

**Study of structural and functional changes in *janu sandhi* (KNEE JOINT) with special reference to symptoms of –*Sandhigata Vata* i.e. Osteoarthritis – a case series.**

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**ABSTARCT :**

Joint diseases are very common in the society. In various joint diseases the structural and functional changes are observed in relation to joints which affects the further prognosis of disease. In this study, patients of *sandhigata vata* are examined to observe such changes at various stages. *Sandhigata vata* mentioned by Charakacharya in *chikitsasthan* 28th chapter and Madhavnidan can be compared with osteoarthritis as per available literature<sup>[3]</sup>. Understanding the pathogenesis of osteoarthritis is very important for deciding treatment plan, monitoring treatment efficacy and predicting disease outcome. The structural elaboration of joints is very limited.<sup>[1]</sup> Ayurveda's approach varies from that of modern science in diagnosis of disease. In Ayurveda, Symptomatology based on vitiation of *dosha* helps in accurate diagnosis of

disease condition. But in modern science main emphasis is given on diagnostic tools such as MRI, Radiograph, Ultra sonography, Histopathological studies mainly to detect the structural changes in Osteoarthritis which is characterized by degenerative changes in the bones, cartilage, menisci, ligaments, and synovial tissue. Hence in this study 10 pre diagnosed patients of *sandhigata vata* (osteoarthritis) having symptoms such as *sandhishula* (pain), *sandhi shoth* (inflammation), *Aatop* (crepitus), and *Sandhigraha* (stiffness)<sup>[2,4]</sup> were selected and an attempt was made to understand the structural changes observed in knee joint osteoarthritis along with the functional changes based on range of motion<sup>[10,11]</sup> and correlation was established with the symptoms.

**KEYWORDS:** *Janu sandhi* (knee joint), *sandhigata vata* (osteoarthritis),

symptoms, structural changes, functional changes, MRI, goniometry.

### INTRODUCTION:

Prevalence of joint diseases is increasing in the society due to sedentary life style, stress and strain in day today life. Osteoarthritis is the second most common joint disease with an incidence rate of 22 percent to 39 percent in India. It is more common in women than men, increases dramatically with age, the prognosis worsens and finally the person ends up with joint replacement. Such chronic patients mainly approach Ayurveda to receive treatment so as to avoid the surgical interventions and to improve quality of life. Structural as well functional aspects of joints should be explored to understand the pathophysiology of joint diseases so as to decide the treatment plan. The anatomy of joint is not much explored in *Ayurveda Shareer*.

There are mainly two types of joints i.e. *cheshtavant* (movable) and *sthira* (immovable) joints mentioned in classical texts<sup>[1]</sup> Further classification of joints enumerates eight types of *sandhi*. The eight types are namely *kora*, *ulukhala*, *samudga*, *pratara*, *tunnasevani*, *vayastund*, *mandal*, and *shankhavart*<sup>[3]</sup>. The presence of *Shleshmadhara kala* and *shleshak kapha* at all the *sandhi* is enumerated by Sushrutacharya. This *kala* along with *Shleshak kapha* helps in smooth functioning of all joints. *Kala* are explained as limiting membranes between *dhatu* and *ashay* which is formed in intra-uterine life. *Kleda* between *dhatu* and *Ashay* becomes *pakva* and gets transformed into mucoid, tendinous and membranous structure

which is known as *kala*. From the previous available studies it is proved that *Shleshmadhara kala* can be compared with synovial membrane and *shleshak kapha* with the synovial fluid<sup>[6,7]</sup>. But this *shareer* about *sandhi* and *kala* explained in Ayurveda Texts is not applied in clinical practice. The structural and functional changes in joints hence needs to be studied along with symptoms of *Sandhigata vata*.

### PRIMARY OBJECTIVE :

To establish a correlation between structural and functional abnormalities in knee joint and symptoms according to Ayurved in manifestation of *avastha* of *Sandhigata vata* (osteoarthritis).

### SECONDARY OBJECTIVE :

- To study changes in knee joint with special reference to *Shleshmadhara kala* in *Sandhigata vata* (osteoarthritis).
- To study range of movement of knee joint in *Sandhigata vata*.
- To study symptoms in *Sandhigata vata* as mentioned in Ayurved texts.
- To establish a scale based on score obtained through observations so as to decide the *avastha* (stages) of *Sandhigata vata*.

### METHODOLOGY :

**Study design :** Descriptive cross sectional study.

**Study setting :** 10 Pre diagnosed patients of *Sandhigata vata* (Osteoarthritis) of knee joint were selected randomly from Shalya and

Kayachikitsa OPD of Arogyashala hospital, Nashik.

**Inclusion criteria:**

- Patients with age group from 45 to 65 years of both gender.
- OPD and IPD Pre –diagnosed patients with *Sandhigata vata*, (osteoarthritis) manifested on knee joint and who are already screened for MRI .

**Exclusion criteria :**

- Uncooperative patients and patients not following research protocol .
- Patients having any other critical illness.

**Criteria for withdrawal:**

Subjects enrolled in the study but who are not willing to continue.

**Methods of measurements**

Measurement of structural changes: Diagnosed patients of *Sandhigata vata* (Osteoarthritis) were assessed for structural changes in knee joint with special emphasis on synovial membrane

- a) Gradations of symptoms of *Sandhigata vata* according to Ayurveda.

and synovial fluid through investigations such as MRI. The changes were noted down according to the gradations.

Measurement of range of movement :Range of movement of knee joint was assessed based on Goniometry .

Assessment of symptoms: The patients were interviewed only once with the help of predesigned proforma to assess symptoms in the *sandhigata vata*. Each symptom was assessed based on gradation system as Grade0- no symptom, Grade 1-mild,Grade 2- Moderate,Grade 3-Severe and Grade4-Extreme. This was followed by clinical examination.

Correlation was established between the Ayurvedic and modern assessment to understand the outcome of the disease. On the basis of assessment the score was obtained and was rated on developed scale for *avastha* (stages) of *sandhigata vata*.

**Data collection tool and its method:**

Sr. no.	Symptoms	Gradation	Observation on 0 <sup>th</sup> day
1.	<b>Sandhishool (pain)</b>	0=No pain 1=Mild (pain with movement ,relieved without medication) 2=Moderate(pain and tenderness relieved with medication) 3=Severe (Pain, tenderness with disturbed routine work, relieved by medication) 4= Extreme (Unbearable pain and not relived by	

		medication ,need for hospitalisation )	
2.	<b>Sandhishotha (oedema)</b>	0=No swelling 1=Mild(slight more in comparison to normal) 2=Moderate (much elevated and joint seems grossly deformed) 3=Severe (much elevated and joint seems grossly deformed with tenderness) 4=Extreme (extremely elevated with pain and immobilisation)	
3.	<b>Aatop (crepitus)</b>	0=No crepitus 1=Mild (Intermittent crepitus) 2=Moderate (Crepitus during exhaustive movement and audible by self) 3=Severe( Crepitus during any movement, clearly audible by third person ) 4=Extreme (Continuous Crepitus during any slight movement and clearly audible)	
4.	<b>Sandhigraha (stiffness)</b>	0=No stiffness 1=Mild (stiffness for few minutes but relieved by mild movements) 2=Moderate (stiffness at any time ,lasts longer ,sometimes affects daily routine ) 3=Severe (continuous stiffness and hampers daily routine severely.) 4=Extreme (locked knee)	

a. **Structural changes assessment tool such as Kellgren -Lawrence (KL) grading scale . based on MRI findings.**

	Joint space narrowing	Articular bony surface(irregularity or sclerosis)	Articular cartilage	Osteophytes formation	Synovial fluid	Synovial membrane
Right knee						
Left knee						

**Kellgren -Lawrence (KL) grading scale:**

- Grade 0: No radiographic feature of OA present
- Grade 1: Doubtful narrowing of joint space and possible osteophytic limping
- Grade 2: Definite osteophytes, definite narrowing of joint space
- Grade 3: Moderate multiple osteophytes, definite narrowing of joint space, some sclerosis and

possible deformity of bone contour.

- Grade 4: Large osteophytes ,marked narrowing of joint space, severe sclerosis and definite deformity of bone contour.

**b) Goniometry readings for knowing range of motion in knee joint.**

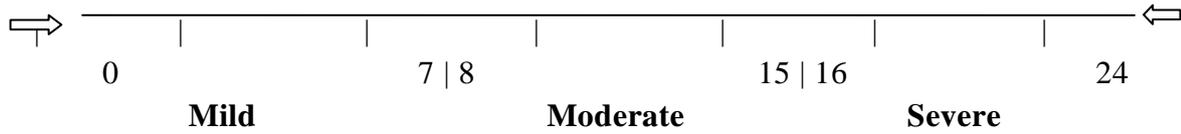
Normal range of motion of knee:

Flexion -120 -150 degrees

Extension - 0 Degree

Movement	Grade	0(120-150)	1(90-119)	2(60-89)	3(30-59)	4(0 -29)
Flexion	Right knee					
	Left knee					
Extension	Right knee					
	Left knee					

**Scale based on score for rating the *avastha* of *Sandhigata vata* .**



**OBSERVATIONS:**

Patients coming to Arogyashala rugnalay, Nashik for seeking treatment of *Sandhigata Vata* were screened in the present study.

All the 10 patients showed four symptoms of *Sandhigata vata* , i.e *sandhishul*, *sandhi shoth*, *Aatop* and *sandhigraha* but the severity of symptoms was different in all the patients.

Out of 10 subjects, 2 subjects showed grade 2 level symptoms and grade 2 level structural changes on MRI. The goniometric reading of these subjects showed grade 0 i.e. normal range of motion of both the knees .Hence the score obtained on the scale was 10 which comes under moderate stage of *sandhigata vata*.

3 subjects showed grade 1 level symptoms and grade 0 level structural changes on MRI. The range of motion of both joint was normal with slight pain during flexion in one subject. The score obtained on scale was within 7 showed Mild stage of *Sandhigata vata*.

One subject showed grade 1 level symptoms and grade 1 level structural changes on MRI. The range of motion of both joint was normal with slight pain during flexion in one subject. The score obtained on scale was within 7 showed mild stage of *Sandhigata vata*.

Four subjects showed grade 3 level symptoms and grade 3 level structural changes on MRI. The range of motion of both joint was normal in three subjects but one subject showed grade 1 flexion in both the knees , extension was normal in all four subject . The score obtained on scale was above 15 showed severe stage of *Sandhigata vata*.

No any structural changes related to synovial membrane were noted in these 10 patients in MRI.

**Conclusion :**

A correlation between structural and functional changes in knee joint and symptoms according to Ayurved can be established to understand the *avastha* of *Sandhigata vata* (osteoarthritis).

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