

IMPORTANCE OF SANDHI SHARIR: A REVIEW ARTICLE

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ABSTRACT

The meaning of word *Sandhi* is “the meeting point of two or more structures.” According to modern joint is a point where two or more bones are articulates with each other. *Aacharya Sushruta* has quoted that although there are numerous *Sandhi* in our body which cannot be counted so only *Asthi Sandhi* should be considered while enumerating *Sandhis*. There are two hundred and ten *Sandhi* in the human body. *Sushruta* has classified *Sandhi* on the following basis: (a) On the basis of function (movements) are classified into *Cheshtavanta* and *Sthira Sandhi* while *Aacharya G ananatha Sen* has classified *Sandhi* on the basis of movements as *Bahucheshta*, *Alpacheshta*, *Acheshta*. (b) On the basis of structure are classified into 8 types i.e. *Kora*, *Ulukhala*, *Samudga*, *Pratara*, *Tunnasevani*, *Vayasatunda*, *Mandala* and *Shankhavarta*. A thorough knowledge of the structure and function of the joint is required to diagnose and treat the diseases of joints. So the knowledge of anatomy of joints should be known.

KEYWORDS: *Cheshtavanta Sandhi*, Joint, *Sandhi*, *Sandhi Sankhya*, *Sthira Sandhi*.

INTRODUCTION

In *Ayurvedic* literature *Atreya*, *Dhanvantari* and all other communities have made it important the knowledge of body to have undoubtedly for the sake of knowledge. The definition of *Sandhi* in various *Ayurvedic* grammatical literature are given as “the union” or “to unite” or “the meeting point of two or more structures.” Regarding this *Aacharya Sushruta* has quoted that although there are numerous *Sandhi* in our body which cannot be counted so only *Asthi Sandhi* should be considered while enumerating *Sandhis*.

In our *Ayurvedic* classics different *Aacharyas* have mentioned different numbers of *Sandhi*. According to *Aacharya Sushruta* *Sandhis* are 210 in number, which are responsible for various movements, and are distributed throughout the body.

In *Ayurvedic Samhitas* the description of anatomy of *Sandhi* in detail is not found. It is observed that the incidence of joints disorders are increasing in today's world. It is the burning problem for both families and society. A thorough knowledge of the structure and function of the joint is required to diagnose and treat the diseases of joints.

Ayurvedic Review

According to *Aacharya Sushruta* only *Asthi Sandhi* should be taken into account where as other *Sandhi* of *Peshi*, *Snayu* and *Sira* are innumerable and should be excluded while counting.

Classification of Sandhi- Main classification is of two types.1. Based on *Kriya* 2. Based on *Rachana****Kriyanusar Vargekaran (Based on Movement):*** The *Sandhis* are of two types.

i. Cheshtavanta Sandhi ii. Sthira Sandhi The *Sandhis* which are situated in the *Shakhas*, *Hanu* and *Kati* are *Cheshtavanta Sandhi* while all the remaining *Sandhi* comes under the *Sthira* in nature.

The *Cheshtavanta Sandhis* are further classified into two types based on their extent of movement.

They are1. *Bahuchala* (freely movable) 2. *Alpachala* (slightly movable)

The *Sandhi* of *Shakhas*, *Hanu* and *Kati* are of *Bahuchala* variety and the *Sandhi* of *Prushtha* etc. are *Alpachala* variety

2. *Rachananusar Sandhi Vargeekaran* (Based on structure)

Based on the structure *Aacharya Sushruta* had described eight types of *Sandhi*. They are *Kora*, *Ulukhala*, *Samudga*, *Pratara*, *Tunnase-vani*, *Vayastunda*, *Mandala* and *Shankhavarta*.

Kora Sandhi

As per the description of *Haranchandra* in commentary of *Sushrut Samhita*, *Kapat* etc. is taken for *Nibandhan* of a special devise called *Kora* is known that the *Kabja* (hinge). The *Kora Sandhi* is seen in the following region- *Anguli*, *Manibandha*, *Gulpha*, *Janu* and *Kurpara*.

Ulukhala Sandhi

These types of *Sandhi* look like stone grinder used in the kitchen in olden days that's why it is named so. The *Ulukhala* variety of joints is found at *Kaksha*, *Vankshana* and *Dashana*.

Samudga Sandhi

This variety of *Sandhi* looks like a box. This variety of *Sandhi* looks like a box. These *Samudga Sandhis* is seen at *Ansapeeth*, *Guda*, *Bhaga* and *Nitamba*.

Pratara Sandhi

According to *Dalhana*, the articulating surfaces of this variety of joint are flat in nature and floating, supported by cushion and friction is seen in between the articulating surfaces. In *Sushruta's* opinion these varieties of joints are located at *Greeva* and *Prushthavansha*.

Tunnasevani Sandhi

The commentator *Gananath Sen* has opined that articulating surfaces resembles dentate edges which are supported and stucked together or embedded into one other. This type of *Sandhi* is found at *Sirakapala* and *Katikapala*.

Vayastunda Sandhi

According to *Gananatha Sen* the *Hanu* which is situated within *Shankhasthi* is considered as *Vayastunda Sandhi*. Even *Sushruta* has got similar opinion about *Vayastunda Sandhi*.

Mandala Sandhi

According to *Dalhana* the *Sandhi*, which are oval or round are called as *Mandala Sandhi*.

This type of *Sandhi* is present in *Kantha*, *Hrudaya* and *Netra*.

Shankhavarta Sandhi

According to *Haranachandra*, these are circular in nature which resembles the circles of a snail or *Shankha*.

According to *Sushruta* they are found in *Shrotra* and *Shringataka*.

Sandhi Sankhya: According to *Aacharya Charaka* - 200 *Sandhi* in body. According to *Aacharya Sushruta* - Body comprises 210 *Sandhi*. Of these sixty-eight are in the four ex-tremities; fifty-nine in the trunk (*Koshtha*); and eighty-three in the neck and the region above it.

Modern review

Joints (articulations) are unions or junctions between two or more bones or rigid parts of the skeleton. Joints exhibit a variety of forms and functions. They are constructed to allow for different degrees and types of movement.

Definition

- Joint is a junction two or more bones or cartilages.

An articulation is a point of contact between bones between cartilages and bones, or between teeth and bones

Classification of joints

Joints are classified structurally, based on their anatomical characteristics, and functionally, based on the type of movement they permit. Functionally, joints are classified as one of the following types:

- **Synarthrosis**: An immovable joint.
- **Amphiarthrosis**: A slightly movable joint.
- **Diarthrosis**: A freely movable joint.

Structurally, joints are classified as one of the following types: Fibrous joints, cartilaginous joints, Synovial joints

1. Fibrous Joints

There is no synovial cavity, and bones are held together by dense irregular connective tissue. Fibrous joints permit little or no movement. The three types of fibrous joints are sutures, syndesmoses and interosseous membranes.

2. Cartilaginous Joints

Like a fibrous joint, a cartilaginous joint lacks a synovial cavity and allows little or no movement. Here the articulating bones are tightly connected by either hyaline cartilage or fibrocartilage. The two types of cartilaginous joints are primary cartilaginous and secondary cartilaginous joint.

3. Synovial Joints

Synovial joints have certain characteristics that distinguish them from other joints. The unique characteristic of a synovial joint is the presence of a space called a synovial (joint) cavity between the articulating bones. Because the synovial cavity allows a joint to be freely movable, all synovial joints are classified functionally as diarthroses. The bones at a synovial joint are covered by a layer of hyaline cartilage called articular cartilage. The cartilage covers the

articulating surface of the bones with a smooth, slippery surface but does not bind them together. Articular cartilage reduces friction between bones in the joint during movement and helps to absorb shock.

Synovial fluid

The synovial membrane secretes synovial fluid, a viscous, clear or pale yellow fluid named for its similarity in appearance and consistency to uncooked egg white.

Types of Synovial joint

Although all synovial joints are similar in structure, the shapes of the articulating surfaces vary; thus, many types of movement are possible. Synovial joints are divided into six categories based on type of movement: planar, hinge, pivot, condyloid, saddle and ball-and-socket.

Planar joints-The articulating surfaces of bones in a planar joint are flat or slightly curved. Planar joints primarily permit back-and-forth and side-to-side movements between the flat surfaces of bones.

Hinge joints-In a hinge joint, the convex surface of one bone fits into the concave surface of another bone. As the name implies, hinge joints produce an angular, opening-and-closing motion like that of a hinged door.

Pivot joints-In a pivot joint, the rounded or pointed surface of one bone articulates with a ring formed partly by another bone and partly by a ligament.

Condyloid joints-In a condyloid joint or ellipsoidal joint, the convex oval-shaped projection of one bone fits into the oval-shaped depression of another bone.

Saddle joints-In a saddle joint, the articular surface of one bone is saddle shaped and the articular surface of the other bone fits into the "saddle" as a sitting rider would sit.

DISCUSSION

In Ayurvedic classics *Sandhis* have been classified into eight types by taking account of shapes of *Sandhis* mainly, movement of *Sandhis* has not been considered whereas in modern science, the classification of *Sandhis* has been done by taking account of both structure and function (movement).

Kora Sandhi

Kora Sandhi is like *Garta* (pit). According to modern *Anguli Sandhi* (Interphalangeal joint), *Gulpha Sandhi* (Ankle joint), *Koorpara Sandhi* (Elbow joint) are hinge variety of synovial joint. *Manibandha Sandhi* (Wrist joint) is ellipsoidal variety of synovial joint and *Janu Sandhi* (Knee joint) is Compound synovial joint, in which two condylar joints between the condyles of the femur and tibia. So on the basis of shape of articulating surfaces hinge joint, ellipsoid joint and condylar joint can be included in *Kora Sandhi* of Ayurveda.

Ulukhala Sandhi

In this type of *Sandhi* one bone has mortar like structure which unites with pestle like head of another bone. *Kaksha Sandhi* (Shoulder joint) and *Vankshana Sandhi* (Hip joint) are ball and socket joints. *Dashana Sandhi* is gomphosis joint. A gomphosis is a specialized fibrous joint in which a conical process or peg of one bone fits into a hole or socket in another bone. So on the basis of shape of articulating surfaces ball and socket joint and gomphosis joint can be included in *Ulukhala Sandhi*.

Samudga Sandhi

These *Sandhis* have articulating ends which look like a *Samputa* (box) or an enclosed shell. *Ansapeetha* (Acromioclavicular joint) and *Nitamba* (Sacroiliac joint) are plane joints. *Guda* (Sacrococcygeal joint) and *Bhaga* (Pubic symphysis) are Secondary cartilaginous joints. So on the basis of shape of articulating surfaces plane joints and secondary cartilaginous joints can be included in *Samudga Sandhi*.

Pratara Sandhi

In Ayurvedic classics has mentioned that these types of joints are formed from articulation of '*Samatala*' or flat part of slightly movable bony parts. *Greevavansha* and *Prushthavansha* are Intervertebral joints. The joint between the vertebral bodies is secondary cartilaginous joint. So on the basis of shape of articulating surfaces secondary cartilaginous joints can be included in *Samudga Sandhi*.

Tunna Sevani Sandhi

Tunna Sevani is a suture type of joint. *Shirokapala* and *Katikapala* have sutural joints. So sutures can be included in *Tunnasevani Sandhi*.

Vayastunda Sandhi

Where *Sandhi* is like beak of crow is regarded as *Vayastunda Sandhi*. *Hanu Sandhi* (Temo-romandibular joint) is the condylar joint. So condylar joint can be included in *Vayastunda Sandhi*.

Mandala Sandhi

Sushruta classified *Sandhi* into two types. Those which can be counted and are between the bones and another type of joints are count-less as these are the joints or junctions between *Peshi* (muscles), *Snayu* (tendons), *Sira* (vessels). Later type of junction is present in *Kantha* (larynx), *Hrudaya* (heart), eyes and *Klom Nadi* (trachea) as *Sandhi*. In *Netra* joints between five *Mandalas* form six *Sandhis*.

Shankhavarta Sandhi

Here the naming of *Shankhavarta* should be taken as irregular structure. By *Shankhavarta Sandhi* it should be considered a joint of irregular structures (or irregular form). The word *Sandhi* in Ayurvedic classics do not focus on joints of bones only, it may be joints between two cartilages or between two *Peshi* (muscles), *Snayu* (tendons) and *Sira* (vessels).

Shrotra is mentioned in classics as a *Shankha-varta Sandhi*. So on going through the anatomy of the ear it is found that the joint of ear ossicles along with cochlea can be considered as *Shankhavarta Sandhi* in *Shrotra*.

The location of *Shringataka* is not clearly de-scribed in classics. So on going through the study of *Shringataka Marma* scholars have *Shringataka Marma* in nose. So the *Sandhi* should be present in nose as conchi, which is present as irregular form like *Shankhavarta*.

CONCLUSION

The various classical texts of *Ayurveda* have defined *Sandhi* are meeting place of two or more *Asthis*. *Ayurveda* and modern science both are same classification basis on the structural and function. *Kora Sandhi* can be consi-dered as hinge joint, *Ulukhala Sandhi* may include ball and socket variety of synovial joint and gomphosis variety of fibrous joint. *Ansa-peetha*, *Guda*, *Bhaga*, *Nitamba* has *Samudga Sandhi* can be considered as acromioclavicular, sacrococcygeal, pubic symphysis, and sacroiliac joint respectively. In *Pratara*, *Greeva* and *Prushtavansha* may include intrevebral joint. Sutures as *Tunnasevani* and *Hanu* in *Vayasatunda* may be taken a tempomendibular. *Sankhavartha* include *Shrota* and *Shringa-taka* can be correlated with cochlea and region of nasal conchae.

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