**This figure shows Stage 4 avascular necrosis of the right Hip and stage 3 avascular necrosis of the left Hip. Marrow edema in Bilateral femoral head and neck ( Right > left )Bilateral Mild Joint effusion.**

### **Fig.2- M.R.I.(Bilateral Hip with Pelvis)**

### 1.11.3 [After treatment] Figure. 3



**This figure shows Stage 2 Avascular necrosis right femoral head.**

### **Fig.3- M.R.I.(Bilateral hip with Pelvis)**

### 1.12 *AsthavidhaPariksha*

The findings of *AshtavidhaPariksha* are provided in Table.3

### 1.13 *A systemic examination fromAyurveda's perspective*

Actual results of Systemic Analysis with Ayurveda's view are provided in Table.4

### 1.14 **DIAGNOSIS**

*AsthimajjagataVikara* (Avascular necrosis)

### 1.15 **PROGNOSIS**

Avascular necrosis has no cure; however, treatment can slow or stop its progression. Avascular necrosis patients usually have Calcium supplements, Steroids, and Surgery, including joint replacement.

### 1.16 **THERAPEUTIC INTERVENTION**

The line of treatment prescribed for this patient is given in Tables.5 and 6, respectively.

### 1.17 **OBSERVATIONANDRESULTS**

Observations and Results obtained after treatment, i.e., at the end of the 12<sup>th</sup> day, were assessed by using subjective & objective criteria; as shown in Table.7, all clinical features in this patient had reduced significantly by using the above-said *Shodhana* and *Shaman Aushadhi* recommended by ancient Acharyas in the management of *AsthimajjagataVikar*.

## 2. **DISCUSSION**

According to *AcharyaCharak*, the *VataDosha* gets vitiated by excessive intake of *VatavardhakaAhara*, *Atiyayam*, *Atiyavay*, *Aghata*, etc., are the common causative factors for vitiation of *VataDosha*. It causes the *Agnimandya*, then gradually situated in the place of *MajjaDhatu* and forms the *Avarana* and produces the symptoms of *Asthimajjagatavata*.<sup>7</sup> This is the general pathology of *Asthimajjagatavata* as per Ayurved to breakdown this *Samprapti* with the help of *AyurvedaShaman* and *ShodhanaChikitsa*(Table.5).

### 2.1 **Role of Panchakarma procedures**

*Abhyanga* has given with *KottamchukadiTaila*. It is a herbal preparation that contains *Kushta*, *Shunthi*, *Vacha*, *Shigru*, *Lashuna*, *Karttiki*, *Devadaru*, *Sarshapa*, *Rasna*, *Dadhi*, and *Chincha Rasa*. It has *Tikta* (bitter), *Katu* (pungent), dominant *Rasa* (taste), *Laghu* (light), *Ruksha* (dry) in nature, *Ushna* (hot) *Virya* (potency), *KatuVipaka* in the heart. Its functions are like *Aamapachaka*(improves digestion power and digests the toxins released from undigested food). Many components have a

*Lekhaniya*, *Shothahara*, and *Shoolahara* (analgesic) effect.<sup>8</sup> *AnuvasanaBasti* is given with *GoKsheera* and *Majja* (meat soup). The *Ksheera*, which has *Madhura* and *Snigdha* (oleaginous) properties, help to control *VataDoṣa* and *PittaDoṣa* and acts as *Brimhaṇa* (nourishing), *Vrishya* and *Rasayana* (immunomodulation property).<sup>9</sup> *Majja* is also used in *Basti*. It enhances *RaktaDhatu* as it helps in hemopoiesis and strengthens the bone.<sup>10-11</sup> It nourishes *Majja Dhatu*, which signifies the nourishment of *Asti Dhatu*, due to its *Snigdha*, *Pichchila*, *Guru*, and *Asti DhatuBrimhana- Poshana* characteristics. When both *Dhatus* are nourished, *VataShamana* happens. So, according to *Rasa* and *Vipaka*, this *Basti* reaches *Asti* and *MajjaVahaSrotasa*, thereby improving *MajjaDhatu*.<sup>12</sup> The *Poorana* (filling) virtue of this *Majja* nourishes *Asti*, while the *Snehana* property settles vitiated *Vata* in *Asti*. It shows that *Majja* affects the physiology of bone. It contains cholesterol which helps synthesize vitamin D. Recent research has also shown that bone marrow adipocytes fill the bone and act as an endocrine organ and affect bone metabolism through their secretions.<sup>13</sup>

### 2.2 **Role of Internal medicines**

*Shamana Aushadhi* also plays a role in the treatment of AVN; in this case study patient was advised with *Shamana Aushadhi*, which is Classically mentioned by *Ayurveda Acharyas*(Table.6) *GandharvaHaritakiChoorna* acts as *Vatanulomana*, *Ajirnaha*, *MriduVirechaka*, and *Rasayana* due to its *Ushna*, *Sukshma*, and *Tridosha Shamaka* properties.<sup>14</sup> *Shallaki XT* has the action of *Shothahara*, *Vedanasthapana* due to its *Ushna*, *Guru*, *SnigdhaGuna*, and *Ushna Virya* properties.<sup>15</sup> *Tab. Dardanash* is a herbs-mineral combination that contains *Vangabhashma*, *Lohabhashma*, *Swarnamakshika Bhasma*, *Rasasindur*, *Ashwagandha*, *Guggulu*, *Maharasnadi Qwath* act as *Vataghna*, *Shoolaghna*, and *Shothahara*. *Rasnasaṭṭaka Qwath* has *Rasna*, *Guduchi*, *Aragwadha*, *Devadaru*, *Gokshura*, *Erandamoola*, and *Punarnava*. It is anti-inflammatory, anti-rheumatic, laxative, diuretic, and analgesic.<sup>16</sup> *Cap. Bonerich* contains Calcium, Zinc, and Vitamin D. calcium provides bone strength and density and helps treat and prevent low calcium levels.<sup>17</sup> Zinc is necessary for building bone cells, and it inhibits the formation of cells that causes the breakdown of bones.<sup>18</sup> *Vit D* a crucial role in the absorption of calcium and phosphorous from the intestine, which is critical for the formation, growth, and regeneration of bones.<sup>19</sup> Previously patient complained of Breaking Pain over the femur bone, Pain in the right Hip joint, Difficulty while walking, and Radiating Pain from the lumbar region to the thigh region(Table.1). Findings of the MRI reports show Stage -4 Avascular necrosis of the right hip joint and Stage-3 Avascular necrosis of the left hip joint(Figure.2) before treatment. After 12 days, *Shamana* and *ShodhanaChikitsa* patients show significant results in Complaints. A MRI of the bilateral Hip joint shows Improvement as complaints of the patient gradually decreased, and it shows Stage-2 Avascular necrosis(Figure.3) after the treatment.

**Table.1- Chief Complaints & Associated complaints**

S.N	Chief Complaints	Duration	Associated complaints	Duration
1	Asthibheda (Breaking Pain in the femur bone)	10 Days	Disturbed sleep due to Pain	7 Days
2	SandhiShoola (Pain in the right hip joint)	10 Days	Restricted movement of the right leg	10 Days
3	Difficulty in walking	10 Days	-----	----
4	Radiating Pain from the lumbar to the thigh region	7 Days	-----	----

**Table.2- Details of the patient's history**

S. N.	Head	Details of patient
1	History	H/O Fall while running six months back, N/H/O HTN/DM/Thyroid dysfunction/ any other allergic illness.
2	Family history	Not specific
3	Medical history	Took allopathic medicine ( 6 <sup>th</sup> month Back) Tab. Zerodol SP 250 mg 1 B.D., Tab Pan-40mg 1 O.D. ( 7 Days )
4	Personal history	Diet- spicy food, irregular diet schedule Sleep- Disturbed sleep due to Pain Habit- not specific

**Table.3- Findings of AshtavidhaPariksha**

Sr. No	Name	Lakshana
1	Nadi	Vata-kapha Predominant
2	Mala	Asamyak (Irregular, unsatisfactory bowel evacuation)
3	Mutra	Sayaka
4	Jihva	Sama
5	Shabda	Spashta
6	Sparsha	Anushnasheeta
7	Drik	Samyak
8	Akruti	Madhyama

**Table.4 Systemic examinations with Ayurveda's perspective**

S. N	Strotas	Lakshana
1	Mamsavahastrotas	Angagouravata, Atitoda
2	Asthivahastrotas	Sandhishoola, BedavatVedana,
3	Majjavahastrotas	Balakshaya, Ruja
4	Purishvahastrotas	Vibandha
5	Manohavastrotas	Prakriti

**Table.5ShodhanaChikitsa given to the patient**

S. N.	Procedure	Drug used	Duration
1	Abhyanga	Kottamchukaditaila	12days
2	PetiSwedana	Erandapatra, Nirgundipatra, Dashamoolachoorna	12 days
3	Niruhabasti	Dashamoolaqwath+ Ashwagandha Chhorna= 800ml Saindhava Lavana- 10 gm, Honey- 80 ml, GuduchiKalka- 10gm, Sahachara Taila – 50 ml	2days (1 <sup>st</sup> day 7 <sup>th</sup> day)
4	Anuvasanabasti (Majjabasti)	Majja – 30 ml Ksheera( milk ) – 20 ml	10 days ( 2 <sup>nd</sup> to 6 <sup>th</sup> day and 8 <sup>th</sup> to 12 <sup>th</sup> day)

**Table.6- ShamanaChikitsa**

S. N.	Medicine	Dose and frequency	Time of administration	Anupama	Duration
1	Tab Dardanash	250mg 1 tab twice a day	After food	Luke warm water	One month
2	Tab Shallaki XT	250mg 1 tab twice a day	After food	Luke warm water	One month
3	RasnasaftakaQwath	15ml twice a day	After food	Luke warm water	One month
4	GandharvaHaritkiChoorna	10 gm	Bedtime	Luke warm water	One month
5	Cap Bonerich	250 mg 1 tab twice a day	After food	Luke warm water	One month

**Table.7-Observation & Results**

S. N	Symptoms	Graduation		Observed score			
		Before treatment	After treatment				
1	Asthibheda (Breaking Pain)	No piercing pain in bones -0		3	0		
		Mild piercing Pain in bones not affecting daily activities -1					
		Occasional moderate piercing Pain in bone not affecting daily activities. Pain can be relieved by rest no need for medication-2					
		Frequently Severe piercing Pain in bones affecting daily activities. The patient needs medication - 3					
		Continuous severe piercing pain in bones with restricted movements not relieved even by simple medications - 4					
2	Sandhishoola ( Pain in Joints)	No pain -0		3	0		
		Mild Pain + no difficulty in walking - 1					
		Slight difficulty in walking - 2					
		Much difficulty in walking - 3					
3	Katisoola ( Pain in the Lumbar region)	No backache - 0		2	0		
		Occasionally - 1					
		Relieves by medicine - 2					
		Dependent on painkiller - 3					

### 3. CONCLUSION

This case study shows that with the help of Ayurveda's treatment principle, i.e., the Combination of *Shodhana* and *ShamanaChikitsa*, the Vitiated *VataDosh* subtle down to its usual stage, and the *Lakshana*, which occurs due to *KaphanubandhitaVata* can be cured up to maximum extend. A previous study shows that *MajjaBasti* acts as the best *Vatanulomaka* and *Balya* in the *AsthmajagataVata* and strengthens the *Asthi*, *Majja* and cures the degenerative changes which are present in Avascular necrosis conditions. *Shamana* Drugs also help to heal this condition and Associated complaints. The overview of treatment shows it is cost-effective, easy to use, and safe at the O.P.D. level in Avascular necrosis conditions.

### 6. REFERENCES

- Samhita S, Ambikadattashashtri A, Prakashan-Varanasi CS Chapter 14/10 Page No: 49. Edition-2007. In: Sutrasthan.
- Samhita S, Ambikadattashashtri A, Prakashan-Varanasi CS Chapter 15/7 Page No: 57. Edition-2007. In: Sutrasthan.
- Available from: <https://timesofindia.indiatimes.com/city/pune/16000-cases-of-avascular-necrosis-each-year/articleshow/16817285.cms>.
- Samhita S, Ambikadattashashtri A, Prakashan-Varanasi CS Chapter 15/13 Page No: 58. Edition-2007. In: Sutrasthan.
- Hungerford DS. Pathogenesis of ischemic necrosis of the femoral head. 1983;32:252-60.

### 4. AUTHOR CONTRIBUTION STATEMENT

This work was carried out in collaboration among all authors. The author MD designed the study and wrote the manuscript's first draft. Author SP designed the study and managed the literature searches. MN, PS, and SP did the final drafting and Analysis of the study. All the authors read and approved the final manuscript.

### 5. CONFLICT OF INTEREST

Conflict of interest declared none.

6. Chapter S. Ashtanga hridayam, Brahmanand Tripathi, Chaukhamba Sanskrit Pratisthan- Delhi. reprint ed; 2017. p. 19/83-87, page no: 246.
7. Samhita Charak, Parmar VD, Bhandar-Ahmedabad SP Chapter 28/67 Page No: 616. Edition-2019-2020. In: Chikitsasthan.
8. Dr. Ramniwas Sharma S; [Taila Prakarana]. with Hindi commentary. Delhi: Published by Chaukhambha Sanskrit Ptatishthanai [reprint]; 2016p. p. 295.
9. Manjunatha NS. International Journal of Biological and Pharmaceutical Sciences Archive. Int J Biol Pharm Sci Arch. 2021;1(2):046-8.
10. Panda SK. Basic principles of kriya Sharira. New Delhi: Chaukhamba orientalia; 2006.
11. Jain PK. INTERNATIONAL JOURNAL OF AYURVEDA ORIENTATION [international journal];1(1).
12. Kashinath S. Chaturvedi Gorakhnath edited Charak Samhita of Agnivesha, revised by Charaka and Dridhbala. Part j [reprint]. 2015; Sutra Sthana 13, verse 17; page no:259.
13. Jansz M, Rajoria K, Singh SK. Panchkarma procedures along with Thrayodashanga Guggulu in the management of katishool, particularly concerning lumber spondylosis. Int J Res Ayurveda Pharm. Jul-Aug 2016;7(4):50-4. doi 10.7897/2277-4343.074132.
14. Varma S, Sawarkar P, Sawarkar G, Parwe S, Rajwade S, Dodiya M et al. Management of AdhogAmlapitta with Ayurveda: A case study. Int J Health Sci. 2022;6;Suppl 2:1050-61. doi: 10.53730/ijhs.v6nS2.5056.
15. Sawarkar P, Sawarkar G. Management of chronic renal failure (C.R.F.) through Ayurveda-A case report. J Kidney. 2021;7(255):2472-1220.
16. Available from: <http://shabnamherbals.com/dardnash-tablets.html>.
17. Beto JA. The role of calcium in human aging. Clin Nutr Res. 2015 Jan 1;4(1):1-8. doi 10.7762/cnr.2015.4.1.1, PMID 25713787.
18. Bhardwaj P, Rai DV, Garg ML. Zinc as a nutritional approach to bone loss prevention in an ovariectomized rat model. Menopause. 2013 Nov 1;20(11):1184-93. doi 10.1097/GME.0b013e31828a7f4e, PMID 23571522.
19. Available from: <https://pharめeasy.in/online-medicine-order/bonerich-strip-of-10-capsules-506637>.