



Review Article

ANATOMY OF JANU SANDHI W.S.R. TO KNEE JOINT: AN AYURVEDA OVERVIEW

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ABSTRACT

The knowledge of anatomy in Ayurveda has been poorly understood in today's era. The lack of sufficient literatures regarding the subject has hindered its development. Despite the hurdles, still the concept of anatomy in Ayurveda is in depth and seeking for scientific exploration. The increasing incidence of joint diseases leading towards chronicity are best being treated through Ayurveda, but the concepts behind the results are not well understood due to lack of proper knowledge in anatomy. The description of various anatomical entities has been clearly mentioned in *Samhitas* in Ayurveda. *Sushruta Samhita*, the pioneer text of Ayurveda surgery, in its *Shareer Sthana* primarily has described about the human body anatomy. Apart from this, *Charaka Samhita*, the text of medicine has also lightened regarding the anatomy. In this article, the anatomical concepts of *Janu Sandhi* (knee joint) are extracted from *Sushruta Samhita* and *Charaka Samhita* in order to organize the knowledge systematically. The concepts are correlated with the view of contemporary medical science and illustrated in best possible way.

INTRODUCTION

The knowledge of anatomy in the Ayurvedic literature is a great boon to the today's science. It seems as some fictitious story while reading about the *Samhitas* thoroughly, but deeper they are purely scientific and factual based. Knee joint is considered as the complex joint in the Ayurvedic texts.^[1] *Acharya Sushruta* has mentioned the importance of *Shavachchedana* (Cadaver dissection) for the proper knowledge of the human anatomy. To be a successful surgeon, it is compulsory for one to become an anatomist. *Shareera Sthana* in *Sushruta Samhita* has described in detail about the human anatomy in the 10 chapters.

There are total number of 210 *Sandhi* (joints) in human body.^[2] Knee joint is termed as the *Janu Sandhi* or *Janu* in Ayurveda classics.

Detail about the location, shape and size, muscle attachments and the different traumatic and non-traumatic diseases have been given by *Acharya Charaka* and *Acharya Sushruta* in their texts.

AIMS AND OBJECTIVES

- To compile all the information related to *Janu Sandhi* in the Ayurvedic texts *Charaka Samhita* and *Sushruta Samhita*.
- Illumination of all information related to *Janu Sandhi*.
- To present information in a clear and understandable manner.

MATERIALS AND METHODS

The information related to the *Janu Sandhi* were compiled from the texts of Ayurveda; *Charaka Samhita* and *Sushruta Samhita*. The different grammatical terms related to *Janu* were searched in e-samhita, correlated with the original textbooks and information were gathered.

Background

The word *Janu* is derived from the root word "*Jan*" with the suffix "*Yujn*". The term *Janu* is found in the literature since Vedic period. It can be found in *Rigveda*, *Atharvaveda*, *Yajurveda*, *Vajaseniya Samhita*, *Sulbasutra*, *Mahabharata*, *Rajatarangini*, etc.

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The number of patients related to knee joint pain in outpatient department are increasing day by day. Rather than achieving the holistic management of the diseases, almost all of them are leading towards chronicity, which may be the result of improper and inaccurate knowledge regarding to the anatomy of this complex joint.

Anatomy

Number of Janu Sandhi (Knee Joint)

There are two *Janu Sandhi* in our body.^[3,4] Similarly, there are two *Janu Kapalika* (bases) forming the *Janu Sandhi*.^[5]

The contemporary anatomical science also tells the two knee joints in our human body.

Type of Janu Sandhi/Type of Knee joint

Janu Sandhi is the *Kora* type of *Sandhi*. There are total number of 8 types of *Sandhi*. *Kora* means *Gadda* or *Kalli*.^[6]

Knee joint is a synovial hinge joint. It is a compound synovial joint composed of the tibiofemoral and patellofemoral joints. It primarily functions as a hinge joint, allowing flexion and extension as well as a variety of other movements.

Size of Janu Sandhi (Knee Joint)

The length of *Janu Sandhi* is 04 *Angula*. *Acharya Sushruta's* opinion regarding the length of *Janu Sandhi* is 03 *Angula*.^[7] While *Acharya Charaka* tells the 04 *Angula* length.^[8] The circumference of *Janu Sandhi* is 14 *Angula*^[9] or 16 *Angula*.^[10] The circumference is measured at the middlemost part of the *Janu Sandhi*.^[11]

We cannot get the exact dimension of knee joint in the contemporary anatomical science. But the size varies according to the age, or the girth of the person. The average adult knee joint dimensions are mentioned in the Ayurveda literature.

Position

Janu Sandhi is situated in between the *Jangha* (calf) and *Uru* (thigh) region.^[12] The distance between the *Janu Sandhi* and *Kati Sandhi* above is 32 *Angula*.^[13]

Number of Snayu in Janu Sandhi

There are 10 *Snayu* in *Janu Sandhi* out of the total 900 *Snayu* in human body.^[14] There are 11 ligaments supporting the knee joint namely fibrous capsule, ligamentum patellae, tibial collateral, fibular collateral, oblique popliteal, arcuate popliteal, anterior cruciate, posterior cruciate, medial meniscus, lateral meniscus and transverse ligament.

Number of Peshi in Janu Sandhi

There are 05 *Peshi* (muscles) attached to *Janu Sandhi*.^[15] There are mainly 05 muscles supporting the movements of the knee joint. Quadriceps femoris helps in extension of the knee joint. Vastus medialis, one of the components of Quadriceps femoris helps in locking of the knee joint. Similarly, popliteus muscle helps in unlocking of the knee joint. The biceps femoris, semitendinosus and semimembranosus help in flexion of the knee joint.^[16]

Janu Sandhi as the vital point

Janu is considered as the *Marma* (vital point) of the human body. It is *Sandhi* (joint) type of *Marma*.^[17] It is also the *Vaikalyakar* (disability forming) type of *Marma*. The trauma at the *Janu Sandhi* results to *Khanjata* (clogged).^[18]

Asthi in Janu Sandhi

There are five types of *Asthi* in our body. They are *Kapala Asthi*, *Ruchaka Asthi*, *Taruna Asthi*, *Valaya Asthi* and *Nalaka Asthi*.^[19]

There is a single *Asthi* in *Janu Sandhi*.^[20] The contemporary science calls it the patella. It is a type of flat bone (*Kapala Asthi*).

Diseases involving Janu Sandhi

There are number of diseases in Ayurveda that involve *Janu Sandhi*. Some of them are *Vatarakta*^[21,22] *Krostukashirsha*^[23], *Shlipada*^[24], *Gridhrasi*^[25,26], *Vataja Pakwatisara*^[27], *Ardita*^[28], *Vataja Jvara*^[29] etc.

Entity (Related to Knee joint)	Ayurveda view	Modern view
No. of Knee joints	02	02
Type of knee joint	<i>Kora Sandhi</i>	Synovial hinge joint
Length of knee joint	<i>Charaka</i> – 04 <i>Angula</i> <i>Sushruta</i> – 03 <i>Angula</i>	-
Circumference of knee joint	<i>Charaka</i> – 16 <i>Angula</i> <i>Sushruta</i> – 14 <i>Angula</i>	-
<i>Snayu</i> (Ligaments)	10	11
<i>Peshi</i> (Muscles)	05	05

DISCUSSION

Knee joint is the largest and the most complex joint in the human body. The anatomy of the knee joint not only deals with the single entity, but with the multiple anatomical structures. It has relations with various structures such as muscles, bones, ligaments, cartilage, synovial tissues, synovial fluid and connective tissues. The knowledge of anatomy in Ayurveda cannot be given of less importance. The various structures forming the knee joint, and associates are mentioned and explained to some extent in Ayurvedic texts. The number of various knee joint related structures mentioned in *Samhitas* are close with that mentioned in modern anatomical science.

CONCLUSION

Acharya Sushruta, the great surgeon of ancient times in his book, has clearly mentioned about the human anatomy. The organogenesis of the different organs, details about the *Mamsa, Asthi, Sandhi, Snayu, Sira, Dhamani*, etc. are the great contributions to the field of human anatomy. Similarly, *Acharya Charaka* after *Acharya Sushruta* has also mentioned about the human anatomy.

In present era, all the texts of Ayurveda are not available with us. There are more than 50 *Teeka* (explanatory texts) of *Sushruta Samhita* itself, but their availability is challenging. Ayurveda needs to get explored more in theoretical as well as practical approach in order to get the knowledge of human anatomy in more detail.

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