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A Patho-Physiological Study on Gridhrasi: Ayurvedic and Modern Review

Kavita Rathiya^{1*} and Nikhila Ranjan Nayak²

^{1,2}Post Graduate Dept. of Roga Nidana evum Vikriti Vigyan, Govt. Ayurveda College, Raipur, Chhattisgarh, India

ABSTRACT

Gridhrasi among the *Nanatmaja Vata Vyadhi* is characterized by *Stambha*, *Ruka*, *Toda* and *Spandana* which is described by *Acharya Charaka*, in *Sutrasthan 20 (Maharoga Adhyaya)*. Such symptoms initially affect *Sphika* (buttock) as well as the lateral aspect of *Kati* (waist) and then eventually radiate to the later aspects of *Uru* (thigh), *Janu* (knee), *Jangha* (calf) and *Pada* (foot). *Acharya Sushruta* mentioned for *Gridhrasi* most of the *Hetu* from which '*Vata Vaigunya*' is very important for causing pain. *Vata* is the main factor that causes the *Gridhrasi* disease and may include other *Doshas*. In the course of the affected portion, it ultimately plays a role in the over stimulation of the nerve as caused by severe pain. In modern medical science, *Gridhrasi* can be compared to sciatica according to its signs and symptoms. However, prolapsed intervertebral disc are the most common among the galaxy of sciatic causative factors; and thus, many of the descriptions of sciatic pathophysiology are mostly centered around this single entity. Sciatica is not a single disease entity, but rather a series of symptoms that can be triggered by any of the multiple diseases that affect the sciatic nerve or its roots. *Samprapti* helps in the diagnosis of contributing factors present in the disease, which in turn indicates the disease name. *Samprapti* of disease help for prescribing *samprapti vighatana chikitsa*. It is also helpful in planning *samsodhana*, *samsamana* and *langhana* therapy based on morbidity of *doshas*.

KEYWORDS

Gridhrasi; Sciatica; Samprapti; Vata; Kapha; Pathogenesis



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INTRODUCTION

Locomotor system disorders are increasing in this present era, which in terms of social and professional life limits human activity. *Gridhrasi* is one of the serious debilitating diseases amongst these disorders. *Gridhrasi* is a frequently encountered problem generated commonly in the present era due to the changed lifestyle. *Gridhrasi* is a *nanatmaj vata vyadhi* in which patient experiences pain mainly in *sphik Pradesh* (low backache) that later radiates down to *kati* (lumbar), backward appearance of *uru* (thigh), *janu* (knee), and *jangha and pada* (foot). For proper cure of disease, the full knowledge of its pathogenesis is must. The term '*Samprapti*' means '*Samyak Prapti of Roga*' which is the correct understanding of the disease process.

AIMS AND OBJECTIVES

Detailed patho-physiological study of *Gridhrasi* in *Ayurvedic* and Modern context.

MATERIALS AND METHODS

The Basic *Ayurvedic* and Modern texts, Original clinical texts of various authors, Reference books, Internet, Latest journal along with Latest research papers were referred and compiled for conceptual part of study.

AYURVEDIC REVIEW

The way in which the *Dosha* gets Vitiated and the course it follows for the manifestation of disease is called *Samprapti*. The synonyms are *Jaati* and *Aagati*. A proper understanding of *Samprapti* is vital for the treatment¹.

The term *Samprapti* is applied to express the course of the appearance of disease right from *Nidana sevana* to *Vyadhi Utpatti*. The knowledge of *Samprapti* helps in the comprehension of the specific features of a disease like *Dosha*, *Dushya*, *Srotodushti*, *Ama* and *Agni* etc. The study of *Samprapti Vighatana* is said to be done by treatment. As explained in the *Ayurvedic* text, *Chikitsa* is nothing but *Samprapti Vighatana*.

SYNONYMS OF SAMPRAPTI: *Jati*, *Agati*, *Nivritti* and *Nispatti* are synonyms of *Samprapti*².

CLASSIFICATION OF SAMPRAPTI

Acharya Charka has described six types of '*Samprapti*' namely *Sankhya*, *Pradhnya*, *Vidhi*, *Vikalpa*, *Bala*, *Kala*.

1. **Sankhya Samprapti** : It deals with the number or subclassification of disease like 2 types of *Gridhrasi*.
2. **Pradhanya Samprapti** : It indicate whether the disease is primary or predominant and Secondary or associated. It helps for the identification of dominance of *doshas* in case of two or more *doshas*



involved. *Gridhrasi* is *Vata Pradhana dwidoshaj vyadhi*.

3. **Vidhi Samprapti:** It deals with the variety of disease like two varieties of disease i.e. *Nija* and *Agantuja*; Based on prognosis of disease i.e. curable, incurable, mild and acute. In *Gridhrasi* 2 varieties (*vataja Gridhrasi* and *vatakaphaja Gridhrasi*) on the basis of *doshas* involvement.

4. **Vikalpa Samprapti:** It indicates the *Ansansa kalpana* (proportional analysis) of the qualities of *doshas* involved. It also helps to detect the quantitative, qualitative, functional and aggravation of the *doshas*. In case of *Gridhrasi* out of 5 types of *vata*, only 2 *apana* and *vyana vata* are involved.

5. **Bala Samprapti:** It helps in understanding the strength of the disease based on *Nidana panchaka*, area of involvement, organ involved, age etc. for the assessment of strength of disease.

6. **Kala Samprapti:** It indicates the time of aggravation of *doshas* in relation to season, various timing of day, night and intake of food. It helps to understand the Aggravating and Relieving factors of the disease. *Shishir* and *Varsha ritu*, daily variations such as *aparhana*, *bhojana jirnakala* also cause *vata prakopa*. All these factors aggravate the symptoms of *Gridhrasi*.

A. **Acharya Sushruta** has described *Samprapti* process in six stages *Sanchaya*, *Prakopa*, *Prasara*, *Sthanasanshraya*, *Vyakti* and *Bheda* known as *Satkriyakala*³. These are the reasons that though *Nidana* of all the *Vatavyadhi* are same but only due to the *Samprapti Visheshas* of disease *Vata* can produce so many *Vata* disorders.

1. **Sanchaya:** In *Sanchayavastha* there is gradual accumulation of *doshas* in their respective seats. It is the earliest stage to plan the suitable preventive measure. *Rukshadi Ahara* and *Vihara*, *Atimatra bhojana*, *ajeerna bhojana* and *vishamashan* etc. leads to *Agnimandya*. Due to *Agnimandya* the production of *rasa dhatu* is impaired and thus results in *dhatu kshaya* which later causes *vata prakopa* in *Gridhrasi*.

2. **Prakopa:** It is the second stage of *kriyakala* where accumulated *dosha* started to move other than its main site. *Atyadhhika bhar vahan*, *diwasapna*, *atiprajagarna*, *abhigataj (trauma)*, *marmaghataja* etc. are the *Prakopak hetu* associated with *Gridhrasi*.

3. **Prasara:** In *prasaravastha* there is overflowing of *doshas* from their respective seats to other place like fermented material comes out after keeping mixture of yeast, water and flour in a vessel for overnight. In *Gridhrasi* *Vitiated Vata* spreads at



Vatasthana Kati, Sakthi, Pada, Asthi of the lower limb.

4. **Doshadushya Sammurhahana and Sthanasansraya** : During *Sthanasanshraya Avastha* the vitiated *Dosha* are said to have reached to particular *Sthana* due to *Kha-vaigunya* and get obstructed here and intimately mix with and vitiate one, two or more *Dushyas* in that particular portion of body. If vitiated *Vata* is accumulated in *Kati* and lower extremities by *Srotosanga* it produces *Gridhrasi*.

5. **Vyakti (vyaktavastha)**: In this stage cardinal sign and symptoms of the disease are appears. *Vyadhipratyanika chikitsa* may applied in this stage of disease. *Ruka, Toda, Stambha* etc. in *Sphik, Kati, Pristha, Janu, Jangha* and *Pada* region in *Gridhrasi*.

6. **Bhedavastha (updravastha)**: In this stage specific sign and symptoms of the diseases manifests. This particular stage of manifestation is very difficult to cure and if not treated at the earliest stage may become incurable. *Khanjata, Shosha, Dehapravakrata*, inability to walk and crippling are the other *Upadrava* associated with *Gridhrasi*.

B. Conventionally the Samprapti can be categorized in two types :

(1) **Samanya (General) Samprapti**: This is a common pathogenesis among various types of a single disease.

(2) **Vishishta (Specific) Samprapti** : This is a specific pathogenesis for a particular sub type of disease.

The two main reasons for *vata prokopa* are *dhatukshaya* and *margavarana*. Continuous ingestions of food materials which are *ruksha, sheeta, laghu, suska* in nature, *ratri-jagarana, vegavidharana, pramitasana*, and all such causes lead to *Dhatu kshaya*. This *Dhatukshaya* leads to *vata prakopa* and this fulfills the empty *sortas*. It occurs specially in *Asthi, majja, meda, mamsa dhatu kshaya*. *Vatik ahara vihara* is the cause of *Asthi dusti*.

Asthidhatu and *vata dosha* are related by *Ashraya ashrayi bhava* hence *asthikshaya* specially deals to *vataprakopa*. *Viruddha ahara, abhigata, prapidana* are the causes of *majjadusti* and also *ruksha ahara* leads to *majjakshaya* as *majjadhatu* is *snigdha* in nature. *Ruksha ahara* can't nourish *meda, mamsa* because they are also *snigdha, guru dhatu* and *ruksha, suska, Laghu ahara* can't nourish them properly. Hence the *meda* and *mamsa dhatukshaya* occurs. In the *lakshanas* of *asthi, meda* and *mamsa kshaya, sandhisaitihilya* and in *asthi* and *majjakshaya, asthi sausirya* (porosity of the bones), *asthi daurbalyas* and *laghuta* are given⁴.

Samprapti Chakra : *Samprapti Chakra* of *Vataj Gridhrasi* is described in Figure 1 and *Vata-Kaphaj Gridhrasi* in Figure 2.

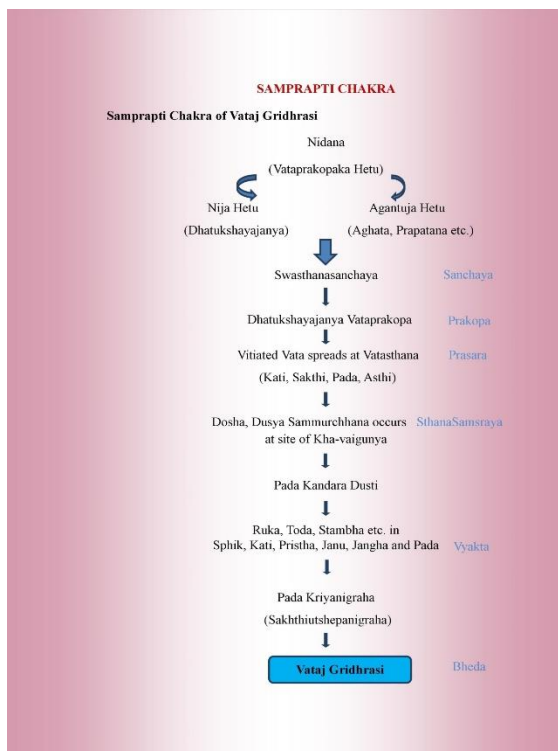


Figure 1 Samprapti of Vataja Gridhrasi

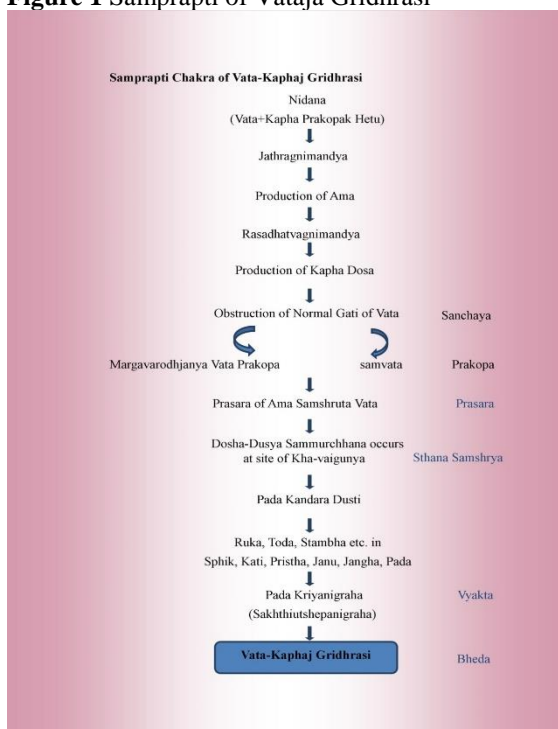


Figure 2 Samprapti of Vata-Kaphaj Gridhrasi
Samprapti Ghataka : Samprapti Ghataka

are the different factors which are responsible for the pathogenesis of any disease. On the basis of symptomatology given in classics, the probable *Samprapti*

ghataka of *Gridhrasi* can be traced out as below –

Dosha - *Vata* – Especially *Vyana* and *Apana, Kapha*

Dushya - *Rasa, Rakta, Mamsa, Meda, Asthi, Majja, Sira, Kandara, Snayu*

Srotasa - *Annavaha, Rasavaha, Raktavaha, Mamsavaha, Medovaha, Asthivaha, Majjavaha*

Srotodushti Prakara - *Sanga*

Agni - *Jatharagni* and *Dhatwagni*

Ama - *Jatharagnijanya* and *Dhatwagnijanya*

Udbhavasthana - *Pakwashaya*

Sanchara Sthana - *Rasayanis*

Adhithana - *Kandaras of Parsani* and *Pratyanguli* and *Sphika, Kati, Uru, Janu, Jangham, Pada*

Vyakta Rupa - *Ruka, Toda, Stambha* in *Adhosakthi, Uru, Janu, Jangha* and *Pada, Arochaka, Tandra, Gaurava*

For better understanding of involved factors, it is necessary to understand each and every individual factor -

1)Dosha: According to the texts, *Vata* is the essential *dosha* for the manifestation of disease *Gridhrasi*. *Kapha* is in the form of *Anubandha*. It is also well known that the *Prakopa* of *Vata* may occur in two ways - due to *Dhatukshaya* and *Margavarodha*⁵. Continuous ingestion of food materials which are *Ruksha, Laghu, Sheeta, Sushka, Ratrijagarana, Vegavidharana,*



Pramitasana and all such causes lead to *Dhatukshaya* and it leads direct *Sanchaya* and *Prakopa* of *Vata*. In the case of *Margavarna*, *Kapha* is an important factor, particularly for producing *Vata-kaphaja Gridhrasi*. *Pittaja Gridhrasi* aren't noticed according to the commentators. There may be burning sensation along with discomfort, though in rare cases. According to *Sushruta*, in *Gridhrasi* “*Sakthi Kshepam Nigrahaniyat*” is found. The *Kshepana*, *Utkshepana* etc. are the *Karma* of *Prakrita Vyana Vayu*. Causes and *Adhithana* of *Gridhrasi* are resembling to causes and *Adhithana* of *Apana Dushti*. Of the five forms of *Vata*, *Vyana* and *Apana* are thus the most vitiated.

2) Dushya: According to *Acharya Sushruta*, in *Gridhrasi* the vitiated *Doshas* affects the *Kandara* and thus manifestation of the disease occurs. *Kandaras*, according to *Charaka*, is *Raktadhatu* of *Upadhatu*. According to *Charaka*, *Mulasthanas* of *Mamsa* is *Snayu* and *Snayu* is an *Upadhatu* of *Meda*⁶. *Chakrapani* and *Yogratnakar* mention that *Sthula Snayu* may be taken as *Kandara* (tendon)⁷.

On the other hand *Vayu's Sthana* was stated as *Asthi* and there is an inverse relationship between *Vayu* and *Asthi*. For example, increasing *Vayu* causes *Asthikshaya* and it leads to the further *Prakopa* of *Vata*. As *Gridhrasi Nadi* vitiated in this disease,

some *Acharyas* correlate nervous tissue with *Mastulunga* and thus to *Majja*. So, in *Gridhrasi* disease, *Rakta*, *Mamsa*, *Meda*, *Asthi*, *Majja*, *Sira*, *Kandara*, and *Snayu* could be taken as *Dushya*.

3) Srotasa : *Rakta*, *Mamsa*, *Meda*, *Asthi* and *Majja Dhatus* are vitiated here, as mentioned above. So, their respective *Srotasa* may also be vitiated in this disease. Hence, the *Srotasa* involved may be taken as *Raktavaha*, *Mamsavaha*, *Medavaha*, *Asthivaha* and *Majjavaha Srotasa*.

4) Srotodushti Prakara: *Sanga* type of *Srotodushti* is found in *Gridhrasi*. *Sanga* of *Dosha* produces *lakshana* of *Vata-kaphaja Gridhrasi* like *Stambha*, *Gaurava*, *Sphurana*, etc. *Margavarodha* leads to symptoms of *Vatika* type of *Gridhrasi* like *Toda*, *Ruka* etc.

5) Agni: This disease may vitiate *Jatharagni* and *Dhatwagni* of *Rakta*, *Mamsa*, *Meda*, *Asthi*, and *Majja Dhatu*.

6) Ama: When the *Agni* is vitiated automatically respective *Ama* is formed. So, in this disease *Jatharagnijanya* and *Dhatwagnijanya Ama* of *Rakta*, *Mamsa*, *Meda*, *Asthi* and *Majja Dhatu* is produced.

7) Udbhavasthana: *Pakvashaya* is the primary *Udbhavasthana* of this disease. As it is a *Nanatmaja Vatavyadhi – Amashaya* may be considered as an *Udbhavasthana* of *Vatakaphaja Gridhrasi*.



8) Sanchara Sthana : Here, *Sanchara sthana* of the vitiated *Dosha* is the *Kandara* which is situated in either side of the limb between *Parshni* and *Anguli* as mentioned by *Sushruta*.

9) Adhithana : According to *Acharya Charaka*, *Kati* and *Sphika* are the initial sites from where the disease starts and then respectively affects *Uru*, *Janu*, *Jangha* and *Pada*. According to *Acharya Sushruta*, vitiated *Dosha* affects *Kandara* of *Parshani*, *Pada* and *Anguli*. Thus, *Sphika*, *Kati*, *uru*, *Janu*, *Jangha*, *Pada* and *Kandara* of *Parshani*, *Pada* and *Anguli* may be taken as *Adhithana* of the *Gridhrasi* disease.

Specific Samprapti of Vataja Gridhrasi:

According to *Charaka*, the *Vataja Gridhrasi* is separately produced by *Vata Prakopak* or *Vata Vriddhi* having symptom of *Stambha*, *Ruka*, *Toda* and *Mhuspandanam*. *Vata Prakopak Ahara Vihara* gives rise to aggravation of *Vata* and at the same time, *Ruksha*, *Khara*, *Laghu*, *Sheeta*, *Daruna*, *Vishada*, *Chala Guna* of *Vata* suppresses the *Snigdha*, *Guru*, *Mridu*, *Pichchhila* and *Sandra Guna* of *Kapha* which leads to decrease of *Sleshma*. Decreased *Sleshma* in *Kati-Pristha*, *Sakthi* and in *Kandara* in turn result into aggravation of *Vata*. This way, *Vata* located in *Kandara* and produces the symptoms viz. *Stambha*, *Ruka*, *Toda*, *Spandana* in *Kati*,

Pristha, *Uru*, *Janu*, *Jangha* and *Pada* in respective order.

Specific Samprapti of Vata-Kaphaja Gridhrasi:

Acharya Charaka explained the signs, that is to say, *Aruchi*, *Tandra*, and *Gaurava* in addition to the *Vataja* symptoms during the explanation of *Vata-Kaphaja Gridhrasi*. Along with *Vata Prakopaka Nidana*, *Kapha Prakopaka Nidana* gives rise to *Agnimandya*, which leads to production of *Ama*. This condition also affects the *Agni* of *Rasa Dhatu*, resulting in the production of *Kapha* abundantly as it is *Mala* of *Rasa Dhatu*. In the *Samprapti* of *Vata-Kaphaja Gridhrasi*, *Prakupita Vata* does not suppress the *Kapha* as explained in *Vataja* type of *Gridhrasi*. Here *Prakupita Vata* also leads to *Agnimandya* and ultimately assists in accumulation of *Kapha*. On the other hand *Kha-vaigunya* occurs due to *Nidana Sevana* in *Kati*, *Pristha*, *Sakthi* and *Kandara*. Thus, both vitiated *Vata* and *Kapha* by spreading get localized at the place of *Kha-vaigunya*. In the condition of *Sthana-sanshraya* that vitiated *Vata* gets masked (cloaked) by *Kapha* and produces symptoms of *Vata-Kaphaja Gridhrasi*.

MODERN REVIEW

A syndrome characterized by pain radiating from the back into the buttocks and into the lower extremities along its posterior or lateral aspect and most commonly caused



by prolapse of intervertebral disc is called sciatica. The term is also used to refer the pain anywhere along course of Sciatic nerve.

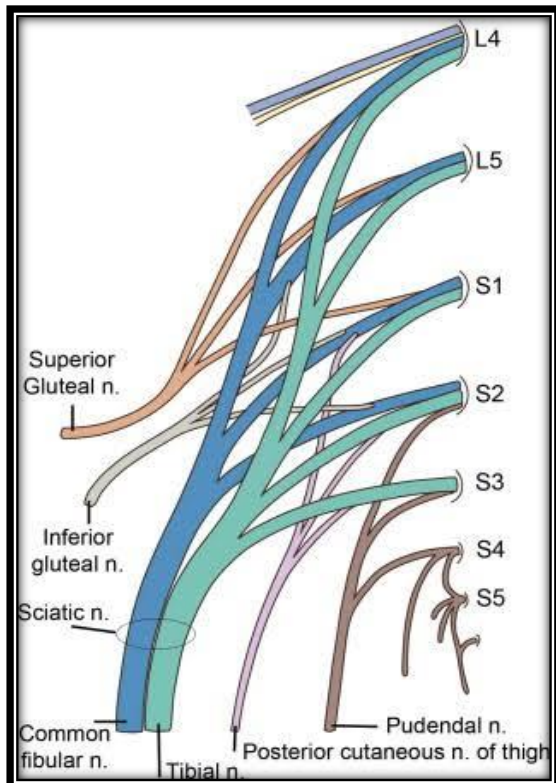


Figure 3 Root value of Sciatic Nerve

The Sciatic nerve is the largest & longest nerve in the human body, around as big as the thumb (2cm) in diameter at its commencement. It derives its fibers from all the roots of the sacral plexus, namely L4, L5, S1, S2 and S3. The nerve is really composed of two loosely bound portions, the tibial and the common peroneal nerves bound together by connective tissue.

The nerve originates in the pelvis and passes through the greater sciatic notch usually below the piriformis into the buttock. Here the nerve runs vertically downwards under cover of gluteus

maximus, lying on the short muscles of the gluteal region midway between the greater trochanter and the ischial tuberosity. Emerging from the covering gluteus maximus, it is soon crossed by the long head of biceps as this muscle passes laterally. At about the junction of the middle and lower thirds of the thigh, it divides into its two terminal branches, the tibial and the common peroneal nerves. These two nerves are, in fact, really separate adherent structures, sometimes they emerge from the pelvis separately and remain so. The point midway between the ischial tuberosity and greater trochanter indicates the site of the nerve on the body surface, above this it passes in a gentle curve medially. It is important for injections not be given into near the nerve, for this reason most injections are given in the upper and outer quadrant of the gluteal region.

Root Value : The tibial part of the sciatic nerve derives its fibers from the ventral division of the ventral rami of L4, L5, S1, S2 and S3; whereas the common peroneal part of the sciatic nerve derives its fibers from the dorsal division of the ventral rami of L4, L5, S1 and S2 (Figure 3).

PATHO-PHYSIOLOGY

This condition is the principal cause of lesions of the spinal nerve roots. The term disease is rather misleading for by the age



of 60 years the great majority of the population shows some radiological evidence of degeneration of the spine. The condition is not necessarily symptomatic and it is perhaps best regarded as a normal aging process which advances at different rates in different individuals. This fatigue causes muscle insufficiency as a result of which the spine sags putting the strain on the ligaments and posterior articulating facets. Changes occur at the facet joints and the lumbosacral junction. Posture of the hip joint is the key to that of the whole body because it determines the pelvic inclination, the pelvis being the foundation for the spine and rotation of the legs.

The pathological basis of the condition lies in degeneration of the intervertebral discs. These structures act as buffers and fulcrum between the vertebral bodies. They permit movement between the vertebrae while cushioning longitudinally acting stress. The discs are thickest at those parts of the spine which are most mobile and which about fixed sections, namely the lower cervical spine and the lower lumbar spine. In these regions the discs are subjected to the greatest stress and are most prone to symptomatic degenerative change. In the young adult the nucleus of the intervertebral disc is a tense well hydrated structure which holds apart the adjacent intervertebral bodies.

Degeneration begins to appear in the third decade and consists of a progressive desiccation and collapse of the nucleus, which may begin to fissure and break up into fragments. By old age the process of fibrosis may lead to what amounts to a fibrous ankylosis between the vertebral bodies. Disc degeneration appears to be normal, wear and tear phenomenon and bears only a limited relationship to heavy occupational stress. Collapse of the disc, leads to a number of secondary phenomena. The annulus of the disc bulges outwards, lifting the periosteum of the vertebral bodies and giving rise to the deposition of marginal osteophytes. The narrowing of the disc space leads to a misalignment of the posterior facet joints, which may accordingly show hypertrophic, osteoarthritic change. As the vertebral bodies come closer to each other, the posterior longitudinal ligament and the ligamenta flava buckle up. Finally, the disc narrowing and facet joint misalignment may permit some degree of forward or backward subluxation of one vertebral upon another. This happens most often at the L4, L5 level, where the axes of the facet joints in some individuals may permit the development of a forward spondylolisthesis. All the above changes, osteophytic ridges, swollen facet joints, and concertinaed



ligaments, may intrude into the spinal canal and intervertebral foramina and cause cord or root compression. Collectively these

chronic degenerative changes leads to the pain in lumber region.

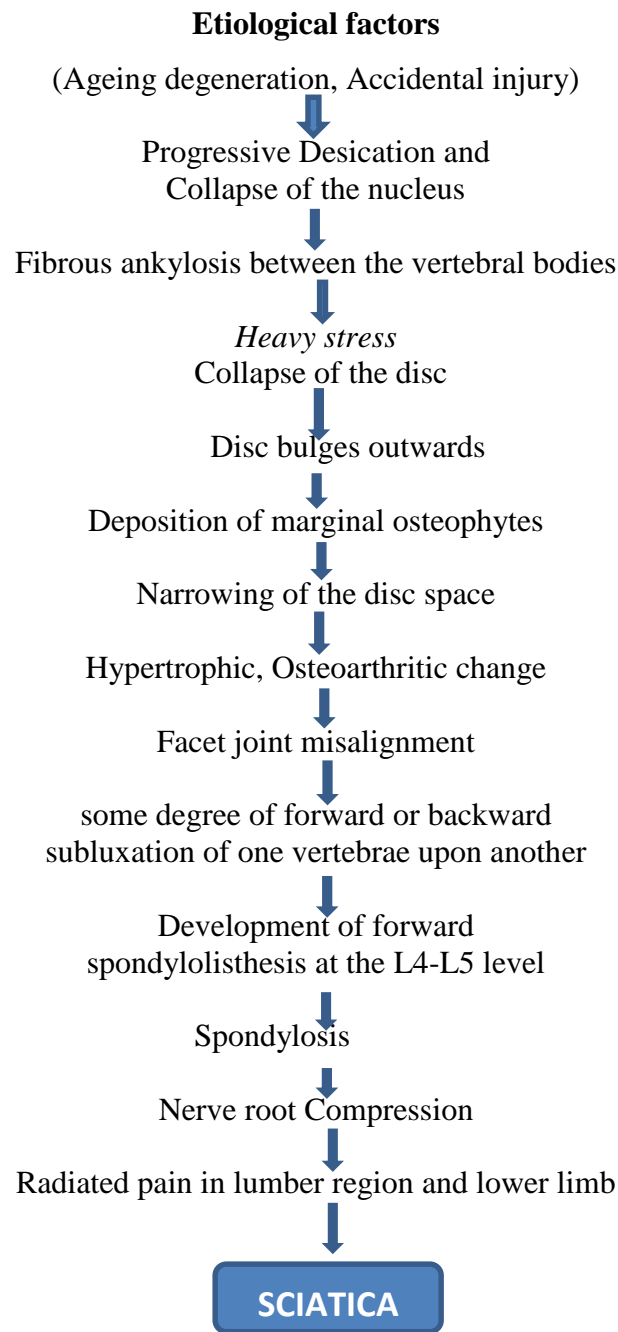


Figure 4 Pathogenesis of Sciatica

CONCLUSION

In the **Samprapti of Vataja Gridhrasi**, *Vata Prakopak Ahara Vihara* gives rise to aggravation of *Vata* and at the same time, *Ruksha, Khara, Laghu, Sheeta, Daruna,*

Vishada, Chala Guna of *Vata* suppresses the *Snigdha, Guru, Mridu, Pichchhila* and *Sandra Guna* of *Kapha* which leads to decrease of *Sleshma*. In turn, decreased *Sleshma* in *Kati-Pristha, Sakthi,* and



Kandara resulted in aggravation of *Vata*. This way, *Vata* located in *Kandara* and produces the symptoms viz. *Stambha*, *Ruka*, *Toda*, *Spandana* in *Kati*, *Pristha*, *Uru*, *Janu*, *Jangha* and *Pada* in respective order. *Prakupita Vata* does not suppress the *Kapha* in the *Vata-Kaphaja Gridhrasi samprapti*, as stated in *Gridhrasi* form of *Vataja*. Here too, *Prakupita Vata* leads to *Agnimandya* which leads to *Ama* development. This condition also affects the *Agni* of *Rasa Dhatu*, resulting in the production of *Kapha* abundantly as it is *Mala* of *Rasa Dhatu* and ultimately helps in accumulation of *Kapha*. On the other hand *Kha-vaigunya* occurs due to *Nidana Sevana* in *Kati*, *Pristha*, *Sakthi* and *Kandara*. Thus, both vitiated *Vata* and *Kapha* by spreading get localized at the place of *Kha-vaigunya*. In the condition of *Sthana-sanshraya* that vitiated *Vata* gets masked (cloaked) by *Kapha* and produces symptoms of *Vata-Kaphaja Gridhrasi*. From modern point of view in sciatica there is Irritation of the 4th, 5th lumbar and 1st sacral roots, which form the sciatic nerve that causes pain which extends, mainly down the posterior and anterolateral aspects of the leg and into the foot. This disorder is mainly caused by aging degenerative changes in the L4, L5, S1 intervertebral discs and hectic lifestyle of today.



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