

COMPARATIVE ANALYSIS OF ASTHI SHARIR SANKHYA IN AYURVEDA AND MODERN OSTEOLOGY BASICS

¹*Dr. Roopal Saini, ²Dr. Ankit Tyagi, ³Dr. Jitender Kumar Rana, ⁴Dr. Aaditiya
Bhardwaj

¹Post Graduate Scholar, ²Associate Professor, ³HOD and Professor, ⁴Assistant Professor,
Department of Rachna Sharir, Quadra Institute of Ayurveda, Roorkee, Uttarakhand, India.

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*Corresponding Author

Dr. Roopal Saini

Post Graduate Scholar, Department of
Rachna Sharir, Quadra Institute of
Ayurveda, Roorkee, Uttarakhand,
India.



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ABSTRACT

Asthi Sankhya is an important topic in Ayurvedic anatomy that explains the enumeration and classification of bones in the human body. Classical Ayurvedic texts describe varying counts of *Asthi*, with most texts stating 360 bones and Sushruta Samhita mentioning 300, while modern anatomy recognizes 206 bones in the adult human skeleton. This comparative study examines the classical Ayurvedic descriptions of *Asthi* and correlates them with modern skeletal anatomy. The variation in bone count is mainly due to differences in counting methods, inclusion of structures such as teeth and nails, and the anatomical framework followed by different *Acharyas*. The study highlights that both Ayurveda and modern science consider the skeleton as the structural support of the body, though they differ in numerical enumeration and classification.

KEYWORDS: Asthi Sankhya, Asthi Sharira, Sharira Rachana, Sapta Dhatu, Comparative anatomy, Osteology.

INTRODUCTION

In Ayurveda, anatomical knowledge is described under the branch of Sharira Rachana, which explains the structural components of the body including Dhatu, Srotas, Asthi, and Sandhi. Among these structures, Asthi (bones) form the basic framework of the body and provide support, protection, and stability.^[1]

The skeletal system plays an important role in maintaining posture, facilitating movement, and protecting vital organs. In Ayurvedic physiology, bones are considered the structural manifestation of Asthi Dhatu, which is one among the Sapta Dhatus responsible for maintaining bodily integrity.^[2]

Asthi, or bones, represent a fundamental and crucial component of the human body. In Ayurveda, the human body is understood to be composed of three primary elements: Dosa, Dhathu, and Mala.^[3] Asthi is one of the seven Dhatu (Sapta Dhatu) present in the body (Sharira). The form of Dhatu located within Mamsa Dhatu (muscle tissue) is known as Asthi (bone tissue). These Dhatu are always formed in a fixed sequence.

In the context of Ayurveda, Asthi Shareera pertains to the study of the human body's anatomy with a specific focus on bones. Enumerating the various parts of the body is crucial for distinguishing normal anatomy from abnormalities. Charaka Samhitha's Shareera Sthana, in its 7th chapter, underscores that a physician well-versed in enumerating the body's components will exhibit clarity in medical practice.^[4] Sushruta Samhita's Shareera Sthana, in its 5th chapter titled Shareera Sankhya Vyakarana, primarily deals with the numerical aspects of the body's limbs and parts.^[5]

As we know, the entire world can be categorized into two types of materials: soft and hard. Although these are opposites, both are essential for sustainability. This division is also evident in the human body, where some parts are soft organs and others are hard structures. The hard part of the body is the skeletal system, which provides support, shape, and protection to the soft organs. It includes components like bones and teeth, which collectively form the framework that supports movement and protects vital organs, acting as the hard shell of the human body. Bones remain largely unchanged even long after death, which is why they are referred to as Asthi. Bones constitute the skeletal framework of the body and are primarily composed of calcium phosphate and calcium carbonate.^[6] The skeletal structure, which includes bones and cartilage, is what we commonly refer to as the human skeleton in anatomy. In human beings, the exoskeleton is minimal, limited to structures like nails and tooth enamel, while the primary framework is the endoskeleton. The study of the structure and function of bones and the skeletal system is known as osteology.^[7]

ETYMOLOGY OF ASTHI DHATU

Among these, Asthidhatu is specifically associated with the structural integrity (Dharana) of the body. Due to its rigid nature, Asthidhatu plays a pivotal role in shaping the body's frame. The term "Asthi" itself is derived from "Asyathe ithi asthi,"^[8]

NEED OF STUDY

1. To co-relate number of bones by Ayurveda & Modern Science.
2. To study difference in number of bones (Asthi Sankhya) according to Ayurveda & Modern Science.

AIMS AND OBJECTIVE

AIMS

Comparative study of number of bones (Asthi Sankhya) according to Ayurveda & Modern Science.

OBJECTIVE

Confirmation of number of bones (Asthi Sankhya).

Scientific study of difference in number of bones (Asthi Sankhya) according to Ayurveda & Modern Science.

MATERIALS AND METHODS

Being subject of comparison based on subject like bone number (Asthi Sankhya) especially in Ayurvedic literature and modern science having difference in number of bones in a human body. It's a small try to study difference on the following levels –

- Literary study
- Dissection study
- Comparative study
- Comparative charts of number of bones.

MATERIALS

- Dissection kit
- Cadaver Literature
- Ayurvedic Literature
- Modern Literature
- Previous research papers.

- Charaka Samhita^[9]
- Sushruta Samhita^[10]
- Ashtanga Hridaya^[11]

METHOD OF STUDY

NUMBER OF ASTHI ACCORDING TO DIFFERENT ACHARYAS

Sushruta Samhita	300
Charaka Samhita	360
Ashtanga hrudaya	360
Ashtanga sangraha	360
Kashyapa Samhita	360
Bhela samhita	360
Bhavapraksa	300
Modern science	206

Sushruta Samhita Sushruta Samhita provides a detailed description of bones in Sharira Sthana and states that the human body contains 360 bones.^[18]

[illegible]

- Shakha – 120
- Madhyamanga – 117
- Shirogreeva - 63

Sushruta.^[20]

UrdhwaShakha	Number	Madhyamanga	Number	Shirogreeva	Number
Name of Asthi		Name of Asthi		Name of Asthi	
<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>Sthalakal</i>	24	<i>Hanu</i>	2
<i>Prakoshtha</i>	4	<i>Arbuda</i>	21	<i>Nasika</i>	3
<i>BahuNalaka</i>	2	<i>Urus</i>	8	<i>Ganda</i>	2
AdhoShakha		<i>Amsaphalaka</i>	2	<i>Shankha</i>	2
<i>Padaanguli</i>	30			<i>Karna</i>	2
<i>TalaKurchagulpa</i>	20			<i>ShiraKapala</i>	6
<i>Parshni</i>	4			<i>Danta</i>	32
<i>Jangha</i>	4				
<i>Janu</i>	2				
<i>Ooru</i>	2				
Total	120	117		63	

[illegible] $5/20||^{[20]}$

- *Kapala* – flat bones
- *Ruchaka* – teeth
- *Taruna* – cartilaginous bones
- *Valaya* – circular bones
- *Nalak* – long bones.^[21]

Charaka describes the total number of bones in the human body as 360.^[22]

सह ॥ Ch.sh.7/6 ||^[23]

This indicates that the total number of bones along with teeth and related structures is counted as 360.

Total number of *Asthi* according to Acharya Charaka

Sl. No	Name of Asthi	Number
1	<i>Danta</i>	32
2	<i>Danta Ulakala</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>Jangha</i>	4
12	<i>Janu</i>	2
13	<i>Jangh 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>Urus</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
	Total	360

Ashtanga Hridaya

Ashtanga Hridaya follows the same classical tradition and mentions that the number of bones in the human body is 360.^[24]

According to Acharya Vagbhata^[25]

- Shakha – 140
- Antaradhi – 120
- Murdha – 100

Total number of Asthi in each Shakha, Antaradhi and Murdha according to Acharya Vagbhata

Shakha	No.	Antaradhi	No.	Murdha	No.
<i>Padaanakha</i>	5	<i>Parshuka</i>	24	<i>Ganda</i>	2
<i>Anguli</i>	15	<i>Sthalka</i>	24	<i>Karna</i>	2
<i>Padashalaka</i>	5	<i>Sthalaka Arbuda</i>	24	<i>Shankha</i>	2
<i>Padashalakapada banshakam</i>	1	<i>Prushta</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
Total	35*4= 140		120		100

Inclusion Criteria

- Classical Ayurvedic descriptions of bones and their number.

- Modern anatomical descriptions of the skeletal system.
- Scholarly interpretations related to comparative anatomy.

Method of Analysis

The collected information was analysed descriptively and presented in a comparative manner to highlight similarities and differences between Ayurvedic and modern anatomical perspectives.

Modern Skeletal Enumeration

Modern anatomical science describes the human skeletal system as consisting of 206 bones in the adult body.^[26] The skeletal system is divided into two major components.

Axial Skeleton (80 bones)

- Skull – 22 bones
- Vertebral column – 26 bones
- Ribs – 24 bones
- Sternum – 1 bone
- Auditory ossicles – 6 bones^[27]

Appendicular Skeleton (126 bones)

- Pectoral girdle – 4 bones
- Upper limbs – 60
- bones Pelvic girdle – 2
- bones Lower limbs – 60 bones.^[28]

DISCUSSION

This study shows that the difference in *Asthi Sankhya* between Ayurveda and modern anatomy is mainly due to different methods of counting skeletal structures. Ayurvedic texts often include teeth, nails, and region-based skeletal parts, while modern anatomy counts only the standard adult bones.

Ayurveda presents a broader view of bones (*Asthi*) compared to modern anatomy. Ancient scholars like **Sushruta (300 bones)** and **Charaka, Vagbhata, Kashyapa, Bhela (360 bones)** included structures such as **nails, teeth, and sockets**, while modern science limits bones to calcified skeletal elements (**206 bones**).

This difference reflects two approaches:

- **Ayurveda:** Functional and holistic, counting any supportive or protective structure as *Asthi*.
- **Modern anatomy:** Structural and histological, restricting bones to skeletal tissue.

Ayurvedic texts also classified bones morphologically into **Kapala (flat), Ruchaka (teeth), Taruna (cartilaginous), Valaya (circular), and Nalaka (long)**, which parallels modern categories of flat, long, short, irregular, and sesamoid bones.

Thus, while numbers differ, both systems emphasize the skeletal framework's role in **support, protection, and movement**, showing conceptual overlap despite methodological differences.

CONCLUSION

The study concludes that *Asthi Sankhya* in Ayurveda shows variation among classical texts, with most texts describing 360 bones and Sushruta Samhita describing 300. This difference is mainly due to variation in the criteria of counting and inclusion of structures such as teeth, nails, and other skeletal parts.

Modern anatomy describes 206 bones in the adult human skeleton. Therefore, the comparison shows that Ayurveda and modern science differ in enumeration, but both recognize the skeleton as the structural framework of the body.

Despite numerical differences, both traditions emphasize the skeletal framework's role in **support, protection, and movement**. Ayurvedic classifications—*Kapala, Ruchaka, Taruna, Valaya, Nalaka*—parallel modern categories of flat, long, short, irregular, and sesamoid bones, showing conceptual overlap.

Thus, Ayurveda enriches anatomical understanding by integrating **structural, functional, and philosophical dimensions**, while modern science provides **precise histological and clinical clarity**. Together, they offer a more comprehensive view of the human skeletal system, bridging ancient wisdom with contemporary medical knowledge.

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