

REVIEW SANDHIGATA VĀTA

Etymology Of Sandhigata Vāta:

The term Sandhigata Vāta is a combination of three words i.e. Sandhi, Gata, Vāta. Sandhi is an anatomical part and Vāta is a physiological aspect of the body and Gata is lodging of Vāta into Sandhi. These words are explained separately below.

Sandhi :

Etymology:

The word ‘Sandhi’ is a masculine gender and derived from the root ‘Du-Dha-jn’ with Sāma prefix, which is used in the meaning of Dhāraṇa and Poṣaṇa. Complete word ‘Sandhi’ is formed in the following way.

Sāma + Dha (here feminine gender ‘Ki’ is used) i.e. Sāma + Dha + Ki (by the sutra ‘Ato Upasarge Dhāki’ Ki is removed.) Sāma+Dha+I (with ‘Monusvar Ma’ Sutra Ma. Changed to Na, hence the word Sandhi is Made up of ‘Sāma + Dha + I’ which means the union, the function, the combination, the connection and reconciliation)

Defination¹:

Besides this, Vāchaspatyam compiled ten meanings of Sandhi Used in different aspect. All the meaning convey the same future i.e. joint.

According to Ācharya Dalhaṇ, Sandhi means Śārīram Asthi Saṃyoga -Sthān by Bhāsakar Govind Ghāṇekar, it mentioned that where two or more objects articulate with each other in the body, i.e. called Sandhi, Ācharya Caraka mentioned in Vimān Sthāna that Asthi Sandhi is Mūlasthāna of Majjāvaha Srota. All the meaning convey, the same future i.e. joint. Though, Ācārya Suṣrūta described various types of Sandhi viz. Śirā Sandhi, Snāyu Sandhi and Peśi Sandhi. In this context, we are dealing here with Asthi Sandhi only.

Sankhyā Śārīra^{2,3} :

Suṣrūta and Vāgbhata -210 Sandhi

Caraka-200 Sandhi

Distribution of Sandhi⁴

1. Śākhā – 68

2.Koṣṭha – 59

3. Urdhav Jatru – 83

Classification of Sandhi

Suṣrūtācārya has classified Sandhi as below

According to Gati of Sandhi :

Sthira Sandhi (achal)

Ceṣṭāvanta (chala) – Bahuceṣṭhā: ex. Śākhā Sandhi

-Alpaceṣṭā : ex. Pruṣṭhavasthā Sandhi

2) According to structure of Sandhi : 8 types

Once again these Sandhi is have been divided in to eight different types according to its Ākrūṭī (shapes). Dalhaṇa has given a good explanation about structure and function of Sandhi which has been described along with the following eight types^{5,6}.

Table No 1: Type of Sandhi

No	Type Of Sandhi	Strucure	Example
1	Kora (Khalla Kora,Paraspara Kora,Cakra Kora,Sandanṣa Kora)	Hinge Joint	Anguli, Manibandha, Jānu, Kurpara,
2	Ulukhala	Ball and Socket Joint	Kakṣā, Vankṣana And Daṣana
3	Sāmudga	Saddle Joint	Aṃsapīta,Guda, Bhaga, Nitamba
4	Pratara	Plain Gliding Joint	Greeva, Pruṣatavamsh
5	Tunnasevani	Sutures	Śīrā, Katī,Kapāla
6	Vāyasatunda	Condylod Joints	Hanu
7	Mandala	Cartilage	Kaṇṭha,Hṛūdaya,Kloma, Nādi
8	Śankhāvartha	Bony Labyrinth	Ṣrotra, Ṣrūṅātaka

Sandhikriyā:

There are 5 Kriyā normally possible with any śārirbhāva

- i. Parasāraṇa
- ii. Ankuncana
- iii. Vivrtāna
- iv. Vinaman
- v. Unnaman

In Sandhigata Vāta Vyādhī, at the time of Sandhi Parikṣana we should know the type of Sandhi, its normal movements, its axis of movements, then only can be determined which type of Vikṛuti is there. When we think of Sandhi Vikṛūtī both Rachanā and Kriyā that is structure and function, we should think of Sthāyi and Asthāyi Vikṛūtī.

Peśī Saṃbandha :

Peśī cover Śirī ,Snāyu , Asthi, Parva, Sandhi and give them Strength that means Sandhi cover with Peśī become strong and bear the weight.

Snāyu Saṃbandha:

All Sandhi in the body are tied up with Snāyu which makes them able to bear Snāyu are situated in all Sandhis⁷.

Kalā Śmaṃmadha (Śleṣmadharā Kalā) :

This is the fourth Kalā .the Kleda which is present in between the Dhātvaṣaya will get Pāka by respective Dhātvaṅni and Kalās are produced⁸.

This is situated in Sandhi and performs lubrication for movements just like wheel, which is lubricated by oleation.

The synovial membrane can be compared with Śleṣamadharā Kalā, which leads to easy movement of joint by secreting synovial fluid.

Doṣa Saṃbandha:

Vāta – It is responsible for normal movement of a joint.

Prāṇa – controls all movement⁹

Vyāna – Vyāna is responsible for all the movement in the body and movements are mostly carried out with the help of Sandhi .This can also be proved ewith the help of symptoms of Kaphāvaṛūta Vyāna i.e. Sandhi Asthi Rujā and Gatisang. Hence ,Vyāna is related Sandhi¹⁰.

Pitta: It is responsible for Sandhistha Pācana ,Pariṇamana etc.

Kapha : Śleṣmak Kapha : Śleṣamaka Kapha is situated in all Sandhi . Sandhi is a site of mainly Kapha. Articulation of two or more bone called as Sandhi. Because of these joints ,various parts of the body can be moved in various directions ,this continuous Gati at joints vitiates Vāta Doṣa causes friction, to avoid there must be something which will keep on oiling the joint .It is Kapha Doṣa which with its Snigdha ,Sthira ,Manda, Guru properties controls vitiation of Vāta and friction of joints. It lubricates the joint to achieve smooth movement and give Strength to the joint.Hence Kapha Doṣa has the most significant relation with Sandhi.

Dhatu Saṃbandha:

Rasa (twak) ,Rakta ,Maṃsa ,Meda, Asthi, Majjā take part in the formation of Sandhi from outside to in words¹¹.

i.Rasa – It dose Priṇana of Sandhi

In the symptoms of Twakgata “ Paravabheda” is mentioned

ii.Rakta – It dose Jivana of Sandhi

iii.Maṃsa –It dose lepana o f Sandhi. Vāgbhata has mentioned ‘Sandhivedanā’ and Caraka has mentioned ‘Sandhisphuṭana’ as a Symptoms of Māṃsa Kṣaya¹².

iv.Meda – It dose Snehana of Sandhi .Suṣrūta has mentioned Sandhiṣunayatā as a symptoms of Medakṣaya¹³.

v. Asthi:- It dose Dhārana of the body and Asthi is a principle Structure of Sandhi¹⁴.

vi. Majjā :-It dose Puraṇa of the Sandhi. Sandhi is Mulasthan of Majjāvaha Srotas . Suṣrūta has mentioned Parvabheda as symptoms of Majjā Kṣaya¹⁵.

Marma Saṃbandha:

Ācārya Suṣrūta says that marma Means the structure where Maṃsa, Śirā ,Snāyu,Asthi, Sandhi gets attached¹⁶.

There are 20 Sandhi Marmās¹⁷

Pāṃcabhautika of Sandhi :

Asthi and Avakāṣa are the two necessary factors which should be present at the site of Sandhi . With the help of Asthi there is Vyaktatā of movements and it is present due to Guṇa of Avakāṣa. In Ākāṣa mahābhuta, there is Vāta Doṣa which establishes movements. At the site of Sandhi Racanā, Pārthiv Ghatak is Asthi and inside Asthi

there is Vāyu. Jala Mahābhuta is present Sandhi as a synovial fluid which lubricates and nourishes the Sandhi.

Concept of Gatatva of Vāta :

Table No 2 : Meaning of Gatatva

गत ः -

शाब्दकल्पद्रुम	प्राच्यपत्यम	M.Williams / V.S.Apate
गत्यर्थकर्मकेति	अतीते	Depered
गच्छति	प्ताते	Gone to
ज्ञानति	घमन	Being in
षाति	-	Come forth form,arrived at

Synonyms- गो ,श्रिते ,अश्रिते , विद्यते , प्राप्ते , अश्रिते

According to above etymology and synonyms we can conclude ‘Gatatva of Vāta’ as Gati – i.e. movement indicates this motion .Direction of movement directed to, referred to, shows same meaning . Ādhiṣṭhān denotes the Ādhiṣṭhān of Vāta. After etymology its pathology will be considered.

While discussing this Phenomeno, Carak has explained that this condition of ‘Gatatva’ Varies with the Ādhiṣṭhān.

Vitiated Vāta Doṣa lodges in the specific Ādhiṣṭhān and creates the syndrome which helps in knowing the Ādhiṣṭhān.

Ādhiṣṭhānās are studied under five different Heading.

Dhātu-eg. Asthi, Majjā, Rakta, All Dhātus are included in Dhātu Gata Vāta. Instead of Rasdhātu Twak is considered in Dhātu Gata Vātu.Only Yogratnākara Has described Rasa Gata Vāta Phenomenon.

Upadhātu - Twak, Snāyu.

Indriya - Koṣṭha, Netra

Avayava –Āmāśaya Pakwāśaya, Guda

Other –Sravānga, Koṣṭha

Vāta gets vitiated by specific causative factors which produce the affinity of Vāta Doṣā towards particular Ādhiṣṭhān. Previous vitiation of Ādhiṣṭhān may not be present .Vitiated Vāta Doṣā lodges in that Ādhiṣṭhān.

As the word of ‘Gata’ is related to ‘Gati’ Vāta also vitiates with other properties like Laghu, Rukṣa and combination of these properties is also seen. E.g. In Sandhigata Vātu ‘Asthibheda’ occurs particularly due to Khara and Rukṣa Guṇa Vāta .Vitiated Vāta starts vitiating Ādhiṣṭhān in the form of structural and functional deformity.

This phenomenon of ‘Gatatva’ may underline the manifestation of different Vāta Vyādhies which are not described in classics. It helps in understanding pathogenesis of different Vāta Vyādhies. Thus ‘Gatatva’ helps in ‘Duṣya Niściti’ and line of treatment of the disease .

Vāta¹⁸:

The term Vāta is originated from the root “Vāgatigandhanayoho” suffixed by ‘Ktan’ gives rise to word Vāta which means to blow, to go, to move, to smell, to strike, to hurt, to enlighten.

It means that which gives motion or creates the movement is known as Vāta. Movement is Vāta or Vāyu¹⁹.

Vāta is named according to the different functions done by it in the body. Each synonym represents different aspects of VātaDoṣa.

Vāyu: It represents Gati and Gandhan function.

Sameer: Gives strength to Agni.

Smiran: Gives strength to Agni.

Anil: Friend of Agni.

Sadagati: Always in motion.

Nabhswan: Present everywhere like Akasha.

Gandhvah: Carrier of smell good or bad.

Mārut: One responsible for death.

Mrut: Important factor for respiration.

Analsakha: Friend of Agni.

Shvasan: Important factor for respiration.

Prabhanjan: One who has power to divide forcefully.

Properties of Vāta according to Caraka, Vāyu is Rukṣa, Śīta, Laghu, Sukṣama. Cala, Viṣada, Khara and Dāruṇa. It is also Yogvāhi Prabhāv.

Ācārya Suṣṛūta has described only four main qualities of Vāta as Rukṣa, Laghu, Śīta and Khara²⁰.

Classification of Vāta:

With its five fold divisions viz., PrānaUdāna, Samāna, Vyāna and Apāna, Vāyu appropriately controls (sustains) the (functions of the body) body by its unimpaired movement in the locations concerned²¹.

Location And Function of Prāna Vāyu:

Prāna-Vāyu is located in the head, chest, throat, tongue, mouth and nose. Its functions are spitting, sneezing, eructation, respiration, deglutition of food.

The term 'Ahāra' implies deglutition, retention (dharana), of the ingested food²².

Location And Function of Udāna Vāyu :

Udāna-Vāyu is located in the umbilicus, chest and throat. Its functions are manifestation of speech, effort, enthusiasm, strength and complexion²³.

Location And Function of Samana Vāyu :

Samāna-Vāyu pervading the Sveda-Vaha-Srotas (channels carrying sweat), Doṣa-Vaha-Srotas (channels carrying doṣas) and Ambu-Vaha-Srotas (channels carrying aqueous material) is located in the neighborhood of Antarāgni or Jatharāgni (seat of digestive enzymes). It promotes the power of digestion²⁴.

Location And Function of Vyāna Vāyu :

The Vyana-Vāyu moves very swiftly and pervades the entire physique of a person. It always functions in the form of motion, extension, Vikṣepa (sudden movements), winking of the eyes and similar other movements (contractions, etc)²⁵.

Location And Function of Apāna Vāyu :

Apāna-Vāyu is located in the two testicles, urinary bladder, umbilicus, thighs, groins, anus and colon. Its functions are the ejaculation of semen, voiding of urine and stool, elimination of menstrual blood and parturition of foetus.

These five types of Vāyu, located in their respective abodes in normal state, perform their functions properly in order to sustain the physique in a healthy state.

Functions of Impaired Vāyu :

When these five types of Vāyu get located in a place which is different from their own and when impaired, they afflict the body with diseases specific to their locations and functions. This may also lead to instantaneous death²⁶. The term "Vāta-Vyādhi" is in a compound form. It may be interpreted in two different ways, as follows:

(1) (Vāta-eva~Vyādhih') Vāyu itself is the disease. By implication, the aggravated Vāyu itself after afflicting the concerned Duśyās (tissue elements) pervades the entire body or a part of it to give rise to different types of pain for which the ailment is called Vāta-Vyādhi;

(2) "Vātād-Vyādhih or the disease caused by Vāyu. By implication, other Doṣās and the Duśyas are vitiated in a special way by Vāyu to produce diseases in the entire body or in a part of it which is called Vāta-Vyādhi.

Relation between Sandhi and Vāta :

There is a relation between the Doṣa and Duśya because of their Bhautika constitution, which has been well narrated in Aṣṭāṅg Hṛūdyā .

While describing the properties, actions and importance of three Doṣas.

This is called as **ĀṣṛayaĀṣṛayī Bāva** i.e. inter relation between Doṣa and Duśya. It has been eluded that Vātais located in Asthi, Pitta is in Sweda and Rakta and Kapha in Rasa, Maṃsa, Meda, Majjā and Śukra. It is because of this relation that the drugs or dietetic regimens which augment the one Doṣa, also have the effect on their dependant Dhātu. By augmentation of the Doṣa, there would be similar effect on their respective Dhātu. But, contrary to this augmentation of Vāta (Āṣṛayī), due to its properties will lead to Decrease (Kṣaya) in the Asthi (Āṣṛaya) and Vice Versa. In the similar way it is related with Kapha. Kṣaya of Kapha will cause increase in the quantum of Vāta and vice versa^{27,28}.

Historical Review of Sandhigata Vāta:

History is nothing but the record of past events Chronologically. In Medicine it contributes to the review of accomplishments, errors, false theories, mis-information and mistaken interpretations since it is derived to a very great degree from the intuitive others ; so one should master and understand it , as a key to understanding of the present. There is no reference regarding Sandhigata Vāta in prevedic period.

Vedic Kala (up to 1000 BC)

Rugveda:

In these five types of Vāta is considered as Panca Prāṇa One of the Mantrās of Rugved described about removing the disease from each organ (hairs and joints) .

Atharvaveda :

In Atharvaveda, there are references about the disease pertaining to Sandhi and Sandhi viśhleṣa. Atharvaveda has coated references regarding the occurrence of Vikar (Ath.2/33/7,6/14/1/), the importance given for Vāta (Ath. 8/2/3, 2/10/3) and disorders of Vāta (Ath. 9/8/21) are available.

Purāna Kāla:

Ramāyana

In this treatise (article), importance of Vāyu in maintenance of health and life is Mentioned . There is also explanation about the pathological effect caused by the Vāyu such as Pain and immobility of Joints.

Mahābhāratha:

In this treatise, Vāta has been given importance and it is called as Panchakarma (having 5 functions)

Agnipurāṇa:

In Agnipurāṇa total number of joints in human body and treatments for Sandhigata Sāmavāta is mentioned.

Samhitā Kāla :(1000 B.C - 500 AD)

Caraka Samhitā (1000 B.C)

Caraka mentions Sandhigata Vāta Roga in the Ādhyāya Vātavyādhi Chikitsā. He names the disease as Sandhigata Anila. He explains this disease with

Dhātugata Anila Vikāra and not mentioned in Nanātmaja Vātavikāra. A separate Nidāna or the treatment principles are not found in the text.

Suṣrūta Saṃhitā (700-600 B.C)

Suṣrūta mentions general Nidāna in Nidāna Sthāna (Vāta Vyādhi Nidana) and Seperate treatment principles mentioned in Chikitsā Sthāna (Vātavyadhi Cikītsā).

Bhela Saṃhitā (800-700 B.C)

There is no clear description is available about Sandhigata Vāta.

But 'Sandhivichyuti' is explained as one of the symptoms of Ashtimajjāgata Vāta.

Harita Saṃhitā (800-700 B.C)

Ācārya Harita explains that there are 84 Vātaja Nānātmaja Vikāra.

Among these, 32 are Vyāna Vāta Prakopaja Vikāra. He also mentions that all the Dhātugata Vāta Vikāra are due to Vyāna Vāta Prakopa and further tell about the tretement aspect of Sandhigata Vāta. He also makes the mention of 'Sandhi Śoṭha' in Śukragata Vāta.

Sangraha Kāla: (500 AD -1700 AD)

Aṣṭāṅga Sangraha and Aṣṭāṅga Hrudaya (600 A.D-1600 A.D)

The disease is described in deTailaa with its treatment.

Mādhava Nidāna:

Ācārya Mādhavakara agrees with Ācārya Caraka with respect to Nidāna and Ācārya Suṣrūta with respect to lakṣaṇās, except for the term Ātopa which he used instead of Śopha.

Bhāvaprakāśa (1400 A.D)

Bhāvamiśra follows Ācārya Suṣrūta while describing the disease and its management which he discusses in Vātavyādhi chapter of Madhyama Khanda.

Cakradatta (1100 A.D)

Cakrapāni Datta gives the same views as Ācārya Suṣrūta in treatment aspects of this Disease.

Bhaiṣajya Ratnāvali

The treatment aspect of this disease is mentioned.

Yogarātnākara (1600 A.D): He has given the same views as of Caraka and Ācārya Suṣrūta but separate treatment principles are mentioned.

Sutra Kāla:

Brāmhana Sutra:

This text has given importance to Vyāna Vāta. While explaining the movements of joints.

Pāṇinī Sutra:

Pāṇinī was well aware of Vāta, its Prakopa and Śamana. He had mentioned the term Vātiki to denote disorders of Vāta.

Ādhunika Kāla: (1700 AD onwards): In early ages Hippocrates, the father of modern medicine observed the prevalence of Osteoarthritis in aged individuals (Benard ,1944) .Due to the deTailaaed study of this disease by Heberdon (1803) the Osteoarthritis nodes on the figures was named after him . Osteoarthritis was differentiated from Rheumatoid Arthritis and named as degenerative Arthritis y Nichols and Ricardson (1909) on morbid anatomical grounds . The appearance of Herberdon’s node in relation with age ,sex, and hereditary factors was mentioned by Strecher (1940). Intermittent claudicating in the Osteoarthritis of lower limb including hip, knee and ankle was observed by Boyd (1940). The term Osteoarthritis was used due to the absence of synovial thickening or inflammatory infiltration in uncomplicated condition by Kellgren (1961).The term Osteoarthritis ,Hypertrophic arthritis, Osteoarthrosis are mentioned under degenerative arthritis by Samuel LTurek (1989)

Table No 3: References of Sandhigata Vāta from All Saṃhitā:

Literatures	References
Caraka Saṃhitā	Cikisāsthāna 28
Suśruta Saṃhitā	Nidānsthān 1; Cikisāsthāna 4
Aṣṭāng Sangraha	Nidānsthān 15; Cikisāsthāna 23
Aṣṭāng Hṛūdyā	Nidānsthān 15 ; Cikisāsthāna 21
Yogratnākara	Pūrvārdha , Vāta Vyādhīādhikara
Bhāvprakaṣa	MadhyaKhanda Vāta Vyādhīādhikara 24
Mādhava Nidān	Pūrvārdha , Vāta Vyādhīādhikara 22
Bhaiṣjyaratnāvali	Vāta Vyādhī Prakarana 23

३. वात :-

तत्र “वा” गतिगन्धनयोश्चि धातुः |सु. सू. २१/५

गतिगन्धोपादानार्थञ्च वा धातोतप्रत्यये वात इति रूपम् ||

Vāta Vyādhī is specific group of Vāta disorders, which can be produced only by the vitiation of Vāta. Ācārya Caraka has mentioned Nānātmja Vyādhī of Vāta, Pitta, Kapha, but a separate chapter has been contributed to only Vāta Vyādhī. Ācārya Vāgbhata has given importance of Vāta as it dominates in the function and is supposed to be the leader of the remaining two Doṣa. Ācārya Śarāngdhar states that Pitta and Kapha are action less (Pāngu) unless and until they are activated by Vāta. Due to this reason Vātika disorders are difficult to cure and some of them are serious in nature, while other takes a chronic course and make the patient thus burden to family and society.

Sandhigata Vāta is one of the “Vāta Vyādhī” which is described as a separate clinical entity even though it is not included in 80 types of Nānātmja Vāta Vikāra. Although Sandhigata Vāta cripples a large number of person, it rarely kills any person. Thus, there is; no other disease which causes so much suffering for so long. Because of the tendency to cripple without killing Sandhigata Vāta belongs at the head of the list of chronic disease from the stand point of social and economic important.

Ācārya Caraka has defined the disease that When provoked Vāta locates in Sandhi, it causes Śoṭha which on palpation appears like bag inflated with air and the movements of extension and flexion are accompanied with pain.

Sandhigata Vāta²⁹:

There is no clear-cut definition of Sandhigata Vāta, but however the classical text of Āyurveda, the Caraka Saṃhitā reveals that after Nidān Sevana aggravated Vāta enters in the Sandhi and get established thereby producing swelling of the joints, which is felt like a bag filled with air and the pain occurs mainly during the flexion and extension of the Knee joints.

Synonyms :

Different authors named this disease according their own views, but most of them are out views. The probable synonyms of Sandhigata Vāta used in the different context or considered by the commentators equivalent to Sandhigata Vāta are as follows.

Sandhigata Anila (Caraka)

Sandhigata (Suṣṛūta)

Gulpha Vāta (Cakrapāṇi)

Classification of Sandhigata Vāta :

It Can be classified in different ways as there is no classification is mentioned in our text.

Vāyu get Vitiated by two ways :

Dhātuksyātamka : Kṣaya of Dhātus is main cause of Vāta Vyādhi

Mārgāvarodhajanya : The primary cause of Mārgāvarodha of Srotasa by Āma ,Kapha, Meda,or any other Doṣa.

On the basis of Hetū Sandhigata Vāta is classified as : Nija Sandhigata Vāta,Āgantuja Sandhigata Vāta.

On the basis of Āma Sandhigata Vāta is classified as:

Sāma Sandhigata Vāta

Nirām Sandhigata Vāta

Nidānpancaka of Sandhigata Vāta :

The knowledge of disease is obtained by the study of Nidān ,Pūravrūpa ,Rūpa ,Upaśaya and Saṃprāptī which are termed as Nidānpancaka³⁰.

Āyurvedic litterateur dose not reveal the special etiological factor for Sandhigata Vāta however, the aggregative factors for Vāta can be adpted for it , Vāta particularly Vyān Vāyu has a close relationship with the movement of Sandhi.Thus ,its aggregative factors which can be produce Sandhigata Vāta are as follows.

Hetu (Etiological – Factor)

The factors responsible for pathogenesis of disease are called as ‘Hetu’ special etiological factors of Sandhigata Vāta are not mentioned in the classic. But ,etiological factors of Vātavyādhi are written. As Sandhigata Vāta occurs Vātavyādhi, etiological factors told in Vātavyādhi can be considered to Sandhigata Vāta also. There can be further classified into Āhāraja , Vihāraja and Mānas Hetū and Anya³¹.

Table no.4: Hetu of Vātavyādhī

Āhārja	Vihārja	Mānsika	Anyā
Rūkṣa Anna	Ati-Vyāyām	Cintā	Viṣamopcār
Sīta Bhojana	Ati- Vyavāya	Śoka	Ati-Doṣa Sāravan
Laghu Bhojana	Prajāgara	Bhaya	Ati-Aṣṛūka Sāravan
Katū,Tikta,Kaṣaya Ras Ati Seven	Plavan	Krodha	Atiyoga of Vamana ,Virecan
Pramitaāśana	Atiadhvagaman	Dukkha	Vegāvārodha
Alapabhojana	Divāswap	--	Abhīghāta
Anaśana	Aticankramana	-	-----
Langhana	----	-	-----

Āhārja:

Consumption of excessive dry, cold , light and small quantity meals, excessive dieting ,disturbed food habits , fasting vitiates Vātadoṣa. According to Sāmānya - Viśeṣa Sidhānta , Dravyā which is having similar properties of Doṣa is responsible for enhancement of that particular property of particular Doṣa. Thus in short,Āhār of following Guṇaswarūpa causes vitiation of Vāta Doṣa.

Rasa – Katu ,Kaṣayā ,Tikta

Virya - Śīṭa

Guṇa -- Rūkṣa ,Laghu, Viṣada ,Pramitaāśana

Vihārja :

Excessive exercise,walking ,swimming causes Dhātūkṣaya. Sleep disturbances, excessive elimination of Doṣa by Viparīta karma are also responsible for Dhātūkṣaya.Frequent intercourse causes Kṣaya of Śukra Dhātu leading to Ojokṣaya and Balakṣaya. Uncomfortable sitting, bedding ,excessive travelling, troma also causes Vāta Vrudhī. Ultimately all these factors cause Vātavrudhi and vitiation of Vātadoṣa.

Mānasa :

Anager, fear, stress , sorrow, jealousy ,etc psychological disturbances are also responsible for vitiation of Vāta Doṣa because Śarīra and Mānasa Doṣa are interrelated with each other.

Vegāvarodha:

Suppression of natural urges also vitiates Vātadoṣa. Vātadoṣa is playing an important role in physiological expression of these Vega. Undue suppression of these Vega creates obstruction in the pathway of Vātadoṣa and ultimately causes vitiation of Vātadoṣa.

Ābhighāta:-

Any type of injury or accident, to fall from some vehicle are responsible for Vātaprakopa as Sthānavaiḡunya as produced at the sight and there is Sang, of Vātadoṣa.

Kālaswarūpa :-

Śītakāla, Abharakāla, Grīṣama , Varṣā Kāla, Vārdhakya.

Deśaswarūpa :- Jāngla Deśa

While examining the patients of Sandhigata Vāta we observed all these Hetū which are described in various Saṃhitā. from the Cikitsā point view we should know the Nidān of Vyādhī so that we can do Nidānparivarjana which is the important Cikīta. By avoiding Hetū we can avoid the recurrence of the disease which is already mentioned^{32,33,34}

Pūrvarūpa:

The premonitory sign and symptoms which appear before the full fledged clinical picture of the disease is called as Pūrvarūpa. Pūrvarūpa are really established in forth stage of disease pathogenesis known as Stānsanṣraya³⁵.

The symptoms which indicates the forth coming disease is called as Pūrvarūpa. In Vātavyādhī Ācāryās have not mentioned any symptoms as predicting Vātavyādhī. According to Carak unexpressed symptoms are Pūrvarūpa. It is because Vāta is Āśukāri or fast acting. At Sandhigata Vāta is Vātavyādhī when we see the symptoms it means the disease is already there with less severity.

Cakrapāṇī comments on the word ‘Avyaktam’ and tried to correlate it with Laghutā in the disease with appearance of few symptoms of the disease. The meaning of ‘Avyaktam’ is ‘Na Ati Abhivyakta’ by Vijayrakṣita. He explains that those symptoms which are not exhibited clearly are Pūrvarūpas.

Suṣṛūta and Vāgbhata slience about Pūrvarūpa.By considering the opinions of Ācāryās commentaries we can come to a conclusion that the symptoms and signs of Sandhigata Vāta in its less severe state (mild or occasional Śūla) can be taken as the premonitory state of this disease before the full swing appearance of Rūpa.

Rūpa:

The characteristics signs and symptoms with which the disease can be easily diagnosed are known as Rūpa . While describing the Rūpa it is explained ³⁵.

The premonitory signs and symptoms (Pūravrūpa) which are not well manifested state, when make their appearance in a full fledged manner ,it can be called ,as Rūpa. This stage appearance when the Doṣaduṣya Saṁmūrcana completes and this particular stage of Vāyādhī occurs in the Vyakti stage of (Kṛīyakāla -5) Saṁprāptī.When Avyakta Lakṣaṇās of Pūravrūpa becomes Vyakta ,which are called Ātamrūpa meaning Svalakṣaṇa of Vātavyādhī.

The various signs and Symptoms of Sandhigata Vāta according to different Ācārya are given below in the table.

Table No.5 Symptoms of Snadhigata Vāta :

Symptoms	C.Su	Su.Sū	A.S	A.H	BP	M.N
Sandhī Sūla	+	+	+	+	+	+
Śoṭha	+	+	+	+	+	+
Vātapurṇa Druṭīsparśa	+	+	+	+	+	+
Parasāranāṅkuncanyayo,Pravrutī CaVedanā	+	+	+	+	+	+
Hantī Sandhi	-	-	-	+	+	+
Ātopa	-	-	-	-	-	+

Śoṭha which is Vātapurṇadrutī Sparśa (like air filled bag on palpation) , Prasāraṇa Āṅkuncanyo Pravrutī Ca Vedana (Pain during flexion and extension) are the main Rūpa of Sandhigata Vāta as described by Vāgbhata and Caraka ‘Hanī Sandhin’ quoted by Suṣṛūta can be correlated with inability of flexion and extension or stiffness of the joint .Madhav has given ‘Ātop’ as a lakṣaṇa. Sandhiśoṭha with Sandhi Sphuṭaṇa can be correlated with this .The Rūpa is deTailaaed in Saṁprāptī of Sandhigata Vāta.The roga

concerned here is Sandhigata Vāta. Concepts of Sandhi and Vāta has already been discussed in earlier Chapters. At present the term ‘Gati’ is explained in deTailaa due to the fact that the present thesis subject is mainly depends upon the Gati of Vāta Doṣa to the Sandhi. The properties of Vāta Doṣa are ; Rukṣa , Śīta , Laghu, Sukṣama and Cala . All the Ācārya except Suṣrūta has mentioned the Cala Guṇa . Again Ācārya Suṣrūta³⁷ explains that Vāta is Triyāggah (transverse course or direction) which indirectly denotes the Cala Guṇa of Vāta . A Guṇa known as Dārūna is added to Vāta Doṣa. This Guṇa possesses the Śoṣaṇa Swabhāva and it in turn reduces the Āpya ana Pārthīvanaśa and increases Vāyu and Akāśa parts³⁸. This also helps to the movement of Vāta Doṣa by making the substance Laghu. The other Guṇas which favour the Cala Guṇa of this Doṣa are Rūkṣa , Śīta and laghu. Rūkṣa Guṇa makes reduction in Snehādī Guṇa . The Sroto Rikatā is produced by this Snehādī Guṇa Śūnyatā³⁹ and the aggravated Vāta gets higher mobility⁴⁰. When the weight decreases (by increasing Laghu Guṇa) Cala Swabhāva increases naturally . For maintaining the optimal Gati of Vāta an optimum temperature is required . Within certain limits the increase of temperature increases the excitability of Vāta Doṣa (C Dawrkānath) . The most important Guṇa which helps in the Gati of Vāta Doṣa is the Cala property.

Samprāpti⁴¹:

Sandhigata Vāta has no specific Samprāpti as per the texts available .it is classified under the heading of the Vāta Vyādhi. It is also a type of Vāta Vikāra, where the Duṣīta Vāta involves the Sandhi and hence, the nomenclature –Sandhigata Vāta. Here Sandhigata Vāta is categorized as a localized disease of Sandhi as it is the disease of Sandhi due to Vāta Prakopa, so it can be derived that all factors contributing to the aggravation of Vāta Doṣa in the the body are liable to produce the disease Sandhigata Vāta .In Sandhigata Vāta early pathology starts with specially Vyāna Vāyu ,which is aggravated by different factors and taks it up to the Parasara stage. The Kha- Vaigunya of Sandhi leads its Sthānsanṣraya . The Prakopa of Vāta may be due to two causes i.e.

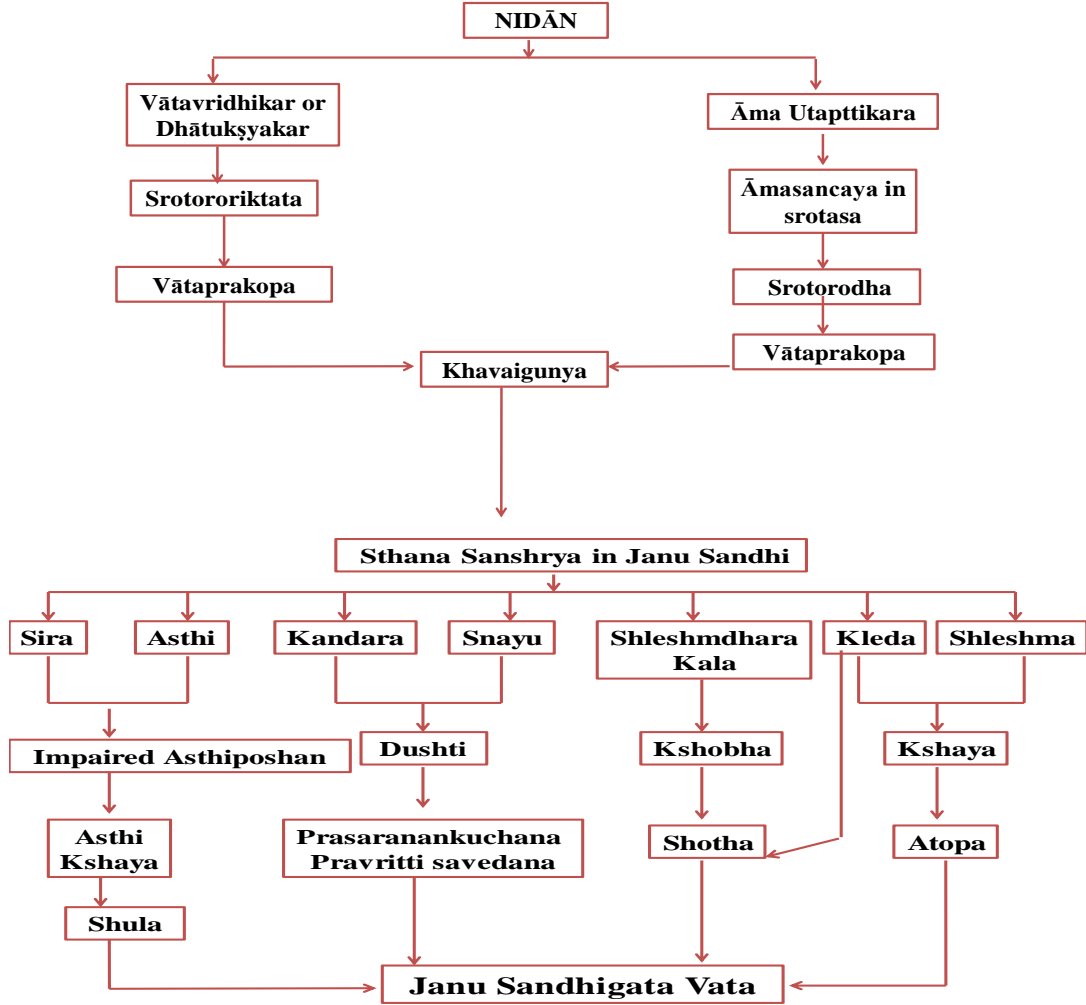
1) Mārgāvarodhajanya 2) Dhātukṣaya⁴².

In Samprāpti , ‘Rikatā of Srotas’ present in the Sandhi is considered as the ‘Khavaigunya’ which is the platform for manifestation of disease ,Sandhigata Vāta . Cakrapāṇi gives explanation about Rikatā as ‘Tucha’ or ‘Snehādī Guṇa Śūnyatā’.

In other words ,the Vāta Doṣa is aggravated due to different factors and Vāta flows out of its Āśaya to circulate in the entire body and its constituents. During circulation it gets localized in the roots of Majjāvha Srota ,i.e.. Asthisandhi. In the Majjāvaha Srotasa the Khavigunya may already present. Because unless there is Khavaigunya of Srota the Doṣa will not take Āṣṛaya. The chief qualities of Vāta are – Khara, Rūkṣa, Viṣād and Laghu. Sandhi gives Āṣṛaya to Śleṣaka Kapha which has to following qualities Gurū , Snigdha and Mṛudu. When aggravated Vāta gets localized in the Sandhi ,it over powers Kapha as well adversely affects on its qualities .The chief task of the kapha is Dhāraṇa. This chief aim of Kapha is destroyed by the influence of aggravated Vāta and thus manifesting symptoms of Sandhigata Vāta.

In Mārgāvarodhajanya condition, the kapha or Āma fills the Srotas present in the Sandhi and does the Strotorodha which leads to Vātaprakopa thus producing the symptoms of the Sandhigata Vāta.

Table No 6: Samprapti of Jānusandhigat Vāta :



Here thus ,in Sandhigata Vāta

Śūla- Result by Prakupīta Vāta.

Śotha- Results as a Srotorodha and accumulation of Duṣṭha Rasa and vitiated Kapha, hence palpation will be of Vātapurnadruti like (air filled bag).

Ātopa- Resulted due to the increased Rūkṣa and Khara Guṇa in Dhātus due to Śleşma Kṣaya. Thus particular sound produced due to friction of Dhātus.

Hanti Sandhi – Occurs at later stage . It is due to the destruction and destoration of other joint structure.

Ācārya Caraka has classified the Samprāptī in following six types⁴³.

Sankhyā Samprāptī : Sandhigata Vāta is in numbered one only as no other variety is mentioned in texts.

Prajñā Samprāptī : From the view point of Doṣika status in Sandhigata Vāta is pradhānatam in all the three Doṣās .

Vidhī Samprāptī : Sandhigata Vāta is Nija ,Vātaja and in general is difficult to cure.

Vikalpa Samprāptī : Sandhigata Vāta being Vāta Vyādhī are get the increased Vāta Guṇa like Rukṣa ,Khara and Viṣād

Bala Samprāptī : Bala Samprāptī is a disease of chronic pattern with few cardinal symptoms and Yāpya Swabhāva ,hence mostly require routine but regular treatment.

Kāla Samprāptī : In Sandhigata Vāta , Śūla becomes worst towards evening which indicates the predominance of Vāta.

Table No.7 Samprapti Ghatak of Jānusandhigata Vāta

Nidān	→	Vātaprakopak Nidān Ca. Ci. 28/15-18
Doṣa	→	Vāta partuculary Vyān Vāyu & Śleṣak Kapha
Duṣya	→	Asthi, Majjā & Meda
Srotasa	→	Asthivaha , Majjāvaha , & Medavaha
Stroduṣṭhī	→	Sanga, Vimargagaman, Atipravṛutī
Agni	→	Manda
Jāṭharāgni	→	Manda
Dhātāvāgni		
Doṣa Mārga	→	Marmāsthi Sandhi Ch.Sū.17/112-113
Roga Mārga	→	Madhyama (Ch.Sū. 11/48-49)
Udabhavsthān	→	Pakvāṣaya (Ca. Ci.28/37)
Ādhisṭhāna	→	Jānu Sandhi (Asthisandhi)
Pratyātama Lakṣaṇa	→	Akuncanyaprasāraṇajanya Vedanā, Sparśāsahatva, Ātopa Sakṣṭha Calana

Sāpekṣa Nidān :

The comparison of similar features which are found in many diseases is called as Sāpekṣa Nidān.Sandhigata Vāta is a painful joint disorders .There are number of condition having

similar features ,so all these mimicking features are to be considered ,before the exact diagnosis of Sandhigata Vāta.

Sandhi Śūla Pradhāna Vyādhis ,which differential diagnosis is required from Sandhigata Vāta are as follows :

Āmavāta (Mā.Ni.25/7)

Vātarakta (Ca.Ci.29/21)

Kroṣṭhka Śirṣa (A.S. Ni. 15/54)

Sarvāṅg Kupita Vāta (Ca.Ci. 28/24)

Kaphakṣaya (A.S.Sū.19/5)

Maṃskṣaya (A.S. Sū.19/6)

Medakṣaya (Ca.Sū.17/65)

Āsthikṣaya (Ca.Sū .17/66)

Majjākṣaya (Su.Sū. 15/9)

Sandhibhagna (B.P. II/48/2)

A comparative study of cardinal feature of similar disease entities are given below ,for clear idea regarding the disease Sandhigata Vāta under the caption of Vyavacchedaka Nidān mainly available and the nearest localized disorders of Sandhi are presented as under.

Table No 8: Vyavachheda Nidān of Sandhigata Vāta

Factors	Sandhigata Vāta	Āmavāta	Vātarkata	Kroṣṭhka Śirṣa
Āmapradhānya	Absent	Present	Absent	Absent
Jawara	Absent	Present	Absent	Absent
Hruda Gaurava	Absent	Present	Absent	Absent
Prone age	Old age	Any age	Any age	Any age
Vedanā	At Prasāraṇajnya and Ānkuncanyajnya	Sancari and Vrchikdanv anśvat	Punha Punha Utapati and Śaman	Tīvra
Śoṭha	Vātapurṇa drutīspraśa	Sarvanga and sandhigata	Mandalyukta	Kroṣṭhuka Śirṣavata
Sandhi	Weight bearing joints only	Māhā Sandhi	Lagu Sandhi	Jānu
Upaśaya	Abhyanga (Jānubasti and Agnikarama)	Rukṣa sweda	Rakta Mokṣana	Rakata Mokṣana

Sādhyāsādhyātva :

Ācārya Vāgbhata and Suṣrūta have considered Vāta Vyādhī as Mahāgada. It is so called due to the fact that the treatment is time consuming and prognosis uncertain. Further, Dhātuṣaya is the chief cause of Vāta Vyādhī. Dhātuṣaya is difficult to treat as Ācārya Vāgbhata has elaborated that since body is accustomed to Mala. Dhātuṣaya is more troublesome than Dhātu Vṛudhī. Sandhigata Vāta the one of the Vāta Vyādhī, therefore it is Kṣṭha Sādhyā.

The ailment of aged person is Kṣṭha Sādhyā and Sandhigata Vāta is the affliction of elderly persons. Disease situated in Marma and Madhyama Rogmārga is Kṣṭha Sādhyā. Sandhigata Vāta is the disease of Sandhi which forms Madhyama Rogamārga. Further Vāta Vyādhī occurring due to vitiation of Asthi and Majjā are most difficult to cure.

In the list of Kṣṭha Sādhya Vāta Vikāra , Sandhigata Vāta is not mentioned by Caraka ,but while commenting on work ‘Khuda Vātāt’ Cakrapāṇi explains the meaning ‘Khuda Vātāt’ as Kṣṭha Sādhya Vāta Vyādhī. It may be curable if occurs in strong persons and if it is recently originated and if there are no complications.

Cikitsā :

Cikitsā involves not only Nidānpravarjan (avoiding causative factor) but also restoration of Doṣika equilibrium. The elimination of the disease can achieved by Śodhan and Śaman. Śodhan comprises of Anatha Parimārajan and Bahiraparimārjana . Bahiraparimārjana is achieved by Snehana ,Swedana,Maradana and Lepana. Śaman types Cikitsā cures disease without eliminating Doṣa.

In the mangment of Sandhigat Vāta, above three measures are taken into consideration in the classics .Ācārya Suṣrūta was the first to explain the Cikitsā in deTailaa.

Ācārya Suṣrūta preferred Snehana ,Upanaha ,Agnikarama,Bandhana,Unmardan in case of Vāta located in Snāyu Asthi and Sandhi⁴⁴.

Ācārya Caraka not gave specific treatment of Sandhigata Vāta but its Vātavyādhī hence treatment of Vāta is the Cikitsā of Sandhigata Vāta^{45,46,47}.

Pathyāpathya:

Specific Pathyā Apathya for Sandhigata Vāta are not mentioned ,but as this disease being a Vātavyādhī , we should adopt same of general Vātavyādhī.

Pathya Āhara:

Godhuma,Maṃsa,Raktaśālī,Godugdha,Ajādugdha,Ghṛut,Drākṣa,Madhuka,Uṣṇa

Jala,Surā,Surāsava,Amlakānjikā, Madhura Amla, Lvaṇa Rasa Pradhāna Āhar are Pathyā

Pathyā Vihāra:

Ātap Śevana,Mrudu Śayaā ,Uṣnodaka Snāna etc.

Apathya Āhara:

Yava, Sīta Jala, Ati Madyapāna,Suṣka Maṃsa, Katu-Kaṣāya Rasa pradhāna Āhara are Āpathya.

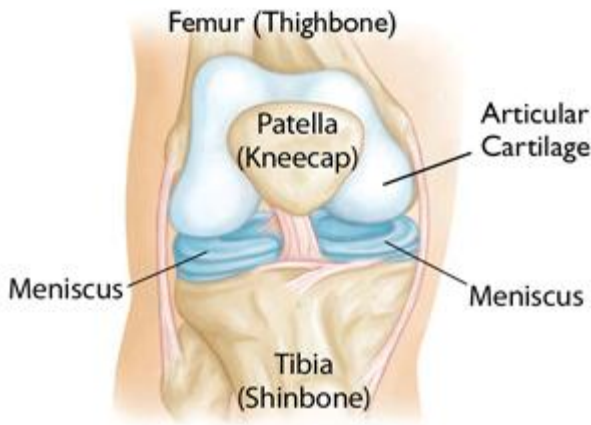
Apathya Vihāra:

Cintā, Krodha, Ratri Jāgarana, Vega Vidhāra,

Ṣṛrama,Anaśana,Vyavāya,Vyāyam,Cankaramana are Apathya Vihāra.

Anatomy of knee joint:

Fig.No.:1



Normal anatomy of the knee:

The knee is the largest and strongest joint in human body. It is made up of the lower end of the femur (thighbone), the upper end of the tibia (shinbone), and the patella (kneecap). The ends of the three bones where they touch are covered with articular cartilage, a smooth, slippery substance that protects and cushions the bones as bend and straighten of the knee.

Two wedge-shaped pieces of cartilage called meniscus act as "shock absorbers" between your thighbone and shinbone. They are tough and rubbery to help cushion the joint and keep it stable.

The knee joint is surrounded by a thin lining called the synovial membrane. This membrane releases a fluid that lubricates the cartilage and reduces friction

The knee joint is one of the strongest and most important joints in the human body. It allows the lower leg to move relative to the thigh while supporting the body's weight. Movements at the knee joint are essential to many everyday activities, including walking, running, sitting and standing.

The knee, also known as the tibiofemoral joint, is a synovial hinge joint formed between three bones: the femur, tibia, and patella. Two rounded, convex processes (known as condyles) on the distal end of the femur meet two rounded, concave condyles at the proximal end of the tibia.

The patella lies in front of the femur on the anterior surface of the knee with its smooth joint-forming processes on its posterior surface facing the femur.

The joint-forming surfaces of each bone are covered in a thin layer of hyaline cartilage that gives them an extremely smooth surface and protects the underlying bone from damage. Between the femur and tibia is a figure-eight-shaped layer of tough, rubbery fibrocartilage known as the meniscus. The meniscus acts as a shock absorber inside the knee to prevent the collision of the leg bones during strenuous activities such as running and jumping.

As with all synovial joints, a joint capsule surrounds the bones of the knee to provide strength and lubrication. The outer layer of the capsule is made of fibrous connective tissue continuous with the ligaments of the knee to hold the joint in place. Oily synovial fluid is produced by the synovial membrane that lines the joint capsule and fills the hollow space between the bones, lubricating the knee to reduce friction and wear.

Many strong ligaments surround the joint capsule of the knee to reinforce its structure and hold its bones in the proper alignment. On the anterior surface of the knee, the patella is held in place by the patellar ligament, which extends from the inferior border of the patella to the tibial tuberosity of the tibia. Posteriorly, the oblique popliteal ligament and arcuate popliteal ligament join the femur to the tibia and fibula of the lower leg. Along the medial side of the knee, the medial collateral ligament (MCL) connects the medial side of the femur to the tibia and prevents forces applied to the lateral side of the knee from moving the knee medially. Likewise, the lateral collateral ligament (LCL) binds the lateral side of the femur to the fibula and prevents forces applied to the medial side of the knee from moving the knee laterally.

Two internal ligaments – the anterior and posterior cruciate ligaments – also help to maintain the proper alignment of the knee. The anterior cruciate ligament (ACL) is the most anterior of these internal ligaments and extends obliquely from the inner surface of the lateral condyle of the femur to the anterior intercondylar space of the tibia. The ACL plays an important role in preventing hyperextension of the knee by limiting the anterior movement of the tibia. Directly behind the ACL is the posterior cruciate ligament (PCL), which extends obliquely from the inner surface of the medial condyle of the femur to the

posterior intercondylar space of the tibia. The PCL prevents the posterior movement of the tibia relative to the femur.

In addition to the joint capsule and ligaments that support the knee, there are also several important structures surrounding the knee that help cushion and protect the joint from friction and outside forces. Small pockets of synovial fluid, known as bursae, surround the knee to reduce the friction from movement of tendons across the surface of the joint. Several of these bursae, including the suprapatellar bursa, are instrumental in the reduction of friction between the patella and femur. Pockets of adipose tissue around the knee, known as articular fat pads, help to cushion the knee from external stress. The largest of these pads, the infrapatellar fat pad, absorbs shock to the anterior surface of the knee and cushions the patellar ligament as it moves with the patella during flexion and extension of the knee.

As the knee is a synovial hinge joint, its function is to permit the flexion and extension of the lower leg relative to the thigh. The range of motion of the knee is limited by the anatomy of the bones and ligaments, but allows around 120 degrees of flexion. A special characteristic of the knee that differentiates it from other hinge joints is that it allows a small degree of medial and lateral rotation when it is moderately flexed.

Fig.No.:2



The bones of the knee—the femur and the tibia—meet to form a hinge joint. The joint is protected in the front by the patella (kneecap). The knee joint is cushioned by articular cartilage that covers the ends of the tibia and femur as well as the underside of the patella. The lateral meniscus and medial meniscus are pads of cartilage that further cushion the joint, acting as shock absorbers between the bones.

Ligaments help to stabilize the knee. The collateral ligaments run along the sides of the knee and limit sideways motion. The anterior cruciate ligament (ACL) connects the tibia to the femur at the center of the knee. Its function is to limit rotation and forward motion of the tibia. A damaged ACL is replaced in a procedure known as an ACL reconstruction. The posterior cruciate ligament (PCL), located just behind the ACL, limits backward motion of the tibia.

Osteoarthritis of knee :

Arthritis is inflammation of one or more joints in the human body. Pain, swelling, and stiffness are the primary symptoms of arthritis. Any joint in the body may be affected by the disease, but it is particularly common in the knee.

Knee arthritis can make it hard to do many everyday activities, such as walking or climbing stairs. It is a major cause of lost work time and a serious disability for many people.

The most common types of arthritis are osteoarthritis and rheumatoid arthritis, but there are more than 100 different forms. In 2012, more than 51 million people reported that they had been diagnosed with some form of arthritis, according to the National Health Interview Survey. While arthritis is mainly an adult disease, some forms affect children.

Although there is no cure for arthritis, there are many treatment options available to help manage pain and keep people staying active.

Description:

The major types of arthritis that affect the knee are osteoarthritis, rheumatoid arthritis, and posttraumatic arthritis.

Osteoarthritis:

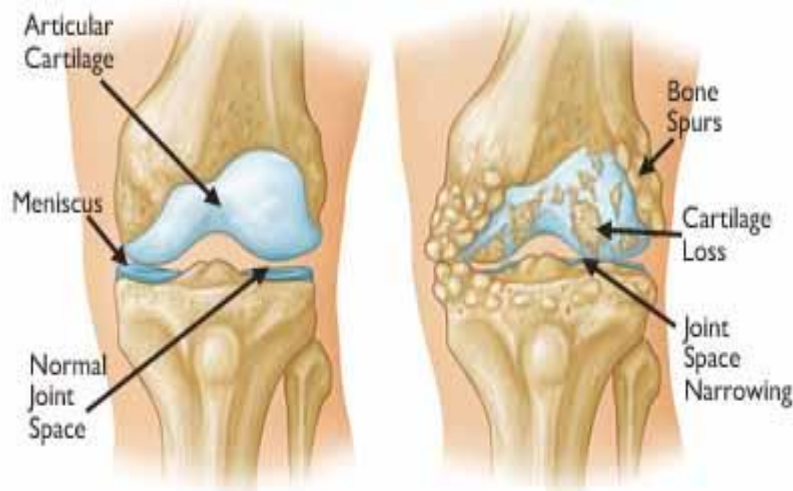
Osteoarthritis is the most common form of arthritis in the knee. It is a degenerative, "wear-and-tear" type of arthritis that occurs most often in people 50 years of age and older, but may occur in younger people, too.

In osteoarthritis, the cartilage in the knee joint gradually wears away. As the cartilage wears away, it becomes frayed and rough, and the protective space between the bones decreases. This can result in bone rubbing on bone, and produce painful bone spurs.

Osteoarthritis develops slowly and the pain it causes worsens over time.

Ostioarthritis of Knee joint:

Fig.No : 3



(Left) Normal joint space between the femur and the tibia

(Right) Decreased joint space due to damaged cartilage and bone spurs.

Animation courtesy Visual Health Solutions, Inc.

Rheumatoid Arthritis

Rheumatoid arthritis is a chronic disease that attacks multiple joints throughout the body, including the knee joint. It is symmetrical, meaning that it usually affects the same joint on both sides of the body.

In rheumatoid arthritis the synovial membrane that covers the knee joint begins to swell, this results in knee pain and stiffness.

Rheumatoid arthritis is an autoimmune disease. This means that the immune system attacks its own tissues. The immune system damages normal tissue (such as cartilage and ligaments) and softens the bone.

Posttraumatic Arthritis:

Posttraumatic arthritis is form of arthritis that develops after an injury to the knee. For example, a broken bone may damage the joint surface and lead to arthritis years after the injury. Meniscal tears and ligament injuries can cause instability and additional wear on the knee joint, which over time can result in arthritis.

Symptoms

1. A knee joint affected by arthritis may be painful and inflamed. Generally, the pain develops gradually over time, although sudden onset is also possible. There are other symptoms, as well:
2. The joint may become stiff and swollen, making it difficult to bend and straighten the knee.
3. Pain and swelling may be worse in the morning, or after sitting or resting.
4. Vigorous activity may cause pain to flare up.
5. Loose fragments of cartilage and other tissue can interfere with the smooth motion of joints. The knee may "lock" or "stick" during movement. It may creak, click, snap or make a grinding noise (crepitus).
6. Pain may cause a feeling of weakness or buckling in the knee.
6. Many people with arthritis note increased joint pain with rainy weather.

Physical Examination:

During the physical examination of knee joint will look for:

- ✓ Joint swelling, warmth, or redness
- ✓ Tenderness about the knee
- ✓ Range of passive (assisted) and active (self-directed) motion
- ✓ Instability of the joint
- ✓ Crepitus (a grating sensation inside the joint) with movement
- ✓ Pain when weight is placed on the knee
- ✓ Problems with pts. gait (the way the pts. walk)

Any signs of injury to the muscles, tendons, and ligaments surrounding the knee

Involvement of other joints (an indication of rheumatoid arthritis) .

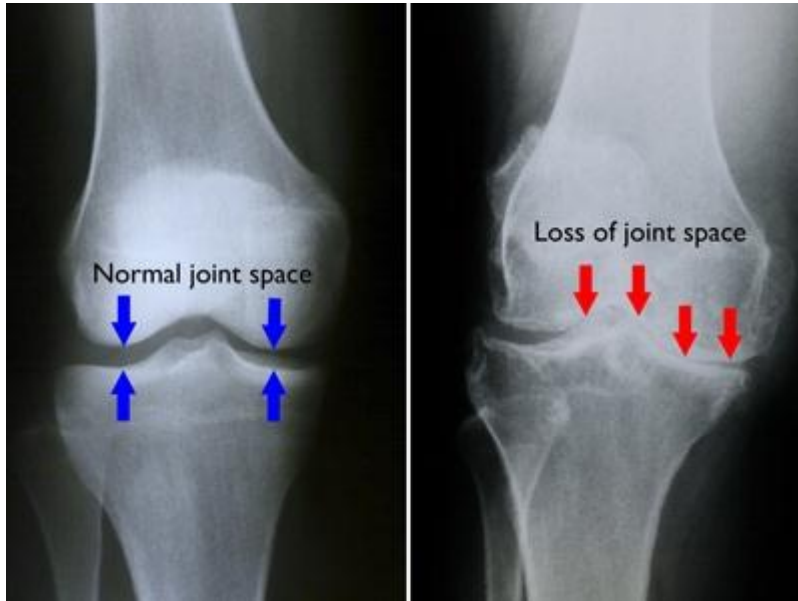
Imaging Tests:

X-rays. These imaging tests create detailed pictures of dense structures, like bone. They can help distinguish among various forms of arthritis. X-rays of an arthritic knee may show a narrowing of the joint space, changes in the bone and the formation of bone spurs (osteophytes).

Other tests. Occasionally, a magnetic resonance imaging (MRI) scan, a computed tomography (CT) scan, or a bone scan may be needed to determine the condition of the bone and soft tissues of your knee.

X-ray of Knee Joint:

Fig.No.4



(Left) In this x-ray of a normal knee, the space between the bones indicates healthy cartilage (arrows). **(Right)** This x-ray of an arthritic knee shows severe loss of joint space.

Laboratory Tests:

Also recommend blood tests to determine which type of arthritis you have. With some types of arthritis, including rheumatoid arthritis, blood tests will help with a proper diagnosis.

Treatment:

There is no cure for arthritis but there are a number of treatments that may help relieve the pain and disability it can cause.

Nonsurgical Treatment

As with other arthritic conditions, initial treatment of arthritis of the knee is nonsurgical. Physician may recommend a range of treatment options.

Lifestyle modifications. Some changes in daily life can protect the knee joint and slow the progress of arthritis.

Minimize activities that aggravate the condition, such as climbing stairs.

Switching from high impact activities (like jogging or tennis) to lower impact activities (like swimming or cycling) will put less stress on the knee.

Losing weight can reduce stress on the knee joint, resulting in less pain and increased function.

Physical therapy: Specific exercises can help increase range of motion and flexibility, as well as help strengthen the muscles in leg. Orthopedic Doctor or a physical therapist can help develop an individualized exercise program that meets pts. needs and lifestyle.

Assistiv devices: Using devices such as a cane, wearing shock-absorbing shoes or inserts, or wearing a brace or knee sleeve can be helpful. A brace assists with stability and function, and may be especially helpful if the arthritis is centered on one side of the knee. There are two types of braces that are often used for knee arthritis: An "unloader" brace shifts weight away from the affected portion of the knee, while a "support" brace helps support the entire knee load.

Otherremedies: Applying heat or ice, using pain-relieving ointments or creams, or wearing elastic bandages to provide support to the knee may provide some relief from pain.

Medications.: Several types of drugs are useful in treating arthritis of the knee. Because people respond differently to medications, Physician will work closely with pts. to determine the medications and dosages that are safe and effective for the pts..

Over-the-counter, non-narcotic pain relievers and anti-inflammatory medications are usually the first choice of therapy for arthritis of the knee. Acetaminophen is a simple, over-the-counter pain reliever that can be effective in reducing arthritis pain.

Like all medications, over-the-counter pain relievers can cause side effects and interact with other medications you are taking. Be sure to discuss potential side effects with Orthopedic physician.

Another type of pain reliever is a nonsteroidal anti-inflammatory drug, or NSAID (pronounced "en-said"). NSAIDs, such as ibuprofen and naproxen, are available both over-the-counter and by prescription.

A COX-2 inhibitor is a special type of NSAID that may cause fewer gastrointestinal side effects. Common brand names of COX-2 inhibitors include Celebrex (celecoxib) and Mobic (meloxicam, which is a partial COX-2 inhibitor). A COX-2 inhibitor reduces pain

and inflammation so that pts. can function better. If pts. are taking a COX-2 inhibitor, should not use a traditional NSAID (prescription or over-the-counter). Be sure to tell Physician if pts have had a heart attack, stroke, angina, blood clot, hypertension, or if pts. are sensitive to aspirin, sulfa drugs or other NSAIDs.

Corticosteroids (also known as cortisone) are powerful anti-inflammatory agents that can be injected into the joint these injections provide pain relief and reduce inflammation; however, the effects do not last indefinitely. Physician may recommend limiting the number of injections to three or four per year, per joint, due to possible side effects.

In some cases, pain and swelling may "flare" immediately after the injection, and the potential exists for long-term joint damage or infection. With frequent repeated injections, or injections over an extended period of time, joint damage can actually increase rather than decrease.

Disease-modifying anti-rheumatic drugs (DMARDs) are used to slow the progression of rheumatoid arthritis. Drugs like methotrexate, sulfasalazine, and hydroxychloroquine are commonly prescribed.

In addition, biologic DMARDs like etanercept (Embril) and adalimumab (Humira) may reduce the body's overactive immune response. Because there are many different drugs today for rheumatoid arthritis, a rheumatology specialist is often required to effectively manage medications.

Viscosupplementation involves injecting substances into the joint to improve the quality of the joint fluid. For more information: [Viscosupplementation Treatment for Arthritis](#)

Glucosamine and chondroitin sulfate, substances found naturally in joint cartilage, can be taken as dietary supplements. Although patient reports indicate that these supplements may relieve pain, there is no evidence to support the use of glucosamine and chondroitin sulfate to decrease or reverse the progression of arthritis.

In addition, the U.S. Food and Drug Administration do not test dietary supplements before they are sold to consumers. These compounds may cause side effects, as well as negative interactions with other medications. Always consult your doctor before taking dietary supplements.

Alternative therapies: Many alternative forms of therapy are unproven, but may be helpful to try, provided pts. find a qualified practitioner and keep Physician informed of

pts.decision. Alternative therapies to treat pain include the use of acupuncture and magnetic pulse therapy.

Acupuncture uses fine needles to stimulate specific body areas to relieve pain or temporarily numb an area. Although it is used in many parts of the world and evidence suggests that it can help ease the pain of arthritis, there are few scientific studies of its effectiveness. Be sure your acupuncturist is certified, and do not hesitate to ask about his or her sterilization practices.

Magnetic pulse therapy is painless and works by applying a pulsed signal to the knee, which is placed in an electromagnetic field. Like many alternative therapies, magnetic pulse therapy has yet to be proven.

Surgical Treatment:

Orthopedic Physician may recommend surgery if pts pain from arthritis causes disability and is not relieved with nonsurgical treatment. As with all surgeries, there are some risks and possible complications with different knee procedures. Your doctor will discuss the possible complications with pts before pts operation.

Arthroscopy: During arthroscopy, surgeon use small incisions and thin instruments to diagnose and treat joint problems.

Arthroscopic surgery is not often used to treat arthritis of the knee. In cases where osteoarthritis is accompanied by a degenerative meniscal tear, arthroscopic surgery may be recommended to treat the torn meniscus.

Cartilage grafting: Normal, healthy cartilage tissue may be taken from another part of the knee or from a tissue bank to fill a hole in the articular cartilage. This procedure is typically considered only for younger patients who have small areas of cartilage damage.

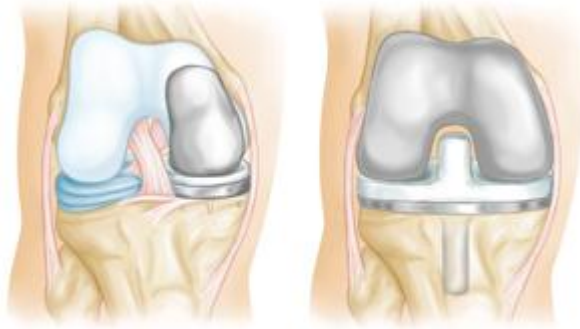
Synovectomy. The joint lining damaged by rheumatoid arthritis is removed to reduce pain and swelling.

Osteotomy. In a knee osteotomy, either the tibia (shinbone) or femur (thighbone) is cut and then reshaped to relieve pressure on the knee joint. Knee osteotomy is used when you have early-stage osteoarthritis that has damaged just one side of the knee joint. By shifting your weight off the damaged side of the joint, an osteotomy can relieve pain and significantly improve function in pts arthritic knee.

Total or partial knee replacement (arthroplasty). Surgeon will remove the damaged cartilage and bone, and then position new metal or plastic joint surfaces to restore the function of pts knee.

ARTHROPLASTY:

Fig.No. 5



(Left) A partial knee replacement is an option when damage is limited to just one part of the knee. **(Right)** A total knee replacement prosthesis.

Recovery

After any type of surgery for arthritis of the knee, there is a period of recovery. Recovery time and rehabilitation depends on the type of surgery performed.

Orthopedic Surgeon may recommend physical therapy to help pts regain strength in pts knee and to restore range of motion. Depending upon pts procedure, pts may need to wear a knee brace, or use crutches or a cane for a time.

In most cases, surgery relieves pain and makes it possible to perform daily activities more easily.

Source: Department of Research & Scientific Affairs, American Academy of Orthopaedic Surgeons. Rosemont, IL: AAOS; April 2014. Based on data from the National Health Interview Survey, 2012; U.S. Department of Health and Human Services; Centers for Disease Control and Prevention; National Center for Health Statistics.