

## A Review on Critical Analysis of Asthi Shareera

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### ABSTRACT

*Asthi* are the important structure present in the body. It gives the structural framework of the body. knowledge of *Asthi* can be traced back from *Vedas* passing chronologically down to *Samhitas*. *Asthi* plays the role of kernel of body on which whole system depends. The Profound description is illustrated in classical texts about nomenclature, enumeration, types, *Bhagna* and its treatment. Especially types and nomenclature are to be discussed in light of modern and classics. the main aims are analytical discussion about *Sankhya* and nomenclature of *Asthi*, *Asthi Prakara* and complete the ayurvedic understanding of *asthi*. As the knowledge about *Asthi* dates from Pre-Vedic period concepts, believes, methods, usefulness etc have changed from time being. The nomenclature of *Asthi* and *Bhagna* and *Prakara* is also same as in the contemporary knowledge and profoundly described.

**KEYWORDS:** *Asthi*, *Ayurveda*, *Types*, *Bones*

### INTRODUCTION

The term *Asthi* has been derived from the root word *As + thin mamsaabhyantaraste*, which is the structural framework or support to the body that exists within the muscles. While *Acharya Sushruta*, a pioneer of *Ayurveda* explains *Asthi* as the component that is last to get deteriorated after burial. References of *asthi* can be traced back from *vedas* passing chronologically down to *Samhita*. Under these contents we are able to find detailed elaborate descriptions on functional and structural classifications of *Asthi*.

Even though there are detailed descriptions available in *Samhita*, there exists some major difference in opinion regarding its enumeration due to various underlying reasons. These reasons can only be drawn out by a thorough evaluation of different school of thoughts existed then.

### DERIVATION

*Asthi* is derived from the root *As+ Kthin<sup>1</sup>*, means that which exists.

*Asyate – As Dhatu+Kidhanpratyaya = Asthi*, means the structure remains left even after all the parts of the body are decayed.

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*Asyatekshipyateya<sup>2</sup>*, means the structure of the body which remains till the end and it is present in whole body

### SYNONYMS

*Kapala<sup>3</sup>*- the skull, cranium, skull bone, flat bone

*Astri<sup>3</sup>*- Not feminine i.e.Musculine, derived from *pitruja bhava*

*Keekasa<sup>3</sup>* -Hard, firm

*Kulya<sup>3</sup>*- Bone

*Medojam<sup>3</sup>*- Which is produced from *medas*

*Hada<sup>7</sup>* – bone, hard

*Medasa teja* – Essence of *Meda dhatu*

*Majjakrit* – That which helps in production of *Majja dhatu*.

*Dehadharakam* – That which does *Deha dharana* or which supports the body.

*Karkaram* – which is rough in nature.

## EMBRYOLOGICAL DEVELOPMENT OF ASTHI

According to *Garbhpanishad*, *Asthi* is formed in 6<sup>th</sup> month<sup>5</sup>.

*Acharya Sushruta*<sup>6</sup>, *Charaka*<sup>7</sup>, *Vagbhata*<sup>8</sup> has mentioned that *Asthi* is *Pitruja* origin and included as one among *kesha*, *shmathru*, *loma*, *asthi*, *Nakha*, *danta*, *sira*, *snayu*, *Dhamani*, *retas*. All these structures are *Sthira*.

## UTPATTI AND POSHANA OF ASTHI DHATU

*Asthi Dhatu* is formed from its precursor *Meda Dhatu*<sup>9</sup>. The *sara* of *Meda Dhatu* and constituents of *Ahara Rasa* are transformed into *Asthi Dhatu* by action of *Asthi Dhatvagni*. *Agni Mahabhuta* and *Vayu Mahabhuta* play a major role in the *kathinatva* and *sthiratva* of *Asthi* by acting upon *Prithvi Mahabhuta*.

## UPADHATU OF ASTHI

According to *Sharangadhara*, *Danta* is the *upadhatu* of *asthi*<sup>10</sup>.

## MALA OF ASTHI

**Table 1: Mala of Asthi according to Acharya Sushruta<sup>11</sup>, Charaka<sup>12</sup> and Bhavaprakasha<sup>13</sup>**

	<i>Sushruta</i>	<i>Charaka</i>	<i>Bhavaprakasha</i>
<i>Kesha</i>	-	+	-
<i>Nakha</i>	+	-	+
<i>Loma</i>	-	+	+
<i>Roma</i>	+	-	-

## RELATIONSHIP BETWEEN ASTHI & PANCHAMAHABHUTA

*Asthi* is made up all *mahabhuta* but predominant of *Prithvi* and *Vayu Mahabhoota*<sup>14</sup>.

This *mahabhuta* has *guru*, *khara*, *kathina*, *sthula*, *sthiraguna* which makes *asthi* to become strong and withstand the pressure.

## RELATIONSHIP BETWEEN ASTHI AND ASHRAYAASHRAYI BHAVA

*Asthi* is *Ashraya* for *Vatadosha*<sup>15</sup>.

In *Ashtanga Hrudaya*, *Acharya Vagbhata* explains that, *Vatadosha* is located in *Asthi*, *pitta dosha* is located in *Sweda* and *Rakta* and *Kaphadosha* is located in *rasa*, *mamsa*, *meda*, *majja*, *shukra*, *mutra*, *pureesha*.

*Vayu* is located in *Asthi*. Due to its lightness, *Vayu* keeps the bones light. Bones are basically made up of *Pruthvi Mahabhuta*-Earth element. Therefore, they are hard tissue and support the body frame. *Vata dosha* is located in this *Pruthvi mahabhuta*

predominant *Asthi*, which is made up of *Vayu* and *Akasha mahabhuta*. This helps to the interior surface of the bone light and porous. This enables the body movement easy mainly at its joints. If *Vayu* is not present in the *Asthi*, it would have been heavy and very difficult to move body and carry its own weight. The space created by *Vayu mahabhuta* in the interior surface of *Asthi*, helps *Majja* to occupy the space thus helps in the production of *Rakta*.

## FUNCTIONS OF ASTHI

- *Dharana*<sup>16</sup>: As *asthi* gives framework to the body, it helps the body to be in the position thereby it does *dehadharana*.
- *Dehadharana, MajjaPushti*<sup>17</sup>: the *sara* of *asthi* helps the formation of *Majja Dhatu*, it does *Majja Pushti*.
- *Asthi* provide the structural support of the body.
- Locomotion is the main function of *asthi*.

## IMPORTANCE OF ASTHI

The importance of *asthi* lies in providing the structural support and protection of internal organs, facilitating movements and serving as a reservoir for minerals like calcium. It contributes to blood cell production in the bone marrow. Overall, *asthi* is vital for the body's function and integrity.

As per *Sushruta samhitha*<sup>18</sup> emphasizes the foundational role of *asthi*, draws an analogy between the *sara* present inside the tree provides the support and strength to stand erect, in the similar way *asthi* acts as *sara* of *deha*. In human body after the death, the *twak*, *mamsa* will decompose but there is no destruction of *asthi*, as it is the *sara of deha*.

## ENUMERATION OF ASTHI

**Table 2: Number Asthi according to different Acharya**

<i>Sushruta Samhita</i>	300
<i>Charaka Samhita</i>	360
<i>Ashtanga Hrudaya</i>	360
<i>Ashtanga Sangraha</i>	360
<i>Kashyapa Samhita</i>	360
<i>Bhela Samhita</i>	360
<i>Bhavaprakasha</i>	300
Modern Science	206

## According to Sushruta Samhita<sup>19</sup>

- *Shakha*-120
- *Madhyamanga*-117
- *Shirogreeva*-63

**Table 3: Total number of Asthi in each Shakha, Madhyamanga and Shirogreeva according to Acharya Sushruta<sup>20</sup>**

<i>UrdhwaShakha</i>		<i>Madhyamanga</i>		<i>Shirogreeva</i>	
<i>Name of Asthi</i>	<i>Number</i>	<i>Name of Asthi</i>	<i>Number</i>	<i>Name of Asthi</i>	<i>Number</i>
<i>Hasta Anguli</i>	30	<i>Shroni</i>	5	<i>Greeva</i>	9
<i>Hasta shalaka</i>	10	<i>Prushta asthi</i>	30	<i>KanthaNadi</i>	4
<i>Hasta tala,kurcha</i>	12	<i>Parshuka</i>	24	<i>Talu</i>	1
<i>Manika</i>	2	<i>Sthalaka</i>	24	<i>Hanu</i>	2
<i>Prakoshta</i>	4	<i>Arbuda</i>	21	<i>Nasa</i>	3
<i>BahuNalaka</i>	2	<i>Uras</i>	8	<i>Ganda</i>	2
<b><i>AdhoShakha</i></b>		<i>Amsaphalaka</i>	2	<i>Shanka</i>	2
<i>Padaanguli</i>	30			<i>Karna</i>	2
<i>TalaKurchagulpa</i>	20			<i>ShiraKapala</i>	6
<i>Parshni</i>	2			<i>Danta</i>	32
<i>Jangha</i>	4				
<i>Janu</i>	2				
<i>Ooru</i>	2				
<b>Total</b>	<b>120</b>		<b>117</b>		<b>63</b>

According to Acharya Charaka<sup>21</sup>**Table 4: Total number of Asthi according to Acharya Charaka**

<i>Sl. No</i>	<i>Name of Asthi</i>	<i>Number</i>
1.	<i>Danta</i>	32
2.	<i>Danta Ulukala</i>	32
3.	<i>Nakha</i>	20
4.	<i>Pani Pada anguli Asthi</i>	60
5.	<i>Pani Pada shalaka</i>	20
6.	<i>Pani Pada shalaka Adhishtana</i>	4
7.	<i>Parshni</i>	2
8.	<i>Padagulpha</i>	4
9.	<i>Hasta Manika</i>	2
10.	<i>Aratni Asthi</i>	4
11.	<i>Jhanga</i>	4
12.	<i>Janu</i>	2
13.	<i>Janu Kapalika</i>	2
14.	<i>Uru Nalaka</i>	2
15.	<i>Bahu Nalaka</i>	2
16.	<i>Amsa</i>	2
17.	<i>Amsaphalaka</i>	2
18.	<i>Akshaka</i>	2
19.	<i>Jatru</i>	1
20.	<i>Talu</i>	2
21.	<i>Shroniphalaka</i>	2
22.	<i>Bhaga</i>	1
23.	<i>Prushta</i>	45
24.	<i>Greeva</i>	15
25.	<i>Uras</i>	14
26.	<i>Parshuka</i>	24
27.	<i>Sthalaka</i>	24
28.	<i>Sthala Arbuda</i>	24
29.	<i>Hanu</i>	1
30.	<i>Hanumulabandhana</i>	2
31.	<i>Nasika Gandakuta lalata</i>	1
32.	<i>Shankha</i>	2

33.	<i>Shirakapala</i>	4
	<b>Total</b>	<b>360</b>

**According to Acharya Vagbhata<sup>22</sup>**

Shakha – 140

Antaradhi – 120

Murdha – 100

**Table 5: Total number of Asthi in each Shakha, Antaradhi and Murdha according to Acharya Vagbhata**

<i>Shakha</i>		<i>Antaradhi</i>		<i>Murdha</i>	
<i>Padanakha</i>	5	<i>Parshuka</i>	24	<i>Ganda</i>	2
<i>Anguli</i>	15	<i>Sthalaka</i>	24	<i>Karna</i>	2
<i>Padashalaka</i>	5	<i>Sthalaka Arbuda</i>	24	<i>Shankha</i>	2
<i>Padashalaka Pada bandhakam</i>	1	<i>Prushtha</i>	30	<i>Jatru</i>	1
<i>Kurcha</i>	2	<i>Uras</i>	8	<i>Talu</i>	1
<i>Gulpha</i>	2	<i>Bhaga</i>	1	<i>Greeva</i>	13
<i>Jhanga</i>	2	<i>Trika</i>	1	<i>Kantanadi</i>	4
<i>Parshni</i>	1	<i>Nitamba</i>	2	<i>Hanubandhana</i>	2
<i>Janu</i>	1	<i>Akshaka</i>	2	<i>Danta</i>	32
<i>Uru</i>	1	<i>Amsa</i>	2	<i>Danta ulukala</i>	32
		<i>Amsaphalaka</i>	2	<i>Nasa</i>	3
				<i>Shiras</i>	6
<b>Total</b>	<b>35*4=140</b>		<b>120</b>		<b>100</b>

**TYPES OF ASTHI**

Depending upon size, shape, position of asthi in the body, they are classified into 5 types.

**Table 6: Types of Asthi as per different Acharyas**

Types	<i>Sushruta Samhita</i> <sup>23</sup>	<i>Ashtanga Hrudaya</i> <sup>24</sup>	<i>Ashtanga Sangraha</i> <sup>25</sup>	<i>Bhavaprakasha</i> <sup>26</sup>
<i>Kapala</i>	+	+	+	+
<i>Ruchaka</i>	+	+	+	+
<i>Taruna</i>	+	+	+	+
<i>Valaya</i>	+	+	+	+
<i>Nalaka</i>	+	+	+	+

**Kapalasthi****Derivation of Kapala**क+पालि+अण् कं मस्तकं पालयति Means which protects the *Kapala*.The literal meaning of *kapala* is flat. Asthi, which are flat are referred to as *Kapalsthi*. This flat bone protects the vital organs. The length, breadth is more but width is less and resembles with the part of an earthen pitcher.**Location of Kapalasthi<sup>27</sup>**

- *Janu*- Patella
- *Nitamba*- Hip bone
- *Amsa*-Shoulder bone
- *Ganda*- Zygomatic bone
- *Talu*- Palate bone
- *Shankha*- Temple bone
- *Shiras*- All the Skull bones

**Ruchakasthi****Derivation of Ruchaka**

रुच् + कुन्

*Ruchaka* means tooth, which does mastication. The *asthi* which helps in mastication are *Ruchakasthi*. As this is white in colour, they resemble with the colour of *sauvarchalalavana*.

**Location of Ruchakasthi<sup>28</sup>**

➤ *Dashana – Danta*- teeth

**Tarunasthi****Derivation of Taruna**

तृ + त्रो रश्च लो वा ।

Cartilages are considered as *Tarunasthi*. A tough flexible tissue that lines joints and gives structures to the nose, ears, larynx and other parts of the body.

**Location of Tarunasthi<sup>29</sup>**

- *Ghrana*- Nasal Cartilage
- *Karna*- Auricular cartilage
- *Greeva*- Tracheal cartilage
- *Akshi kosha*- Tarsal plate of orbit

**Valayasthi****Derivation of Valaya**

वल् + वलिमलितनिभ्यः कयन् ।

Literally *Valaya* means, a circle or a structure which encircles. These are short and irregular in nature. The bone which are curves like circles and short are considered to be *Valayasthi*.

**Location of Valayasthi<sup>30</sup>**

- *Parshwa*- Lateral bones of thoracic cage
- *Prushta*- Vertebral bones
- *Uras*- Bones of anterior part of thoracic cage.

**Nalakasthi**

Rest all other bones are included under *Nalakasthi*. In modern long bones are correlated to *Nalakasthi*.

Hemachandra has considered *Shakasthi* as *Nalakasthi* because all long bones are present in the extremities.

**Location of Nalakasthi<sup>31</sup>**

- *Hasta tala*- Meta carpal bones
- *Pada tala*- Meta tarsal bones
- *Anguli*- Phalanges
- *Kurcha, Manibandha*- Carpal and Tarsal bones
- *Bahu, Jangha* – Bones of arm, forearm, thigh and shank.

**ASTHI MARMA<sup>32</sup>**

*Marma* are the vital areas or spots where *prana* resides and there are 107 of such vital areas. Among them eight are *Asthi Marma*.

**Table 7: Panchavidha Classification of Marma**

Sl. No	Name	Shadanga	Rachana	Parimana	Pramana	Sankhya
1.	<i>Katikataruna</i>	<i>Prushtagata</i>	<i>Asthi</i>	<i>Kalantara pranahara</i>	<i>Ardhangula</i>	2
2.	<i>Nitamba</i>	<i>Prushtagata</i>	<i>Asthi</i>	<i>Kalantara pranahara</i>	<i>Ardhangula</i>	2
3.	<i>Amsaphalaka</i>	<i>Prushtagata</i>	<i>Asthi</i>	<i>Vaikalyakara</i>	<i>Ardhangula</i>	2
4.	<i>Shankha</i>	<i>Jatroordhva</i>	<i>Asthi</i>	<i>Sadyopranahara</i>	<i>Ardhangula</i>	2

**ASTHIVAHA SROTAS<sup>33</sup>**

Channels of Transportation of *Asthaayi* (*Poshaka, Sukshma*) *Asthidhatu* to their destination is *Asthivahasrotas*. It is explained by *Acharya Charaka*. The *-Moola sthana* of *Asthivahasrotas* are *Medas* and *Jaghana*.

**ASTHI SANGHATA<sup>34</sup>**

*Asthi* means bones and *asthi sanghata* means cluster of bones. The confluences of bones are fourteen in number. The locations are *Gulpha* (ankle), *Janu* (knee), and *Vankshana* (groin) in lower limbs and their counter parts *Manibandha* (wrist), *Kurpara* (elbow) and *Kaksha* (axilla) in upper limbs on each side. One is in the *Trika* (lower back) and the other on the *Shira* (skull).

**ASTHI JAALA<sup>35</sup>**

*Asthi Jaala* can be correlated to bones present in Wrist joint and ankle joint binded by ligaments. All these structures in wrist and ankle gives rise to a network like structure is known as *Asthi Jaala*.

**ASTHI SARA PURUSHA LAKSHANA<sup>36</sup>**

There are 8 kinds of sara they are *twak, rakta, mamsa, medas, asthi, majja, sukra* and *satva*, which are described for the knowledge of degree of strength of a person.

The persons with *sara* of *Asthi Dhatu* have prominent *Parshni* (heels), *Gulpha* (ankles), *Janu* (knee Joint), *Aratni* (elbows), *Jatru* (collarbones), *Chibuka* (chin), *Shira* (head), *Parshva* (flanks), joints, bones and teeth. Such persons are highly enthusiastic, active, enduring, having strong and firm body as well as longevity.

**ASTHI PRADOSHAJA VIKARA****Table 8: Asthi Pradoshaja Vikara according to Acharya Charaka and Acharya Sushruta**

Sl. No	Charaka <sup>37</sup>	Sushruta <sup>38</sup>
1.	<i>Adhyasthi</i>	<i>Adhyasthi</i>
2.	<i>Adhidanta</i>	<i>Adhidanta</i>
3.	<i>Danta Bheda</i>	-
4.	<i>Dantashoola</i>	-
5.	<i>Asthibheda</i>	-
6.	<i>Asthishoola</i>	<i>Asthishoola</i>
7.	<i>Vivarnata</i>	-
8.	<i>Kesha, Loma, Nakha, Shmashru Dosha</i>	-
9.	-	<i>Kunakha</i>
10.	-	<i>Asthi toda</i>

**CLINICAL ASPECTS OF ASTHI****KAANDA BHAGNA<sup>39</sup>**

They are of 12 types:

1. *Karkataka*: At both ends of the bone there is hyperaesthesia and, in the middle, the fractured point is raised like a cyst.
2. *Ashwakarna*: That which is projected like horse's ear.
3. *Choornita*: If there is sound in palpation, it is *choornita*.
4. *Picchita*: The affection is extensive and with severe swelling.
5. *Asthicchallita*: When bone is lowered and projected in sides respectively.
6. *Kaandabhagna*: If it moves on shaking, it is *Kaandabhagna*.
7. *Majjanugata*: When a portion of bone pierces the pith of the other end and digs out the marrow it is known as *Majjanugata*.
8. *Atipapita*: The bone is divided completely.
9. *Vakra*: The bone is bent but not separated.
10. *Chinna*: If one of the sides remains intact it is *Chinna*.
11. *Patita*: It has many small cracks with pain.
12. *Sphutita*: If the site is as if full of awns, inflated, large and having many cracks.

**Lakshana**

*Shwayathu Bahulya* (Excessive Swelling), *Spandana vivartana sparsha ashishnuta* (Inability to bear shaking, movement and touch), *Avapeedyamane Shabdaha* (Crepitus on pressure), *Srastangata* (Looseness of part), *Vividhavedanna pradurbhava* (Appearance of various types of pain and no relief in any position).

**ASTHI KSHAYA****Table 9: Asthi Kshaya Lakshana**

Sl. No	Sushruta <sup>40</sup>	Charaka <sup>41</sup>	Vagbhata <sup>42</sup>
1.	<i>Asthi shoola</i>	<i>Kesha, Loma, Nakha, Shmashru patana</i>	<i>Asthitoda</i>
2.	<i>Danta Nakha bhanga</i>	<i>Shrama</i>	<i>Danta, Kesha, Nakha Sadana</i>
3.	<i>Rookshata</i>	<i>Sandhi shaitilya</i>	-

**ASTHI VRIDDHI****Table 10: Asthi Vriddhi Lakshana**

Sl. No	Sushruta <sup>43</sup>	Vagbhata <sup>44</sup>
1.	Adhyasthi	Adhyasthi
2.	Adhidanta	Adhidanta

**DISCUSSION**

There are 300 *Asthi* according to *Acharya Sushruta*, but *Acharya Charaka* and *Acharya Vagbhata* has explained 360 bones and modern anatomists has considered 206 bones.

In today's era, only the hard structure which gives support to the body is considered as bone but *Acharyas* have considered anything that provides support, attachment of muscles and dependence of blood vessels etc was counted as bones. Thus, they counted *Nakha*, *Danta*, *Danta ulukala* as bones.

Also, *Acharyas* has described *Guda*, *Bhaga*, *Nitamba* as separate *Asthi* but recent authors considered *Ileum*, *Ischium* and *Pubis* as single Hip bone. In vertebra, ancient seers considered *Kasheruka* (Vertebra), *Arbuda* (Tuberosities) and *Sthalaka* (Transverse Process) as separate bones but in modern science these are the parts of single vertebra.

There is difference of opinion among *Acharya Charaka* and *Acharya Sushruta*, as *Acharya Charaka* has considered *Nakha*, *Danta*, *Danta ulukala* in enumeration which was not added by *Acharya Sushruta* and considered them as *Mala*. But *Acharya Charaka* has explained two types of *Nakha*, *Sthapya Nakha* (Attached to nail bed) and *Chedyak Nakha* (which is not attached to nail bed) and considered *Chedyak Nakha* as *Asthi*.

**CONCLUSION**

It's fascinating to consider the depth of knowledge about bones since ancient times, particularly evident in the *Vedic* period. While early scholars focused primarily on the hard parts of the human skeleton, such as bones, cartilages, and ligaments, modern efforts aim to bridge ancient wisdom with contemporary clinical practices. This article gathers various concepts related to *Asthi Sharira* in line with Ayurvedic understanding, including definitions, constituents, embryology, types, uses, and clinical aspects. While there may be some disparities with current knowledge, it's indeed remarkable to acknowledge and celebrate our rich heritage of medical knowledge, especially in the field of *Asthi Sharira*.

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