



AYURVED MANAGEMENT OF SCIATICA- A CASE STUDY

***Vd. Neha G. Tank and Vd. Shruti Pandith K.**

¹MD Ph.D (Panchakarma) Reader- Panchakarma Department, Shree Gulabkunverba Ayurved Mahavidhyalaya, Gujarat Ayurved University, Jamnagar, Gujarat. India.

²BAMS Medical Officer Panchakarma Dept, Shree Gulabkunverba Ayurved Mahavidhyalaya, Gujarat Ayurved University, Jamnagar, Gujarat. India.

***Correspondence for Author: Dr. Vd. Neha G. Tank**

MD Ph.D (Panchakarma) Reader- Panchakarma Department, Shree Gulabkunverba Ayurved Mahavidhyalaya, Gujarat Ayurved University, Jamnagar, Gujarat. India.

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ABSTRACT

In this hectic life sciatic pain is a very common disorder that hampers people from doing their routine activities. Most of people suffering from this, complains about moderate to severe pain in buttock region which then radiate to thigh, calf and down to the foot and even toes. The main cause of sciatica can be a horizontal or slipped disc, piriformis syndrome, spinal stenosis, spondylolisthesis. In the starting stage people neglect this but later this becomes a major issue when the pain becomes unbearable. At this stage they might search for a better cure. There are wide ranges of treatment for sciatica which includes internal medications for pain and inflammation, Physical therapy & spinal injections. And lastly surgery is advised for those who do not respond for conservative treatments. But, these are not much successful and therefore those who are suffering from this are always in search of result oriented remedy. Classics of Ayurveda have references related sciatica, according to Ayurveda signs and symptoms of sciatica is much similar to "Grdhrasi-Vaata Roga." Grdhrasi can be treated remarkably with procedures of panchakarma and internal medications. Here in this case study, the patient was suffering from sciatic pain due to, herniation at L4-5 and L5-S1. She was treated with one course of Kaala Basti followed by Matra Basti along with Abhyanga (ayurvedic massage), Swedana (fomentation) internal medicines were Yogaraja guggulu and Chandraprabha vati. The patient recovered remarkably and could do all her routine activities.

KEYWORDS: Sciatica, Grdhrasi, Panchakarma, Abhyanga, Swedana, Basti.

INTRODUCTION

Sciatica is a kind of neuralgia characterized by intense pain and tenderness along the course of the body's longest nerve (sciatic nerve) extending from back to the thigh down to calf region then down towards foot and toes.^[1] Sciatica can be occurred suddenly or it can be occurred gradually. The pain can be associated with numbness, burning sensation and tingling sensation. It is more accurately termed as lumbar radiculopathy. This is a syndrome involving nerve root impingement or inflammation that has progressed enough to cause neurological symptoms. People suffer from sciatica as a result of 'pinched nerve' affecting one or more of the lower spinal nerves. Nerve might be pinched inside or outside of spinal canal as it passes down.^[2]

CAUSES

The causes of sciatica can be

- A herniated disc or slipped disc-that causes pressure on a nerve root.
- Piriformis syndrome-when piriformis muscle that lies deep in the buttocks, become tight or spasm which can put pressure on and irritate the sciatic nerve.

- Spinal stenosis-this condition results from narrowing of the spinal canal with pressure on the nerves.
- Spondylolisthesis-this is the slippage of one of the vertebra, so that it is out of the line with the one above it narrowing the opening through which the nerve exists.

DIAGNOSIS

This can be clearly diagnosed clearly by complete medical history including review sings, symptoms and physical examination like straight leg raising test. Other improved diagnostic tests like x-rays, magnetic resonance imaging (MRI), electromyography, myelogram etc will give the accurate cause of sciatica.

TREATMENT

There are wide ranges of treatment for sciatica. The main aim of treatment is to decrease pain and increase the mobility. The treatment often includes

- Limited rest-these advices to stay away from hectic works, prolong sitting, standing and weight lifting etc.

- Physical therapy-exercises which strengthens the back muscles thigh muscles and abdominal muscles are advised.
- Medicines-pain medicines and anti inflammatory drug that which helps to reduce the pain, inflammation and stiffness. They includes non-steroidal anti inflammatory drug(NSAIDs) like aspirin, ibuprofen, naproxen etc. Muscle relaxants like cyclobenzaprine are also given.
- Spinal injections-an injection of cortisone into lower back region might help to reduce swelling and pain.
- Surgery-this might be needed for those who do not respond to conservative treatment, and have progressing symptoms. They include microdiscectomy and laminectomy.^[3]

But these are not much successful and therefore people with such disease are always in search of result oriented remedy. The complications associated with untreated sciatica is if the pinched nerve is seriously injured chronic muscle weakness such as drop foot might occur.

Classics of Ayurveda have references related to sciatica. These types of diseases are being discussed under the chapter of Vaata Vyadhi (diseases of Vaata). According to Ayurveda the signs and symptoms of sciatica can be correlated with that of 'Grdhrasi' explained as 'Grthavath Gati'- meaning individual affected with this disorder walks like vulture. Hence It is termed as Grdhrasi. As it is caused by vitiation of Vaata (biohumor) it is popularly known as Grdhrasi Vaata Roga. The symptoms mentioned in classical references are specific type of pain which arise from low back region which radiates to lumbosacral region, buttocks, thighs, down to calf and then to foot and even toes. if the pain is characterized with stiffness, pricking and throbbing in nature then it is due to only Vaata and if there is involvement of Kapha then the pain will be associated with heaviness, drowsiness and lassitude. Depending on dominancy of Dosha, Grdhrasi is divided into two types, they are.

- Vaataja- Involvement of only Vaata Dosha.
- Vaata kaphaja- Involvement of Kapha along with Vaata Dosha.^[4]

TREATMENT

There are wide range of treatments, which includes

- Siravedha-venesection^[5]
- Agnikarma-chemical cotrisation
- Abhyanga- Ayurvedic massage with medicated oils
- Swedana- medicated fomentation
- Basti- therapeutic enema
- Lepa-external application of drugs
- Internal medicines-different kind of decoctions, Tablets and powders which decreases Vaata Dosha.

CASE STUDY

One fine day during my OPD hours at Shree Gulabkunverba Ayurveda hospital, Jamnagar, Gujarat,

India, in the month of may, a 35yr old female patient came with complaints of severe pain over buttocks on her left side that which is radiating to the thighs, calf region and down to the foot. The severity of pain can be marked out from her face itself tears were about to role from her eyes as she was explaining her condition. The Pain severity is more during morning hours when patient gets up from the bed. she was not able to do her routine work like sitting on floor, climbing upstairs, cleaning etc. The pain was associated with heaviness and numbness of the leg. She also suffered from difficulty in walking and prolong standing. Her sleep was disturbed since then due to the shooting type of pain that comes in the midst of night. Her appetite, urine, stool, menstrual history were normal.

Onset of disease was 6 months prior. Before 6 months she had just tolerable pain only during morning hours which was neglected by the patient. Slowly the disease has progressed and now the pain has aggravated and it is unbearable, which is disturbing her routine normal life. The patient has undergone MRI study which shows disc dessication is seen at L4-5 and L5-S1levels. Annular tear is seen at L4-5 level. Diffuse and right lateral bulge is seen at indenting dural sac. Diffused and broad based postero central bulge at L4-5 level disc is seen indenting the dural sac. Pseudo diffuse bulge and postero lateral herniation of L5-S1with left foraminal extension is seen indenting the dural sac, impinging upon exiting bilateral L5 nerve roots.

On examination there was no swelling, tenderness, reddishness or increase in temperature on her back and whole course of lower limb. Her straight leg raising test was positive at app.60 degree on left side. Her blood pressure was 120/80mmHg and pulse 72/minute. She was not having any complaints of diabetes or previous drug allergy. Her routine blood and urine examinations were normal. As per Ayurveda she had kapha-Vaata Prakrti(constitution)and mentally she was madhyama satva (moderate mental capacity). Body built was healthy. she was advised for admission in hospital for Panchakarma treatment.

TREATMENT PLAN

According to Ayurveda patient had Grdhrasi Vaata Vyadhi, So, treatment was planned accordingly. Main line of treatment was Abhyanga (Ayurveda massage) with Bala taila on the back and both legs followed by Patrapinda Swedana and Kaala Basti (therapeutic enema for 16 days) followed by Matrabasti (therapeutic enema only with oil)for 14 days. Along with internal medicines i.e. Yogaraja guggulu and Chandraprabha Vati.

DIETARY ADVISE

Patient was strictly advised for simple food without red/green chills, any type of spices were not allowed. In pulses only green gram (Mung) were allowed and in vegetables (Taroi) Luffa acutangula/ Ridged gourd, (Dhamargava) Luffa cylindrica/Sponge gourd, (Patola)

Trichosanthes dioica/Pointed gourd were permitted and all leafy vegetables were allowed. More emphasis was given for various gruel preparations, soups, green gram soup, rice and various rice recipes and Indian preparation made from rice and lentils (khichadi) because, during Basti treatment improper food may aggravate Vaata thereby disturbing the treatment. Patient can consume milk but not curd and buttermilk. Sour things like lime, tamarind etc should be avoided strictly. Fruits are not allowed during Basti treatment.

ADVISED REGIMEN

Patient was advised for complete bed rest to get maximum result of Basti. Any type of physical or mental exertion, walking, exercise, Gym, Yoga, sexual intercourse, exposure to cold-wind-dust, exposure to excessive sunlight etc should be avoided during Basti treatment.

DETAILS OF TREATMENT SCHEDULE

The Panchakarma treatment consists of Kaala Basti (therapeutic enema) followed by Matrabasti along with

Abhyanga (Ayurved massage) and Swedana (fomentation) and internal drug was Yogaraja guggulu and Chandraprabha vati.

Abhyanga

Special Ayurved massage was done on back and both the legs with warm Bala Tail for 20mins daily.

Swedana (Fomentation)

Swedana was given by using heated pack of fresh herbal leaves of Nirgundi (Vitex negundo) known as Patrapinda Swedana.

Basti (Therapeutic enema)

Kaala Basti was planned which is for 16 days, followed by Matrabasti for 14 days.

Kaalabasti

It consists of two different types of Basti, Anuvaasana (oil enema) and Niruha Basti (decoction enema). Schedule is mentioned in table 1.

Table- 1 A-means Anuvasana Basti, N – is for Niruha Basti.

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Type of Basti	A	N	A	N	A	N	A	N	A	N	A	N	A	A	A	A

Basti drugs

Table-2 Drugs used for Anuvaasana Basti (oil enema)

No.	Name of drug	Dose	Duration
1	Bala Ashwagandhaadi oil.(Arya vadiya shala Kottakal)	60ml	Both these oils were mixed together and total 120ml of Anuvaasana Basti was given every alternate days.
2	Rasanadi Tail (Arya vadiya shala Kottakal)	60ml	

Table- 3 Drugs used for Niruha Basti (decoction enema)

No	Name of drugs	Quantity	Description
1	Saindhava (Rock salt)	5gms	All these drugs were mixed as per classical indication i.e. first saindhava and honey should be mixed properly than both the oils, but one should not add the whole quantity of oil at a time it should be mixed by pouring very small quantity in honey. If you add the whole quantity of oil in honey it will not form homogenous mixer. Once oil and honey are mixed properly we can add Kalka and lastly warm decoction of Dashmool. ^[6]
2	Honey	60ml	
3	Kalka- consists of fine powder of 5 herbs they are Triphala, Trivruta, Kataphal, Madanaphala and Vacha. availed from the in-house pharmacy of the hospital	20gms	
4	Oil-Bala-Ashwagandhaadi and Rasanadi Tail. (Arya vadiya shala Kottakal)	Each oil 60ml so total quantity 120ml	
5	Dashmoola decoction availed from the in house pharmacy of hospital	400ml	

*Kalka drugs

- Triphala it is combination of 3 herbs they are Haritaki- Terminalia chebula, Bhibhitaki- Terminalia bellirica and Amalaki-Emblica officinalis.

- Trivruta- Operculina terpepethum
- Kataphal- Myrica esculenta
- Madanaphala- Randia spinosa
- Vacha- Acorus calamus

***Drugs of Dashmool decoction**

Shalparni (*Desmodium gangeticum*), Prashniparni (*Uraria picta*), Kantakari (*Solanum surattense*), Bruhati (*Solanum indicum*), Gokshura (*Tribulus terrestris*), Bilva (*Aegle marmelos*), Agnimanth (*Premna integrifolia*), Sonapaatha (*Oroxylum arborea*), Paatala (*Sterospermum suaveoleus*) and Gambhari (*Gmelina arborea*).

Contents of Bala-Ashwagandhaadi**Matra Basti**

Table- 4: MB-Matrabasti (therapeutic enema with medicated oil).The oil used are Balashwagandadi oil and Rasnadi oil 30ml each.

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Type of Basti	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB	MB

It mainly contains Bala (*Sida cordifolia*) and Ashwagandha (*Withania somnifera*) along with other Vaata decreasing drugs like devadaru (*Cedrus deodara*) chandana (*Santalum album*) laksha (*Laccifera lacca*) manjishta (*Rubia cordifolia*).

Contents of Rasanadi Tail

It mainly contains Rasana (*Pluchea lanceolata*) and many other Vaata decreasing drugs.

Table- 5: Contents of Yograja Guggulu^[7]

Sr. No.	Name of drugs used in Yogaraja Guggulu	Botanical / English Name	Sr. No.	Name of drugs used in Yogaraja Guggulu	Botanical / English Name
1	Citraka	Plumbago zeylanica	15	Dhanyaka Beej	Coriandrum sativum
2	Pippalimula	Piper longum	16	Haritaki	Terminalia chebula
3	Yavani	Trachyspermum ammi	17	Bibhitaki	Terminalia bellerica
4	Krsna Jiraka	Carum carvi	18	Amalaki	Emblica officinalis
5	Vidanga	Embelia ribes	19	Musta	Cyperus rotundus
6	Ajamoda	Carum roxburghianum	20	Sunthi	Zingiber officinale
7	Svetajiraka	Cuminum cyminum	21	Marica	Piper nigrum
8	Devadaru	Cedrus deodara	22	Pippali	Piper longum
9	Cavya	Piper chaba	23	Dalacini	Cinnamomum zeylanicum
10	Ela	Elettaria cardamomum	24	Usira	Vetivera zizanioides
11	Sandhava Lavana	Rock salt	25	Yavaksara	Hordeum vulgare
12	Kustha	Saussurea lappa	26	Talisapatra	Abies webbiana Lind.
13	Rasna	Pluchea lanceolata	27	Tejapatra	Cinnamomum tamala
14	Gokshura	Tribulus terrestris	28	Suddha Gugulu	Commiphora Mukul

Table- 6: Contents of Chandrapraba vati^[8]

Sr. No.	Name in Sanskrit / Hindi	Botanical / English Name	Sr. No.	Name in Sanskrit / Hindi	Botanical / English Name
1	Musta	Cyperus rotundus	20	Marica -Krsna	Piper nigrum
2	Bhunimba	Swertia chirata Buch.	21	Pippali	Piper longum
3	Amrta (Guduci)	Tinospora cordifolia	22	Maksika Bhasma	Chalko pyrite, Copper Pyrite
4	Daruka (Devadaru)	Cedrus deodar Roxb.	23	Yava ksara	Hordeum vulgare
5	Haridra	Curcuma longa	24	Sarjika Ksara	Fuller's earth
6	Ativisa	Aconitum heterophyllum	25	Saindhava Lavana	Rock salt
7	Darvi (Daruharidra)	Berberis aristata	26	Saurvarcala Lavana	Black Salt
8	Pippali Mula	Piper longum	27	Vida – Lavana	
9	Citraka mula	Plumbago zeylanica	28	Tivrtta (Syama)	Ipomoea turpenthum R. Br.
10	Dhanyaka	Coriandrum sativum	29	Danti Mula	Baliospermum montanum
11	Haritaki	Terminalia chebula	30	Patraka	Cinnamomum tamala
12	Bibhitaki	Terminalia bellerica	31	Tvak (Dalacini)	Cinnamomum zeylanicum
13	Amalaki	Emblica officinalis	32	Suksmaila	Elettaria cardamom
14	Cavya Kanda / Cavika	Piper chaba	33	Vamsarocana	Bambusa bambos
15	Vidanga Beeja	Embelia ribes	34	Loha Bhasma	Iron
16	Gaja Pippali	Scindapsus officinalis	35	Sita	Sugar

		Schult.			
17	Sunthi	Zingiber officinalis	36	Silajiat (Shuddha)	Purified Black Bitumen
18			37	Suddha Guggullu	Commiphora mukul
19			38	Gogharta	Cow's Ghee

- Internal medications – Yogaraj guggulu 1 tablet three times a day with warm water, Chandrabaprabha vati one tablet three times a day with warm water. Both tablets were given after food.
- Total two types of Basti were administered, i.e. Kaala Basti- Basti with schedule of 16 days alternate days oil enema and decoction enema and followed by Matra Basti which consists of only oil enema and was administered for 14 days immediately after Kaala Basti. During the administration of Basti patient was asked to continue internal medicines. After completion of Basti patient was discharged then she was asked to continue with internal medicines, along with application of oil on her back and legs, with strict diet and regimen. Patient was advised to continue maximum rest for 3 months. Slowly the pain reduced and there was marked improvement.

Changes in MRI study was obtained which can be seen in reports. Scanned copy of MRI study of LS Spine before and after treatment is attached here with. Disc desiccation and diffuse circumferential mild posterior herniations at L4-5 and L5-S1 encroaching on bilateral neural foramin. Right exiting nerve roots at L4-5 mildly abutted. Compared to previous MRI there was much improvement.

DISCUSSION

Panchakarma is main line of treatment in disease of Vaata and amongst it Basti is considered as a 50% treatment. So, keeping in mind these facts in the present case Basti treatment was planned along with Abhyanga and swedana (fomentation) as again they are very important to subside Vaata biohumor. The oil used in Abhayanga was Bala oil (*Sida cordifolia*) which decreases the increased Vaata biohumor.

Probable mode of action of drugs used in Anuvaasana, Niruha Basti & Matra Basti.

Oil and decoction are main drugs for Basti and its probable mode of action can be explained as below.

Bala-Ashwagandhaadi oil contains mainly Bala and Ashwagandha and Rasanadi oil contains mainly Rasna along with many other drugs which are Vaata decreasing.

Bala (*Sida cordifolia*)- it mainly promotes the tone and power of muscles and it decreases Vaata.^[9] The plant is analgesic, anti-inflammatory and tonic. It affects the central nervous system and provides relief from anxiety. Kanth and Diwan also demonstrated that *S. cordifolia* can increase pain tolerance and appears to have anti-inflammatory properties.^[10] (Kanth et al., 1999).

Ashwagandha (*Withania Somnifera*) is Bruhaniya (the one which nourishes the tissues), Balya (promotes the tone and power of muscles), Rasayana (rejuvenates), Vrishaya (aphrodisiac), and Shothahara (decreases the swelling).^[11]

Some of the research work on anti-inflammatory effect of Ashwagandha are as follows.

Anti-inflammatory effects

Ashwagandha acts as an effective anti-inflammatory agent and relieves the symptoms of arthritis and variety of rheumatologic conditions. Naturally, it has much higher steroidal content than that of hydrocortisone. In one of the animal study it was observed that rats treated with powder of *Withania somnifera* root orally for 3 days, 1 h before injection of inflammatory agent produced anti-inflammatory responses comparable to that of hydrocortisone sodium succinate.^[12]

Anti-inflammatory effects

In vitro and animal experiments suggest *W.somnifera* may possess anti-inflammatory properties. Cultures of cartilage from patients with osteoarthritis and rheumatoid arthritis have been used to demonstrate *W.somnifera*'s protective effects on chondroblasts. Related effects on cytokines and transcription factors and suppression of nitric oxide have also been demonstrated. In experiments in rats with induced inflammation, decreased inflammation (paw volume), pain and disability were noted, as well as an antipyretic effect after administration of *W.somnifera* root powder.^[13,14,15]

RASANA

Pluchea lanceolata. Rasana is best drug for Vaatahara (the one which subsides the Vaata biohumor).^[16] Amapachana (improves the digestion), Kapha Vaatanashana (destroys the increased Kapha & Vaata bio humor), Shothahara (decreases the swelling), useful in all 80 types of Vaata diseases.^[17] It is highly effective in the treatment of Low Back Pain, sciatica and Sacro-Iliac joint disease / pain. Being bitter in taste (Tikta rasa) and hot in potency (Ushnaveerya), combats both Kapha and Vaayu, thus relieves stiffness and pain associated with back pain low, sciatica and other painful conditions of the back and lower limbs. It is also a potential analgesic. It also relieves inflammation and regional swelling (Shothahara).

Since it is one of the best Aamahara (expels metabolites and detoxifies the system) it is also used in back pain occurring due to inflammatory arthritis like Aamavata (rheumatoid arthritis).

Dashmoola Kwatha

It is combination of 10 drugs which are mentioned above. It mainly destroys diseases of all the 3 biohumors, decreases pain & swelling and promotes interest in food.^[18]

Probable mode of action of Internal drugs

Internal drugs were Yogaraja Guggulu and Chandraprabhavati. It's probable mode of action can be explained as below.

Yogaraja Guggulu-indicated in Amavaata (Rheumatoid arthritis), Gout etc diseases, it increases the digestive fire, muscular strength & Aura, it destroys the disease of Sandhi & Majjagata Vaata (diseases pertaining to joints & bonemarrow).^[19]

Chandrapraba vati-The drugs like Pippali moola and Vacha act as sedative and relieve anxiety. The drugs like Trikatu, Chavya and Musta etc help to relieve state of Mandagni. The drug namely Guggulu is included in higher quantity which is proven as anti inflammatory drug. The formulations act as anti spasmodic and analgesic agent to manage backache.^[20]

Probable Mode of Action of Basti

Again Basti as a procedure also has its own effect which can be explained as below.

1) By Absorption Mechanism

Basti being the most widely used and highly effective treatment modality in the Ayurveda, it is the prime subject of interest for modern scientific community. With this background the basic question which comes forward regarding Basti is "do active principles of drugs used in Basti get absorbed in systemic circulation?" Considering absorption factor Swapnil et al. carried out a study in which they have given Triphaladi decoction Basti containing biomarker gallic acid and after Basti they traced it in the circulation. The rectum has rich blood and lymph supply and drugs can cross the rectal mucosa like other lipid membrane. Thus unionised and lipid soluble substances are readily absorbed from the rectal mucosa. Small quantity of short chain fatty acid fatty acids, such as those from butterfat are absorbed directly into portal blood rather than being converted into triglycerides. This is because short chain fatty acids are more water soluble and allow direct diffusion from the epithelial cells into capillary blood of villi. However decoction Basti gets a very little time maximum 48 minutes^[21] to absorb from colon and rectum how so ever these areas have very large surface area and highly vascular needed for absorption. Retention time for Anuvashana Basti is relatively more so probability of absorption also increases. Anuvasana Basti after reaching in the rectum and colon causes secretion of bile from gall bladder which leads to the formation of conjugate micelles which is absorbed through passive diffusion. Especially short chain fatty acid present in Sneha of Anuvasana Basti may absorb from colon and large

intestine part of gastrointestinal tract and break the pathology of disease. In Basti Karma, a homogenous emulsion^[22] of Honey, Saindhava, Sneha Dravya, Kalka, and decoction mixed in remarkable combination after proper churning (break the large and middle chain fatty acid into small chain fatty acids) is given which facilitates absorption better than a single drug per rectum. In Ayurveda classics, various Basti Dravya are mentioned in diverse proportion in different diseases, it again confirms pharmacodynamics of Basti through absorption mechanism.^[23]

REFERENCES

1. National Institute of Arthritis and Musculoskeletal and Skin Diseases. National Institute of Health. September, 2009; Retrieved 10 June 2013.
2. Tarulli AW Raynor EM, Lumbosacral radiculopathy, *neuro Clin*, 2007; 25(2): 387-405.
3. American academy of orthopaedic surgeons sciatica accessed, 2014; 6: 25.
4. Agnivesh Charaka Samhita, Vidyotini hindi commentary by K.N. Shashtri and G. N. Chaturvedi. 18th edition Chaukhambha Bharti Academy, Varanasi, Chikitsa Sthana, 28(56): 787.
5. Agnivesh Charaka Samhita, Vidyotini hindi commentary by K.N. Shashtri and G. N. Chaturvedi. 18th edition Chaukhambha Bharti Academy, Varanasi, Chikitsa Sthana, 28(101): 795.
6. Agnivesh Charaka Samhita, Vidyotini hindi commentary by K.N. Shashtri and G. N. Chaturvedi. 18th edition Chaukhambha Bharti Academy, Varanasi, Sidhhi Sthana, 3(23): 994.
7. Ayurvedic. Formulary of India, Part-1, 2nd edition, 69.
8. Ayurvedic Formulary of India, - 2nd Edition Part-1 Page no.-186.
9. Agnivesh Charaka Samhita, Vidyotini hindi commentary by K.N. Shashtri and G. N. Chaturvedi. 18th edition Chaukhambha Bharti Academy, Varanasi, Sutra Sthana, 25(40): 469.
10. Chopra Kanth VR, Diwan PV. Analgesic, anti inflammatory and hypoglycemic activities of *Sida cordifolia*. *Phytotherapy research*. PTR, 1999; 13(1): 75-77
11. Sribhava mishra Bhavaprakasha edited with the 'Vidyotini' hindi commentary, Notes and Appendix by Shri Brahmashankara Mishra & Shri Rupalalaji Vaishya. First part, Edition. Chaukhambha Sanskrit Bhawan. Guduchiyaadi Varga, 2013; 393.
12. AnBalagan, K. and J. Sadique. Influence of an Indian medicine (Ashwagandha) on acute-phase reactants in inflammation. *Indian J. Exp. Biol.*, 1981; 19: 245-249.
13. Sumantran VN, Chandwaskar R, Joshi AK, et al. The relationship between chondroprotective and antiinflammatory effects of *Withania somnifera* root and glucosamine sulphate on human osteoarthritic cartilage in vitro. *Phytother Res.*, 2008; 22(10): 1342-1348.

14. Sumantran VN, Kulkarni A, Boddul S, et al. Chondroprotective potential of root extracts of *Withania somnifera* in osteoarthritis. *J Biosci.*, 2007; 32(2): 299-307.
15. Singh RH, Narsimhamurthy K, Singh G. Neuronutrient impact of Ayurvedic Rasayana therapy in brain aging. *Biogerontology.*, 2008; 9(6): 369-374.
16. Agnivesh Charaka Samhita, Vidyotini hindi commentary by K.N. Shashtri and G. N. Chaturvedi. 18th edition Chaukhambha Bharti Academy, Varanasi, Sutra Sthana, 25(40): 469.
17. Sribhava mishra Bhavaprakasha edited with the 'Vidyotini' hindi commentary, Notes and Appendix by Shri Brahmashankara Mishra & Shri Rupalalaji Vaishya. First part, Edition. Chaukhambha Sanskrit Bhawan. Haritakiyadi Varga, 2013; 79.
18. Sribhava mishra Bhavaprakasha edited with the 'Vidyotini' hindi commentary, Notes and Appendix by Shri Brahmashankara Mishra & Shri Rupalalaji Vaishya. First part, Edition. Chaukhambha Sanskrit Bhawan. Guduchiyaadi Varga, 2013; 234.
19. Govinddas Sen Bhaishajaya Ratnavali, Vidyotini hindi commentary by Shree Ambika dutta Shashtri 12th edition Chaukhambha Sanskrit Sansthana, Varanasi, chapter, 21/162-167: 443.
20. N Krishnan Raju et al, Anti inflammatory prospective study of guggulu on wistar rats, RGR Sidhanti college of pharmacy secunderabad 500034, 2011-12.
21. Swapnil Auti et al., Effect of Triphaladi Basti in the management of dyslipidemia M.D. (Ayu.) dissertation, Jamnagar, 2011.
22. S.S. Savrikar C.E. Lagad, Study of preparation and standardisation of Madhu Tailik Basti W.S.R to emulsion stability, *Ayu*, 2010; 31(1): 1-6.
23. Shukla GD, et al. A comparative study of efficacy of Virechana and Basti Karma with Shamana therapy in the management of Essential Hypertension, M.D. (Ayu.) dissertation, Jamnagar, 2010.