



ISSN 2456-3110

Vol 8 · Issue 3

March 2023

Journal of
**Ayurveda and Integrated
Medical Sciences**

www.jaims.in

JAIMS

An International Journal for Researches in Ayurveda and Allied Sciences



Maharshi Charaka
Ayurveda

Indexed

An observational study of anatomical changes in Lumbar Spine produced due to *Atibharvahan* in farmers using MRI

Dibyajyoti Moharana¹, Sarbeswar Kar², K. C. Das³

¹Assistant Professor, Department of Panchakarma, Shri Krishna Ayurvedic Medical College, Varanasi, Uttar Pradesh, India.

²Professor, Department of Shalaky Tantra, Principal, JSS Ayurvedic Medical College, Mysore, Karnataka, India.

³Professor, Department of Kayachikitsa, Principal, SVM Ayurvedic Medical College, Ilkal, Karnataka, India.

ABSTRACT

For diagnosis and treatment of various diseases anatomical study i.e., *Rachana Sharir* is necessary. *Rachana Sharir* - human anatomy is explained in detailed by various *Acharyas* in their *Samhitas*. For locomotory movements of human body, bones and joints are essential aspect of anatomical learning. Detail explanation of *Asthi* (bones) is described in *Ayurvedic* classics and modern science which will be studied and utilized for the observational study of lumbar spine in farmers due to *Atibharvahan*. India is agriculture predominant country. As numbers of farmers are more which deals with heavy weight lifting leading to physical stress and strain in Lumbar spine, which was not studied earlier.

Key words: Lumbar Spine, *Atibharvahan*, MRI.

INTRODUCTION

The description of anatomy in *Ayurveda* is peculiar. *Marma*, *Srotas*, *Kala* etc. are described only in *Ayurveda*. One should have a thorough knowledge of basic principles in *Ayurveda*, for the successful use of *Ayurvedic* way of treatment. The modern science of medicine has developed anatomy by continuous research in this subject. Hence an *Ayurvedic* physician must know modern anatomy and its applied aspects. He must study how the anatomical structure has been involved and modified in a particular disease. Considering involvement and changes of structures he

should decide the line of treatment to get the complete success in the treatment.

The success of treatment depends on the knowledge of human body. While considering the pathology/etiology of any disease by *Ayurvedic* method, *Ayurvediya Racanā Sārira* must be considered first but beyond that; knowledge of modern anatomy must be applied for the thorough understanding of the disease because it is said that,

The physician who studies only one science will not be able to arrive at a correct decision. Therefore, the physician should study many sciences.

In brief modern anatomy must be studied in details by a physician and structural involved must be examined. Now days advanced diagnostic imaging techniques help us in this regard.^[1,2]

Vayu develops hollowness within the bone which is filled up by the essence of *Meda* called *Majjā* (marrow). *Asthi* is an important place of *Vayu*. It produces *Saushirya* porosity in bones, *Bhrama* and *Timira Darsana* (Blackout). *Majja Kshaya* causes *Alpa Śukrata*, pain in joints and bones and feeling of hollowness in the bone. Joints of bones are those

Address for correspondence:

Dr. Dibyajyoti Moharana

Assistant Professor, Department of Panchakarma, Shri Krishna Ayurvedic Medical College, Varanasi, Uttar Pradesh, India.

E-mail: dibyajyotimoharana@gmail.com

Submission Date: 16/01/2022 Accepted Date: 24/02/2023

Access this article online

Quick Response Code



Website: www.jaims.in

DOI: 10.21760/jaims.8.3.5

where bones articulate together with the ligaments and tendons. *Ati Sopha, Ruja, Balaksaya, Parva Bheda Sopha, Sandhikarmoparati* (inoperativeness of joint) mark the injury of the movable or immovable joint.

Caraka Samhita is the first and foremost treatise that elaborates *Vata, Vatavyadhi* at full length. The role of *Vata Dosha* in health and disease is described in the first chapter itself. He allotted major part of 12th chapter entitled *Vatakalakaleeya* for the description of *Vata*, its normal functions and both intrinsic and extrinsic factors for its aggravation. In 17th chapter *Kiyantashiraseeya*, the two modes of morbidity of *Vata* i.e., *Chaya* and *Prakopa* as well as different courses of *Doshas* in the pathogenesis of disease are described. He has mentioned *Shula* as a symptom of provoked *Vata*.

In *Maharogadhyaaya*, the 20th chapter in *Sutrasthana*, where he enlists *Nanatmaja Vatavyadhi*, though *Kati Graha* has not been mentioned, other symptoms of spinal disease like *Prushtha Graha, Trikagraha, Pada Shula, Supti*, etc. is found.

As he has not given place for *Vatavyadhi* in *Nidana Sthana*, he stressed the importance of *Vata* in 28th chapter of *Chikitsa Sthana*. He further described five varieties of *Vata* and etiology of its morbidity along with its clinical features. The description of morbidity of *Vata* included the different clinical manifestation according to the site of involvement. The unique pathogenesis of *Vata* vitiation due to the obstruction to its passage or functioning is elucidated in full detail. In addition, the elaborate description of treatment of imbalance of *Vata* in general, and at specific sites and when the passage is obstructed in particular is also made in the same context. This chapter also includes the complete description of certain common *Vatavyadhi* is in regards its etiology, pathogenesis, general principles of treatment as well as treatment in particular.

Different references related to *Katishoola* in *Charaka Samhita*:

- *Prishthashoola* as *Nanatmaja Vatavikara*
- *Katiprishthashoola* or *Graha* as a symptom of *Vrikkajavidradhi*

- *Jengha-Uru-Trika Shoola* occurs in *Apatarpana* disorders
- Excessive use of *Katu Tikta* and *Kashaya Rasa* leads to *Vatavyadhi*
- Different types of pain In *Kati* and *Parshva* in *Vataja Jwara*
- Different types of pain in *Kati* and *Prishtha* in *Vatika* of *Taitarika Jwara* and *Udara Roga*
- *Kati-Prishtha Shoola* in *Vatika Arshas*
- *Kati-Uru-Trika Shoola* in *Vatika Atisara* have been mentioned
- *Trika -Vedana* due to *Pakwashayagata Vata*
- *Trika Roga* is Told in *Gudagata Vata* have been mentioned
- *Prishthashoola* as *Nanatmaja Vatavikara*
- *Katigraha* as one of the *Swedya*
- *Katiprishthashoola* or *Graha* as a symptom of *Vrikkajavidradhi*
- *Jengha-Uru-Trika Shoola* occurs in *Apatarpana* disorders
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Anatomy was much advanced during *Sushrut's* period. He has counted 300 bones and 24 *Prakaaras* of joints in relation to the spine. In *Sharira Sthana*, *Sushruta* has described the structure of *Prushtha, Pada* and its joints. He clearly mentioned in *Marma Sharira* that

trauma on *Kukundara Marma* leads to sensory and motor loss of lower limbs and leads to disability (*Vaikalyata*). In *Siravyadha Sharira* he described the position, place and method of *Siravyadhana* in *Vatavyadhi* cases.^[3]

Sushruta has given much importance by allotting the first chapter of *Nidana Sthana* itself for *Vatavyadhis*. He portrayed some allied conditions like *Gridhrasi*, *Khanja*, *Pangu*, *Kalayakhanja* etc. but references for *Katigraha* are not found. In *Bhagna Nidana* chapter he made many original observations pertaining to *Sandhimukta* (dislocation or herniation) *Kandabhagna* (fracture). His description pertaining to classification, clinical features, prognosis etc., of *Sandhimukta* suits for lumbar disc prolapse which is responsible for majority of Low back ache and sciatica cases.^[4]

Hareeta described the etiological factors of *Vata Prakopa* very elaborately. He has illustrated the *Vata* disorders classifying according to five varieties of *Vata* with mentioning about 16 diseases for each type.

In *Kashyapa Samhita* there is no specific chapter for *VataVyadhi Chikitsa*. However, the general aspects of *Vata* and its aetiopathogenesis are discussed in *Sutrasthana* in similar lines as that of *Charaka*.^[5]

Methods

1. Total number of 30 patients were selected in OPD basis irrespective of their gender.
2. Informed written and valid consent of the patient taken prior to commencement of clinical trials.

Total 32 Patients completed the study successfully. Observations were carried out before and after completion of treatment and during each follow up.

Method of selection of Study subjects

- Patient suffering from lower back pain, restricted lower back movements, numbness & weakness of both legs studied.
- A case record form will be designed for the study.
- Based on clinical observations farmers selected after giving an idea of the project and informed consent taken prior to study.

- Patient clinically examined in detail.
- The structural involvements and changes noted with the help of X-ray (radiology).

A] Inclusion criteria

1. The patients were professionally Farmers.
2. Patient between 35-70 years of age were selected.
3. Professional Farmers who have had complaint of persistent lower back pain and restricted lower back movements were selected.
4. Patient who has been in the profession for more than 10 years.
5. Patients were selected irrespective of gender, region and religion etc.

B] Exclusion criteria

1. All patients with congenital, traumatic, functional, infective, inflammatory, neoplastic pathology were excluded.
2. Non-co-operative patients were excluded.

Operational definition of Atibharvahan

Patient (Farmer) who does daily weight lifting (more than 27kg, even small weight for long time) since more than 10 years, daily work of farmers is laddering, ploughing, water/seeds/soil lifting in bucket, hoeing dry soil, bund trimming etc. wet/dry soil, spade work, disk harrowing, cutting crops, grain cutting, grain threshing by beating, pounding grain etc.

Ayurveda is a science of life, which is framed on a many concepts. All these concepts are proved & established facts. The methodology adopted to establish these facts was holds good for that perspective era. In the present era, due to globalization of *Ayurveda* & too easily convince the common people, these olden techniques are not sufficient, so these old principles should be reestablished with the help of modern advanced technology. As *Asthi* & *Majja* is among *Sapta Dhatu* & it does the function of *Dharana* & *Purana*. The normalcy & abnormality of *Asthi* & *Majja* can be easily visualized with the help of so many techniques. One among them is MRI. By these deformities of IV foramina, Muscles, Ligaments, IV space, etc. can be

ruled out & this is one amongst best technology to rule out deformities of *Asthi & Majja Dhatu*.

For diagnosis and treatment of various diseases anatomical study i.e., *Rachana Sharir* is necessary. *Rachana Sharir* - human anatomy is explained in detailed by various *Acharyas* in their *Samhitas*, text and in classics. For locomotory movements of human body, bones and joints are essential aspect of anatomical learning. Detail explanation of *Asthi* (bones) is described in ayurvedic classics and modern science which will be studied and utilized for the observational study of lumbar spine in farmers due to *Atibharvahan*.^[6-8]

Discussion on demographic data

- 1. Atibharvahan for long time causes more symptoms in patient:** In this preset study 30 subjects showed *Katishool* (pain), 28 subjects showed *Katistabdhatta*, 26 subjects showed *Chankraman Kashtata* (Difficult in walking)
- 2. Age:** In this Present Clinical trial group of 5 patients belongs to Age Group 35 to 40 years, 6 patients belongs to Age Group 41 to 50 years, 12 patients belongs to Age Group 51 to 60 years, 7 patients belongs to Age Group 61 to 70 years
- 3. Gender:** In these present study 11 subjects was female and 19 subjects were male. Male are prone for this, because working phenomena.
- 4. Atibharvahan duration:** In this Present Clinical trial group of 9 patients belongs to *Atibharvahan* duration 15 to 25 years – 8 patients belongs to *Atibharvahan* duration 26 to 35 years, 9 patients belongs to *Atibharvahan* duration 36 to 45 years, 4 patients belongs to *Atibharvahan* duration 46 to 55 years.
- 5. Intervertebral disc changes:** In this preset study 5 subjects showed Intervertebral disc bulge L1-L2, 10 subjects showed Intervertebral disc bulge L2-L3, 18 subjects showed Intervertebral disc bulge L3-L4, 26 subjects showed Intervertebral disc. Bulge L4-L5, 23 subjects showed posterior disc bulge L5-S1.
- 6. Intervertebral Foramina Changes:** In this preset study 2 subjects showed Intervertebral foramen narrowing L1-L2. 7 subjects showed Intervertebral

foramen narrowing L2-L3, 17 subjects showed Intervertebral foramen narrowing L3-L4, 21 subjects showed Intervertebral foramen narrowing L4-L5, 16 subjects showed Intervertebral foramen narrowing L5-S1,

- 7. Ligaments changes:** In this Present Clinical trial 12 patients showed Thickening of Ligaments, 18 patients showed Unremarkable Thickening of Ligaments.
- 8. Lumbar Muscle Changes:** In this preset study 8 subjects showed Muscles Spasm, 20 subjects showed Mild Muscles Spasm, 2 subjects showed Unremarkable Muscles Spasm.

RESULTS

Assessment Criteria

- 1. Vertebral Body:** All subjects showed degenerative & osteophytic changes in vertebral body.
- 2. IV Disc:** 2 subjects showed posterior disc bulge at L1-L2 & L4-L5, 3 subjects showed posterior disc bulge at L1-L2, L2-L3, L3-L4 & L5-S1, 5 subjects showed at posterior disc bulge L2-L3 & L4-L5, 1 subjects showed posterior disc bulge at L2-L3 & L4-L5, 3 subjects showed posterior disc bulge L2-L3, L4 L5 & L5-S1, 1 subjects showed posterior disc bulge L3-L4, 14 subjects showed posterior disc bulge L3-L4 & L5-S1.
- 3. IV Space:** In this present Study, all subjects showed reduced IV space.
- 4. Muscles:** All subjects showed Unremarkable mild Spasm in muscles.
- 5. Ligaments:** All subjects showed Unremarkable mild thickening in Ligaments.
- 6. IV foramina:** 1 subject showed L1-L2 & L4-L5 narrowing IV foramina, 1 subject showed L1-L2 L5-S1 narrowing IV foramina, 3 subject showed L1-L2, L2-L3, L3-L4 & L5-S1 narrowing, 5 subject showed L23-L3, L4 L5 & L5-S1 narrowing, 3 subject showed L2-L3 & L5-S1 narrowing, 1 subject showed L2-L3, L4 L5 & L5-S1 L5 narrowing, 1 subject showed L2-L3, L4 L5 L5 narrowing, 1 subject showed L3 L4, L4-

L5 L5 narrowing, 12 subject showed L3-L4 & L5 S1 narrowing, 1 subject showed L3-L4 L5 narrowing

Mechanism of Action

Ati Bhar Vahan means excessive *Shareera Ayas Janana Karma* that is more than *Ardha Shakti Vyayam*. When person performs the *Ati Bhar Vahan* continuously it leads to increase in *Laghu, Ruksha, Sukshma, Teekshna Guna, in Shareera*. Later it invariably leads to *Vata Vitiation*. Because *Vata* have some *Guna, Like Laghu, Ruksha, Sukshma*, etc on the basis of *Samanya Siddhanta*, as per contemporary science, excessive exercise causes the injury to the body like changes in bone & bone marrow.

DISCUSSION

- *Asthi & Majja* is among *Sapta Dhatu*, & it does the function of *Dharana & Purana*.
- The normal & abnormality of *Asthi & Majja* can be easily visualised with the help of so many techniques.
- One among them is MRI.
- By these deformities of IV foramina, Muscles, Ligaments, IV space, etc. can be ruled out & this is one amongst best technology to rule out deformities of *Asthi & Majja Dhatu*

MRI for evaluation of various acute traumatic spinal injuries

- Ligamentous injury
- Disc damages and herniations
- Extra medullary haemorrhage.
- Vascular injuries
- Cord injuries
- Acute vs old vertebral fracture
- Benign vs malignant fracture

Mechanism of Action

- *Ati Bhar Vahan* means excessive *Sharira Ayas Janana Karma*
- That is more than *Ardha Shakti Vyayam*.

- When person performs the *Atibharvahan* continuously it leads to increase in *Laghu, Ruksha, Sukshma, Teekshna Guna, In Shareera*.
- Later it invariably leads to *Vata* vitiation. Because *Vata* have some *Guna, like Laghu, Ruksha, Sukshma*, etc on the basis of *Samanya Siddhanta*
- Excessive exercise causes the injury to the body like changes in bone & bone marrow.
- Farmers having a work like pulling, pushing the heavy things. Heavy work load effects on the lumbar region.
- *Asthi Majjagata Vata* is the *Vata* situating condition deep in *Asthi & Majja Dhatu*, in which patient is suffering from severe pain, insomnia, tenderness.

Role of MRI

- With advances in computer graphics technology, a complete 3D computer graphics-based geometrical model of the locomotor system.

CONCLUSION

Degenerative & osteophytic changes of vertebral body, Intervertebral space reduces. Intervertebral posterior disc bulge specifically L-4 & L-5. Intervertebral foramina narrowing specifically L-4 L-5 is found. Straightening of lumbar spine is noted due lumbar muscle spasm. This structural modification accompanied by thickening of ligamentum flavum.

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How to cite this article: Dibyajyoti Moharana, Sarbeswar Kar, K. C. Das. An observational study of anatomical changes in Lumbar Spine produced due to Atibharvahan in farmers using MRI. J Ayurveda Integr Med Sci 2023;03:31-36.
<http://dx.doi.org/10.21760/jaims.8.3.5>

Source of Support: Nil, **Conflict of Interest:** None declared.
