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A Comprehensive Structural Study Of *Kati Kasheruka* And It's Applied Aspects W.S.R. To *Katishool* In Lumbar Spondylosis

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ABSTRACT:

Ayurveda adapts laws of nature and propounds number of applied doctrines for the understanding of life, health and diseases. Human lumbar vertebrae supports the weight of the upper body. Loads lifted and carried by the upper extremities cause significant loading and stress to the vertebral bodies. Katishool can be a result of conditions affecting the discs between the vertebrae, ligaments around the spine and discs, spinal cord and nerves, muscles of lower back and various other factors. Increasing age brings about inevitable changes in the structure, shape and function of the human vertebrae.. What factors mediate this degenerative progression in lumbar spine? What leads a large portion of the population to manifest spondylosis, even early on their lives?

Hence the conclusion's put forth are that the *Ruja, Stambha, Khanjata, Shopha, Asthi vikruthi lakshana's* are seen in the *Kati Sandhi* during trauma ,sports, routine work injuries are due to the involvement of structural changes in lumbar vertebrae which were identified by the radiological findings..*Vata dosha* is the major factor behind the whole pathogenesis involved in *Katishoola*. All the *Nidanas* of *Vatavyadhi* & *Vata prakopa* can be regarded as *Nidana of Katishoola*..Degenerative changes are more likely to occur in women as compared to men.

Keywords :- Spondylosis, *Ruja, Stambha, Khanjata, Katishoola*.

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INTRODUCTION

For an expert *vaidya* to treat a disease, knowledge about the *Shareera* and its part is very mandatory. *Sushruthacharya* describes that *Asthi dhatu* is responsible for *shareera dharana and poshana* karma of *majja dhatu*. Among these, *Asthi* has great importance as they maintain normal body posture and helps in locomotion. Globally, about 40% of people have Low Back Pain at some point in their lives, with estimates as high as 80% of people in the developed world. Difficulty most often begins between 20 to 40 years of age and it is more common among people aged 40 to 80 years. LBP is an important clinical, social, economic and public health problem affecting the population indiscriminately. Consequently, the vast literature available on LBP is heterogeneous but also contradictory. What

factors mediate this degenerative progression in lumbar spine? What leads a large portion of the population to manifest spondylosis, even early on their lives? This problem, supposedly has a favorable natural history, although it can be remarkably disabling, has challenged the health care providers. This study primarily helps for the better understanding of the diagnostic skills and a more reasoned approach to treatment . Hence, the study is undertaken.

AIMS AND OBJECTIVES

- Comprehensive structural study of *kati kasheruka* (lumbar vertebrae) and it's applied aspects w.s.r to *katishool* in lumbar spondylosis.
- The in depth study about lumbar spondylosis based on the individual and the severity of the spine positions.

MATERIALS AND METHODS

Source And Collection Of Data

Ayurvedic classical texts like *Brihatrayee*, *Laghutrayee* and all relevant texts from various modern texts of Anatomy, Physiology, Orthopedics and Radiology and by the previous works done thesis, Journals, through photographs. Also data from relevant and trustworthy Internet Sources.

Plan of study: The structural changes happening in lumbar vertebrae will be identified with the help of Radiographs collected. For the present study, patients fulfilling the clinical criteria of *Katishoola* (Lumbar spondylosis) were randomly selected by simple randomization method from the O.P.D and I.P.D of KC and *Panchkarma* department, SSRAMC, INCHAL and review has been done on the basis of published data.

Review Of Literature

I. KATI

(1) Etymology of *Kati*:

“Kati” is derived from the root “Kat + in” meaning *sareera avayava vishesham* .

(2) Definition of *Kati*:

According to *Sushrutha acharya*, we can say that *Kati* is formed by union of 5 individual

bones -viz.guda bhag, both nitamba and trik.¹

(3) Dimension of *Kati*:

In *Charaka Vimana sthan* dimension of *Kati* is described as 16 Angul.²

According to *Aacharya Sushrut* , dimension of male chest is same as a dimension of female waist. The dimension of female chest is 18 *Angul* which is same as male waist.³

Vice a versa female waist is 12 *angul* which is same as a male chest.⁴ According to *Aacharya Charak*, *Kati* is 1/3 of chest.⁵ According to *Sushrut*, main site of *Medh-dhatu* is *Kati* and *Vrukka*.⁶

Vikrut avastha of asthi dhatu

According to *Aacharya Charak* when vitiated *Vata* enters into the *Asthi and Majja dhatu*, it produces symptoms like *sandhishool*, *manasbalakshaya*, *aswapna* and *satat ruk*.⁷

According to *Acharya Sushrut* when *Vata* is situated in *Asthi Dhatu* it produces piercing pain. ⁸Also when *Vata* is situated in *Majja Dhatu* it produces continuous pain.⁹

II. SANDHI

SANDHI SHAREERA

Ayurveda has a unique way of defining and classifying various body constituents. The *Sandhi* word is derived from the root *Sam+dha+ki*. The word '*Sandhi*' belongs to *pullinga*. '*Sam*' *upasarga* has been used. It is originated by '*Dha*' *dhatu*. '*Ki*' *pratyaya* is used. This means *Sandhanamiti* – Holding together, joining, and binding.¹⁰

Definition of *Sandhi*

Where two or more bony articular surfaces are joined together they form *Sandhi*. From the mobility and dislocation point of view, Sushruta has considered only bony joint¹¹. Bones are joined to each other with the help of *Mamsa, Sira, Snayu and Asthi* binding each other are collectively can be considered as *Sandhi*.¹²

Synonyms

Amarakosha- Sandhi, Slesha. Anekartha Sangraha-Sanyoga, Slesha.¹³

Panchaboutikatva of *Sandhi*

As the *Sandhi*'s are the meeting point of *Asthi*'s, it indicates the involvement of *Prithvi mahaboota*. The space which is seen between the articular surfaces indicates towards the presence of *Aakasha mahaboota*. The synovial fluid which is present between the articular surfaces shows the presence of *Jala mahaboota*. The warmness which is seen after the movements of joints indicates the presence

of *Agni mahaboota*. The various movements and functions of *Sandhi* are because of *Vata*, indicating the presence of *Vayu mahaboota*.¹⁴

Sandhi and Garbha bhava's: The *Sandhi*'s can be considered under *Pitruja bhava's*.¹⁵

Sandhi and Dosha: Acharyas described that *Sandhi*'s are formed by *Shleshaka Kapha*.¹⁶

Sandhi and Kala

The fourth *Kala* is known as *Shleshmadhara Kala* which is located in the *Sandhi*'s and binds the bony ends together.

CLASSIFICATION OF SANDHI

It is mainly of two types:

A. Classification based on *Kriya*

Functionally the *Sandhi*'s can be classified into two varieties:

- 1) *Chestavantha*.
- 2) *Sthira*.

The *Chestavantha* are further classified into two:

- 1) *Bahuchala* (Freely movable). 2) *Ishatchala* (Slightly movable).

B. Classification based on *Rachana*

According to Acharya Susrutha the structural classification of *Sandhi*'s are eight types. *Kati sandhi* comes under *Pratar* type.¹⁷

SANDHI SANKHYA

According to *Acharya Charaka* there are 200 *Sandhi's*¹⁸ *Acharya Susrutha* explains that the *Sandhi's* are 210 in number, in which 68 are in *Shakha's*, 59 in **Koshta** and 83 are present in *Greeva*.¹⁹

Sandhi viddha lakshana's²⁰

Acharya Sushrutha explains *Sandhi Vidha* as: Injury to the *Chestavantha and Sthira Sandhi's* will lead to excessive increase of inflammatory swellings, severe pain, debility, breaking pain and inflammation in small joints, even loss of function of joints.

MODERN REVIEW²¹**(A) LUMBAR VERTEBRAE**²²**i. Lumbar vertebrae in general**

A typical lumbar vertebra has the following characteristics

- The body is large and kidney shaped.
- The pedicles are strong and directed backward.
- The laminae are short in a vertical dimension (important when performing a spinal tap.)
- The vertebral foramina are triangular.
- The transverse processes are long and slender.
- The spinous processes are short, flat, and quadrangular and project posteriorly.
- The articular surfaces of the superior articular processes face medially, and those

of the inferior articular processes face laterally. Note that the lumbar vertebrae have no facets for articulation with ribs and no foramina in the transverse processes.

Fifth (Atypical) Lumbar Vertebra

1. The most important distinguishing features are as follows.

- a. The transverse processes are thick, short and pyramidal in shape. Their base is attached to the whole thickness of the pedicle and encroaches on the side of the body.
- b. The distance between the inferior articular process is equal to or more than the distance between the superior articular process.
- c. The spine is small, short and rounded at the tips.

Ossification: A lumbar vertebra ossifies from three primary centres—one for the body or centrum and one each for each half of the neural arch. These appear in the third month of the foetal life

There are seven secondary centres.

Clinical Anatomy Of Lumbar Vertebra

The lumbar region is a common site of a number of developmental deformities like Sacralization of fifth lumbar vertebra, Spina bifida, Spondylolisthesis, Fracture-dislocation.

Investigation²³

Radiologists consider a lumbar spine radiographic film of good quality when it demonstrates the lower ribs, lumbar vertebral bodies, transverse processes, pedicles, spinous processes, sacrum, and sacroiliac joints.

1) Lumbar spine AP or PA 2) Lumbar spine lateral 3) Lumbar spine oblique

AYURVEDIC REVIEW**Derivation Of Katishoola**

The word 'Katishoola' originated from the union of two words 'Kati' and 'Shoola'. 'Kati' is derived from the root "Kat + in" meaning *sareera avayava vishesha*²⁴. In "Amara Kosha" the word meaning of "Kati" is "Katau Vastra Varanau", part of the body covered with clothe²⁵.

Shoola is a severe pain similar to driving a nail into the body and it is *parayaya* (Synonym) of *Ruja*.

Paryaya

It is mentioned under various terms like Katishoola, Trika Shoola, Trika graham and Prishtagraha Prishtashoola, Vatikshoola.

Definition Of Katishoola

When *shuddha vayu* or *Sama vayu* gets vitiated in *Kati pradesha* and the pain produced in the *sphik asthi and prista vamsha asthi* is termed as Katishoola²⁶

Asrayasthana Of Vata:

Kati pradesha is described as an important seat of *Vata dosha*. In *Katishoola*, *vata* gets vitiated in its *swasthana*. *Katishoola* is mentioned under *Vatavyadhi* by all *Acharyas*.

Nidana

In classics there is no specific *Nidana* has been mentioned for *Katishoola*. *Katishoola* is a *Vatavyadhi*, so general *Nidana* of *Vatavyadhi* can be considered as *Nidana* of *Katishoola*.

Samprapti:

All the *Nidanas* of *Vatavyadhi* & *Vata prakopa* can be regarded as *Nidana* of *Katishoola*. *Samprapti vyapara* is on the similar lines of *Vatavyadhies*. The two types of *samprapti* have been discussed before as *dhatukshaya* and *margavarodha*.

Poorvaroopa²⁷

In *Katishoola* vague pain, mild discomfort in the low back and limitation in the spinal movements in its minimal severity may be considered as *poorvaroopa*.

Roopa

Katishoola being a *Vatavyadhi* is characterized by *ruja* and *stabdhata* in *katipradesha*.

These symptoms manifest in a clear and distinguishable form from its vague and mild form in

Poorvaroopavastha.

Vyavachchedhaka Nidana Of Katishoola

Gridhrasi, Pakwashyagata vata, Gudagata vata.

LUMBAR SPONDYLOSIS ²⁸

Etymology

'Spondylosis' it is derived from Ancient Greek 'spondylos', it represents "a vertebra", in pleural "vertebrae - the backbone". The word, spondylos (Greek) means 'Vertebra'; losis means 'Disease'.

Definition

Spondylosis: Spondylosis is stiffening of the spine (vertebrae) as the result of a disease.

It is often called osteoarthritis. It refers to degenerative changes such as bone spurs and degenerating inter-vertebral discs. Cause is usually age related.

Spondylosis: Causes and Risk Factors

Cause- Degenerative changes, Improper posture of back, Previous spinal disease, Traumatic injury, Back sprain/ strain, PIVD, Congenital deformity.

Risk Factors For Spondylosis:

Age, Female sex, Genetic factors, Major joint trauma, stress, Obesity, Congenital/Developmental defects, Prior inflammatory joint disease.

Pathology

In the cases of lumbar spondylosis, the degenerative changes are simply a manifestation of increasing age or wear and tear.

Phase I- Stage of Dysfunction: It is the initial effects of repetitive micro trauma with the development of circumferential painful tears of the outer, innervated annulus and associated end-plate separation that may compromise disc nutritional supply and waste removal. In this stage, localized synovitis of the facet joint is seen.

Phase II - Stage of Instability: This is characterized by the loss of mechanical integrity with progressive internal disruption of disc with changes of resorption and additional annular tears, combined with further facet degeneration with lax capsules that may induce subluxation and instability. It seen in the age group of 35-70 years.

Phase III - Stage of Stabilization: It seen in over 60 years. In this stage, continued disk space narrowing and fibrosis occurs along with the formation of osteophytes and transdiscal bridging.

OBSERVATIONAL STUDY²⁹

The diagnosis of spondylosis is made using radiology tests such as plain film X-rays, MRI, or CT scans. Simple PFR is a common diagnostic tool to diagnose lumbar spondylosis basing upon following radiological characters-Marginal osteophytes Lumbar vertebra, Reduced Vertebral body height, Reduced Lumbar inter-vertebral disc space,End plate sclerosis, Scoliotic changes in Lumbar Spine, Exaggerated lumbar lordosis, Straightening of the lumbar spine. In a classic case of lumbar spondylosis, the space between discs in the lumber spine

becomes narrowed. As a result, the patient develops numbness, tingling, and pain which seem to radiate out from the area. These symptoms are the result of pressure on the nerves as they exit the spinal cord. If the spondylosis is allowed to progress, it can lead to a narrowing of the spinal canal, resulting in impingement of the spinal cord, which can cause poor bladder control, unsteady gait, and other severe neurological problems According to modern medicine, this stage may be correlated with stage-1 degeneration i.e. dysfunctional phase of spines.

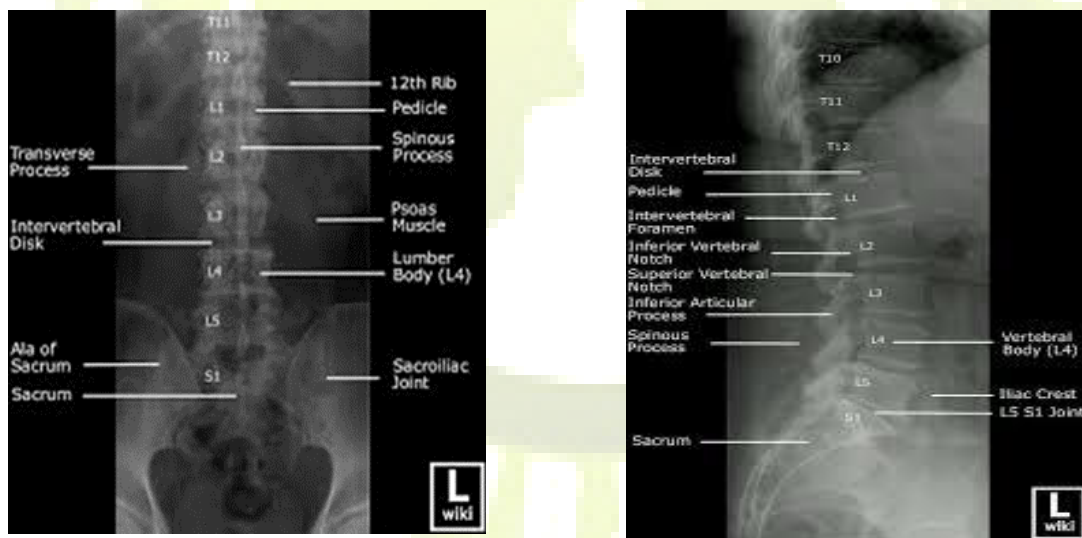


Fig.No.1 Radiological and Pictorial presentation of lumbar

Fig.No.2 Normal Lumbar X-Ray

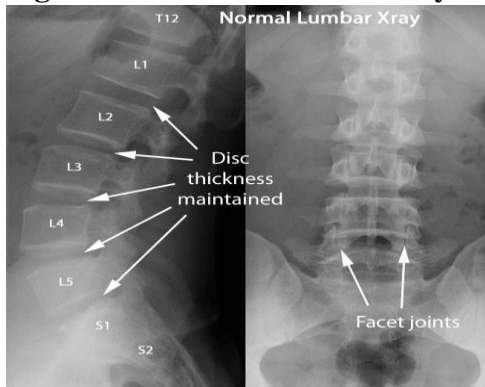


Fig No.3 .Lumbar spondylosis spine X- ray³⁰



Fig No.4 .Changes in Lumbar spondylosis



Phase-I: This pathogenesis leads to the restriction of the movements of the *Kati Sandhi* (Lumbar spine). During the progressive phase, the *Asthivridhi* (osteophytes formation) occurs between two adjacent vertebrae, which cause the compression of the vertebral artery as well as the emerging nerve root through the intervertebral foramen of the respective vertebrae. The compression of nerve root exhibits the neurological symptoms.

Phase-II: This phase is being developed due to progressive loss of mechanical

integrity of the lumbar joint. The disc related changes include multiple annular tear; internal disc disruption and loss of disc space. In Ayurveda, this stage can be correlated with *Vimukta Sandhi Bandhana* (Looseness of joints).

Phase III: The third and final phase is stabilization, characterized by further description (*Ekadeshaja Dhatukshaya*), disc space narrowing, disc fibrosis (*Sandhi Sankocha*) and osteophytes (*Asthivridhi*) formation. These features might be observed due to *Vataprokopa* and

developed the clinical features like *Sandhi Shoola* (pain), *Sandhi Shopha* (disc herniation), *Karmahani* (restricted movement), *Shunyata* (numbness) in respective area of the nerve supply.

RESULTS

From this observation, we realise that more males are suffering from low backache, tingling sensation, etc. as compared to that of the females, reason for this is might be males are very prone to the heavy workload, walking, standing and riding for long duration, sitting in improper postures. More patients were found in age group 50-60 yrs. because in this age group structural changes happen predominantly due to degeneration which in turn gives rise to low backache, tingling sensation etc. All these factors aggravate the pain and excessive stress on lumbar spine (*Atipravrutti* & *Vishamcheshta*) might have leads to *Dhatukshaya* and *Vataprakopa*. *Dwidoshas Prakruti* are more prevalent than that of *Ekdoshaj*. Because of the tendency of Vata to be enveloped is more common in *Dwidoshas prakruti* than that of *Ekdoshas*. More patients were having the history of aggravation of low back pain due to seasonal changes. Among the chief complaints, *Katishoola* (Low backache)

was found in all cases. In *Katishoola*, the aggravated *Vata Dosha* might have provoked disturbed function of *Katisandhi* at the onset and started process of *Asthikshaya*. *Shoola* is developed due to compression or irritation of spinal nerves of lumbar spine which is cardinal symptoms of *Vatavyadhi* that brought the patients towards physician.

CONCLUSION

Injury to the *Chestavantha Sandhi's in kati pradesh* will lead to excessive increase in severe pain, inflammation, debility, breaking pain and even loss of function of joints.

- *Ruja, Stambha, Khanjata, Shopha, Asthi vikruthi lakshana's* are seen in the *Kati Sandhi* during trauma, sports, routine work injuries are due to the involvement of structural changes in lumbar vertebrae which were identified by the radiological findings.
- *Vata dosha* is the major factor behind the whole pathogenesis involved in *Katishoola*. All the *Nidanas* of *Vatavyadhi* & *Vata prakopa* can be regarded as *Nidana of Katishoola*. *Katishoola* being a *Vatavyadhi* is

characterized by *Shoola and Stabdhata* in *Katipradesha*.

- *Katishoola* most often begins between 20-40 years of age and it is more common among people aged 40-80 years .
- Degenerative changes are more likely to occur in women as compared to men.

- *Kati Shoola* may occur independently or as a complication in many diseases which should be kept in mind while doing clinical examination.
- Preventive aspect and patient's education play an important role in the management of *Katishoola*.

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