

REVIEW ARTICLE

Basic Concepts of Spine and Spinal Disorders

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ABSTRACT

When we think about spine or spinal disorders, we must concentrate on basic concepts of *Ayurveda*. Spine is made up of *Mamsa Dhatu*, *Asthi Dhatu*, *Majja Dhatu*, *Medo Dhatu*, *Rakta Dhatu* as well as *Vata*, *Pitta*, and *Kapha Dosha*. Concepts of *Agni*, *Purishdhara Kala*, and *Pittadhara Kala* play an important role in spinal disorders.

As a traditional health care supportive to a total quality of life, *Ayurveda* or its core concepts must be evaluated in a prospective approach through primary understanding of *Ayurvedic* core concepts followed by search into modern knowledge. If we consider spine based on the *Ayurvedic* physiology, i.e., what type of *Dosha*, *Dhatu-UpDhatu* shows their existence in this region? What types of humors play an important role during embryonic evolution of spine (process of *Dhatu Nirmana*)? What is the role of *Agni* or *Kala* in spinal disorders?

If we interpret these core concepts with prospective approach, we should better understand pathophysiology of spinal disorders, treatment and mechanism of drug action used in spinal disorders. This prospective approach will be discussed in full paper.

Keywords: Ayurvedic physiology, *Dhatu Nirmana*, *Kala*, Prospective approach, Spine.

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INTRODUCTION

Spinal disorders are very common in today's lifestyle. The spine is designed to hold the body upright and serve as its primary support. The curvature of spine is made up of bones, muscles, nerves, ligaments, tendons, and intervertebral disks. When we think about spine or spinal disorders we must concentrate on *Ayurvedic* basic concepts related with spine. The prospective approach of *Majja Dhatu*, *Asthi Dhatu*, *Mamsa Dhatu*, *Medo Dhatu*, *Rakta Dhatu* as well as *Pittadhara Kala*, *Purishdhara Kala*, concept of *Agni* and *Vata Dosha* with reference to spine proves the

value of *Ayurveda* as a traditional health care supportive to a total quality of life.

ROLE OF MAJJA DHATU

“मज्जवहानां स्रोतसां अस्थीनिमूलं संध्यश्च ।”¹

The root or root habitat of *Majja Dhatu* is bones, i.e., medullary cavity of larger bones and joints. The word joints include bone joints as well as skeleto-muscular junction and neuromuscular junction.

As per *Acharya Charaka*, larger bone spaces filled with very viscous substance are called as *Majja Dhatu*.

As per *Acharya Sushruta*, *Majja Dhatu* originated from *Medo Dhatu*. *Medo Dhatu's* unctuous quality converted into *Majja Dhatu*.

Larger bones contain *Majja Dhatu* and smaller bones filled with *Medo Dhatu* associated with *Rakta Dhatu*.

“तृतीया मेदोधरा; मेदो हि सर्वभूतानामुदरस्थम् अण्वस्थिषुच, महत्सुच मज्जा भवति । स्थुलास्थिषु विशेषेण मज्जा त्वभ्यन्तराश्रितः अथ इतरेषु सर्वेषु सरक्तं मेद उच्यते ॥”²

Majja Dhatu plays an important role in smooth functioning of *Vata Dosha*. All spinal movements are performed under the influence of *Vata Dosha*. Oily property (स्निग्धगुण) of *Majja Dhatu* pacifies roughness (रूक्षगुण) of *Vata Dosha* and thus helps in smooth functioning of *Vata Dosha*. *Vata Dosha* vitiated due to *Vata Prakopaka* diet and routine which affects *Majja Dhatu*. This induces porosity in bones and symptoms like joints pain.

“शीर्यन्त इव चास्थिनि दुर्बलानि लघुनि च ।

प्रततं वातरोगिणि क्षीणे मज्जनि देहिनाम् ।”³

ROLE OF MAJJADHARA KALA (PITTADHARA KALA)

“षष्ठी पित्तधरा नामः या चतुर्विधमन्नपानमुपभुक्तमामाशयात् प्रच्युतं पक्वाशयोपस्थितं धारयति ।”⁴

“एवं यैव पित्तधरा सैव मज्जधरेति ।”⁵

Pittadhara Kala is situated at small intestine (ग्रहणी). Factors that affect this membrane of lining finally affects *Majjavaha Srotasa*. Small intestine, i.e., *Pittadhara Kala* is the main site for digestion of long chain fatty acids or fats. Vitiated *Pittadhara Kala* lacks proper digestion and assimilation of fats, and consequently develops vitiated *Majja Dhatu*. This *Majja Dhatu* functions improperly and affects spine (intervertebral disk).

ROLE OF AGNI

Panchabhautic Ahara requires *Jathara Agni* for its conversion into smaller molecules (संघात भेदन).⁶ *Agni* acts upon

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Panchabhautic Ahara and converts it into *Sara* and *Asara* constituents whereas *Saptadhatvagni* acted upon related *Dhatu Poshaka* part.⁷

Causative factors for vitiation of *Majjavaha Srotasa* affect Agni.

“उत्पेषाद् अतिअभिष्यन्दादभिघातात् प्रपीडनात् ।
मज्जवाहीनि दृश्यन्ति विरुद्धानां च सेवनात् ॥”⁸

AtiAbhishandi diets weaken energy of Agni. Vitiating Agni affects *Dhatvagni*, which resulted in *Majjavaha Srotodushti*. This causes following sign and symptoms.

“रुक् पर्वणां भ्रमो मूच्छां दर्शनं तमस्तथा ।
अरुषा स्थुलमूलानां पर्वजानां च दर्शनम् ॥”⁹

In spinal disorders, we can find these symptoms.

ROLE OF MEDO DHATU

Majja Dhatu derived from unctuous quality of *Medo Dhatu*.

“मेदसस्तानि पूर्यन्ते स्नेहो मज्जा ततः स्मृतः ।
करोति तत्र सौषिर्यमस्थानां मध्ये समीरणः ।
मेदसस्तानि पूर्यन्ते स्नेहो मज्जा ततः स्मृतः ॥”¹⁰

Bones are surrounded by *Medo Dhatu*. By association and dissociation action of *Vata Dosha* during remodeling or ossification of bone, spaces are created inside bone. These spaces are filled by *Medo Dhatu*. This intrinsic *Dhatu* inside larger bone is known as *Majja Dhatu*. *Medo Dhatu's* unctuous quality not only generates *Majja Dhatu* but also affects the status of other *Dhatu*s like *Asthi*, *Majja*, and *Shukra*.

Degradation in unctuous quality of *Medo Dhatu* affects formation of higher order *Dhatu*. This causes symptoms of deterioration of *Dhatu* (धातुक्षयजन्य लक्षणम्).¹¹ Hence, if our diet is devoid of essential oils, higher order *Dhatu* lacks nourishment from *Medodhatu*.

“मेदः स्नेहेस्वेदोदृढत्वं पुष्टिम् अस्थानां च ॥”¹²

As *स्नेह गुण* maintains integrity of cell membrane, in absence of *स्नेहगुण* cell wall lost its integrity (दृढत्वम्), this phenomenon causes degeneration of higher order *Dhatu*. Same phenomenon plays an important role in spinal disorders.

ROLE OF SNAYU

“मेदसः स्नायुसंभवः ॥”¹³

स्नायु is one sort of subset of *Dhatu* which is derived from *Medo Dhatu*. Two separate part put together in proper position is called as (बंधन) in *Ayurveda*. *स्नेह गुण* of *Meda Dhatu* maintains the integrity of different types of बंधन.

“स्नायुबन्धनं प्रोक्ता देहमांसास्थिमदसाम् ॥”¹⁴

In human body *Meda*, *Mamsa*, and *Asthi* are put together in proper alignment with the help of *स्नायु*. The curvature of spine is maintained by ligaments (स्नायु) with the help of *Sneha* from *Meda Dhatu*. Lack of *Sneha* declines the performance of ligaments that is why deterioration of *Medo Dhatu* causes symptoms like *स्वपनं कटयाः*, *संधीनां स्फुटनं*, *सन्धिश्नून्यता*.¹¹

ROLE OF ASTHI DHATU

“मज्जवहानां स्रोतसां अस्थीनिमूलं संघयश्च ॥”¹

According to different biotransformation process of diet in classical text, *AsthiPoshaka* constituents by its own Agni gets converted into *Sthula Asthi Dhatu*, *Majja Dhatu Poshaka* constituent and excretory product like nails and hairs. According to *Bhava Prakash Samhita*, during biotransformation of *AsthiPoshaka* constituents, *Majja Dhatu Poshaka* constituent separated just like oozing of sweat and concentrated into a viscous form which is called as *Majja Dhatu*.

“अस्थि यत् स्वाग्निना पक्वं तस्य सारो भवेत् घनः ।

यः स्वेदवत् पृथक्भूतः स मज्जा इत्याभिधीयते ॥”¹⁵

Asthi Dhatu is a precursor of *Majja Dhatu* as said by *Acharya Sushruta* and *Vagbhata*.

“अस्थीनि देहधारणं मज्जः पुष्टिं च ॥”¹⁶

“देहोर्ध्वताधारणमज्जपोषणाभ्यामस्थि ॥”¹⁷

Vitiation of *Asthi* is a causative factor for *Majjavaha Strotodushti*, as crushing of bone or bone injuries brings vitiation in *Majjavaha Srotasa*. Hence, when we think about spine, we must think about vertebral column which is made up of bones. A column injury causes spinal disorders.

“अस्थिवहानां स्रोतसां मेदोमूलं जघनं च ॥”¹⁸

Formation of *Asthi Dhatu* is carried out by semisolid *Medo Dhatu*. According to *Chakraani Datta*, the precursor *Asthi Dhatu* will always be in fluid state. With this fluid state it can be easily transported in *Asthivaha Srotasa*.

अस्थयपि द्रवरुपम् अस्त्येव स्रोतोबाह्यमिति कृत्वा अस्थिवहानाम् इति उक्तम् ॥¹⁹

With the help of heat of *Asthi Dhatvagni*, fluid or gelatinous nature of *Asthi Dhatu* converted into ossified bone by the aggregation of inherent *Mahabhuta* and *Sneha* of *Meda Dhatu*.

“पृथिव्यग्न्यनिलादीनां संघातः स्वोष्मणाकृतः ।

खरत्वं प्रकरोत्यस्य जायते अस्थि ततो नृनाम् ॥”²⁰

Absence of *स्नेह गुण* causes fragility of bones and develops osteoporotic changes. Hence in classical text, nourishment of *Asthi Dhatu* is the important function of *Medo Dhatu*.

This *Asthi Dhatu* affects higher *Dhatu Majja*, as its deterioration causes deterioration of *Majja Dhatu*. Such deteriorated *Majja Dhatu* causes osteoporosis, bony pain, etc.

“मज्जक्षये – अस्थिनिस्तोद अस्थिश्नून्यता ॥”²¹

ROLE OF MAMSA DHATU

लेपन कर्म of spine is done by *Mamsa Dhatu*. It keeps spine in upright position. Covering of the body parts is nothing but लेपन कर्म. *Mamsa Dhatu* covers *Sira*, *Snayu*, *Asthi*, and *Sandhi* in the form of muscle tissue. All types of contraction and relaxation movements in the body is due to *Mamsa Dhatu* in the form of *Snayu* and *Kandara*.

“मांसपेशयो बलायस्युः अवष्टंभाय देहिनाम् ।

प्रसारण आकुंचनयोरंगानां कंडरा मताः ॥”²²

Ligaments (स्नायु) play an important role in maintaining posture of body, contraction, and relaxation of muscle and gives support to muscle for attachment with bone. That is why they are called as root of *Mamsavaha Strotasa*.

Causative factors of *Mamsavaha Strotasa* bring loss of muscle power and then cause faulty body posture.

“अभिष्यन्दीनि भोज्यानि स्थूलानि च गुरुणि च ।
मांसवाहीनि दुष्यन्ति भुक्त्वा च स्वपतां दिवा ।”²³

Extra workload of spinal muscle and faulty posture cause spinal disorders.

ROLE OF RAKTA DHATU

Raktadhara Kala embedded in muscles is another form of *Mamsadhara Kala*.²⁴

The network of *Raktavaha Strotasa* inside muscle nourishes all *Dhatu*s with the help of blood vessels, which are the subset of *Rakta Dhātu*.

“धातुनां पुराणं । स्वाः सिराः संचरत् रक्तं कुर्यात् ।”²⁵

Process of nourishment to all *Dhatu*s depends upon formation and integration of blood vessels. That is why in deterioration of *Rakta Dhātu*, blood vessels lost their tone which causes nourishment defect.

Even if solid entities like *Kapha* and *Meda* block lumen of blood vessels, they cause same nourishment defects. Finally, any defect in the blood vessels of spine causes spinal disorders.

“कफमेदोनिरुद्धमार्गत्वात् एव शेषा धातवो ना आप्यायन्ते ।”²⁶

ROLE OF PURISHDHARA KALA

“पञ्चमी पुरीषधरानाम्; यः अंतःकोष्ठे मलम् अभिविभजते पक्वाशयस्था ।”²⁷

Purishdhara Kala is situated at अंतःकोष्ठ, which sort out nourisher and nonnourisher part of the digestive process. The main spot of this sort-out process is पक्वाशय. According to *Acharya Sushruta*, this is mainly divided into two parts: Upper part and lower part.

“अंतकोष्ठे कोष्ठमध्ये, तत्रापि रसविभागे किट्टस्य पुरीषत्वात् तत् पुरीषं कोष्ठे विभजति कोष्ठात् पृथक् करोति, स चात्र पुरीषविभागोऽग्निमारुतकृतोऽपि ; तत्राग्निकृतो यथा – विवेचयति च रसमूत्रपुरीषाणि । मारुतकृतो यथा – सोऽन्नं पचति तज्ञास्च विशेषान् विविनक्तिः ।”²⁸

In upper part, there is dominance of Agni, which sort out and separates *Sara* constituents, *Mutra*, and *Purish Poshaka* constituents. While in lower part there is predominance of *Vata Dosha*, which is responsible for real stool. *Asthi Dhātu* plays an important role in the formation of spine. *Asthiposhaka* constituents are mainly absorbed by *Purishdhara Kala*.

“यैव पुरीषधरा सैव अस्थिधरा ।”⁵

Hence बस्ति कर्म or विरेचन कर्म is very helpful in spinal disorders.

ROLE OF VATA DOSHA

पक्वाशय is the main area of dominance for *Vata Dosha*. पक्वाशयगत वात produces symptoms like त्रिक, पृष्ठ, कटिग्रह.²⁹ *Vata*

Dosha is mainly responsible for all association and dissociation movements at spinal joints. Hence, vitiation of पक्वाशयगत वात shows above symptoms. Regarding the treatment of पक्वाशयगत वात, *Acharya Sushruta* said that if the root of vitiation is in upper पक्वाशय where *Pitta* is in dominance, then the patient should be advocated for स्नेहविरेचन and if the root is in lower पक्वाशय where *Vata* is in dominance, then the patient should be advocated for स्नेहबस्ति.³⁰

Hence, while treating spinal disorders, we should use prospective approach regarding basic concepts that help to get better result in treatment.

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