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A review on causes of *Janu Sandhi Vikruti* (knee joint disorders).

Bhavesh Motilal Oswal^{*1}, Santosh Chavhan²

1. PG Scholar,
2. Professor and HOD

Rog Nidan AumVikruti Vidgyan, Dr D.Y. Patil School of Ayurveda ,
Nerul, Navi Mumbai, Maharashtra, India

***Corresponding Author:** Email id- bmoswal09@gmail.com; 9860188341

ABSTRACT

The knee joint is the largest joint in our body. It is vulnerable to injury as it bears an enormous amount of pressure while providing flexible movement. Knee problems are very common, and they occur in people of all ages. Knee problems can interfere with many things, from participation in sports to simply getting up from a chair and walking. This can have a big impact on life. Treatment of knee problems depends on the cause. Hence this article focuses on the cause of abnormalities seen in knee joint from both Ayurvedic and modern aspects.

Keywords: *Janu sandhi*, Hetu of *Vikruti*, Knee joint, Causes of Abnormalities

INTRODUCTION:

The knee joint is one of the most commonly injured joints, as an isolated injury or a frequent component in a multiple trauma patient. The knee is a complex joint, consisting of two

condylar joints between the corresponding condyles of femur and tibia and a sellar joint between the patella and femur. The principal intra articular structures in knee are the two menisci, the two cruciate ligaments, and the two collateral ligaments. The menisci serve to distribute joint fluid, cartilage nutrition, mechanical shock absorption, increasing the surface area of the joint and therefore the stresses, serve to stabilize the joint, and a weight bearing function. The cruciate ligaments function as stabilizers of the knee in both forward and backward motions of the tibia on the femur and provide an axis around which both medial and lateral rotary movements are assisted. The knee is a vulnerable joint that bears a great deal of stress from everyday activities, such as lifting and kneeling, and from high-impact activities, such as jogging and aerobics. Humans having erect posture bearing the maximum weight on the knee joint which is commonest site where many disorders prevails. The *Sushrut samhita* is a treatise written by *Acharya Sushrut*, has mentioned orthopaedic surgery in detailed form. It is fact that the management of skeletal injuries is

well advanced in today's modern era. But it is also true that the principles of diagnosis & management of skeletal injuries laid down by *Sushrut* still hold good & deserve appreciation. *Acharya sushrut* has elaborately described types of Bones, causes of bone injuries, its clinical features, and dislocation and their management. The principles of management of fracture mentioned by *sushrut* are never changing principles even after any advancement in modern surgery. While treating any disorder it is very essential to understand the factors causing the disability. Hence this article enlightens the most possible causes of *janu sandhi vikruti* (knee joint disorders) from both Ayurvedic and modern aspects.

Ayurvedic Concept of knee joint:

Janu – In general it is the junction that lies between *Uru* and *Jangha*. *Sandhi* is an anatomical part and *vata* is physiological aspect of the body. *Janu sandhi* -It means knee joint.

Acharya *sushruta* explain Circumference of *janu sandhi* is 14 *angula*.

Generally *sandhi* means the junction between two structures. In ayurveda *sandhi* is a technical word indicates that it is a two or more bone join together and joint formed, may be fixed or freely movable or with less. According to Acharya *charaka in vimana sthana* that *asthi sandhi* is *moolasthan* of *majjavahastrotas*. Acharya *Dalhana*, *sandhi* means '*shariram Asthi samyoga sthana*', that is where two or more object join together in the body that is called *sandhi*. Acharya *sushrut* has described various types of *sandhi* that is *shira sandhi*, *snayusandhi*, *sira sandhi*, *peshi*, *asthi* etc. but description given is only *asthi sandhi*. *Janu marma* – lies between *jangha* and *uru* in *sandhi sthana*. It is *vaikalyakara marma*

Janusandhi* -*Panchmahabhuta sambandha

In *Akash mahabhuta*, there is *vata dosha* which established movement. At the site of *sandhi prithvi ghataka is asthi* and inside *asthi is vayu*. *Jala mahabhuta* is present in *sandhi* as synovial fluid which lubricate and nourishes the *sandhi*.

Sandhi sharir

'*Asthi samyoga sthanam*' the union of two or more bone is called as *sandhi*. at the time of *sandhi parikshana* we should know the types of *sandhi* it's normal movement, it's axis of movement then only can be determined which type of *vikruti* is there.

When we think of *sandhi vikruti* both *rachana* and *kriya* that structure and function we should think of *sthayi* and *asthayi vikruti*. The knowledge of the physiology and structure related to particular organ as well as surrounding structures is very important before studying the pathology of any disease related to that region. Hence anatomy and physiology of *janusandhi* should be understood properly. The *asthi sandhi* located at the region of *janu* is called *janu sandhi*. It can be classified under the group of *chestvanta* and *kore sandhi* according to features. They are two in number the structures that constitute the *sandhi* are mentioned below.

1. *Asthi*
2. *Snayu and kandara*
3. *Shleshmadhara kala*
4. *Shlesmak kapha*
5. *Peshi*
6. *Sira and dhamani*

Disorders where in changes in the structural pattern of knee joint are seen are *sandhigata*, *aamvata*, *vatarakta*, *kosthushirshak*.

The causes that led in to anatomical and physiological changes of knee joint are as follows:

- ***Viharjanya nidan***

The *vihar* which vitiates *vata* and *kapha* excessive indulgence in activities like

Ativyayama ,Ati Prajagarana ,plavana, Ativyavaya, Ati Shram, Upavasa, Vegadhara, Divaswapna ,Abhighata, Marmabhighata Dhatushaya, etc

- **Abhighata**

It may be fall on knee joint, *aghat* to knee joint may affected *asthi,snayu*, and *majja* of knee joint. It is possible to vitiate the *vata dosha* and produced *sthanavaiguna* at site of knee joint.

- **Marmaabhighata**

Janu sandhi is one of the *vaikalyakara sandhi marma*. *Janusandhi marma* is a vital point which is formed by *Snayu,sira,asthi* and *marma* between *jangha* and *uru sandhi sthana* .

Any *abhighata* to that may lead to *khanjatva*.

- **Vegavrodh**

Vata dosha is play important role in physiological expression of these *vega* which creates obstruction in the pathway of *vatadosha*, ultimately causes vitiation of *vata dosha*.

- **Bhara vahan**

Carrying excessive load causes excessive pressure and stretching effect. *Janusandhi* is the weight bearing joint carry excessive load will have direct effect on knee joint. *Ativyayama*- It include excessive physical works if affected the structure of *sandhi* .Over exertion the stability of joint affected and mostly affected in *janu sandhi* .

- **Manasik**

According to acharya mental factor like *shoka,bhaya ,krodha,chinta* etc vitiation *vata dosha* because *sharir and mana* those are interrelation between each other.

- **Age factor**

As per ayurvedic acharya in old age *vata dosha* is predominant of three *doshas* .During these period naturally to

vitiation of *vata* due to *vata kara ahara,vihara* .In this process the *shleshmak kapha* in the *sandhi* does *kshaya* causing *vataprakopa* in particular part.

- **Kala swarupa**

Kala is an important role to produce the disease. Especially in *rutu sandhi* changes of getting disease are prone.*Vataprakopa* is more seen in night time. Ayurveda acharya has explain and classified the *rutu* into six .In this *rutu* each *dosha* has got their own involvement *vata* having natural. *Chaya – Grishma;Prakopa –Varsha;Prashama –Sharad*. More *vata vyadhi* can be seen in *varsha rutu* .(A.H.Su12/25)

- **Desh swarupa**

Vata dosha predominant in *jagal desha* (A.H.Su1/24)

Joint Definition: An articulation (joint) is a point of contact between bones, between cartilage and bones or between teeth and bones. When we say that one bone articulates with another, we mean that one bone forms a joint with another bone. The scientific study of joint is called arthrology .

(Arthro = joint, Logos = study of).

Synonyms: Articulation, Arthroses, Junction ossium.

Classification of the Joints:

The joints may be categorized into structural, based on anatomical characteristic, or into functional classes, based on the type of movement they permit.

A) Anatomy of the Synovial Joints:

All synovial joint have certain characteristic in common, which are as follows –

- | | |
|-------------------------|----------------------|
| a) Capsular ligaments | c) Synovial membrane |
| b) Articular cartilages | d) Synovial fluid |

B) Common Movement of the Joint

There are seven types of movement in the joint depending on the structure have been described by Gray:

1. Abduction
2. Adduction
3. Rotation
4. Circumduction
5. Angular movement
6. Translation

Bones of knee joint: There are four bones around the knee: the thigh bone (femur), the shin bone (tibia), knee cap (patella), and the fibula

Ligaments in the knee: Ligaments are strong, tough bands that are not particularly flexible. The function of ligaments is to attach bones to bones and to help keep them stable. In the knee, they give stability and strength to the knee joint as the bones and cartilage of the knee have very little stability on their own.

Cartilage of the Knee

There are many types of cartilage in our body, each with a slightly different function. For instance, the medial and lateral meniscus (discussed below) is made up of *fibrocartilage* which makes them strong and rubbery and able to add additional stability to the knee. On the other hand, like bones of most joints, the end of the femur and tibia and the under surface of the patella are covered in *hyaline* cartilage. *Hyaline* (also known as *articular*) cartilage is both flexible and slippery. The flexibility helps it to act as a shock absorber. Articular cartilage is made even more slippery by an oily lubricant made within the joint, called *synovial fluid*. This allows the two bones to move smoothly on each other without pain. If this articular cartilage wears away, joint movement can become painful and limited (this is known as arthritis). Unfortunately, cartilage has almost no blood supply and is very bad at repairing itself.

Factors that Causes knee abnormalities:

- As the knee has many structures associated with it, there are many problems that can occur around the knee. In addition to wear and tear type issues of the knee, sports injuries are the source of many knee problems.
- **Sprained or strained knee ligaments and/or muscles:** A sprained or strained knee ligament or muscle is usually caused by a blow to the knee or a sudden twist of the knee. Symptoms often include pain, swelling, and difficulty in walking.
- **Torn Cartilage: Trauma** to the knee can tear the menisci (pads of connective tissue that act as shock absorbers and also enhance stability). Cartilage tears can often occur with sprains. Treatment may involve wearing a brace during an activity to protect the knee from further injury. Surgery may be needed to repair the tear.
- **Tendonitis:** Inflammation of the tendons may result from overuse of a tendon during certain activities such as running, jumping, or cycling. Tendonitis of the patellar tendon is called jumper's knee. This often occurs with sports, such as basketball, where the force of hitting the ground after a jump strains the tendon.
- **Arthritis:** Osteoarthritis is the most common type of arthritis that affects the knee. Osteoarthritis is a degenerative process where the cartilage in the joint gradually wears away. It often affects middle-age and older people. Osteoarthritis may be caused by excess stress on the joint such as repeated injury or being overweight. Rheumatoid arthritis can also affect the knees by causing the joint to become

inflamed and by destroying the knee cartilage. Rheumatoid

arthritis often affects persons at an earlier age than osteoarthritis.

DISCUSSION

Table showing *janu sandhigat roga*

<i>Hetu</i>	<i>Sandhigatvata</i>	<i>Aamvata</i>	<i>Vatrakta</i>	<i>Koshtrukshriskha</i>
<i>ama pradhanya</i>	present/absent	Present	absent	Absent
Age	old age	any age	-	-
<i>dosha/dushya</i>	<i>only vata</i>	<i>vata+ama</i>	<i>vata+rakta</i>	<i>vata+rakta</i>
<i>sandhi</i>	weight bearing knee joint	knee gets affected along with other large joint	Mostly affects the big toe but can also affect the knee joint.	only <i>janu sandhi</i>

- The knee joint being a *marma sthan*, it is the seat of *Prana vayu*. Any injury to this vital point causes the vitiation of *Vata dosha*. Also being a joint, it is a *kapha sthan* (*Shleshaka kapha*), which lubricates and strengthens the joint. Due to vitiation of these two doshas there is pain, swelling, stiffness etc. when the joint is affected.
- *Janu Sandhi* is included amongst the 107 *Marmas* in the body. *Marmas* are the vital points. When traumatised they can result in mortality, morbidity, pain or some dysfunction. They are congregations of important vessels or nerves.

Pathological Conditions and Syndromes in the Knee

- Osteoarthritis: the most common disease affecting the knee is osteoarthritis. The cartilage in the knee gradually wears away, causing pain and swelling.
- Osteochondritis Dissecans
- Infectious Arthritis

- Chondromalacia Patellae
- Gout
- Plica Syndrome
- Rheumatoid Arthritis
- Internal derangement of the knee (IDK) is an inclusive term used to indicate (alone or in combination) certain disorders of the joint including (alone or in combination) torn meniscus, loose bodies in the knee, and damaged collateral or cruciate ligaments.
- Anterior cruciate ligament (ACL) Injury or Tear
- Meniscus tear
- Lateral and Medial Collateral Ligament Injury
- Posterior Cruciate Ligament (PCL) Injury or Tear
- Patellar Dislocation and Instability
- Patellofemoral syndrome (Runner's Knee)
- Patellar Tendon Rupture
- Iliotibial Band syndrome
- Pes Bursitis

- Fracture and Stress Fracture
- Osgood-Schlatter Disease

CONCLUSION:

- A faulty dietary habit, irregular life style is responsible for changes in body tissues and plays a vital role in the manifestations of the deformity occurs in *Sandhi* i.e. joints. *Janu sandhi* i.e. knee joint is one of the mostly affected joints.
- All these hetu which are explained in various samhita helps understand the complexity of janu sandhi(knee joint) .
- ‘*Nidanaparivarjan*’ Which is an important *chiktisa*. By avoiding the *hetu* we can avoid the recurrence of the disease.

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